# Screening of Hypertension as a Predictable Risk Factors in Metabolic Syndrome in Urban and Rural Populations

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## Abstract

**Background**: The Global Burden of Diseases study has reported that hypertension is the most important cardiovascular risk factor in this region and responsible for the largest burden of disease and mortality. Present estimates suggest that a 2 mm Hg population -wide decrease in systolic BP can lead to prevention of more than 181,000stroke and 183,000 coronary heart disease deaths in India. Hypertension is the new era pandemic which is the leading cause of mortality in the world and is ranked third as a cause of disability-adjusted life years. HTN (also known as high blood pressure) affects millions of people. High BP is defined as BP = 140/90 mmhg. Approx. 77.9 million American adults & approx. 970 million people worldwide have high Bp. It is estimated that by 2025, 1.56 billion adults will be living with HTN. The overall is similar b/w both men & women but differ with age. For those younger than 45 years old, high BP is more common in men than women. For those 65 years old or older, high b p affects women more than men. BP value increases with age and HTN is very common with elderly. The life time risk of developing HTN among those 53 yrs of age and older who currently have normal BP is 90%. African Americans (47% women 43 % in men) develop high blood pressure more often & at an earlier age, followed by concussions (31% in women, 33 % in male) & Mexicans Americans (29% in women, 30 % in men). HTN costs the nation approx. 147.5 billion each year. This includes the cost of health care services, Medicare's to treat high b p and missed days of workers. Escalating cardiovascular risk factors such as smoking, high blood pressure (BP), high low-density lipoprotein (LDL) cholesterol, low high-density lipoprotein (HDL) cholesterol, metabolic syndrome and diabetes are the major risk factors associated with the increasing CVD in India. **Aim**: The aim and objectives of the study were to estimate and compare the prevalence of hypertension among urban and rural population; and to assess the factors associated with Hypertension among the study population. The present study will estimate the prevalence of hypertension and identify & compare some socio- demographic and lifestyle risk factors associated with urban and rural population of Hapur. **Methods**: The present study was a across-sectional study conducted in Saraswathi institute of medical Sciences, district Hapur. Hapur is a small town in western U.P. Study included a total of1000 subjects from urban and rural population of Hapur. Individuals greater than 18 years of age were included. Data regarding basic demographic characteristics were collected along with anthropometric measurements including height and weight. They were randomly selected from urban and rural populations of Hapur using modified luster sampling method. Three Blood Pressure readings were recorded using mercury sphygmomanometer in the sitting position and the mean of two was considered for analysis. Data entry and analysis was done using SPSS20 for windows version 8.1.

**Results:** The prevalence of hypertension was high in urban area (31.4%). Though prevalence of hypertension in rural area is low when compared to urban, it can be observed that it is increasing over time to match the urban rate. Most of the study population belonged to age group of2 0–29yrs (27%) followedby50–59yrs (19%).45% of the study population was constituted by males and the rest 55% by females. The prevalence of hypertension was 23% in the present study, which is compare able to the estimates given by World Health Organization (23%).Around 33% o the population had blood pressure in the normal range and 47% of the population had pre-hypertension. The prevalence of hypertension was 30% in the urban areas and 16% in the rural areas. This difference was found to best artistically insignificant.
**Conclusions:** ANO. of risk factors were attributed for the development of hypertension–increasing age, sedentary occupation, higher socio – economic status, extra salt intake, family history of hypertension, reduced physical activity, tobacco smoking, smokeless tobacco consumption, alcohol consumption, BMI≥25and high waist- hip ratio.

**Keywords**:- Hypertension, stroke, risk factors, population.

## INTRODUCTION

The Global Burden of Diseases study has reported that hypertension is the most important cardiovascular risk factor in this region and responsible for the largest burden of disease and mortality.[1] Hypertension is the new era pandemic which is the leading cause of mortality in the world and is ranked third as a cause of disability-adjusted life years.[1] The World Health Organization and the seven three port of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure (JNC-7) and (JNC-8) defines hypertension as systolic blood pressure more than or equal to 140mmHgand/or diastolic blood pressure more than or equal to 90mmHg.[2,3] Since then prevalence of hypertension in Indian cities has been steadily increasing from 3.0-4.5% in early

