

## **Research Article**

# **A Clinical Study on Comparison of Magnitude of Obesity among Urban and Rural Adults of Kashmiri Population**

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**Abstract:** 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. This study is the first analysis of obesity prevalence in rural and urban adults using body mass index classification with measured height and weight. 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 in age group of 18-45 years. All the households falling in the selected rural and urban areas, 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. The obesity prevalence was 6.61% among rural compared to 8.34% among urban population ( $P = .035$ ). The overall prevalence of obesity was 7.05% in our study which include 5107 people, in which 360 came out to be obese. **CONCLUSIONS:** Statistically significant ( $p < 0.005$ ) differences in the prevalence of obesity were observed in urban and rural population. Residents of urban areas were found to be more obese 8.34% as compared to rural people 6.61%. This is probably because of sedentary life style and better socioeconomic status of urban residents, which are risk factors for many diseases including obesity. Also urban residents tend to eat out in restaurants and food outlets. Besides they consume a great proportion of protein and fat and smaller proportion of carbohydrate.

**Keywords:** Obesity, Rural, Urban, Body-Mass Index

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## **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].

The term obesity is derived from the latin word "obesus" meaning "having eaten until fat". Obesity is an excess of body fat that frequently results in a significant impairment of health. Obesity results when

the size or number of fat cells in a person's body increases. A normal-sized person has between 30 and 35 billion fat cells. When a person starts losing weight, the cells decrease in size, but the number of fat cells generally stays the same. This is part of the reason that once you gain a significant amount of weight, it is more difficult to lose it [6]. However, some recent studies seem to imply that fat cells can be destroyed as a result of certain medications and that a decrease in fat cell number may occur if a lower body weight is maintained for a prolonged period of time [7].

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.

(A) Simple Obesity: The simple obesity, called as primary obesity, is due to excessive energy intake and too little consumption, also known as diet-induced

obesity and has the largest proportion in all types of 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.

(B) Secondary obesity: Secondary obesity is metabolic disorder resulted by endocrine or metabolic obstructed diseases and genetic diseases.

(C) 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, can also lead to obesity; drugs for mental disease like the phenothiazine drugs, can also induce obesity. Patients with this type of obesity take up the proportion about 2 percent. 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 [8, 9]. 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 low income countries, obesity is more common in people of higher socioeconomic status and in those living in urban communities. In more affluent countries, it is associated with lower socioeconomic status, especially in women, and rural communities [10, 11]. The sex differences are less marked in affluent countries and obesity is often common amongst adolescents and younger children. Brazil is an example of a country with well documented changes in obesity prevalence as it undergoes rapid nutrition transition. 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. 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. The increasing westernization, urbanization and mechanization occurring in most countries around the world is associated with changes in the diet towards one of high fat, high energy-dense foods and a sedentary lifestyle [12,13]. This shift is also associated with the current rapid changes in childhood and adult obesity. Life expectancy has increased due to advancement in nutrition, hygiene and the control of infectious disease. Infectious diseases and nutrient deficiency diseases are, therefore, being replaced in developing countries by new threats to the health of populations like obesity, cardiovascular disease and diabetes [12]. A sharp decline in cost of vegetable oils

and sugar means that they are now in direct competition with cereals as the cheapest food ingredients in the world [14]. This has caused a reduction in the proportion of the diet that is derived from grain and grain products [13] and has greatly increased world average energy consumption, although this increase is not distributed evenly throughout the world's population [14].

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 [13, 14]. Ethnic cuisine and unique traditional food habits are being replaced by westernized fast foods, soft drinks and increased meat consumption. Homogenizations and westernization of the global diet has increased the energy density [14] and this is particularly a problem for the poor in all countries who are at risk of both obesity and micronutrient deficiencies [11]. As obesity has increased over the last 30 years, the prevalence of type 2 diabetes has increased dramatically.

Potential aetiological factors in relation to obesity in populations The format for identifying potential nutritional causes of obesity at a population level is based on the Epidemiological Triad [15] where the 'hosts' are the general population, the 'vectors' are the foods and nutrients and the 'environment' includes the physical, economic, policy and socio-cultural factors external to the individual.

