



**“AN ANALYSIS OF PREVALENCE AND RISK FACTORS FOR HYPERTENSION IN
TERTIARY CARE TEACHING HOSPITAL, MIMS MANDYA”**

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ABSTRACT:

Background: Hypertension is the commonest cardiovascular disorder and now regarded as major public health problem, which is common, asymptomatic and readily detectable having prevented risk factor and often lead to lethal complication if left untreated. High blood pressure or hypertension is one of the most important preventable causes of premature death worldwide. Chronic arterial hypertension is an important cardiovascular risk factor and associated with significant morbidity and mortality in the general population. **Objectives:** To analyse prevalence and risk factors for Hypertension in Mandya Tertiary Care Teaching Hospital. **Study Design:** An analysis of prevalence and risk factors for Hypertension in Mandya Tertiary Care MIMS Hospital is a retrospective observational study and patients who were satisfying the inclusion criteria were enrolled into study. Patient case sheet, medication treatment chart, lab reports, data collection form and other relevant source form Medical Record Department of MIMS are used as source of data and materials. **Results:** Out of 200 Hypertension cases analysed 59.5% were female and 40.5% were male with associated risk factor of alcohol and smoking bearing 18.5% and 22%. Major of the patients (22.5%) have co-morbidities i.e., Hypertension with Diabetes Mellitus and 19.5% of Cardiovascular system disease co-morbidity. **Conclusion:** Among the 200 patients, the prevalence of Hypertension was more in females compared to males of age group 50-60 years, increase with age. Smoking and alcohol are found to be significant risk factors for hypertension.

KEYWORDS: Prevalence, Risk Factors, Hypertension, Retrospective, MIMS.

INTRODUCTION

Hypertension is a common disease that is simply defined as persistently elevated arterial blood pressure (BP).^[1] High blood pressure is defined as BP \geq 140/90 millimeters of mercury (mmHg). It is estimated that by 2025, 1.56 billion adults will be living with Hypertension.^[2] Hypertension (HTN) is a challenge for public health bodies all over the world.^[3] Hypertension is the commonest cardiovascular disorder and now regarded as major public health problem.^[4] High blood pressure or hypertension is one of the most important preventable causes of premature death worldwide. Even a blood pressure at the top end of the normal range increases the risk. Many who are affected feel no discomfort until a medical crisis i.e.; a heart attack, the rupture of a blood vessel in the brain or a stroke. Hypertension is an important public health problem, which is common, asymptomatic, readily detectable, having preventable risk factors and often lead complications if left untreated.^[5]

In considerable proportion of cases the disease tends to be asymptomatic for prolonged time, hence also labeled as ‘Silent Killer’. High blood pressure is a major risk factor for stroke, CHD, heart or kidney failure.^[6] Blood pressure (BP) is defined as lateral pressure exerted by the blood on the walls of the blood vessels while flowing through them. Blood pressure in a blood vessel depends upon two things.

- 1) Distance from the heart and
- 2) Nature of the blood vessel.^[7,8]

The world health organization (WHO) reports states that a 2% reduction in diastolic blood pressure could prevent 3, 00,000 deaths from CVD by 2020.^[9] Hypertension is generally symptom less, but increases the risk of various other cardiovascular diseases like stroke, heart attack and non-cardiovascular diseases like renal damage, end stage of renal failure, etc.^[10] Over 1 billion people are living with high blood pressure. In 2008, globally, the overall prevalence of high blood pressure in adults aged 25 and above was around 40%. In the south-East Asia Region,

36% of adults have hypertension. In India, raised blood pressure increased from 5% in the 1960s to nearly 12% in 1990s, to more than 30% in 2008.^[5]

Arterial hypertension is a worldwide problem, affecting more than 1 billion people. Chronic arterial hypertension is an important cardiovascular risk factor and associated with significant morbidity and mortality in the general population. Chronic hypertension also is the primary risk factor for cerebrovascular disease. Acute hypertension is not uncommon in the emergency room or acute care

setting and can have important consequences on various organs, including the heart, the kidneys, the brain and the lungs; associated end-organ injury has been reported in 19-81% of patients with acute severe hypertension.^[11]

Etiology

For the majority of patients with high blood pressure, the cause is unknown. This is classified as Primary or Essential Hypertension. A small portion of patients have a specific cause of their high blood pressure, which is classified as Secondary Hypertension.^[2]

CLASSIFICATION OF HYPERTENSION

Table: 1 classification of hypertension

CATEGORY	SYSTOLIC BLOOD PRESSURE (mmHg)	DIASTOLIC BLOOD PRESSURE (mmHg)
BP		
Optimal	< 120	<80
Normal	<130	<85
High normal	130-139	85-89
Hypertension		
Grade 1 (mild)	140-159	90-99
Grade 2 (moderate)	160-179	100-109
Grade 3 (severe)	≥ 180	> 110
Isolated Systolic Hypertension		
Grade 1	150-159	< 90
Grade 2	≥ 160	< 90

PRIMARY HYPERTENSION

It results when arterial blood pressure is increased due to increased peripheral resistance. It is further divided in to two types namely: benign and malignant hypertension.

Benign hypertension

Here, there is a moderate increase in blood pressure with systolic pressure of 200 mm Hg and the diastolic pressure of above 100 mm Hg.

Malignant hypertension

Here, the blood pressure elevated to a great extends of about 250 mm Hg of systolic pressure and 150 mm Hg of diastolic pressure. It produces severe symptoms like renal disease, retinal disease and being a fatal disease, it causes death within few years.

