

Evaluation of Risk of Development of Hypertension Among Obese People: A Retrospective Institutional Based Study

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ABSTRACT

Background: Obesity is a well-known risk factor for cardiovascular disease.¹ It increases the risk of the development of hypertension. Among Asian population, several studies have shown that obesity is one of the risk factors for development of hypertension. Hence; present study was planned and commenced to evaluate the relation of obesity with development of hypertension.

Materials & Methods: The present study was commenced among 300 cases who reported in the department of general medicine, Rajshree Medical Research Institute & Hospital, Bareilly, Uttar Pradesh (India). The study comprised of evaluation of relation of obesity with development of hypertension. Body mass index (BMI) was calculated [weight in kilograms divided by height in meters squared (kg/m^2)]. All the results were analysed by SPSS software. Individual risk factors were studied and were analysed for assessment of relative risk of development of hypertension.

Results: The relative risk among normal individuals (18.5–22.9 kg/m^2) was 1.21, among overweight individuals (23–24.9 kg/m^2) was 1.74, and obese individuals ($\geq 25 \text{ kg}/\text{m}^2$) was 2.09.

Conclusion: We observed that subjects with BMI more than $\geq 25 \text{ kg}/\text{m}^2$ comparatively had higher risk of development of hypertension. Maintenance of lower body mass index reduces the risk of development of hypertension.


Key words: Cardiovascular Diseases; Hypertension; Obese; Sedentary Lifestyle.

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INTRODUCTION

Obesity is a well-known risk factor for cardiovascular disease.¹ It increases the risk of the development of hypertension.² Genetic factors, a sedentary lifestyle, high salt intake, and excessive alcohol consumption are also known risk factors.¹

As per the Guyton theory, maintained hypertension can happen just when the connection between blood vessel weight and natriuresis is unusual.³⁻⁴ As obesity is associated with increased blood flow, vasodilatation, cardiac output, and hypertension, although cardiac index (cardiac output divided by body weight) does not increase, cardiac output and glomerular filtration rate do. However, renal sodium retention also increases, leading to hypertension.² Several studies conducted among Asian population revealed that obesity is one of the major risk factors for development of hypertension.⁵ Hence; present study was planned and commenced to evaluate the relation of obesity with development of hypertension

MATERIALS & METHODS

The present study was commenced among 300 cases who reported in the department of general medicine, Rajshree Medical

Research Institute & Hospital, Bareilly, Uttar Pradesh (India). The study comprised of evaluation of relation of obesity with development of hypertension. Cases of hypertension were defined according to World health organisation (WHO) criteria.⁶ Demographic details, alcohol and smoking history, clinical details, blood pressure, medical history of patients were retrospectively reviewed and body mass index (BMI) was calculated [weight in kilograms divided by height in meters squared (kg/m^2)]. Respondents were categorized into four groups, on the basis of WHO's Asia-Pacific classification,⁷ as per their BMI, which were as follows: underweight ($< 18.5 \text{ kg}/\text{m}^2$), normal (18.5–22.9 kg/m^2), overweight (23–24.9 kg/m^2), and obese ($\geq 25 \text{ kg}/\text{m}^2$). All the results were analysed by SPSS software. Individual risk factors were studied and were analysed for assessment of relative risk of development of hypertension.

RESULTS

Out of 300, 180 were males and 120 were females. 79 individuals were underweight ($< 18.5 \text{ kg}/\text{m}^2$), 71 individuals were normal individuals (18.5–22.9 kg/m^2), 87 individuals were overweight

