



doi: <https://doi.org/10.20546/ijcrar.2020.812.011>

## Prevalence of Pre-hypertension in Undergraduate Madurai Medical College Students

**Robinson Joseph\***

*Department of Community Medicine, Madurai Medical College, Madurai -625020, Tamil Nadu, India*

*\*Corresponding author*

### Abstract

In the present study was to find out the prevalence of in undergraduate medical college students and to find the factors associated with it in Madurai Medical College. Hypertension is a commonest cardiovascular disorder, posing a public health challenge. Pre-hypertension among younger age group is a major risk factor for developing hypertension in later life. Tracking of blood pressure from an earlier age is necessary to prevent them developing cardiovascular disease in later life. This cross-sectional study was conducted among under graduate students in a Madurai medical college. Among undergraduates 207 students were selected by simple random sampling and a semi- structured questionnaire was administered to assess physical activity, fruit intake, vegetable intake, habits like smoking and consumption of alcohol, previous history of raised blood pressure and sugar levels. Anthropometric measures, waist circumference, skin fold thickness were measured. Blood pressure readings were taken to find the prevalence of pre-hypertension. Chi-square test was used for statistical analysis. Totally 207 students were included in this study, 94 were males and 113 were females and age between 18 years to 25 years. The prevalence of pre-hypertension was 49.3%. Prevalence of pre-hypertension among males were significantly (58%) increased when compared with females (48%). In the Present study we conclude that high prevalence of pre-hypertension among medicos, it is necessary to counsel them about modifiable factors of hypertension, so that they can follow a healthy lifestyle and avoid developing pre-hypertension and hypertension in later life.

### Article Info

*Accepted: 08 November 2020  
Available Online: 20 December 2020*

### Keywords

Hypertension, Medical Students, Blood Pressure, pathophysiology

### Introduction

Hypertension affects about one billion individuals worldwide. The prevalence of hypertension has increased over the past decade, reaching an alarming level of 25% among the general population in the United States and an even higher percentage in Europe (Monika Kuber Kotpalliwar *et al.*, 2013). It is an established risk factor for the development of cerebral, cardiac, and renal events (Messerli *et al.*, 2007). The majority of these patients have essential hypertension that can be defined as a rise in blood pressure (BP) due to an unknown cause. Essential hypertension remains a major modifiable risk

factor for cardiovascular disease (CVD) despite important advances in our understanding of its pathophysiology and the availability of effective treatment strategies. There is established evidence that effective treatment of hypertension is associated with a significant reduction of cardiovascular events, yet the number of patients who are aware of their condition and who achieve adequate BP control remains unacceptably low (Wolf-Maier *et al.*, 2004).

In the past decade, the incidence of end-stage renal disease, the prevalence of heart failure and age-adjusted rates of stroke incidence have increased. A major

contributor to these trends is inadequate control of BP in the hypertensive population. In spite of the dreaded complications associated with uncontrolled hypertension, the disease remains inadequately treated in most patients, mainly due to its insidious onset and asymptomatic nature even as it progressively damages multiple organ systems.

Therefore many people with essential hypertension may present with overt or sub-clinical organ damage involving the heart, kidneys, central nervous system or retina at the time of initial diagnosis. HTN has become a major public health problem that needs to be faced with more aggressive treatment strategies to contain the incumbent epidemic of cardiovascular complications. The main issue at this context is to identify the target or sub group that is at higher risk for future events. Pre-hypertension is rising alarmingly among young adults, but our NPCDS programme has been planned for opportunistic screening of population of more than 30 years of age only (Go *et al.*, 2004; Guidelines Committee, 2003). Hence this study was conducted to find the prevalence of pre-hypertension among young adult medical college students and its associated factors.

### **Materials and Methods**

This cross-sectional study was conducted among MBBS under graduate students in a medical college situated in Madurai. After getting institutional ethical committee approval, sample size was calculated using the formula. Among MBBS undergraduates, 207 students were selected from 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year, by simple random sampling proportionately. Apparently healthy students in the age group between 18-25 years of both sexes, who were willing to give consent were chosen.

Apparently healthy students in the age group between 18-25 years of both sexes, who were not willing to give consent and who were absent on the day of data collection. All the participant students were examined on a single meeting. The participants were examined for various anthropometric parameters. The anthropometric parameters measured in the study were height in cm, Weight in kg, body mass index, and waist circumference in cm, skin fold thickness in mm and blood pressure in mmHg.