Obesity has reached epidemic proportions in India in the 21st century; affecting 5% of the country's population<sup>16</sup>.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 iceberg 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

There are many methods to assess ones built or structure, which should not usually change during one's life. 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<sup>2</sup> [18]. If BMI is less than 18.5 kg/m<sup>2</sup>, 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<sup>2</sup>, then the person has risk of getting other diseases and proportionately more, with increasing BMI.

**WHO Classification of adults according to BMI [19, 20]**

Classification	BMI (kg/m <sup>2</sup> )	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

The appropriateness of using BMI > 25 for defining overweight and BMI > 30 for obesity for the Asian population has been questioned by certain quarters in recent years. The Japan Association for the Study of Obesity (JASO) has been reported to be considering lowering the cutoff for obesity as BMI > 25 [21]. In the meantime, China has recently completed an extensive analysis of large data sets from cross-sectional and longitudinal studies. It has been decided that the cutoff for defining overweight is to be lowered to 24.0–27.9 and that for obesity to > 28 [22]. Other countries in the region have not taken firm action on this as it is felt that there has to be sufficient scientific evidence for the downward adjustment of the cutoff.

**MATERIAL AND 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. The valley of Kashmir is situated in North West of India at an altitude of 4000 meters. 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.

Every effort was made to take a detailed history; clinical examination was done, of those people who were found to be obese, to access the magnitude of obesity in age group of 18-45 years.

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 of 449 villages was prepared where from a sample of 13

villages (comprising total population of 15664 and the population in the age group of 18-45 years were 3800) , with the help of three digit random sample technique was taken. As regards to urban areas are concerned with the total urban population of 4765 and the population in the age group 18-45 years was 1307. 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<sup>2</sup> (m). The scales were checked for accuracy before starting the survey and after and then rechecked periodically [23, 24].

**Statistical Analysis**

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

**Table 1: Distribution of population as per sex**

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

**In the above table, out of 5107(18-45 yrs) screened population 2652 ( 51.92%) of the participants were males and 2455 (48.08%) of participants were females.**

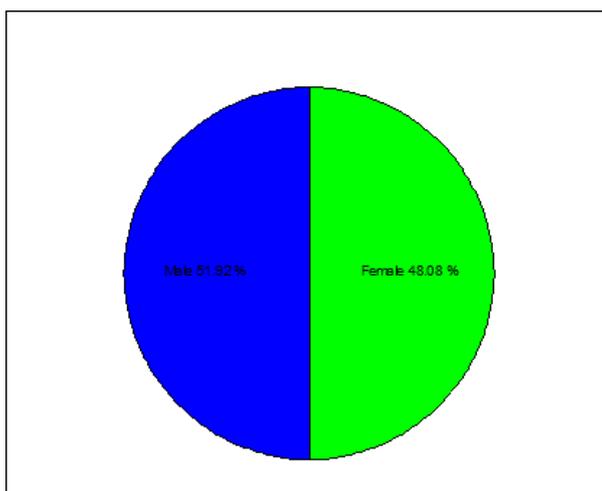


Fig.1: Distribution of studied population as per sex

Table 2: 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 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

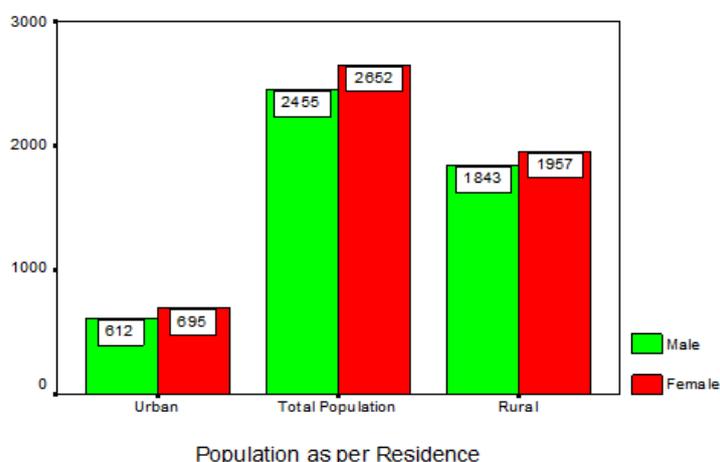


Fig. 2: Obese population as per Residence

Table 3: Prevalence of obesity as per residence

Residence	Population in the age-group 18-45	Obese population	Prevalence
Rural	3800	251	6.61%
Urban	1307	109	8.34%
Total	5107	360	7.05%

$\chi^2 = 4.47$      $d.f. = 1$      $p - value = 0.035$

The table reflects the overall prevalence of obesity in the screened population as 7.05%, rural prevalence of obesity being 6.61% and urban prevalence for obesity as 8.34%.

