



## A STUDY ON PREVALENCE OF PREHYPERTENSION AND HYPERTENSION AMONG DEGREE COLLEGE STUDENTS

**Dr Sandhya Rani Javalkar\***

Associate Professor, Department of Community Medicine, JJM Medical College, MCC B block, Davangere- 577004 \*Corresponding Author

### ABSTRACT

**Introduction:** The pressure of flowing blood on the walls of the body's arteries, or main blood vessels, is known as blood pressure. When blood pressure is excessively high, it is known as hypertension. **Objectives:** To study the prevalence and determinants of pre-hypertension and hypertension among degree college students, and to assess the association between pre-hypertension, hypertension and some known risk factors. **Material And Methods:** An analytical cross sectional study was carried out among young adults, aged 18 to 23 years, attending degree college. 285 study participants were included in the study. Global School-based Student Health Survey (GSHS) questionnaire, which was used for data collecting Anthropometric measurements and blood pressure recordings were conducted for all the study participants. The data collected was entered and analysed using SPSS software. **Results:** A total of 285 study participants were included in the study, among them 153(53.6%) were males and 132(46.3%) were females. The mean age was 21.78 years (21.78±0.954). Students were categorised into three groups based on their blood pressure status. Normotensive students comprised 61.4% (n = 175), prehypertensive students accounted for 31.5% (n=90), and hypertensive students represented 7.1% (n=20). Dietary practices, physical activity and nutritional status association with hypertension and pre hypertension were to be found significant in the study (P<0.005) **Conclusion:** This study elucidates the prevalence of elevated blood pressure in degree college and examines the correlation between unhealthy diet, poor physical activity, high body mass index and increased blood pressure

**KEYWORDS :** Hypertension, Pre-hypertension, Body Mass Index

### INTRODUCTION

The pressure of flowing blood on the walls of the body's arteries, or main blood vessels, is known as blood pressure. When blood pressure is excessively high, it is known as hypertension. It's a serious medical disorder that raises the chance of cardiovascular, neurological and renal diseases. Obesity, glucose intolerance, dyslipidaemia, and other risk factors appear to be linked to hypertension.<sup>1</sup>

It is widely recognised that the prevalence of hypertension is increasing in both developed and developing countries.<sup>2</sup> Hypertension and pre-hypertension can start in adolescent, possibly in the early stages of life, and last throughout adulthood, according to several studies.<sup>3</sup>

Pre Hypertension prevalence increases with age, according to a recent study.<sup>4</sup> According to a regional survey, blood pressure readings in both boys and girls rose steadily with age.<sup>5</sup> Prehypertension has also been linked to an increased risk of cardiovascular disease. According to the Framingham Heart Study, prehypertensive individuals have a more than twofold increased relative risk of cardiovascular disease when compared to those with normal blood pressure.<sup>6</sup>

According to research, pre-hypertension is linked to an elevated risk of severe cardiovascular events, as independent risk factors. Prehypertension is linked to a threefold rise in the incidence of hypertension over a four-year follow-up period, according to another study.<sup>7,8</sup> Although several research on hypertension have been undertaken, there are less investigations on prehypertension and hypertension among college-aged young adults in India. Identifying hypertension and prehypertension risk factors among college students is critical for developing risk-reduction measures, especially for those with prehypertension. Thus, this study is designed with objective to study the prevalence and determinants of pre-hypertension and hypertension among degree college students, and to assess the association between pre-hypertension, hypertension and some known risk factors.

### MATERIAL AND METHODS

An analytical cross sectional study was carried out among young adults, aged 18 to 23 years, attending degree college in Davanagere, Karnataka. The study was conducted for a period of 8 months from Jan-Dec 2022. Permissions from the head of the institutes and ethical clearance form institutional ethical committee was obtained prior to initiation of the study. Considering the prevalence of pre-hypertension of 24.5% alpha error of 5% and confidence level 98%, sample size of 285 was estimated.<sup>9</sup>

The study participants were randomly selected, during the day to data collection. Written informed consent was collected from all study participants. Inclusion criteria included the degree college students

present during the day of data collection.

