

Assessment of Risk of Development of Hypertension among Obese People: A Retrospective Study

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ABSTRACT

Introduction: One of the risk factors which is hypothesized to increase the risk of development of hypertension is obesity. Among Asian population, several studies have shown that obesity is one of the risk factors for development of hypertension. Therefore the present study was planned to assess the impact of obesity on prevalence of hypertension among a known population.

Material and methods: The present study was included assessment of obesity as a risk factor for development of hypertension. Complete reviewing of data records of all the subjects was done to collect information regarding the clinical, demographic details. Only those subjects were included which came up for follow-up examination. Initially a total of 520 subjects were included. Emails were sent to all the subjects for follow-up examination of estimation of relative risk. Out of this, 200 subjects were included in the present study for data analysis. Calculation of the body mass index (BMI) was done as weight in kilograms divided by height in meters squared (kg/m^2). Separate physicians reviewed the medical records of all the subjects. For the evaluation of individual risk factors, cox's proportional hazards model was used for assessment of risk of development of hypertension.

Results: Out of 200 subjects, 100 were males and 100 were females. Among males, 92 were married and 8 were unmarried. Among females, 90 were married and 10 were unmarried. Among males and females, 79 and 82 subjects had positive hypertension history. We observed that subjects with BMI lower than 2.0 were comparatively subjected to a lesser risk for development of hypertension.

Conclusion: Maintenance of lower body mass index decreases the risk of development of hypertension

Keywords: Hypertension, Obesity, Risk

hypertension even in patients with typical renal capacity.⁵⁻⁷ Among Asian population, several studies have shown that obesity is one of the risk factors for development of hypertension.⁷ Hence; we planned the present study to assess the impact of obesity on prevalence of hypertension among a known population.

MATERIAL AND METHODS

The present study was conducted in the department of general medicine of the medical institution and included assessment of obesity as a risk factor for development of hypertension. We included assessment of data records of all the hypertensive patients that reported to the department from 2013-2015. Before starting of the surgery, ethical committee clearance was obtained from the institute's ethical board. World health organisation (WHO) criteria were used for defining cases of hypertension.⁶ Complete reviewing of data records of all the subjects was done to collect information regarding the clinical, demographic details. Only those subjects were included which came up for follow-up examination. Initially a total of 520 subjects were included. Emails were sent to all the subjects for follow-up examination of estimation of relative risk. Out of this, 200 subjects were included in the present study for data analysis. All the subjects were informed about the study and a written informed consent was obtained from all in their vernacular language. Complete medical and physical examination of all the subjects was done. Complete alcohol drinking history and smoking history of all the subjects was obtained. Calculation of the body mass index (BMI) was done as weight in kilograms divided by height in meters squared (kg/m^2). Separate physicians reviewed the medical records of all the subjects. On the basis of BMI, the subjects were divided into four categories according to criteria given previously in the literature.⁸ All the results were analysed by SPSS software. For the evaluation of individual risk factors, cox's proportional hazards model was used for assessment of risk of development of hypertension.

RESULTS

A total of 200 subjects were enrolled in this present study. Out of 200, 100 were males and 100 were females.

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INTRODUCTION

Obesity builds the danger of the improvement of hypertension. This linkage has been the subject of a few late surveys. As per the Guyton theory, maintained hypertension can happen just when the connection between blood vessel weight and natriuresis is unusual.¹⁻³ In the event that a typical connection amongst weight and renal sodium discharge relates, expanded weight will bring about expanded sodium discharge and bringing down of weight. Despite the fact that the confirmation to help this theory is broad, it must not prompt the supposition that all hypertension comes about because of sickness in the kidney in light of the fact that different components can modify the weight natriuresis relationship in typical kidneys.²⁻⁴ The clearest case of this is the activity of aldosterone, which incorporates expanding renal tubular sodium reabsorption and the generation of

Among males, 92 were married and 8 were unmarried. Among females, 90 were married and 10 were unmarried. Among males and females, 79 and 82 subjects had positive hypertension history. Among males and females, 42 subjects and 56 subjects had body mass index value less than 23.0 kg/m² (Table 1, Figure 1). We observed that subjects with BMI lower than 2.0 were comparatively subjected to a lesser risk

for development of hypertension (Table 2). Also less risk of development of hypertension was seen in subjects with no smoking and drinking habit.