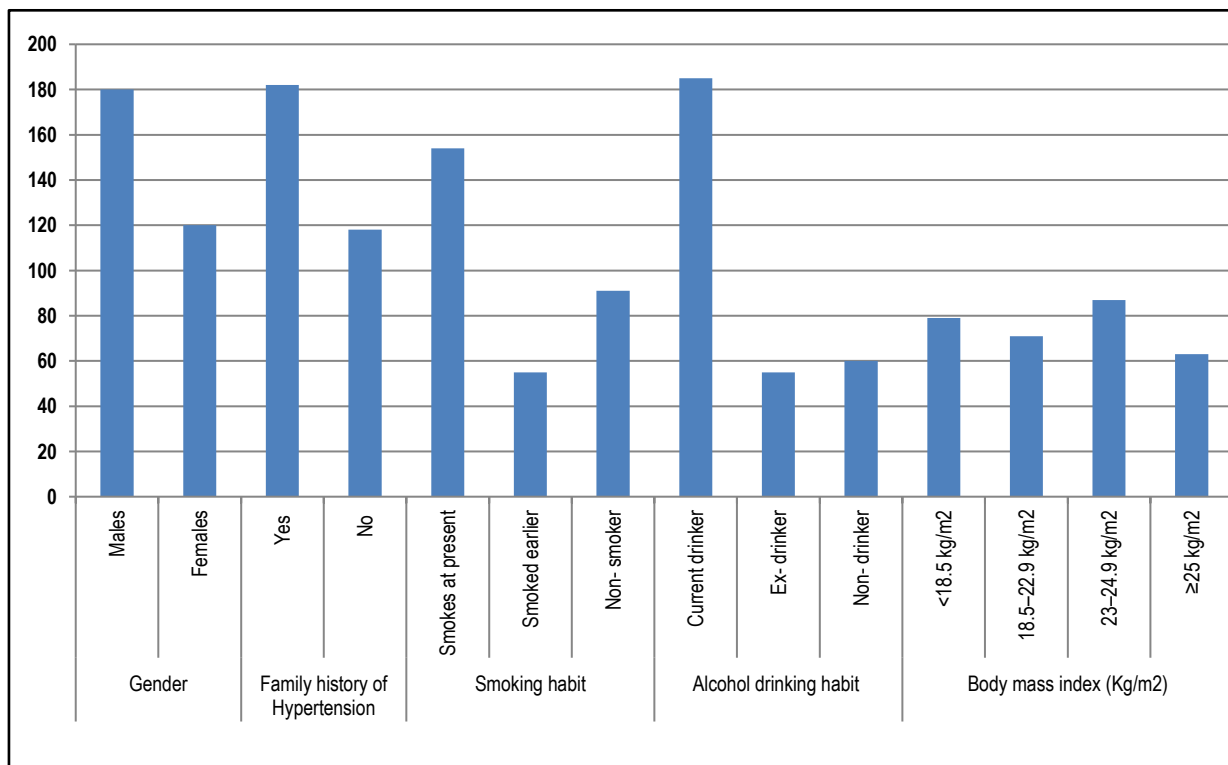
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(23–24.9 kg/m²), and 63 individuals were obese individuals (≥ 25 kg/m²). (Table 1).
The relative risk among underweight individuals (<18.5 kg/m²) was

0.95, among normal individuals (18.5–22.9 kg/m²) was 1.21, among overweight individuals (23–24.9 kg/m²) was 1.74, and obese individuals (≥ 25 kg/m²) was 2.09 (table 2).

Table 1: Characteristic details of all the subjects of the present study

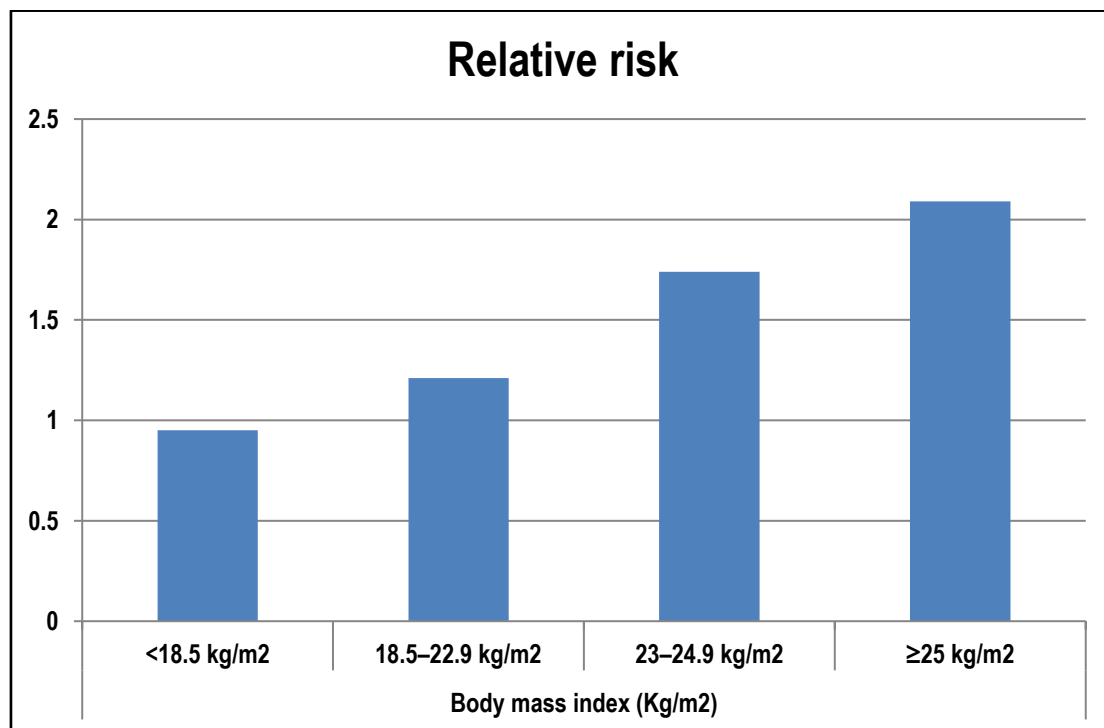
Parameter	n= 300	
Gender	Males	180
	Females	120
Family history of Hypertension	Yes	182
	No	118
Smoking habit	Smokes at present	154
	Smoked earlier	55
	Non- smoker	91
Alcohol drinking habit	Current drinker	185
	Ex- drinker	55
	Non- drinker	60
Body mass index (Kg/m²)	<18.5 kg/m²	79
	18.5–22.9 kg/m²	71
	23–24.9 kg/m²	87
	≥ 25 kg/m²	63