The World Health Organisation (WHO) developed the Global School-based Student Health Survey (GSHS) questionnaire, which was used for data collecting including respondents' socio-demographic information and risk behaviours associated with tobacco and alcohol consumption, dietary practices, and physical activity.<sup>10</sup>

Anthropometric measurements and blood pressure recordings were conducted for all the study participants. Height was recorded using a Stadiometer, a ruler with a sliding headpiece fixed above the head is used to record the distance from the bottom of the feet to the top of the head while standing upright, height was measured to the closest centimetre. Weight was recorded using a weighing scale, with the child standing with both feet on the scale so weight is evenly distributed; Weight was measured to the closest 500 grammes. BMI is calculated by dividing weight in kilograms by their height in metres squared. Blood pressure was assessed by the qualified team members via a mercury sphygmomanometer. Measurements were conducted on the right arm of the individuals who were sitting and at rest for five minutes. Blood pressure was assessed three times during a span of 10 minutes. The final observation was determined by the average of all three measurements.

The Joint National Committee (JNC) report delineated blood pressure (BP) categories as follows: normal blood pressure is defined by a systolic blood pressure (SBP) ranging from 91-120 mm Hg or a diastolic blood pressure (DBP) from 61-80 mm Hg; pre-hypertension (pre-HTN) is characterised by an SBP between 121-139 mm Hg or a DBP between 81-89 mm Hg; hypertension (HTN) is indicated by an SBP of 140 mm Hg or higher and a DBP of 90 mm Hg or higher; finally, hypotension is defined as an SBP of 90 mm Hg or lower or a DBP of 60 mm Hg or lower.<sup>11,12</sup>

The data collected was entered and analysed using SPSS software. The data expressed in form of frequency, percentages, mean and standard deviation, graphs. Chi Square used for test of statistical significance. Continuous data student t test used for statistical mean difference between the two groups or variables. p value: < 0.05 will be considered as statistical significance.

### RESULTS

A total of 285 study participants were included in the study, among them 153(53.6%) were males and 132(46.3%) were females. The age range of study subjects was 18 - 23 years. The mean age was 21.78 years (21.78±0.954)

Students were categorised into three groups based on their blood pressure status: normotensive, prehypertensive, and hypertensive. No cases of hypotension were identified. Normotensive students

comprised 61.4% (n = 175), prehypertensive students accounted for 31.5% (n = 90), and hypertensive students represented 7.1% (n = 20). Descriptive statistics for systolic and diastolic blood pressure are presented in Table 1.

**Table 1: Distribution Of Study Participants According To Blood Pressure**

| Variable                 |        | Normotensive | Prehypertensive | Hypertensive |
|--------------------------|--------|--------------|-----------------|--------------|
| Systolic Blood Pressure  | Mean   | 108          | 124.4           | 142          |
|                          | SD     | 7.9          | 10.2            | 14           |
|                          | Median | 108          | 124             | 138          |
| Diastolic Blood Pressure | Mean   | 72           | 82              | 90           |
|                          | SD     | 7            | 9               | 6            |
|                          | Median | 70.8         | 80              | 90           |

In this study, with regard to gender, 38.5% of males and 38.6% of females were either pre-hypertensive or hypertensive and the difference was not statistically significant ( $P=0.88$ ). Among the high socio-economic group 37.6 % and among the low socio-economic group 39% were either pre-hypertensive/ hypertensive and the difference was not significant ( $P=0.83$ ). Dietary practices (consuming junk food), physical activity and nutritional status were to be found significant in the study ( $P<0.005$ ), as shown in table 2.

In this study, we also co related factors as family history of hypertension, tobacco smoking and alcohol use which did not show statistically significant association with blood pressure.

