ORIGINAL ARTICLE

# Prevalance Study of Overweight/Obesity and Hypertension Among Rural Adults

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**Abstract**

The present study was conducted to find out the magnitude of overweight, obesity and hypertension among rural adults of Jammu and whether there exists an association of overweight/obesity with age, sex, physical activity & hypertension. Adults > 30 years with sample size 2216 were studied. Prevalence of obesity was 2.21% with females 3.35%: males 1.02%. Prevalence of overweight was 9.70% with females 11.63%: males 7.68%. A strong association between obesity/overweight and gender was found (p value <.000004). An increase in prevalence of obese & Overweight persons with age upto 59yrs. & 49yrs. respectively in both the sexes, declining thereafter; but this association with age was not statistically significant.Prevalence of hypertension was13% ; females 14.71%: males 11.19% showing a strong association between gender and hypertension (p value <.02). An increase in prevalence of hypertension with age(from 30-39yrs. to >/= 60yrs) from 6.67% to 37.78% in females (p value <.0001) & 4.5% to 18.69% in males (p value <.00001), showing a strong association between hypertension and age in both the sexes. Proportion of obese & overweight persons was higher in sedentary workers when compared with that in moderate and heavy workers, results being statistically significant (p value <.01). An increasing proportion of hypertensives from 10.91% to 29.30% to 48.98% respectively among persons with "normal BMI" to "Overweight" to "Obese" was found showing highly significant association between BMI and Hypertension (p value <.000001).

**Key Words**

Hypertension, Obesity, Rural, Epidemiology

## Introduction

There has been rise in prevalence of obesity in India in last few years in urban as well as rural populations. Overweight and obesity are very important risk factors for many diseases viz. hypertension, diabetes and IHD.

Increasing trend of hypertension is a worldwide phenomenon. Hypertension is one of the most important modifiable risk factors for CHD in western and Asian population (1,2). There are few epidemiological studies (3-21) on prevalence of hypertension or obesity in rural population. However, very scanty data only on hypertention (16) is available that too in past from this region.Hence, the current study was done to determine the prevalence of obesity & oypertension among the rural adults of Jammu and to find out the association of obesity with age, sex, physical activity & hypertension.

## Material and Methods

A pretested doctor administered questionnaire was used to interview 2216 adults aged 30 years and above by house-to-house survey in a rural population of 3 villages viz. Purkhoo, Gaddi and Jungwadi in Block Kot

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BMI as defined by WHO (3) was used to define overweight/obesity. Weight and Height were recorded as per standard procedures to determine BMI. Persons with BMI ">/=30" were defined as obese and the persons with BMI of "25.0-29.9" were defined as overweight. International Physical Activity Questionnaire (4) was used to determine "type of activity" and subsequently subjects were classified into sedentary, moderate and heavy workers. B.P. of all the persons was measured in sitting position after standardizing the apparatus (5). Hypertension was diagnosed (6) when diastolic BP was 90 mmHg or more &/or systolic BP was 140 mmHg or more (without use of antihypertensive medication) or when medications for established hypertension were being received.

**Statistical Analysis**

It was done using epi-info 6 software.Data was expressed in n (%) and chi square test and chi square test for trend was applied where as applicable and p< 0.05 was considered as significant.

**Results**

*Table 1* shows an overall prevalence of obesity as 2.21%, 3.3 times higher in females i.e. 3.35% when compared with males. While comparing the results for overweight (pre-obese); there is a still higher overall prevalence i.e.9.70%.Here also prevalence in females is almost 1.5 times higher. A strong association between obesity/overweight and gender was found (p value <.000004).Overall prevalence of hypertension shown is 13%, females having higher prevalence i.e. 14.71% as against 11.19% in males showing a strong association between gender and hypertension (p value <.02).

