

PREVALENCE OF OBESITY AND ITS ASSOCIATED CO MORBIDITIES AMONGST ADULTS

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ABSTRACT

Objective: To evaluate association of obesity with common co morbidities like hypertension and type 2 diabetes mellitus.

Background: Obesity has reached epidemic proportions in India. The health consequences of obesity range from increased risk of premature death to serious chronic conditions like hypertension and type 2 diabetes which reduces overall quality of life. BMI and waist circumference are useful guide to assess obesity related health risks.

Material and methods: A cross sectional study done on 53 adult subjects attending diabetes and hypertension detection camp organized at an urban health training center of a private Medical College, Pune.

Results: Prevalence of obesity was 43 % among adults. There was statistically significant association between BMI (≥ 25) and diabetes ($p < 0.05$) and BMI and hypertension ($p < 0.05$). In females central obesity (waist circumference ≥ 80) was statistically associated with diabetes and hypertension. Diabetes and hypertension did not found to be associated with central obesity in male ($p > 0.05$).

Conclusion: Obesity as assessed by BMI and waist circumference is associated with hypertension and diabetes. Thus approaches to reduce the risk of developing hypertension and diabetes may include prevention of overweight and obesity.

Key words: Obesity, BMI, Waist Circumference, Hypertension, Diabetes Mellitus.

INTRODUCTION

Obesity has reached epidemic proportions in India in the 21st century, with morbid obesity affecting 5% of the country's population.¹ India is following a trend of other developing countries that are steadily becoming more obese. According to the NFHS, 10 percent of India's population was either overweight or obese in 2006.

Unhealthy, processed food has become much more accessible following India's continued integration in global food markets. Indians are genetically susceptible to weight accumulation especially around the waist.²

Overweight or obesity is the leading cause of type 2 diabetes, hypertension, osteoarthritis, various types of cancers in women like breast cancer and uterus cancer, menstrual disorder and infertility and many more diseases.

Undernutrition and overweight/ obesity are both higher for women than men

Obesity can be general or central (abdominal). Many epidemiologic studies have shown that body Mass Index (BMI) which is a measure of general obesity, is a powerful predictor of type 2 diabetes. Waist circumference (wc) measures the central obesity.

³

Thus screening for obesity followed by health education of obese persons for weight reduction will be useful for early prevention of its comorbidities like hypertension and type 2 diabetes.

Thus a study was conducted with following objectives.

OBJECTIVES

1. To calculate prevalence of obesity, diabetes and hypertension.
2. To estimate association of obesity with hypertension and diabetes.

MATERIAL AND METHODS

Study setting: Diabetes and hypertension detection camp organized at Urban Health Training center (UHTC) of a private Medical College.

Study subjects: 53 subjects who attended camp from adjoining slum and non slum area

Type of study: Cross sectional.

METHODOLOGY

Institutional ethics committee permission was obtained. And written informed consent of the study subjects was taken.

Height, weight measurement and waist circumference of every subject was done by the investigator. Patient's random blood sugar was noted by glucometer.

Blood pressure of each subject was recorded on left arm supine position by mercury sphygmomanometer. Subjects were classified as hypertensive by blood pressure levels of ≥ 140 mm of Hg (systolic) or ≥ 90 mm of Hg (diastolic) respectively. While levels up to 139 mm of Hg (systolic) or 89 mm of Hg (diastolic) were considered as normotensive. When systolic and diastolic blood pressure belonged into different categories the higher category was selected to classify the person's blood pressure.

Patient's random blood sugar was noted by glucometer.

For random blood glucose a cut off of ≥ 140 mg/dl was taken as diabetic, levels below 140mg/dl were considered as normal (non diabetic).⁴

Waist circumference was taken when persons breathe out. It was ensured that subjects were relaxed and did not contract the abdominal muscles. It was measured at the level of midpoint of lower margin of rib cage and the iliac crest to nearest 0.1 cm.

For men cut off levels for waist circumference for men was ≥ 90 cm

For females cut off levels for waist circumference was considered as ≥ 80 cm

Body Mass Index (BMI):

Height of every person was taken on height measuring scale with subjects standing while they wore no shoes on surface, heels attached, the hips and shoulders leaned against the measuring scale with 0.1 cm as minimum measuring unit.