**Table 2: Association Of Blood Pressure With Other Variables**

| Variable              |                        | Normal (n=175) | Prehypertension and Hypertension (n=110) | Total | P value |
|-----------------------|------------------------|----------------|------------------------------------------|-------|---------|
| Gender                | Male                   | 94             | 59                                       | 153   | 0.88    |
|                       | Female                 | 81             | 51                                       | 132   |         |
| Socio Economic status | High                   | 53             | 32                                       | 85    | 0.83    |
|                       | Low                    | 122            | 78                                       | 200   |         |
| Junk foods            | <2 times per week      | 43             | 52                                       | 95    | 0.007   |
|                       | >2 times per week      | 132            | 58                                       | 190   |         |
| Physical activity     | <3 times per week      | 153            | 22                                       | 175   | 0.001   |
|                       | >3 times per week      | 22             | 88                                       | 110   |         |
| Nutritional status    | Underweight and normal | 143            | 42                                       | 185   | 0.001   |
|                       | Overweight and Obese   | 32             | 68                                       | 100   |         |

## DISCUSSION

In this study we observed that normotensive students comprised 61.4%, prehypertensive students accounted for 31.5%, and hypertensive students represented 7.1%. A comparable research indicated that the prevalence of hypertension among Iranian college students was 23.8%.<sup>13</sup> A research conducted by Al-Shaibani H et al., revealed the prevalence of hypertension 11.8%.<sup>14</sup> A similar study conducted among young adults in Kuwait reported the proportion of prehypertension and hypertension in college students were 39.4 and 7%, respectively.<sup>15</sup>

In this study, with regard to gender, 38.5% of males and 38.6% of females were either pre-hypertensive or hypertensive and the difference was not statistically significant. Nonetheless, both hypertension and pre-hypertension are reportedly much more common in men than in females. This may be attributed to the disparities in hormonal activity between males and females throughout early development.<sup>16,17</sup>

Low socioeconomic status emerged as a major risk factor for elevated blood pressure many studies; research from India indicate that illiteracy

and poor socioeconomic status are independent risk factors for cardiovascular disease.<sup>18,19</sup> However, in this study we did not find a statistically significant association.

Prior research indicated that blood pressure rose considerably with an increase in Body Mass Index (BMI).<sup>20</sup> A research conducted among young adults indicated a 14% greater likelihood of developing prehypertension or hypertension with each unit rise in BMI.<sup>21</sup> A similar study identified elevated BMI as one of the most significant risk factors for hypertension.<sup>22</sup> The current research corroborated the findings of previous studies about overweight or obesity.

In this study, we observed dietary practices, physical activity and nutritional status were to be found significant in the study ( $P<0.005$ ), a study done among young adults reported that low values of systolic and diastolic blood pressure were identified in adolescents with a consumption of health diet.<sup>23</sup> A similar study conducted by Jayanth et al., reported young adults who were smoking/ consumed alcohol in have a high risk developing these habits, which would then increase the risk of increased blood pressure.<sup>24</sup>

## CONCLUSION

This study elucidates the prevalence of elevated blood pressure in degree college and examines the correlation between unhealthy diet, poor physical activity, high body mass index and increased blood pressure. The significant incidence of prehypertension requires immediate management via counselling on lifestyle modifications. The results may inform the creation of messages for health education classes aimed at young adults, enhancing their awareness of the dangers associated with high blood pressure and its behavioural determinants.