***Table 1: Prevalence of Overweight, Obesity & Hypertension in the Study Population* n (%)**

| Study Population | | Overweight | Obese | Hypertensive |
|---|---|---|---|---|
| Males | 1081 | 83(7.68) | 11(1.02) | 121(11.19) |
| Females | 1135 | 132(11.63) | 38 (3.35) | 167(14.71) |
| Both Sexes | 2216 | 215(9.70) | 49(2.21) | 288(13) |
| *p value* | | <.000004 | | <.02 |

*Chi square p value <.000004 & < 0.02 Male vs Female*
*For the purpose of statistical analysis "males & Females of Overweight& Obese" have been grouped together*

*Table 2* shows increase in prevalence of obese persons with age upto 59 years in both sexes, declining thereafter. There is also an increase in prevalence of overweight persons with age upto 49 years in both sexes, declining thereafter; but this association with age was not statistically significant. Also an increase in prevalence of hypertension with age in both sexes from 6.67% to 37.78% in females (p value< .0001) &4.5% to 18.69% in males (p value <.0001) from "30-39yrs" to ">/=60yrs" can also be found, showing a strong association between hypertension and age.

***Table 2: Agewise Prevalence of Overweight, Obesity & Hypertension in Males & Females* n(%)**

| Age in Yrs. | Study Population | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Overwt. Obese | | Overwt.Obese | | HT | |
| | M | F | M | | F | | M | F |
| 30-39 | 400 | 450 | 33(8.25) | 2(0.5) | 54(12) | 13(2.89) | 18(4.5) | 30(6.6) |
| 40-49 | 295 | 321 | 26(8.81) | 3(1.02) | 40(12.4) | 10(3.12) | 30(10.1) | 31(9.6) |
| 50-59 | 172 | 184 | 12(6.97) | 4(2.33) | 22(11.9) | 11(5.98) | 31(18.0) | 38(20.6) |
| >/=60 | 214 | 180 | 12(5.61) | 2(0.94) | 16(8.89) | 4(2.22) | 40(18.6) | 68(37.7) |

*For the purpose of statistical analysis "males of Overweight& Obese " and" females of Overweight& Obese" have been grouped together chi square for trend*
*P value 0.92 for obese &overweight vs age in males*
*P value 0.53 for obese &overweight vs age in females*
*P value <0.0001 for Hypertention vs age in males*
*P value <0.0001 for Hypertension vs age in females*

***Table 3: Association Between BMI and Hypertension***

| BMI level | Hypertensive (%) | Non-Hypertensive (%) |
|---|---|---|
| Normal weight | 199(10.19) | 1753(89.81) |
| Overweight | 63(29.30) | 152(70.70) |
| Obese | 24(48.98) | 25(51.02) |

*Test Applied:-chi square p value <.0001*

***Table 4: Association between Body Wt & Physical Activity***

| Study variable | Normal (%) | Overweight (%) | Obese (%) |
|---|---|---|---|
| Moderate & Heavy Worker | 782(90.40) | 72(8.32) | 11(1.28) |
| Sedentary | 1170(86.60) | 143(10.58) | 38(2.82) |

*Test Applied:-chi square for trends p value <.01*

In *Table 3* an increasing proportion of hypertensives with rise in BMI from 10.91% in persons with "normal BMI" to 29.30% in overweight to 48.98% in obese can be found showing a strong association between BMI and hypertension.

*Table 4* shows, higher proportion of obese& overweight in sedentary workers i.e.2.82%& 10.58%when compared to that in moderate and heavy workers i.e. 1.28%& 8.32% respectively, the results being significant.A vice versa relation is also evident.

**Discussion**

In current study overall prevalence of obesity was 2.21%; 3.3 times higher in females i.e.3.35% when compared against males. In pre-obese (overweight); there is a still higher overall prevalence i.e.9.70%.Here also prevalence in females is almost 1.5 times higher. A strong association between obesity/overweight and gender was found. An increase in prevalence of obese& overweight with age was found upto 59yrs. & 49yrs. respectively in both sexes, declining thereafter; but this association with age was not statistically significant. In current study, also an increasing proportion of hypertensives was found with increase in BMI from those having "normal BMI" to overweight and then to the obese;showing a strong association between BMI and hypertension

