

**Research Article****A Preliminary Study of Prevalence of Prehypertension and Association of Body Mass Index with Blood Pressure in Prehypertensive Subjects****Bharath T.<sup>1\*</sup>, K. G. Prarthana<sup>2</sup>, Shrinidhi<sup>3</sup>, Suja P.<sup>4</sup>**<sup>1</sup>Department of Physiology, JSS Medical College, SS Nagar, Mysore, India<sup>2</sup>Department of Physiology, Srinivasa Institute of Medical Sciences and Research Centre, Mangalore, India<sup>3</sup>Department of Physiology, Kanachur Institute of Medical Sciences, Deralakatte, Mangalore, India<sup>4</sup>Department of Physiology, Malabar Medical College and Research Centre, Modakkallur, Calicut, India**\*Corresponding author**

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**Abstract:** Subjects with prehypertension, a new category created in classification of Blood Pressure (BP) by Joint National Committee 7 (JNC 7), have a greater risk of developing hypertension and cardiovascular diseases than subjects with lower blood pressure levels. Obesity is recognized as a major risk factor for the development of hypertension. This short cross sectional study was done to determine the prevalence of prehypertension and its relationship with body mass index (BMI) in prehypertensive young adult males. 170 healthy young adult males in the age group of 20-30yrs were selected for the study. Blood pressure, weight and height of the subjects were measured and BMI was calculated. Blood pressure measurements were categorized using JNC 7 guidelines. Association of BP with BMI was assessed. The prevalence rate of prehypertension was 20%. A positive association has been found between both Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) with BMI. Prehypertension is highly prevalent in young adult males. There is a positive association between BP and BMI. Early intervention and health-promoting lifestyle modifications are recommended in prehypertensive subjects.

**Keywords:** Prehypertension, BMI, SBP, DBP

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**INTRODUCTION**

The prevalence of cardiovascular diseases and hypertension is rapidly increasing in developing countries [1]. Statistical data shows that cardiovascular diseases have led to 1.59 million deaths in the year 2000 in India and it is projected to increase in future [1, 2]. Recent data suggests that hypertension affects nearly 25% of urban Indian population [3-5]. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) created a new category in classification of grades of hypertension called prehypertension. SBP ranging between 120-139 mmHg or DBP ranging between 80-89 mmHg is classified as prehypertension [6]. Normal blood pressure is defined by JNC 7 as SBP < 120 mmHg and DBP < 80 mmHg [6]. According to this classification, subjects who were earlier considered normal were categorised as prehypertensives.

Studies done on hypertensives also show obesity is a major risk factor associated with hypertension [7]. Studies show subjects with prehypertension have a greater risk of developing hypertension and cardiovascular diseases than subjects

with lower blood pressure levels [8, 9]. Early detection and early interventions in the form of lifestyle modifications or therapeutic interventions may therefore arrest the progression of prehypertension to frank hypertension and also prevent complications in prehypertensives. There are fewer studies of the prevalence of prehypertension and its association with BMI in young adult males. So the present work was undertaken with the aim to determine the prevalence of prehypertension and its relationship BMI in prehypertensive young adult males.

**MATERIALS AND METHODS**

170 healthy young adult males in the age group of 20-30 yrs, non-smokers, were selected for the study. The subjects were recruited by history and clinical examination from general population. Study was cleared by the institutional ethics committee. Written informed consent was obtained and subjects were screened for general physical health to rule out any clinical disorder likely to interfere with study findings.

Blood pressure was measured using mercury sphygmomanometer, in sitting posture after five

minutes of rest, first Korotkoff sound was taken as SBP and fifth Korotkoff sound was taken as DBP. Three readings were taken and the mean of last two readings were used for analysis. All the readings were taken by a single observer using standardised procedures. Blood pressure measurements were categorized as normal or prehypertension using JNC 7 report. Anthropometric parameters were measured and interpreted as per World Health Organization recommendations [10]. BMI was calculated using Quetelet's index (weight in kg/height in m<sup>2</sup>).