1960's to 11.0 to 15.5% in mid 1990's. People with hypertension possess two folding her risk of developing coronary artery disease, four times higher risk of congestive heart failure and seven times higher risk of cerebrovascular disease compared to normotensive people.[4,5,6] Cardiovascular disease is a model of chronic degenerative disease, and at present is the leading cause of death worldwide, accounting for >15 million deaths each year.[7] According to 2020 WHO projections, Hypertension and its complications, will be the most important cause of morbidity and death worldwide, with high costs to health-care systems. Because of changes in life style, changes in environment and increased life expectancy the problem of hypertension is on the rise. Recent data suggests that non-communicable diseases are already the commonest cause of death in many parts of rural India.[8,9] The goal BP as

recommended by WHO/ISH,ESH/ESC, JNC-7HP T report of US and GST G of MOH, is that both systolic and diastolic BPs, be lowered intensively to at least below140/90mmHg and to lower values if tolerated, in all Hypertension patients, and to below 130/80mmHg in diabetics.[10] The actual burden of Hypertension in urban and rural India is often underestimated. Most of the cases go undetected and the patient's untreated leading to complications. There is a felt need to define actual burden of the disease and to deter mine the geographic differences in the prevalence of hypertension and the risk factors associated with it. Hypertension it is readily detectable, easily treat able condition and if left untreated may leads to serious complications.[8] In consider able proportion of cases the disease tends to be a symptomatic for prolonged time, hence also labeled as 'Silent Killer'. Hypertension is also considered as an 'Iceberg' disease' because unknown morbidity far exceeds the known morbidity.[11,12] Estimation of hypertension prevalence is therefore necessary to plan effective control measures. There is need for community based study in urban and rural population in view to determine the geographic differences in the prevalence of hypertension and the various risk factors. jNC-7 recommended five medication classes for HTN. HTN (also known as high blood pressure) affects millions of people. High BP is defined as BP = 140/90 mmhg.[9] Approx. 77.9 million American adults &approx. 970 million people worldwide have high Bp. It is estimated that by 2025, 1.56 billion adults will be HTN.[2,3,4,5,6,7] The overall is similar b/w both men & women but differ with ages.[9] For those younger than 45 years old, high BP is more common in men than women.

For those 65 years old or older, high bp affects women more than men. African Americans (47% women 43 % in men) develop high blood pressure more often & at an earlier age, followed by concussions (31% in women, 33 % in male) & Mexicans Americans (29% in women, 30 % in men). HTN costs the nation approx. 147.5 billion each year. This includes the cost of health care services, Medicare's to treat high b p and missed days of workers. JNC-8 do not include Beta blockers initial treatment. Beta Blockers should be used as primary therapy if a patient has a compelling indical.[13,14]

## Risk Factors

There are various risk factors associated with hypertension; some of the known risk factors for primary hypertension like age, heredity, and gender are non-modifiable. However, the majority of the other risk factors like to because, alcohol use, unhealthy diet, physical in activity, over weight and obesity can be effectively prevented.[15,16,17] There are differences in these risk factors in urban and rural populations depending on the level of development and epidemiological transition. The control of hypertension will require modification of its risk factors and hence necessitates identifying the various risk factors associated with hypertension in the urban and rural populations of India. Thus, burden of hypertension in these populations might be under estimated and might leave the disease undiagnosed and untreated. Estimating the prevalence of hypertension and its risk factors in both the urban and rural populations is very crucial as this forms the basis for planning of primary and secondary prevention of hypertension. Hence this field based cross-

sectional study was under taken. HTN costs the nation approx 147.5 billion each year.[18,19] This includes the cost of health care services; Medicare's to treat high BP and missed days of worker.[9,10]

## Aims and Objectives

- To estimate and compare the pre valence of hypertension among urban and rural population; and to assess the factors associated with Hypertension among the study population
- To identify and compare some socio-demographic and lifestyle risk factors associated with hypertension in urban and rural populations of Uttar Pradesh.

## MATERIAL AND METHODS

The present study is a Randomized, Prospective and Comparative study in Saraswathi Institute of Medical Sciences and Hospital, Hapur (UP).

**Study Area:**
The study was conducted in District Hapur (UP), India.

**Study Period:**
The study was conducted from May 2019 to Nov 2020.

**Study Setting:**
The study was carried out from the patients of Department of General Medicine, Saraswathi Institute of Medical Sciences and Hospital, Hapur (Uttar Pradesh).

**Study Population:**
A total of 1000 individuals were recruited in the study. In the present series, the subjects were diagnosed with hypertension with no further immediate medical complications. The study was carried out in urban and rural field practice area of Hapur and Pilkhuwa. All the people with age group 20 years and above living in the study area were eligible to participate in the study.

