

## Hypertension: The Undetected Base of an Iceberg

Prachi Jasuja<sup>1</sup>, Dolly Mehta<sup>2</sup>, Salil Sakalle<sup>3</sup>, Shivam Dixit<sup>4</sup>, Priyanka Mahawar<sup>5</sup>,  
Chandra Gopal Dogne<sup>6</sup>, Yusuf Kagzi<sup>7</sup>

<sup>1</sup>PG Resident, Department of Community Medicine, MGM Medical College & MY Hospital, Indore (M.P.), <sup>2</sup> Assistant Professor, Department of Community Medicine, Sri Aurobindo Medical College, Indore (M.P.), <sup>3</sup> Professor and Head, Department of Community Medicine, MGM Medical College & MY Hospital, Indore (M.P.), <sup>4</sup> Assistant Professor (Statistics and Demography), Department of Community Medicine, MGM Medical College & MY Hospital, Indore (M.P.), <sup>5</sup>Associate Professor, Department of Community Medicine, MGM Medical College & MY Hospital, Indore (M.P.), <sup>6</sup>PG Resident Department of Community Medicine, MGM Medical College & MY Hospital, Indore (M.P.), <sup>7</sup>Yusuf Kagzi Research Scholar Department of Neurology, McGovern Medical School (UT Health), University of Texas Health Science Center at Houston, TX, United States.

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### Abstract

**Introduction:** Hypertension is a major public health problem due to its high proportion all around the globe. Hypertension is a major cause of premature death worldwide. An estimated 1.28 billion adults aged 30–79 years worldwide have hypertension, most (two-thirds) living in low and middle-income countries.

**Aims and Objectives:** To estimate proportion of undiagnosed hypertensive cases in >30 years age group.

**Materials and Methods:** A Pre-designed and semi-structured questionnaire was interviewed to the patients after taking their consent who were fulfilling the inclusion criteria, after that their blood pressure was measured using the appropriate tools. Data was entered in Microsoft excel spread sheet and analysed using Rsoftware. Chi square test and Kruskal Wallis H test was applied.

**Results:** The proportion of hypertension was 32.9% (male: 40.9%, female: 26.0%). Mean systolic and diastolic BP were 124.25±15.05 mmHg and 83.45±9.49 mmHg, respectively. Higher odds of being hypertensive were found in male subjects, eldest age group, married subjects, subjects of upper socioeconomic status, illiterate subjects, and retired subjects. Tobacco and alcohol consumption, overweight, obesity, and abdominal obesity were also associated with hypertension.

**Conclusion:** Around one-third of the subjects were hypertensive and half of the study subjects were prehypertensive in this area. The awareness, treatment, and control of high blood pressure were also very low.

**Keywords:** Hypertension, Pre-hypertension, Undiagnosed, Awareness.

**Corresponding Author:** Priyanka Mahawar, Associate Professor, Department of Community Medicine, MGM Medical College & MY Hospital, Indore (M.P.).

**E-mail:** pjasuja1996@gmail.com

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## Introduction

Hypertension is a major public health problem due to its high proportion all around the globe. Hypertension is a major cause of premature death worldwide. An estimated 1.28 billion adults aged 30–79 years worldwide have hypertension, most (two-thirds) living in low- and middle-income countries. An estimated 46% of adults with hypertension are unaware that they have the condition. Less than half of adults (42%) with hypertension are diagnosed and treated. Approximately 1 in 5 adults (21%) with hypertension have it under control. One of the global targets for noncommunicable diseases is to reduce the prevalence of hypertension by 33% between 2010 and 2030.<sup>(1)</sup> Hypertension can be classified according to JNC-8 classification.<sup>(8)</sup> It is a silent killer as very rarely any symptom can be seen in its early stages until a severe medical crisis takes place like heart attack, stroke, or chronic kidney disease<sup>(2,3,4)</sup> Since people are unaware of excessive blood pressure, it is only through measurements that detection can be done. Although majority of patients with hypertension remain asymptomatic, some people with HTN report headaches, light headedness, vertigo, altered vision, or fainting episode. There are several factors predisposing to hypertension. These factors vary from country to country and even there is difference between urban and rural regions of the same place.<sup>(5)</sup> Realizing the effect of urbanization on our collective Hindawi International Journal of Hypertension Volume 2017, Article ID 5491838, 10 pages <https://doi.org/10.1155/2017/5491838> 2 International Journal of Hypertension health<sup>(11)</sup> World Health Organization has chosen “Urbanization and Health” as the theme for World Health Day 2010.<sup>(6)</sup> Rapid urbanization, increasing elderly population, mechanization, sedentary life, and dietary changes act together as a web of risk factors which entangles people in it and leads to several chronic diseases. In order to take effective prevention measures, identification of the risk factors is an essential prerequisite. This study intends to generate information on proportion of hypertension and their associated risk factors in an urban area of Indore. In addition, it will also look into the awareness and control of hypertension among the study subjects.