### **Statistical Analysis**

All the data's were collected and analysed by using SPSS software version 20. The P values less than 0.05 considered as significance.

## **Results and Discussion**

### **Distribution of Risk factors of Prehypertensive undergraduate students**

The total number of study population was 207, out of them 102 members were diagnosed to have pre-hypertension as per JNC-7. Thus the prevalence of pre hypertension in the study population was 49.3% and prevalence of hypertension was 2.4% respectively. (Table.1) shows the distribution of risk factors among undergraduate medical students.

### **Prevalence of risk factors and BMI of pre-hypertension undergraduate medical students**

Mean BMI of the students were 23.41, mean waist circumference in males were 88.94cm and in females were 86.94cm, mean skin fold thickness in males were 47.28mm and in females were 50.47mm and mean systolic pressure was 114.38 mm of Hg and diastolic was 74.21 mm of Hg. (Table.2 ) shows the prevalence of risk factors among undergraduate medical students.

Table 2 depicts the prevalence of pre-hypertension among study population. Among all the factors; gender, skin fold thickness and BMI between 25 and 29.9 kg/m<sup>2</sup> were found to be significantly associated. Though higher risk of pre-hypertension were noted on people who smoke cigarette, consume alcohol and in those who takes salty food. There is no statistical significance is noted in our study.

Prevalence of pre-hypertension and hypertension among students were 49.3% and 2.4% respectively. The prevalence rate of pre-HT in our finding was comparable with studies done by Logaraj *et al.*, (2016); Thilip kumar *et al.*, (2014) and Aghore Debbarma *et al.*, (2015). With advancing technologies, students preferring sophisticated lifestyle, brings in about not only laziness but also many lifestyle diseases and pre-hypertension is one of the culprits among them.

After the JNC (Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure) – 7 report from the United States in 2003, the term “pre-hypertension” (systolic blood pressure 120-139 mm Hg and/ or diastolic blood pressure 80-89 mm Hg) is known worldwide.

Globally cardiovascular diseases accounts for approximately 17.7 million deaths a year, nearly one third

of the total. Of these, 9.4 million deaths worldwide every year and pre-hypertension is one of the contributory factors for cardiovascular morbidity. Individuals with pre-hypertension have two-fold higher risk of mortality associated with stroke and coronary artery disease when compared with normotensives (individuals with BP less than 120/80 mm Hg). (Monika Kuber Kotpalliwar *et al.*, 2013) According to JNC-7 Report's criteria for BP classification, our study showed that 58% males and 42% females were prehypertensives. There is a statistically

significant difference between male and female gender. In our study it is been observed that males are more prone to develop pre-hypertension in the early age when compared to females. Though most of the students had parental history of hypertension, we couldn't find any statistical association between parental history and pre-hypertension in our study. Prehypertensive students with BMI of 25 or more were 73.7% and 56% of prehypertensive students had their skin fold thickness equal or more than the Standard cut-off.

**Table.1** Distribution of Risk factors of Prehypertensive undergraduate students

<b>Factors</b>	<b>Result</b>
Sex	Male : 97 Female : 110
Smokers	Current smokers:5.3 % Ex-smokers : 2.4%
Consumption of Alcohol	Current alcoholic : 5%
Type of Food	Vegetarian : 14% Non- vegetarian : 86%
Fruit intake	Regular : 31.9% Occasional : 68.1%
Vegetables intake	Regular : 61.8% Occasional : 38.2 %
Hotel Food Consumption	>2 days /week: 22% < 2 days /week: 78%
Physical Activity	1. Vigorous : 10% 2. Moderate : 65% 3. Sedentary : 25%
Family History (Hypertension)	Present : 49% Absent : 51%