Varghese *et al* (7) in their study found overall prevalence of obese and overweight as 5.5%& 24.8% respectively. They also found an increase in prevalence of obese or overweight with age from "20-29yrs" to "50 -59yrs"; showing a decline thereafter. In a study conducted by Venkatramana *et al* (8), overall prevalence of obesity found was 1.91 %;( 1.03% in males & 2.79% in females)& prevalence of overweight persons 11.48% (13.33%in males &9.74% in females).In a study conducted in a Chinese rural population by Zhang *et al* (9),the prevalence of overweight persons was 18.6%; significantly higher among women than men. The prevalence of obesity was 1.7%, also higher among women than men .In another study conducted by Jackson *et al* (10), in a rural US population the overall prevalence of obesity was 23%.In a study conducted in school going children in Ludhiana by Bishav *et al* (11) in rural population; overweight and obese students were 4.7% and 3.63% respectively. They also found a significant increase in prevalence of hypertension with increasing BMI. In a study conducted by Kumar *et al* (12), prevalence of hypertension found was high in overweight persons.

As regards the physical activity, in current study significantly more number of obese & overweight were found in sedentary workers when compared to moderate& heavy workers, showing a significant association between obesity/overweight and physical activity. In "The surgeon general's report on physical activity and health (13)"it was mentioned that "low levels of activity, resulting in fewer calories used than consumed, contribute to the high prevalence of obesity".

In a study conducted by Patrick *et al* (14) insufficient vigorous physical activity was found the only risk factor for higher BMI for adolescent boys and girls. In a study conducted by Lowry *et al* (15) it is mentioned that obesity results from an energy imbalance created by factors that increase energy intake or reduce energy expenditure. Television viewing may promote obesity both by displacing participation in physical activity, and by increasing dietary energy intake.

Regarding hypertension, in current study an overall prevalence of hypertension was 13%, females having a higher prevalence i.e. 14.71% as against 11.19% in males showing a strong association between hypertension and gender. An increase in prevalence of hypertension with age in both sexes from 6.67%to 37.78% in females (p value< .0001) &4.5% to18.69% in males (p value <.0001) from 30-39yrs. to >/=60yrs was found showing strong association between hypertension and age.

An earlier study conducted by Sharma *et al* (16) in Block RS Pura in 1997, which again is a rural area in Jammu, the prevalence of hypertension found was 8.31%,with higher prevalence in females i.e. 10.08% in comparison with 6.34% in males. It can be observed that after a gap of 7 years (the current study was conducted in 2004), there is an overall and gender wise increase in the prevalence of hypertension even under the similar geographical conditions, showing a rising trend with the passage of time; probably due to changing life styles and the dietary habits. In the study it was also found that prevalence of hypertension increased with the increasing age.

In a WHO India Report (17) an overall weighted pooled prevalence rate of hypertension was 15.74% found in various studies conducted in rural areas of India. An ICMR study (18) in 1994 involving 5537 individuals demonstrated prevalence of hypertension among males and females as 13% and 10% respectively in rural Haryana.

In a study by Mohan *et al* (19), the prevalence of hypertension increased with age in both sexes from "20-29yrs" to ">/=60yrs". In a study conducted by Sun Z *et al* (20), higher age& higher BMI were associated with the prevalence of hypertension. Swami *et al* (21) in their study found that prevalence of hypertension was 82.5% among overweight elderly in comparison to 45.87% among non-overweight/obese.

## Conclusion

Overall prevalence of obesity & overweight persons found in a rural population of Jammu in present study was 2.21% and 9.70% respectively. Females showed a higher prevalence of obesity as well as overweight & a strong association between obesity/overweight and gender was found. An increase in prevalence of obese& overweight with age was found upto 59yrs. & 49yrs. respectively in both sexes, declining thereafter; but this association with age was not statistically significant. Also significantly more number of obese& overweight was found in sedentary workers when compared to moderate& heavy workers. Overall prevalence of hypertension was 13% with females showing higher prevalence & a strong association between gender and hypertension was found. The prevalence of hypertension increased with age in both sexes. A strong association between hypertension and age was found. A strong association between BMI and hypertension was found. An increasing proportion of hypertensives was found with the increase in BMI from those having "normal BMI" to overweight and then to the obese.

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