



Prevalence Of Pre-Hypertension In Young Adult Medical College Students

Midhun Kumar G.H*, Mahendran C, Pandiyan K, Shankar K, Kokila Selvaraj

Department of Community Medicine, Meenakshi Medical College Hospital and Research Institute,
Meenakshi Academy of Higher Education and Research, Tamil Nadu, India

***Corresponding Author:**

Dr. Midhun Kumar G.H.

Department of Community Medicine, Meenakshi Medical College Hospital and Research Institute,
Meenakshi Academy of Higher Education and Research, Tamil Nadu, India

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Background: 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.

Aim: To find the prevalence of pre-hypertension among medical college students and to find the factors associated with it.

Materials and Methods: This cross-sectional study was conducted among under graduate students in a medical college situated in Kanchipuram district. 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. 94 were males and 113 were females.

Results: Higher prevalence of pre-hypertension was seen in non modifiable factors like male gender and modifiable factors like body mass index and skin fold thickness.

Conclusion: In the present study we conclude that the 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.

Keywords: Pre-hypertension, Anthropometric measures, blood pressure

Introduction

Hypertension is a common cardiovascular disorder, posing a major public health challenge to in the world. Pre-hypertension among younger age group is a major risk factor for developing hypertension in later life.¹ According to JNC-7, Pre-hypertensives are the persons with systolic BP 120-139 or diastolic BP of 80-89.² Pre-hypertensives can also develop cardiovascular diseases (CVD) because of associated risk factors. Risk factor assessment is necessary at an earlier age to prevent them developing cardiovascular

disease at later life. Pre-hypertension is rising alarmingly among young adults,³ but our NPCDS programme has been planned for opportunistic screening of population of more than 30 years of age only.⁴ 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 under graduate students in a medical college situated

in Kanchipuram district. After getting institutional ethical committee approval (IEC-17/MMCHRI/2019), sample size was calculated using the formula.

$$n = Z^2pq/d^2 \quad p = 67\% [5], q = 33\% \text{ and } d=10; n = (1.96)^2 \times 67 \times 33 / (6.7)^2; n = 189; \text{ Non response rate} = 10\%; \text{ Sample size} = 207.$$

Sampling frame was set. Among undergraduates, 207 students were selected from 2nd, 3rd and 4th year, by **simple random sampling** proportionately.

Inclusion Criteria Apparently healthy students in the age group between 18-25 years of both sexes, who were willing to give consent, were chosen.

Exclusion Criteria 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; The anthropometric parameters measured in the study were height in cm, Weight in kg, body mass index, waist circumference in cm, skin fold thickness in mm and blood pressure in mmHg; Body Weight - Body weight was measured using manual weighing scale with subject standing erect and looking straight; Height - It was measured with the subject standing in

an erect position against a vertical scale; BMI - The body mass index is calculated by using the formula, weight in kilograms divided by the square of the height in meters; Waist Circumference - It was measured between the lower margin of lowest rib and the highest point of iliac crest using non-stretchable inch tape; Skin fold thickness – it’s the sum of values taken at four sites(triceps, biceps, subscapular and supra iliac) using Harpenden calliper; Blood pressure- Blood pressure was measured twice by using standardized mercury sphygmomanometer in left upper arm in sitting position after ensuring that the subject has relaxed at least for 5 minutes. Two readings were taken at a gap of 10 minutes apart.

Statistical Analysis: The collected data were analysed using SPSS software version 20.

Results

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. Distribution of risk factors of prehypertension

FACTORS	RESULT
1. Sex	MALE : 94 FEMALE : 113
2. Cigarette Smokers	CURRENT SMOKERS: 5.3 % EX-SMOKERS : 2.4%
3. Alcohol Consumption	CURRENT ALCOHOLIC : 5%
4. Type of Diet	VEGETARIAN : 14% NON- VEGETARIAN : 86%
5. Fruit Intake	REGULAR : 31.9% OCCASIONAL : 68.1%
6. Vegetable Intake	REGULAR : 61.8%

	OCCASIONAL : 38.2 %
7. Salty Food	REGULAR : 47.8% OCCASIONAL :52.2 %
8.Hotel Food Consumption	>2 DAYS /WEEK: 22% < 2 DAYS /WEEK: 78%
9.Physical Activity	1. VIGOROUS : 10% 2. MODERATE : 65% 3. SEDENTARY : 25%
10.Family History (Hypertension)	PRESENT : 49% ABSENT : 51%