**Selection of Cases**
**Inclusion Criteria:**
1. Adult patients (aged 18 years or more) reporting first time/ regularly associated with SIMS hospital for management of Hypertension issue are selected.
2. Only mild to moderate grade hypertensive patients were taken
3. Patients consenting for the study

**Exclusion Criteria:**
**Cases with the following findings will be excluded:**
1. Complicated/Unregulated Blood pressure
2. Patients with history of drug abuse history or history of psychiatric disorder
3. Other factors causing hypertension
4. Cancer or suspicion of malignancy
5. Patients with renal failure
6. Patients with pedal odema and patient with fluid overload
7. Patients with known kidney disease
8. Patients on haemodialysis
9. Pregnancy
10. Angina
11. Hypertensive emergency

**Study Population (Sample size):**
The sample size was calculated using the probability sampling formula below: $N = Z^2 pq / d^2$
Where, n = sample size
z = statistical certainty chosen

p = proportion of hypothyroid individuals with hypertension

q = 1- p

d = precision desired.

**Ethical Approval:**

Ethical Approval was taken from the Institutional Ethical Committee after explaining the Aim and Objectives of the Study.

**Informed Consent:**

A written Informed Consent was obtained from each patient before starting the procedure. The involvement of the subject was voluntary and deliberate.

**Study Population:**

Study was carried out in urban and rural field practice area of Hapur and Pilkhuwa. All the people with age group 20 years and above living in the study are eligible to participate in the study. A written Informed Consent was obtained from each patient before starting the procedure. The involvement of the subject was voluntary and deliberate.

**Tools used in collection of data:**

Pre-tested semi-structured Questionnaire to assess:

❖ Socio-demographic characteristics of the study participants.

❖ General physical and CVS examination in study subjects.

❖ Risk factors associated with Hypertension.

**RESULTS**

The data collection was tabulated, coded, and analyzed using Microsoft word SPSS for windows version 8.1.

**Table 1:** Distribution of Study Subjects Based on Jnc-7& 8 Classification

| Blood Pressure Classification | NO. | % |
|---|---|---|
| NORMAL | 330 | 33 |
| PRE-HYPERTENSION | 470 | 47 |
| Stage 1 Hypertension | 160 | 16 |
| Stage 2 Hypertension | 40 | 4 |
| Total | 1000 | 100 |

**Table 2:** Prevalance of hypertension in urban and rural study population

| Urban | 500 | 140 (28%) | 360 (72%) |
|---|---|---|---|
| Rural | 500 | 80 (16%) | 420(84%) |
| Total | 1000 | 220 (22%) | 780 (78%) |

**Table 3:** Distribution of subjects according to blood pressure status and Age.

| Age | No. | Hypertensive % | Normotensive % |
|---|---|---|---|
| 20-29 | 270 | 10(3.7) | 155 (93.93) |
| 30-39 | 130 | 20(15.38) | 110 (84.61) |
| 40-49 | 130 | 50(38.4) | 80 (61.6) |
| 50-59 | 190 | 82(43.15) | 108 (56.84) |
| 60-69 | 172 | 140(81.40) | 32 (18.6) |

| | | | |
|---|---|---|---|
| Up to 70 | 108 | 78(72.2) | 30 (27.8) |
| Total | 1000 | 380 (38%) | 620 (62%) |

**Table 4:** Distribution of subjects according to blood pressure status and gender.

| Gender | No | Hypertensive% | Normotensive% |
|---|---|---|---|
| Male | 450 | 58 (23.67) | 189 (77.14) |
| Female | 550 | 68 (19.15) | 285 (80.28) |
| Total | 1000 | 190 (19) | 810 (81) |

**Table 5:** Urban and rural distribution of subjects by blood pressure and gender

| Gender | No. | URBAN | No | RURAL (HTN%) |
|---|---|---|---|---|
| Male | 200 | 80 (40%) | 250 | 60 (24%) |
| Female | 300 | 40 (13.3%) | 250 | 40 (16%) |
| Total | 500 | 120 (24%) | 500 | 100 (20%) |

## DISCUSSION

The present study was conducted to estimate and compare the prevalence of hypertension in urban and rural populations of Hapur and to identify & compare some socio-demographic and lifestyle risk factors associated with hypertension in urban and rural populations of Hapur. A total of 1000 subjects were selected, which included 500 each from urban and rural areas of Hapur respectively. Most of the study population belonged to age group of 20–29 yrs (27%) followed by 50–59 yrs (19%). 45% of the study population was constituted by males and the rest 55% by females. Majority of the study population belonged to middle class (58%) followed by upper lower class (42%).[2,3,4,5,6,7]

**Prevalence of hypertension:**
Following JNC-7,JNC-8and WHO definition of hypertension, the prevalence of hypertension in the present study was 23%.[4,5,6,7,13] Around 33% of the population had blood pressure in the normal range and 47% of the population had pre-hypertension. The findings of the study are comparable to WHO estimates which gives a 23% prevalence of hypertension in India.[20,21]