DISCUSSION

Obesity is one of the predisposing factors for hypertension and is responsible for altering the course of hypertensive cardiovascular disease in many ways. The strong association of obesity with diabetes further complicates the picture in patients with such conditions and complicates the design of effective therapeutic interventions.⁹⁻¹² In the present study, we observed that subjects with BMI less than 23.0 kg/m² comparatively had less risk of development of

Parameter		Males	Females
Total subjects		100	100
Age group	<38 years	24	37
	39- 48 years	50	35
	49- 58 years	17	18
	> 59 years	9	10
Marital status	Married	92	90
	Unmarried	8	10
Family history of hypertension	Yes	79	82
	No	21	18
Smoking status	Current smoker	52	20
	Ex- smoker	20	5
	Non- smoker	28	75
Alcohol drinking status	Current drinker	79	35
	Ex- drinker	5	4
	Non- drinker	16	61
Body mass index (Kg/m ²)	< 23.0	42	56
	23.0- 24.9	36	22
	25.0- 26.9	15	14
	≥ 27.0	7	8

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

Parameter		Relative risk
Body mass index (Kg/m ²)	< 23.0	1.00
	23.0- 24.9	1.65
	25.0- 26.9	1.89
	≥ 27.0	2.24
Family history of hypertension	Yes	1.59
	No	1.00
Smoking status	Current smoker	1.42
	Ex- smoker	1.10
	Non- smoker	1.00
Alcohol intake	Current drinker	1.58
	Ex- drinker	1.17
	Non- drinker	1.00