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. Prevalence of risk factors of pre-hypertension

Factors	Prevalence of pre-hypertension	p-value
1.SEX	MALE: 55 (58.5%)	*0.015
2. CIGRATTE SMOKERS	8 (72%)	0.125
3.ALCOHOLIC	7 (70%)	0.378
4.DIET	VEG: 16 (55%)	0.493
5.FRUIT INTAKE	REGULAR: 30 (45%)	0.337
6.VEGETABLE INTAKE	REGULAR: 76 (52%)	0.193
7.SALTY FOOD	REGULAR: 54 (54%)	0.146
8.HOTEL FOOD	>2 DAYS /WK: 31(49.2%)	0.391
9.PHYSICAL ACTIVITY	1. VIGOROUS: 9 (43%)	0.344
10.FAMILY HISTORY OF	PRESENT: 48 (47%)	0.530
11. 11.BMI <18.5 KG/M²	7 (46.7%)	0.83
11A. BMI 18.5 TO 24.9 KG/M²	59 (42.4%)	*0.005
11B. BMI 25 TO 29.9 KG/M²	28 (73.7%)	*0.000
11C. BMI >30 KG/M²	8 (53.3%)	0.83
12.WAIST CIRCUMFERENCE	RISK: 68 (51%)	0.56
13.SKIN FOLD THICKNESS	RISK: 75 (56%)	*0.009

* p < 0.05 is considered as statistically significant

Discussion

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.,⁶ Thilip kumar et al.,⁷ and Aghore Debbarma et al.,⁸.

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. 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.

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/m²) and pre-hypertension ($p=0.000$) which is comparable with the studies like Maria C et al.,⁸ Wang WJ, et al.,⁹ Aida et al.,¹⁰ Hawale.,¹¹ 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.

Conclusion :

In the present study we conclude that the 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.

Authors’ Contribution:

1. Conception or design of the work: Dr. Gundola Harigopal Midhun Kumar
2. Data collection.- Dr. Mahendran Chandran,
3. Data analysis and interpretation.- Dr. Pandiyan Krishnan Rajendrakumar,
4. Drafting the article.- Dr. Shankar Kanagasabapathy,
5. Critical revision of the article: Dr. Kokila Selvaraj

Final approval of the version to be published: Dr. Gundola Harigopal Midhun Kumar

References

1. Kotpalliwar MK, Wanjari A, Acharya S. Prevalence of pre hypertension in young healthy individuals and its associated risk factors. Indian J Med Health 2013;2(3):242-8.
2. Chobanian AV, Bakris GL, Black HR, et al. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension 2003; 42:1206–1252.
3. Kini S, Kamath VG, Kulkarni MM, Kamath A, Shivalli S. Pre-Hypertension among Young Adults (20-30 Years) in Coastal Villages of Udupi District in Southern India: An

- Alarming Scenario. PLoS One 2016;11(4):e0154538.
4. Park K. 21st ed. Jabapur: Banarsidas Bhanot; Park's Text Book of preventive and Social Medicine 2011; p. 344–8.
 5. Patnaik A, Choudhury KC. Assessment of risk factors associated with hypertension among undergraduate medical students in a medical college in Odisha. Adv Biomed Res 2015 (11);4:38.
 6. Thilip kumar G, Prabhavathi K, Karthick N, Poornima KN and Saravanan A. Evaluation of pre-hypertension, hypertension and its associated factors among First year medical students . Asian J Pharm Clin Res 2014;7(5): 20-24.
 7. Aghore Debbarma¹, Himadri Bhattacharjya, Arpita Mohanty and Chanda Mog. Prevalence of pre-hypertension and its relationship with body mass index among the medical students of Agartala government medical college. Int J Res Med Sci 2015; 3(5):1097-1101.
 8. Maria C, Kuschnir C and Gulnar AS. Mendonça. Risk factors associated with arterial hypertension in adolescents. J. Pediatr Rio J 2007; 83(4):335-342.
 9. Clarke WR, Schrott HG and Bums TL. 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.
 10. Aida Bendo, Ferdinand Mara, Bashkim Delia. A Study of the Level of Obesity Among Children Aged 6-18 Years in the City of Berat. International Journal of Current Research and Review 2021;13(11):159-163.
 11. Hawale D, Ambad R, Hadke S, Anjankar A. Correlation of HBA1C with UACR and Serum Creatinine Level in Type 2 Diabetes Mellitus. International Journal of Current Research and Review 2021;13(11):188-192.