**RESULTS**

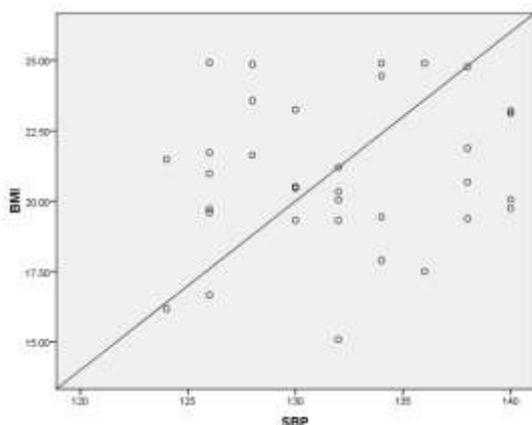
Descriptive statistical analysis has been carried out and results on continuous measurements are

presented as Mean ± SD. Subjects with prehypertension were 34 in number. Pearson's correlation test was applied to study the association of BMI and blood pressure in prehypertensive subjects.

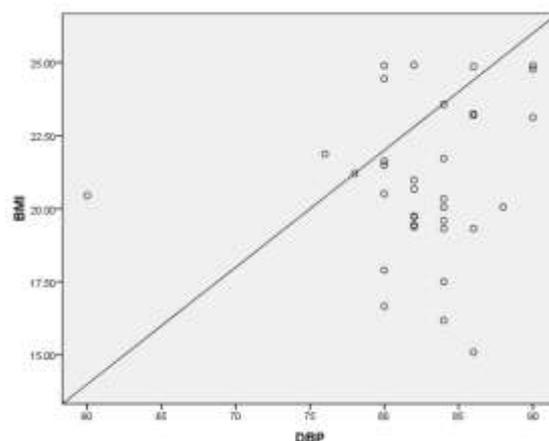
Mean age of the subjects was 21.9yrs. Mean SBP was 132 mmHg, DBP was 82.59 mmHg and BMI was 20.97kg/m<sup>2</sup>. Descriptive variables are shown in Table 1. The prevalence rate of prehypertension was 20%. Pearson's correlation test was applied to study the association of BMI and blood pressure in prehypertensive subjects. Though not significant, a positive association has been found between both SBP (r=0.14, p=0.42) (Fig. 1) and DBP (r=0.14, P=0.43) (Fig. 2) with BMI.

**Table 1: Baseline variables of the prehypertensive subjects**

Descriptive Statistics				
	Min	Max	Mean	Std. Deviation
Age	20	32	21.91	2.503
Height	160	188	175.44	6.814
Weight	49	88	64.59	9.455
BMI	15.09	24.91	20.96	2.622
SBP	124	140	132.00	5.093
DBP	60	90	82.59	5.200



**Fig. 1: Scatter diagram showing the positive association of BMI and SBP**



**Fig. 2: Scatter diagram showing the positive association of BMI and DBP**

**DISCUSSION**

Prevalence of prehypertension is high in young adult males. The result of the present study is in consensus with the studies which were conducted in Indian population which have also reported high prevalence [11, 12]. In the present study, there is a positive association of blood pressure with BMI. This stresses the point that lifestyle modifications in the form of exercise, healthy diet and reduced sodium intake should be encouraged in prehypertensives, so that a decreased BMI can have beneficial effects in the subjects and prevent complications in prehypertensives.

Follow up studies have shown, subjects with prehypertension are more susceptible to develop

hypertension and coronary atherosclerosis [8, 13, 14]. Therefore, it is clear that prehypertensives are at a considerably high cardiovascular risk and require some type of intervention to reduce risk. Early intervention and health-promoting lifestyles like exercise and healthy diet are therefore recommended in prehypertensives. Healthcare providers should implement educational and preventive strategies in prehypertensives in order to reduce the burden of hypertension in the society.

**Limitation of the study**

The present study was a preliminary study with small sample size. Even though positive association was observed between BMI and blood

pressure, it was not significant. Further studies with larger sample size are required to prove the significant positive association between BMI and blood pressure.

#### CONCLUSION

- Prehypertension is highly prevalent in young males.
- There is a positive association of blood pressure with BMI.
- Early intervention and health-promoting lifestyle modifications are recommended in prehypertensive subjects.

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