## Aims and Objectives:

- To estimate proportion of undiagnosed hypertensive cases in >30 years age group.
- To find out the relationship between other physiological and environmental variables.
- To find out the relationship between various comorbidity factors.
- To assess relationship with addiction.

## Methodology

A Pre-designed and semi-structured questionnaire was interviewed to the patients after taking their consent who were fulfilling the inclusion criteria, after that their blood pressure was measured using the appropriate tools. Data was entered in Microsoft excel spread sheet and analysed using R software. Kruskal Wallis H test and Chi Square test was applied.

**Study Design:** Cross-sectional Study.

**Study Area:** Indore has total population of 1,964,086 as per Census 2011. Indore consists of 85 wards (12) out of which 5 wards were taken for study which are as follows: Azad Nagar, Vijay Nagar, Geeta Nagar, Alok Nagar, Samvid Nagar.

**Study Population:** A multistage sampling was used for this study. There were three stages and for each stage different sampling design was used. At first, out of these 85 wards, 5 wards were selected by using simple random sampling. At second stage, from each selected ward the households were further selected by using systematic random sampling and probability proportional to size was done. At the third stage, one member of target age group was interviewed from selected household. If the selected family has more than one available eligible person.

**Sample Size:** A community based cross-sectional study was carried out among the people aged >30 years living in the selected study area. The sample size for the present study was calculated by taking prevalence of hypertension as 29.8%<sup>(7)</sup> and permissible error as 7% with 95% confidence interval. Fixing the permissible error as 7%, the minimum sample size was calculated as  $n = 170$ . After adding 10% attrition,  $n = 187$  which was further rounded off to 200.

**Inclusion Criteria:**

- People above 30 years of age & giving consent.
- People with no history of hypertension.
- People with any related comorbidity factors.

**Exclusion Criteria:**

- The study subjects who will not give consent for the study and measuring Blood Pressure.
- Any previous history for diagnosis of hypertension.

- Subject of less than 30 years of age.

**Study Tools:**

- Pre tested and Pre designed Semi structured Questionnaire for population more than 30 years of age.
- Manual Blood Pressure measuring tool - Diamond Mercury-free BP apparatus Model No. BPDG034

**Table: 1. Association of various factors with Pre-hypertension and Hypertension**

Age (In Yrs)	Normotensives (N=25)	Pre-Hypertensives (N=95)	Hypertensives (N=80)	Total
30-39	12(16.2%)	48 (64.9%)	14 (18.9%)	74(37%)
40-49	5(19.2%)	9 (34.6%)	12 (46.2%)	26 (13%)
50-59	3(8.9%)	13 (38.2%)	18 (52.8%)	34 (17%)
60&Above	5(7.6%)	25 (37.9%)	36 (54.5%)	66 (33%)
P Value	0.0458			
<b>Family History:</b>				
Yes	9(16.7%)	18(33.33%)	27(50%)	54(27%)
No	16(10.9%)	77(52.7%)	53(36.4%)	80(40%)
P Value	0.0497			
<b>Time:</b>				
No Exercise	20(15.3%)	63(48.1%)	48(36.6%)	131(65.5%)
<15Min	0(0%)	22(56.4%)	17(43.6%)	39(19.5%)
20-30Min	4 (44.5%)	0(0%)	5 (55.5%)	9 (4.5%)
30-60Min	0(0%)	10 (50%)	10 (50%)	20 (10%)
>60min	1 (100%)	0(0%)	0(0%)	1 (0.5%)
Total	0.0003			
<b>Long Standing Illness:</b>				
Diabetes Mellitus	0(0%)	2(28.6%)	5(71.4%)	7(3.5%)
Asthma	0(0%)	0(0%)	11(100%)	11(5.5%)
Tuberculosis	0(0%)	3(20%)	12(80%)	15(7.5%)
Rheumatoid Arthritis	0(0%)	0(0%)	4(100%)	4(2%)
No Illness	25(15.4%)	90(55.2%)	48(29.4%)	163(81.5%)
Total	25(12.5%)	95(47.5%)	80(40%)	200(100%)
<b>Stress Levels:</b>				
Mild(1-4)	5(5%)	50(50%)	45(45%)	100(50%)
Moderate(5-8)	15(16.7%)	40(44.4%)	35(38.9%)	90(45%)
Severe(9-10)	5(50%)	5(50%)	0(0%)	10(5%)
P Value	0.001			
<b>Addiction:</b>				
No Addicton	4(100%)	0(0%)	0(0%)	4(2%)

Continue.....