**Prevalence of hypertension in rural areas:**
Prevalence of hypertension and pre-hypertension is high in the present study which supports the increasing trend in the rural communities of India which are under the epidemiological transition. The prevalence of hypertension in rural areas was 20%. The prevalence rates of the present study differed from those given by office of Register General of India (10%) and WHO (22.6%).[1,8] Depending on the rural areas selected and the methodology used other researchers have found a prevalence of hypertension in rural Indian areas ranging from 7%to19%.[22,23]

**Prevalence of hypertension in urban areas:**
Both urban and rural are as in India have been surveyed to estimate the prevalence of hypertension and a number of reviews have high light deescalating burden of hypertension in India.[8] The prevalence of hypertension in urban areas was 24%. The prevalence rates were similar to those given by office of Register

General of India (25%) and WHO (23.1%).[1,8] Based on the difference in the methodology use do the researchers have found a prevalence of hypertension in urban Indian areas ranging from 20% to 40%. In the mid-1950s, Indian urban population based epidemiological studies used older World Health Organization (WHO) criteria for diagnosis (known hypertension or BP >=160 mm Hg systolic and/or 95 mm Hg diastolic) and reported hypertension prevalence of 1.2 to 4.0%.[9] The Global Burden of Diseases study has reported that hypertension is the most important cardiovascular risk factor in this region and responsible for the largest burden of disease and mortality.[1] Present estimates suggest that a 2 mm Hg population - wide decrease in systolic BP can lead to prevention of more than 181,000 stroke and 183,000 coronary heart disease deaths in India.[1]

**Association between hypertension and age:**
Isolated systolic hypertension, an elevation in systolic but not diastolic pressure, is the most prevalent type of hypertension in those aged 50 or over, occurring either denovoor as a development after a long period of systolic- diastolic hypertension with or without treatment. It is known from various studies that rising blood pressure is associated with increased cardiovascular risk. The present study found increasing age to be an important on-modifiable risk factor for the development of hypertension. The prevalence of hypertension was 3.7% in the age group of 20–29 yrs, which increased to 72. 2% for people of aged ≥ 70 yrs. There was a sharp increase in the prevalence of hypertension after the age of 50 years. The increase in blood pressure with age was found to be similar in both the urban and rural areas. The main reason for increase in blood pressure within crease in age is that arteries and arterioles become less elastic due to a the rosclerotic changes as people age advances. Changes in life style and stress are also important contributors. Almost all the studies done to identify the risk factors of hypertension have inferred that age is a significant risk factor for the development of hypertension. The prevalence of hypertension was 15.38% for the age group 25–39 yrs which increased to 72% for the age group> 70years.[24,25]

**Association between hypertension and gender:**
Gender differences in hypertension emerge in early adult hood. Our results provide new insights into the origins of gender disparities in both hypertension status and hypertension awareness in several ways. The gender disparities in hypertension status observed during adult hood are already evident when men and women are in their twenties, with women far less likely to be hypertensive compared to men. In the present study males had a higher prevalence of hypertension compared to females. The prevalence of hypertension was 24% in males and 20% in females, but this difference was found to be statistically in significant.[26] In urban areas the prevalence of hypertension was 40% in males and 13.3% in females. In the rural areas the prevalence of hypertension was 24% in males and 16% in females. A large number of epidemiological studies have in ferred that prevalence of hypertension is more in males as compared to females. This is because; during adolescent and middle aged males have a higher blood pressure compared to females. The female hormone esestrogen and progesterone have a protective effect on blood

pressure. Later in life this difference diminishes mainly because of the postmenopausal changes. In the present study thought there is difference in prevalence of hypertension in males and females it is not statistically significant, this is most probably because there were more number of post menopausal women involved in the study.[27,28]

## CONCLUSIONS

The prevalence of hypertension was 23% in the present study, which is comparable to the estimates given by World Health Organization (23%). Around 33.7% of the population had blood pressure in the normal range and 47% of the population had pre-hypertension. The present study identifies risk factors for the development to hypertension–

- ❖ Being overweight or obese
- ❖ Too much salt (sodium) in your diet..
- ❖ Too little potassium in your diet.
- ❖ Not being physically active
- ❖ Drinking too much alcohol

- ❖ Stress
- ❖ Non-steroidal Anti-inflammatory Drugs (NSAIDs)
- ❖ Ibuprofen (Advil, Motrin, Ibuprofen) can cause marked worsening of existing hypertension or development of new high blood pressure. Cough and Cold Medications (Sudafed and other brands that contain pseudoephedrine and phenylephrine)
- ❖ Cough and cold medicines frequently contain decongestants such as pseudoephedrine and phenylephrine. These medications cause your blood pressure and heart rate to rise, by constricting all your arteries, not just those in you nose.
- ❖ Certain chronic conditions also may increase your risk of high blood pressure, including diabetes, kidney disease and sleep apnea.
- ❖ A diet low in vitamin D.

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