

PREVALENCE OF OBESITY IN ADULTS OF KASHMIRI POPULATION WITH SPECIAL REFERENCE TO THEIR DEMOGRAPHIC PROFILE

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ABSTRACT

Background: 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.

Aims & Objective: To determine the prevalence of obesity in adults of Kashmiri population and their demographic profile in persons aged 18-45 years.

Materials and Methods: Multistage and multiphasic sampling technique was utilized in this study 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. Socio-economic parameters and other demographic parameters were noted in all the subjects of 18-45 years of age. 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, the highest prevalence of obesity was 10.92% & seen in 39-45 years category. As per the marital status, highest prevalence of obesity is in the widowed 9.35% followed by married 8.65% and lowest in the singles 4.47%. As per educational status, showing that illiterate population has the highest prevalence of obesity 10.67% followed by university level 7.05% and lowest prevalence in less than high school of study population 6.37%. As per profession, the home duties/house wives group of the study population has the highest prevalence of obesity (8.84%), followed by the employed group (8.07%) then unemployed group having the lowest prevalence of obesity (3.71%). As per income, the income group of the study population who had 30,000 and above income were having the highest prevalence (11.16%) and the prevalence of obesity is lowest in the income group of less than 10,000 (5.65%).

Conclusion: The highest prevalence of obesity is seen associated with increased age group, widowed, illiterate, home duties/house wives group, 30,000 and above income and with more family size.

Key Words: Obesity; BMI (Body Mass Index); Marital Status; Income; Literacy

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 arise 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 apnoea.^[2-5]

Obesity results when the size or number of fat cells in a person's body increases. When a person gains weight, these fat cells first increase in size and later in number. 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]

Obesity can be divided into, (1) *Simple Obesity* also 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. (2) *Secondary Obesity* due to endocrine or metabolic and genetic diseases. (3) *Drug-Induced Obesity* (2%): For example, the use of adrenal cortex hormones drugs (such as prednisone, dexamethasone and hydrocortisone, etc.) & the phenothiazine drugs. In general, when patients stop using these drugs, obesity will disappear by itself.

In Asia, the prevalence of obesity has rapidly increased.^[7,8] 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.^[9,10] 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.^[11] 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. 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. Even in many low income countries, obesity is now rapidly increasing, and often coexists in the same population with chronic under nutrition.^[13] 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.¹⁴ 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.^[10] Health consequences of obesity Mortality rates increase with BMI and they are greatly increased above a BMI of 30 kg/m². For example, a study in US women estimated that among people with a BMI 29

kg/m², 53% of all deaths could be directly related to their obesity.^[15] As obesity has increased over the last 30 years, the prevalence of type 2 diabetes has increased dramatically. The most potent predictor for the risk of diabetes, apart from age, is the BMI.^[16] Type 2 diabetes is becoming increasingly prevalent among children as obesity increases in those age groups. Asian populations appear to develop diabetes at a lower BMI than other populations.^[17]

Health care costs of obesity. The direct health care costs of obesity in the US have been estimated to account for 5.7% of total health care expenditure in 1995. 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.^[18] The format for identifying potential nutritional causes of obesity at a population level is based on the Epidemiological Triad 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.^[19]

Assessment of Obesity

For children and adolescents, obesity is defined in terms of body mass index (BMI) percentile. BMI is a formula that considers an individual's height and weight to determine body fat and health risk, and it is used differently for children and adolescents than it is for adults. In adults, BMI often misrepresents obesity because it does not consider healthy weight from muscle tissue; therefore, body fat percentage is considered a more accurate method for determining obesity in adults. In children and adolescents, because body fat changes as they mature, BMI is gender- and age-specific and plotted on gender-specific growth charts to determine BMI-for-age. Curved lines on the chart (percentiles) are used by healthcare professionals to identify children and adolescents at risk for overweight and obesity. Children and adolescents with a BMI-for-age in the 85th to 95th percentile are considered overweight and at risk for obesity, and those with a BMI-for-age greater than the 95th percentile are considered obese. Ideally BMI must be in normal range, that's between 18.5 to 24.9 kg/m².^[20] If BMI is less than 18.5 kg/m², 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/m², then the person has risk of getting other diseases

and proportionately more, with increasing BMI.

Table-1: WHO Classification of adults according to BMI^[21,22]

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
Pre-obese	25.0--29.9	Increased
Overweight (≥25.0)	Obese class I 30.0--34.9	Moderate
	Obese class II 35.0--39.9	Severe
	Obese class III ≥40.0	Very severe

Materials 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 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. Socio-economic parameters and physical activity were noted in all the subjects of 18-45 years of age.

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.

Survey Data

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 $BMI = \text{Weight (kg)} / \text{Height}^2 \text{ (m)}$. The scales were checked for accuracy before starting the survey and after and then rechecked periodically.

Socio-Economic and Life Style Data: The demographic data such as age, sex, education, occupation, and financial income (household total income per month) were compiled. Information on physical activity, smoking, dietary habits, and self-reported health problems were also obtained from the same questionnaire.

Statistical Analysis

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

Results

Table 2 depicts age-wise prevalence of obesity in the study population. The prevalence is observed to be 2.54%, 5.40%, 7.68%, 10.92% in age groups of 18-24, 25-31, 32-38, 39-45 years respectively. The prevalence is seen to be increasing with increasing age group. Category wise highest prevalence of 10.92% is seen in 39-45 years category. Table 3 shows the prevalence of obesity as per the marital status of the study population, showing that the highest prevalence of obesity is in the widowed 9.35% followed by married 8.65% and lowest in the singles 4.47%.