Table-2: Adjusted relative risk of hypertension according to risk factors

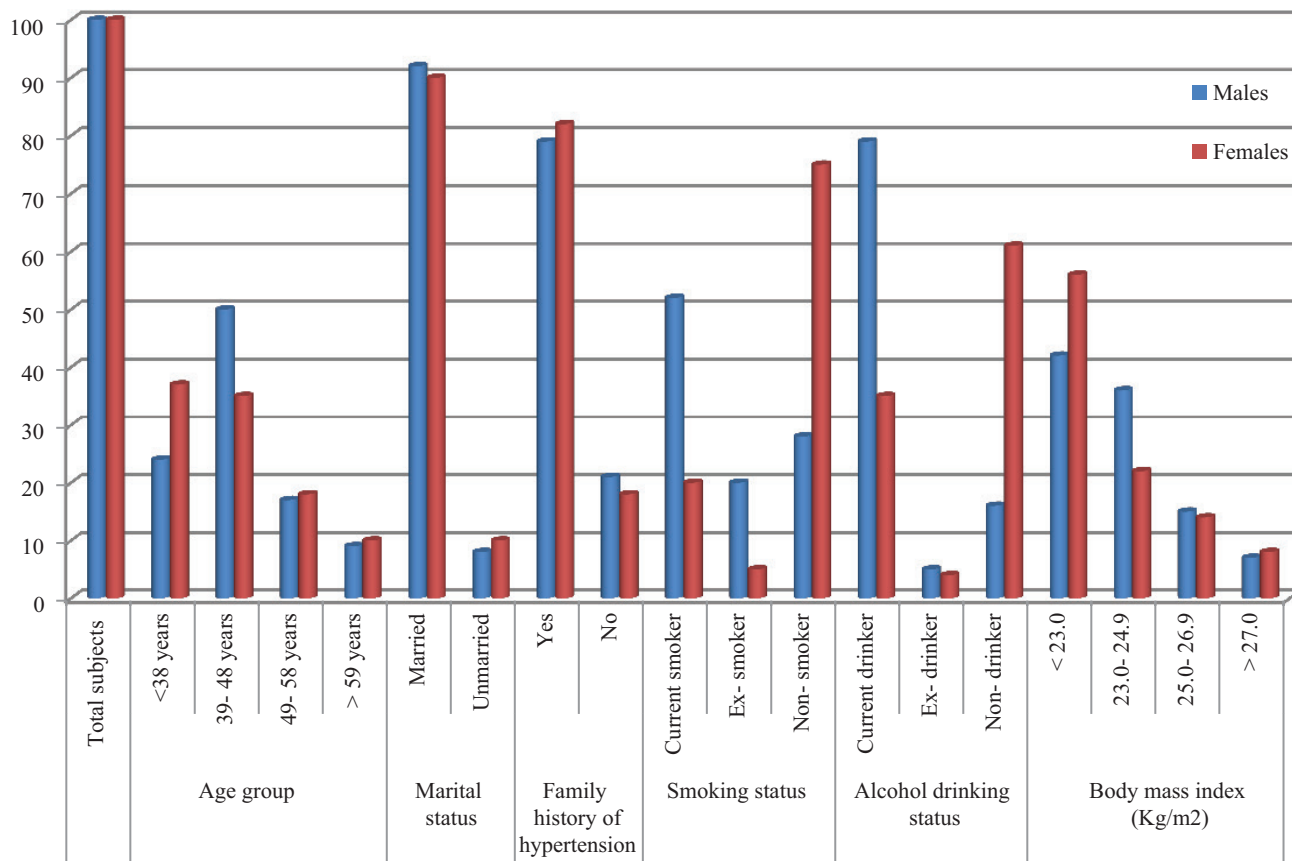


Figure-1: Characteristic details of all the subjects of the present study

hypertension. Lee SH in his study to find out association between hypertension is directly proportional to age, BMI and the amount of alcohol consumption. In his study there were 1467 males and 944 females who were aged between 20 to 75 years and were initially normotensive. They were followed for a period of 1 year. The relative risk development of hypertension was 2.56 times more in men and 3.17 times more in females whose body mass indices were more than 2.7 Kg/m². Therefore, the study concluded that there is strong association between hypertension and Obesity and the risk of developing hypertension also increases with increase in alcohol consumption.⁸

In a study by Haapamen Niemi Netal¹³, to find possible association and interaction between BMI, leisure time physical activity and sense of physical fitness with the risk of mortality, he concluded that the males and females with no physical activity have 1.61 times higher chances of developing cardiovascular mortality. The males, who thought their physical fitness was better than their mates, had relative risk of 3.29 in overall mortality and 4.37 in case of cardiovascular mortality. In his study the data regarding mortality was obtained from national census information and level of BMI, physical activity and fitness were obtained by filling the questionnaire. On application of Cox proportional hazard model there was no significant association between BMI and risk of death amongst males and females. Males who have difficulty in walking 2 Km are at a relative risk of 1.62 times than those who have no difficulty in walking. There is an increased risk of 1.47 times and 2.39 times in cases of males and females who have difficulty while climbing upstairs. They are at 1.85 and 3.38 time's relative risk of cardiovascular mortality. BMI did not come out to be an independent risk factor for cardiovascular and overall mortality. There was an additive beneficial effect of leisure time physical activity on mortality risk amongst Obese and non obese males and females. Wie M et al in their study on 25714 men over a period of 1970 to 1993 found that there were 1025 deaths during the follow up period and out of them 439 were due to cardiovascular disease. They found out that men who were obese and overweight were at increased risk of overall and cardiovascular mortality compared to men who had normal weight. There was an increased relative risk amongst obese men who were diabetic, had increased cholesterol, high BP and low fitness. The relative risk ranged from 4.4 (95% CI, 2.7-7.1) increase of smoking to 5.0 (95% CI, 3.6-7.0) in case of low fitness. In their study low fitness acted as an independent risk factor for mortality amongst patients with different body mass indices. There were 50% of the obese males who had low fitness which lead to population attribution risk of 39% in case of CV mortality and 44% for all cause mortality. Another factor that emerged as an independent risk factor for cardiovascular diseases was low cardio-respiratory fitness.^{14,15}

CONCLUSION

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

of hypertension. However, future studies are recommended.

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