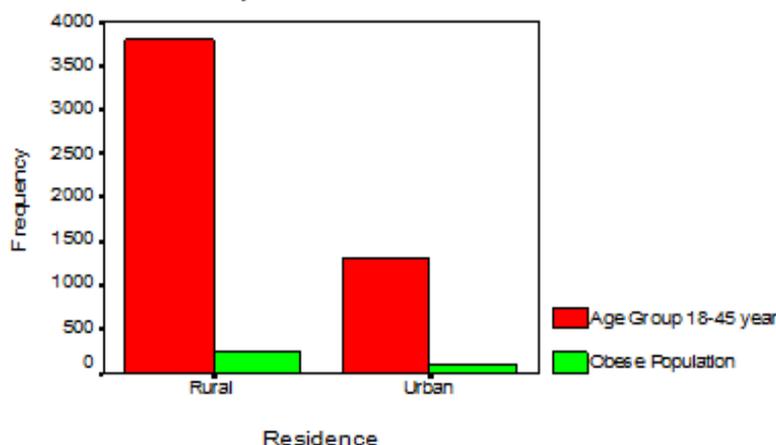


Fig. 3: Obesity in the study population as per residence

Table 4: Village-wise prevalence of obesity in study population

Village	Population in the age-group 18-45	Obese population	Prevalence
Nallah Awoora	348	25	7.18%
Langbal	219	11	5.02%
veersiran	318	13	4.09%
Lissu	255	16	6.27%
Tangwari	210	10	4.76%
Khushpora	432	32	7.41%
Paybogh	209	11	5.26%
Kralpora	157	10	6.37%
Nowgam Mattan	206	19	9.22%
Sheikhpora	348	23	6.61%
Chittergul	356	25	7.02%
Uttersoo	320	23	7.19%
Kreri	422	33	7.82%
Total	3800	251	6.61%
$\chi^2 = 10.20$ $d.f. = 12$ $p - value = 0.599$			

Table shows village wise prevalence of obesity in the study group showing that highest prevalence of obesity in the village Nowgam Mattan (9.22%), followed by village Kreri (7.82%) and lowest prevalence of obesity in the village Veersiran (4.09%).

**DISCUSSION**

The present study is a cross sectional study conducted at district Anantnag of Kashmir province. 5107 people in the age group 18-45 were included out of 20429 people screened in a multiphasic sampling manner from district Anantnag. Out of 5107 people selected, 2652(51.92%) were males and 2455(48.08%) were females Habibullah *et al.* [25] 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.* [26] reported a prevalence of 7% obesity in their study. Similar trends were found by Khan *et al.* (8%) [27], Laurier D *et al.* (7%) [28] and Pragati Chabra *et al.* (6.1%) [29].

rural population. Residents of urban areas were found to be more obese 8.34% as compared to rural people 6.61%. This is probably because of sedentary life style and better socioeconomic status of urban residents, which are risk factors for many diseases including obesity. Also urban residents tend to eat out in restaurants and food outlets. Besides they consume a great proportion of protein and fat and smaller proportion of carbohydrate [30]. Our results were similar to those of a study conducted by Muhammad Abbas *et al.* [26], who found the prevalence of obesity in urban areas to be greater than in rural areas. Several other studies like, Nanan DJ reported in Pakistan [31], Erem C *et al.* in Turkish population [32], Martinez-Ros MT *et al.* in Murcia, a Mediterranean region in south-east Spain [33] and Adul-Rehman HF *et al.*, a study in a rural and urban Palestinian West Bank population [34] found the similar trends as observed in our study.

Statistically significant ( $p < 0.005$ ) differences in the prevalence of obesity was observed in urban and

In our study, there were 13 villages which constituted the rural area. As previously mentioned that

the total number of obese people were 251 among the screened population (3800) revealing an overall prevalence of 6.61% in rural areas. Among these villages, Nowgam Mattan village has the highest prevalence of obese population (9.22%) as compared to other villages. This may be contributed to their relatively prosperous socioeconomic status in terms of income and other related factors.

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