Weight of the subjects was measured without shoe/ chappal by using weighing machine with 100gm as minimum measuring unit. The BMI is calculated as the weight in kilograms divided by the square of height in meters. In the present study the cutoff level for BMI was taken as ≥ 25 to label a person as obese.

RESULTS AND DISCUSSION

Out of 53 subjects' maximum i.e. 34 were in the age group 40-60. The gender wise distribution of 53 subjects was 34 females and 19 males. Five subjects were known hypertensive and one subject was a known case of diabetes. Out of total 53 subjects, 7 subjects had random sugar of ≥ 140 mg/dl. Prevalence of obesity was 41% as per the BMI criteria (≥ 25) Prevalence of hypertension was 43%. Prevalence of diabetes was 13.2%.

Out of 23 subjects 14 were having BMI of 25 or more i.e. they were obese. The association of obesity and hypertension was found to be statistically significant. Out of 7 diabetic subjects 6 subjects had BMI 25 or more and the association of diabetes and obesity was found to be statistically significant.

In a prospective cohort of 4920 participants, by **Gelber RP**⁵ the association between BMI and risk of incident hypertension was valued and found a strong gradient between higher BMI and increased risk of hypertension.

In a national survey of adults done in United States (National Health and Nutrition

Examination Survey III 1988-1994) found strong associations of BMI with hypertension. ⁶

Table 1: Association of BMI with diabetes and hypertension

BMI	Blood pressure		significance	Diabetes		significance
	Hypertensive	Normotensive		Diabetic	Non diabetic	
>=25	14	08	$\chi^2_{cal}=6.29$, d.f. =1,	06	16	$\chi_{cal}^2= 4.06$, d .f.=1,
<25	09	22	p<0.05S*	01	30	p<0.05
Total	23	30		07	46	

In a study by Bhat NA ⁷ found prevalence of hypertension was higher in females with BMI greater than 25.

Patnaik L ⁸ in his study on Hypertension in Urban Slum of Brahmapur, Orissa on 336 persons above 18 years of age found higher prevalence of hypertension in persons with BMI >25.

Sandeep TK ⁹ in a community based cross sectional study in urban slum area of Ankoli,

Brahmapur done on 332 persons found Hypertension was significantly higher in persons of more than 40 years age, with BMI>25 (P<0.001).

Out of 19, 10 male subjects were hypertensive of which 8 had WC of 90 or more, the association of hypertension and obesity (central) was not statistically significant.

Table 2: Association of waist circumference and diabetes and hypertension

Waist circumference	Blood pressure		Significance	Diabetes		significance
	Hypertensive	Normotensive		Diabetic	Non diabetic	
Males(n=19)						
>=90	08	04	$\chi^2_{cal}=1.9$	01	11	$\chi^2_{cal}=0.078$
<90	02	05	p>0.05	00	07	p>0.05
Females(n=34)						
>=80	12	06	$\chi^2_{cal}=10.65$	06	12	$\chi^2_{cal}=4.3$
<80	01	15	p<0.05	00	16	p<0.05

Out of 13 hypertensive female subjects, 12 had WC of 80 or more obese (central), the association of central obesity with hypertension in female is statistically significant.

Out of 18 non diabetic male subjects 07 had waist circumference less than 90. There was only one diabetic male with WC of 90 or more. Thus central obesity is not statistically associated with diabetes in males. Out of 34 females 6 were diabetic and all had waist circumference of 80 or more. Thus central obesity is statistically associated with diabetes in females.

In the study by. Mokadad AH ¹⁰ found overweight and obesity were significantly associated with diabetes, high blood pressure.

Larger waist circumference identifies people at increased cardiovascular risks ¹¹.

In a study done on Brazilian women by Olinto MTA ¹² the risks of hypertension and diabetes were directly related to WC measurement.

Women with WC > 80 cm had increased risk of hypertension (odds ratio (OR) = 6.2, P < 0.001). The association remained significant.

In the study "Association of waist circumference with risk of hypertension and type 2 diabetes in Nigerians, Jamaicans and African Americans" by Oksum IS¹³ found that waist circumference was positively correlated with blood pressure and fasting blood glucose.

CONCLUSIONS

The study indicates general obesity as assessed as BMI is statistically associated with hypertension and diabetes in both males and females .While central obesity as assessed as waist circumference is statistically associated with hypertension and diabetes in females only.

Thus early and routine screening of all obese patients is essential for identification of its

known co morbidities, so that many of the complications can be delayed or prevented.

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