Table 4 shows the prevalence of study population as per educational status, showing that illiterate population of the study group has the highest prevalence of obesity 10.67% followed by university level 7.05% and lowest prevalence of obesity as per educational status in less than high school of study population 6.37%.

Table 5 shows that the home duties/house wives group of the study population has the highest prevalence of obesity (8.84%), followed by the employed group of the study population (8.07%) then unemployed group of the study population (5.47%) and students of the study population were having the lowest prevalence of obesity (3.71%).

Table-2: Age-wise prevalence of study population

Age-Group (Years)	Population	Obese	Prevalence
18-24	1025	26	2.54%
25-31	1130	61	5.40%
32-38	1523	117	7.68%
39-45	1429	156	10.92%
Total	5107	360	7.05%

$\chi^2 = 70.11$; $df = 3$; $p\text{-value} < 0.001$

Table-3: Prevalence of obesity as per marital status

Marital Status	Population	Obese	Prevalence
Single	1989	89	4.47%
Married	2845	246	8.65%
Widowed	214	20	9.35%
Divorced	59	5	8.47%
Total	5107	360	7.05%

$\chi^2 = 33.11$; $df = 3$; $p\text{-value} < 0.001$

Table-4: Prevalence of obesity as per educational status

Educational Status	Population	Obese	Prevalence
Illiterate	731	78	10.67%
Less than High School	1224	78	6.37%
High School	1618	96	5.93%
University	1534	108	7.04%
Total	5107	360	7.05%

$\chi^2 = 18.56$; $df = 3$; $p\text{-value} < 0.001$

Table-5: Prevalence of obesity as per occupation

Occupation	Population	Obese	Prevalence
Employed	2081	168	8.07%
Home duties/house wives	1278	113	8.84%
Unemployed	805	44	5.47%
Student	943	35	3.71%
Total	5107	360	7.05%

$\chi^2 = 28.71$; $df = 3$; $p\text{-value} < 0.001$

Table-6: Prevalence of obesity as per monthly household income

Income (₹)	Population	Obese	Prevalence
Less than 10000	1753	99	5.65%
10000-20000	2016	115	5.70%
20000-30000	621	66	10.63%
30000 and Above	717	80	11.16%
Total	5107	360	7.05%

$\chi^2 = 41.43$; $df = 3$; $p\text{-value} < 0.001$

Table-7: Prevalence of obesity as per family size

Family Size	Population	Obese	Prevalence
Less than 5	3356	222	6.62%
5-8	897	69	7.69%
Above 8	854	69	8.08%
Total	5107	360	7.05%

$\chi^2 = 2.92$; $df = 1$; $p\text{-value} = 0.223$

Table 6 shows that income group of the study population who had 30,000 and above income were having the highest prevalence (11.16%) in the study population and the prevalence of obesity is lowest in the income group of less than 10,000 (5.65%).

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.

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)^[23] reported a prevalence of 7% obesity in their study. Similar trends were found by Khan et al (8%) (2003)^[24], Laurier D et al^[25] (7%) and Pragati Chabra et al (6.1%) 2007^[26].

The age of our study population ranged from 18 to 45 years. The prevalence of obesity showed a significant increasing trend as the age increases with highest prevalence of obesity in the age group 39-45 years (10.92%). Similar trends were found by Lekhraj Rampal et al^[27], Habibullah et al^[28] and Decanoy et al^[29]. The association between obesity and age can be explained due to a decrease in the physical activity with the increasing age. Residents of urban areas were found to be more obese 8.34% as compared to rural people 6.61% 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, Alam khan and M. Muzaffar Ali khan Khattak, who found the prevalence of obesity in urban areas to be greater than in rural areas.^[23]

Birgul Ozcirpici et al in their study "Obesity Prevalence in Gaziantep, Turkey" found that being unmarried reduces obesity, highest prevalence of obesity was found in widowed followed by currently married people and marital status was positively associated with the prevalence of obesity. In our study, out of 5107 people, 1989 (38.94%) were never married, 2845 (55.70%) were married, 214 (4.19%) were widowed and 59 (1.17%) were divorced. Obesity was significantly higher in widowed (9.35%) followed by married (8.65%) and divorced (8.47%) as compared to never married group (3.4%) ($p=0.001$). Several other cross sectional studies of marital status and obesity reported that currently and formerly married individuals were more obese than those never married. The positive relationship between marital status and obesity can be explained by the fact that people after marriage have less physical activity, change their dietary pattern, have more social support and may be exposed to other environmental factors.^[31,32]

Level of education has a significant impact on obesity. In our study we found that, prevalence of obesity was highest among illiterate group (10.67%) as compared to

people with higher education (7.04%). This may be due to healthier lifestyle in individuals who have been educated to a higher level. Similar results have been found in other studies, Lekhraj Rampal et al^[27], Habibollah Esmaeily, Mohsen Azimi-Nezhad et al^[28].

Several studies, Habibollah Esmaeily et al^[28], Hajin-Tilaki & Heidani^[31], Meshkani et al^[32] have demonstrated positive association between occupation and obesity. It has been found that people performing domestic duties especially housewives were found to be more obese than their unemployed counterparts. In our study, we observed that those performing home duties were more obese (8.84%) than unemployed persons (5.47%) which is statistically significant (p -value <0.001). This may be explained due to levels of physical activity and access to food during the day.

Sobal J et al, in their review of the related literature found that socio-economic status in terms of income is the main indicator associated with obesity in developing countries.^[33] We being a developing nation also have similar trends as observed in our study. We observed that the prevalence of obesity was 11.16% in higher monthly income group ($\geq 30,000$) as compared to 5.65% with income group less than 10,000 per month which is statistically significant (p -value <0.001).

Conclusion

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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