## REFERENCES

- World Health Organization. The World Health Report 2002: Reducing risks, promoting healthy life. Geneva, Switzerland; 2002.
- Kaerney PM, Whelton M, Reynolds SK, Munter P, Whelton PK, He J. Global burden of hypertension: An analysis of world wide data. *Lancet* 2005;365:217-23.
- Ejike CE, Ugwu CE, Ezeanyika LU. Variations in the prevalence of point (pre) hypertension in a Nigerian school-going adolescent population living in a semi-urban and an urban area. *BMC Pediatr* 2010;10:13-7.
- Kitai E, Vinker S, Halperin L, Meidan A, Grossman E. Prehypertension is a common phenomenon: National database study. *Isr Med Assoc* 2007;9:8-11.
- Al-Salloum AA, El-Mouzan MI, Al Herbish AS, Al Omar AA, Qurashi MM. Blood pressure standards for Saudi children and adolescents. *Ann Saudi Med* 1009;29:173-8.
- Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC7 Report. *JAMA*. 2003;289(19):2560-72.
- Liszka HA, Mainous AG, King DE, Everett CJ, Egan BM. Pre-hypertension and cardiovascular morbidity. *Ann Fam Med*. 2005;3:294-9.
- Ferguson TS, Younger N, Tulloch-Reid MK, Lawrence-Wright MB, Forrester TE, Cooper RS, Van den Broeck J, Wilks RJ. Progression from prehypertension to hypertension in a Jamaican cohort: incident hypertension and its predictors. *The West Indian medical journal*. 2010 Oct;59(5):486.
- Madhavikutty Amma GD, Vasudevan B, Akshayakumar S. Prevalence and determinants of prehypertension and hypertension among adolescents: a school based study in a rural area of Kerala, India. *Int J Res Med Sci* 2015;3:58-64.
- World Health Organization. Global School-based Student Health Survey (GSHS). Available at [https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/gshs/2018-gshs-core-modules-english.pdf?sfvrsn=d49eb117\\_4&download=true](https://cdn.who.int/media/docs/default-source/ncds/ncd-surveillance/gshs/2018-gshs-core-modules-english.pdf?sfvrsn=d49eb117_4&download=true) last accessed on 11.11.24
- Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo Jr JL, Jones DW, Materson BJ, Oparil S, Wright Jr JT, Roccella EJ. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. *Jama*. 2003 May 21;289(19):2560-71.
- Rois R, Ray M, Rahman A, Roy SK. Prevalence and predicting factors of perceived stress among Bangladeshi university students using machine learning algorithms. *Journal of Health, Population and Nutrition*. 2021 Dec;40:1-2.
- Alikhani S, Delayari A, Alaadini F, Kelishadi R, Rohbani S, Safaei A. A province-based surveillance system for the risk factors of noncommunicable diseases: A prototype for integration of risk factor surveillance into primary health care systems of developing countries. *Public Health* 2009;123:358-64.
- Al-Shaibani H, El-Batish M, Sorkhoul I, Al-Shamali N, Al-Namash H, Habiba S, et al. Prevalence of Insulin Resistance Syndrome in a Primary Health Care Center in Kuwait. *Fam Med* 2004;36:540.
- Al-Majed HT, Sadek AA. Pre-hypertension and hypertension in college students in Kuwait: a neglected issue. *Journal of family and community medicine*. 2012 May 1;19(2):105-12.
- Oleda NB, Grigore D, Robertson EB, Alexander BT. Estrogen protects against increased blood pressure in postpubertal female growth restricted offsprings. *Hypertension* 2007;50:679-85.25.
- Hulanicka B, Lipowicz A, Koziel S, Kowalsko A. Relationship between early puberty and the risk of hypertension / overweight at age 50: Evidence for a modified Barker hypothesis among Polish youth. *Econ Hum Biol* 2007;5:48-60.
- Joshi PP, Islam S, Pais P, Reddy KS, Prabhakaran D, Kazmi K, et al. Risk factors for early myocardial infarction in South Asians compared with individuals in other countries. *JAMA*. 2007;297:286-94.
- Gupta R, Gupta VP, Ahluwalia NS. Educational status, coronary heart disease and coronary risk factor prevalence in a rural population of India. *BMJ*. 1994;309:1332-6.
- Thompson D, Edelsberg J, Colditz GA, Bird AP, Oster G. Life time health and economic consequences of obesity. *Arch Intern Med*. 1999;159(18):2177-83.
- Sreedharan J, Mathew E, Muttappallymalil J, Sharbati SA, Shaikh RB, Basha

- SA. Determinants of blood pressure among youth in Ajman, UAE. *Natl J Epidemiol*. 2010;1(1):17-21.
22. Berenson GS, Srinivasan SR, Bao W, Newman WP, Tracy RE, Wattigney WA. Association between multiple cardiovascular risk factors and atherosclerosis in children and young adults. The Bogalusa heart study. *N Engl Med*. 1998;338(23):1650-6.
23. Damasceno MM, de Araiyo MF, de Freitas RW, de Alemdia PC, Zandli MI. The association between blood pressure and consumption of fruits, vegetables and fruit juice. An exploratory study. *J Clin Nurs*. 2011 Jun;20(11-12):553-60
24. Jayanth K, Notani PN, Gualti SS, Gadre VV. Tobacco usage in school children in Bombay, India. A study of knowledge, attitude and practice. *Indian J Cancer*. 1991;28:139-47