Graph 1: Characteristic details of all the subjects of the present study

Table 2: Adjusted relative risk of hypertension with body mass index

Parameter	Relative risk	
Body mass index (Kg/m²)	<18.5 kg/m²	0.95
	18.5–22.9 kg/m²	1.21
	23–24.9 kg/m²	1.74
	≥ 25 kg/m²	2.09



Graph 2: Adjusted relative risk of hypertension with body mass index

DISCUSSION

Obesity is associated with increased morbidity and mortality due to hypertension, diabetes, dyslipidemia, and cardiovascular and renal diseases. The prevalence of obesity and obesity-related disease is increasing worldwide.⁸ Obesity predisposes to hypertension and alters the course of hypertensive cardiovascular disease in ways that are only now coming to be appreciated. The strong association of obesity with diabetes further complicates the picture in patients with such conditions and complicates the design of effective therapeutic interventions.^{9,10} In the present study, we observed that subjects with BMI more than ≥ 25 kg/m² comparatively had higher risk of development of hypertension.

Parsekar SS et al¹¹ estimated the proportion of adolescents of Udipi taluk having high BP and studied the association of high BP with overweight/obesity and revealed that the proportion of respondents having high BP as well as overweight/obesity was found to be high. As high BP was found to be strongly associated with overweight/obesity, authors recommended screening of BP to be carried out both in children and adolescents and the inclusion of sports hours in their curriculum. Lee SH et al¹ evaluated the influence of obesity on the development of hypertension and compared men and women whose body mass indices were smaller than 23 kg/m², the relative risks of hypertension were 2.56 times greater in men and 3.17 times greater in women, whose body mass indices were greater than 27 kg/m² and thus, study confirmed that obesity is a strong risk factor for hypertension among Korean adults. In addition, high alcohol consumption may be a significant risk factor for men.

Dua S et al¹² carried out a study to evaluate the blood pressure and body dimensions and to find out the prevalence of overweight/obesity and hypertension among adults in Punjab and found that there was a significant positive correlation between BMI, fat percentage, and blood pressure both SBP as well as DBP. Odds ratio showed that overweight/obese subjects were more likely to have hypertension than those with normal BMI.

Wei M et al¹³ found that overweight and obese men with baseline CVD or CVD risk factors were at higher risk for all-cause and CVD mortality compared with normal-weight men without these predictors. In their analysis, low cardiorespiratory fitness was a strong and independent predictor of CVD and all-cause mortality and of comparable importance with that of diabetes mellitus and other CVD risk factors.

Researchers have therefore recommended weight reduction, low salt intake, regular exercise, a moderate amount of alcohol consumption, and adequate calcium intake as primary interventions to prevent hypertension.¹

The importance of lifestyle management in the treatment of patients with obesity-related hypertension should be considered. Adoption of a healthy lifestyle facilitates weight loss, increases responsiveness to antihypertensive medications, and produces independent beneficial effects on cardiac risk factors.¹⁴

CONCLUSION

From the above results, the authors conclude that maintenance of lower body mass index decreases the risk of development of hypertension.

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