Tea Only	21(14.9%)	79(56%)	41(29.1%)	141 (70.5%)
Alcohol Only	0(0%)	0(0%)	1(100%)	1(0.5%)
Tea+ Alcohol	0(0%)	10(35.7%)	18(64.3%)	28(14%)
Tea+Smoking	0(0%)	0(0%)	7(100%)	7(3.5%)
All Three	0 (0%)	6(31.6%)	13(68.4%)	19(9.5%)
P Value	0.0003			

## Results

It was seen that 54.5% of the subjects above 60 years of age were hypertensive while only 18.9% of the subjects between 30-39 years were hypertensive, while 64.9% of the subjects between 30-39 years were pre-hypertensive while 37.9% of the subjects above 60 years of age were pre-hypertensive. On applying KRUSKAL WALLISHTEST, P value found is 0.0458. Hence it is proving that there is significant relation between Age and stages of hypertension. In our study, 50% of the hypertensives had a positive family history for it. On applying CHI SQUARE TEST, P value found is 0.0497. Hence it is showing that there is significant relation between family history and stages of hypertension. It was found that the maximum study subjects didn't have any longstanding illness and majority of the patients with any above long standing illnesses were found to be hypertensive. Among subjects suffering from asthma and Rheumatoid arthritis, 100% were found to be hypertensives whereas and among subjects having no long standing illness, 55.2% were pre-hypertensives and 29.4% were found suffering from hypertension. It was found that 65.5% of the subjects said that they don't exercise. On applying CHI SQUARE TEST, P value found is 0.0003. Hence it is showing that there is significant relation between exercise and stages of hypertension. It can be said that most of the subjects did not exercise daily which may have an effect on their blood pressure causing it to increase. It was seen that 57.1% of the male subjects were hypertensive while only 21.1% of females were hypertensive and 64.2% females were pre-hypertensive while 32.4% males were pre-hypertensive. It was seen that stress levels have significant association with hypertensives and pre-hypertensives with p value of 0.001. It was seen that 70.5% subjects had an addiction for only tea and 64.3%, 68.4% & 100% of subjects who consumed tea & alcohol, tea & smoking & all three respectively had hypertension. On applying CHI SQUARE TEST, P value found is <0.001. Hence it is showing that there is significant relation between Different Addiction and stages of hypertension.

## Discussion

- In our study, the proportion of hypertension was 40% (male:57.1%, female:21.1%) and that of prehypertension was 47.5% (male: 32.4%, female:64.2%) while according to the study conducted in urban Area of Bagalkot City, North Karnataka, the proportion of hypertension was 22.3% in males when compared to 15.4% females.<sup>(9)</sup>
- In our study, 50% of the hypertensives had a positive family history while in a study done in urban area of Bagalkot City, North Karnataka 30% had positive family history of hypertension, whereas 71.4% had no such history.<sup>(9)</sup>
- In our study, 50% of the hypertensives had a positive family history while in a study done in urban area of Bagalkot City, North Karnataka 30% had positive family history of hypertension, whereas 71.4% had no such history.<sup>(9)</sup>
- **In our study the socioeconomic association was found maximum in upper middle class** and same was found in the study conducted in Varanasi in 2017.<sup>(10)</sup>
- **In our study, we found maximum hypertensives and pre-hypertensives in the subjects were people who didn't exercise** and according to the study conducted in Varanasi in 2017, it found inverse association between physical activity and hypertension and similar result was reported by other studies conducted in Turkey.<sup>(10)</sup>
- **In our study we found maximum proportion of hypertensives and prehypertensives in subjects who were either Illiterate or studied till primary school** and according to the study conducted in Varanasi in 2017, low literacy level was significantly associated with hypertension and higher education had a healthier lifestyle.<sup>(10)</sup>

- According to WHO, alcohol consumption was third largest risk factor of cause of death worldwide and in our study we found high blood pressure in subjects who consumed alcohol & smoked while in the study conducted in Varanasi in 2017, hypertension was more prevalent in alcoholics.<sup>(10)</sup>

#### Recommendations:

- Hypertension is a condition which is present in many people without them knowing it, owing to its vague non-specific symptoms. Since it has severe complications which can be avoided by proper blood pressure control, screening of the mass population and their counselling is necessary to avoid complications in the masses.
- The general population should be made aware about the signs, symptoms and complications of Hypertension.
- The government should provide screening services for the masses for active case detection in hypertension to find out all people who are having hypertension and provide counselling and referring services as required. This will decrease the burden of many non-communicable diseases in the population.
- The general population should be made aware about the importance of regular exercising, lower salt intake and other relevant lifestyle changes in order to prevent hypertension in them.

#### Limitations:

The findings are based entirely upon the study conducted in Indore city (general population) in selected urban areas. Time duration of study was limited (5 months). In our study, we couldn't find any association between abdominal obesity and hypertension as waist and hip circumference couldn't be measured. The results are entirely based on answers given to the questionnaire, so there is a possibility that some questions may be misinterpreted or intentionally wrongly answered.

**Ethical Clearance:** The study was started after obtaining the ethical approval from Institutional Ethic Committee, MGM Medical College and MY hospital, Indore.

**Conflict of Interest:** There was no conflict of interest.

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