**Table.2** Prevalence of risk factors of pre-hypertension

Factors	Prevalence of pre-hypertension	p-value
Sex	Male: 55 (58.5%) Female: 47 (41.6%)	*0.015
Smokers	8 (72%)	0.125
Consumption of Alcohol	7 (70%)	0.378
Type of Food	Veg: 16 (55%) Non- veg: 86 (48%)	0.493
Fruit intake	Regular: 30 (45%) Occasional: 72 (51%)	0.337
Vegetables intake	Regular: 76 (52%) Occasional: 26 (42%)	0.193
Hotel Food Consumption	>2 days /wk: 31(49.2%) < 2 days /wk: 26 (57.8%)	0.391
Physical Activity	1. Vigorous: 9 (43%) 2. Moderate: 72 (53%) 3. Sedentary: 25 (42%)	0.344
Family History (Hypertension)	Present: 48 (47%) Absent: 54(51%)	0.530
BMI <18.5 kg/m <sup>2</sup>	7 (46.7%)	0.83
BMI 18.5 to 24.9 kg/m <sup>2</sup>	59 (42.4%)	*0.005
BMI 25 to 29.9 kg/m <sup>2</sup>	28 (73.7%)	*0.000
BMI >30 kg/m <sup>2</sup>	8 (53.3%)	0.83
Waist Circumference	Risk: 68 (51%) No risk: 34 (46%)	0.56
Skin Fold Thickness	Risk: 75 (56%) No risk: 27 (37%)	*0.009

[\* p < 0.05 is considered as statistically significant]

This study also showed that obesity is one of the major risk factor for pre-hypertension. Among various parameters of obesity skin fold thickness and BMI are the very important factors. In our study we could find that there is significant association between skin fold thickness and pre-hypertension (p=0.009) and also there is significant association between overweight (BMI 25 to 29.9 kg/m<sup>2</sup>) and pre-hypertension (p=0.000) which is comparable with the studies like Maria *et al.*, (2007); Clarke *et al.*, (1986) also stated a positive correlation between BMI and hypertension. The findings of the

present study showed that there is high prevalence of pre-hypertension among medicos. Modern lifestyle habits with increased BMI and skin fold thickness contributes in developing pre-hypertension in earlier age. Thus adopting healthier lifestyle will avoid serious consequences in later life.

It is necessary to counsel them about modifiable & non modifiable risk factors of hypertension and importance of tracking of blood pressure. Following blood pressure checkup regularly can help in finding any raise from

normal value early thus avoid developing pre-hypertension and hypertension in later life.

## References

- Clarke W R, Schrott H G and Bums T L. Aggregation of blood pressure in the families of children with labile high systolic blood pressure. The Muscatine Study. *Am. J. Epidemiol.* 1986; 123: 67-71.
- Go A S, Chertow G M, Fan D, McCulloch C E, Hsu C Y.: Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization. *N Engl J Med* 2004; 351: 1296–1305.
- Guidelines Committee: 2003 European Society of Hypertension-European Society of Cardiology. Guidelines for the management of arterial hypertension. *J Hypertens* 2003; 21: 1011– 1053.
- Logaraj, M., R. S. Dinesh Madhavan, R. Balaji. Prevalence of pre hypertension and its association to risk factors for cardiovascular diseases among male undergraduate students in Chennai *Int J Community Med Public Health.* 2016 Feb;3(2):542-550.
- Maria C, Kuschnir C and Gulnar A S. Mendonça. Risk factors associated with arterial hypertension in adolescents. *J. Pediatr (Rio J).* 2007; 83(4):335-342.
- Messerli F H, Williams B, Ritz E. Essential hypertension. *Lancet* 2007; 370: 591-603.
- Monika Kuber Kotpalliwar A, Anil Wanjari B and Sourya Acharya C. Prevalence of Prehypertension in Young Healthy Individuals and its Associated Risk Factors. *Indian Journal of Medicine and Healthcare.* 2013; Vol 2: Issue 3.
- Prevalence of pre-hypertension and its relationship with body mass index among the medical students of Agartala government medical college Aghore Debbarma1, Himadri Bhattacharjya2\*, Arpita Mohanty3, Chanda Mog2 *Int J Res Med Sci.* 2015;3(5):1097-1101
- Thilip Kumar G, Prabhavathi K, Karthick N, Poornima K N, Saravanan A. Evaluation Of Pre-Hypertension, Hypertension And Its Associated Factors Among I<sup>st</sup> Year Medical Students. *Asian J Pharm Clin Res* 2014; Vol 7, Issue 5.
- Wolf-Maier K, Cooper R S, Kramer H, Banegas J R, Giampaoli S, Joffres M R, Poulter N, Primatesta P, Stegmayr B, Thamm M: Hypertension treatment and control in five European countries, Canada, and the United States. *Hypertension* 2004 43: 10–17.

### How to cite this article:

Robinson Joseph. 2020. Prevalence of Pre-hypertension in Undergraduate Madurai Medical College Students. *Int.J.Curr.Res.Aca.Rev.* 8(12), 117-121. doi: <https://doi.org/10.20546/ijcrar.2020.812.011>