SECONDARY HYPERTENSION

The different forms of secondary hypertension are.

Cardiovascular hypertension

It is produced due to

- Atherosclerosis- hardening and narrowing of blood vessels
- Coarctation of aorta- narrowing of aorta.

Renal hypertension

It is produced due to

- Stenosis renal arteries- narrowing of one or both renal arteries, so that the renal function is impaired.

- Glomerulonephritis- nephritis with inflammation of the capillary loops in the renal glomeruli.

Endocrine hypertension

It occurs due to

- Pheochromocytoma- tumor in adrenal medulla
- Hyperaldosteronism- excess secretion of aldosterone from adrenal cortex Conn's syndrome.
- Cushing's syndrome- excess secretion of cortisone.
- Gigantism or Acromegaly- excess secretion of growth hormone.^[7]

HYPERTENSIVE CRISES

Hypertensive crises are situations in which measured BP values are markedly elevated, typically in the upper range of stage 2 hypertension (>180/110 mm Hg). They are classified as either a hypertensive emergency (with acute or progressive target organ damage) or urgency (without acute or progressive target organ damage). Hypertensive emergencies require hospitalization for immediate BP lowering using intravenous (IV) medications and intra-arterial BP monitoring. Examples of acute target-organ damage include encephalopathy, myocardial infarction (MI), unstable angina, pulmonary edema, eclampsia, stroke, head trauma, life-threatening arterial bleeding, aortic dissection, severe retinopathy, or acute kidney failure.

Hypertensive urgencies do not require immediate BP lowering; instead, BP should be slowly reduced within 24 hours (but not generally to goal BP so quickly) after

drug therapy recommendations for stage 2 hypertension.^[12]

EFFECTS OF HYPERTENSION

The common organ damage by long standing hypertension are heart, blood vessels, retina and central nervous system.

CVS: Increased myocardial work leads to concentric hypertrophy of left ventricle, angina pectoris and accelerated coronary artery diseases.

Kidneys: Progressive arteriosclerosis involves both the efferent and afferent renal arterioles and capillaries of glomerular tuft. This leads to compromise in renal function, shrinkage of kidneys, proteinuria.

CNS: Hypertension may cause micro aneurysms, which may rupture and cause cerebral hemorrhage. Accelerated atherosclerosis may cause cerebral thrombosis, embolism and infection. Cerebral arteriolar spasm may cause hypertensive encephalopathy.

Fundus: The following changes may occur:

- **Grade I:** Arteriolar narrowing leading to copper wire and silver wire appearance.
- **Grade II:** Arteriovenous nipping where arteries cross the vein.
- **Grade III:** In addition to Grade II changes, superficial flame shaped and deep dot like hemorrhages and cotton wool exudates.
- **Grade IV:** Grade III change with papilledema.

RISK FACTORS FOR HYPERTENSION

Table: 2. Risk factors for Hypertension

Risk Factors that can be controlled	Risk Factors that cannot be controlled
Overweight or obese Sedentary lifestyle (lack of physical activity) Tobacco usage Unhealthy diet (high in sodium) Excessive alcohol usage Stress Sleep apnea Diabetes	Age Race Family History

All over the world the life expectation of people is increasing. Unfortunately, the rapidity of population ageing is expected to continue to outpace social and economical development in developing countries like India. Moreover, these developments have reduced the physical activity of the people to a very large extent and increased the alcohol and tobacco use.

ALCOHOL

Alcoholism is a worldwide social problem, with severe effects on public health. Several factors complicate the interactions between tobacco and alcohol on cardiovascular disease. The relationship between

SYMPTOMS

Symptoms due to hypertension

Head ache: This occurs usually in morning hours. It is throbbing and usually frontal.

Dizziness: The patients feel unsteadily.

Epistaxis: This occurs due to increased pressure, causing rupture of the capillaries of the nose. The bleeding reduces circulating volume and lowers the BP.

Symptoms due to affection of organs

CVS

- a) Dyspnea on exertion (insipient LVF)
- b) Anginal chest pain (IHD)
- c) Palpitation

Kidneys: Hematuria, Nocturia, Polyuria

CNS

- a) Transient ischemic attacks (TIA or stroke) with focal neurological deficit.
- b) Hypertensive encephalopathy (head ache, vomiting, convulsion, unconsciousness, focal neurological deficit).
- c) Dizziness, tinnitus and syncope.

Retina: Blurred vision or sudden blindness.

Symptoms due to underlying diseases

1. Edema and puffy face- Acute nephritis.
2. Weight gain, hirsutism and stria- Cushing's syndrome.
3. Weight loss, tremors, palpitation and sweating.
4. Hyperthyroidism/ pheochromocytoma.
5. Weakness- hyperaldosteronism.
6. Joint pain, bronchospasm and peripheral vascular disease.
7. Symptoms- polyarteritis nodosa.^[7]

analysis i.e.; researchers recognize that smoking is common among drinkers and that is a strong risk factor for heart disease that could cloud the true effect of alcohol consumption. Moreover, cigarette smoking among alcohol drinkers may be related both to share lifestyle habits and to direct effects of alcohol.^[13]

The harmful use of alcohol is a risk factor for hypertension. The relationship between alcohol consumption and coronary heart disease and cerebrovascular diseases is complex. It depends on both the level and the pattern of alcohol consumption. There is a direct relationship between higher levels of alcohol consumption and the pattern of binge drinking (defined as 60 or more grams of pure alcohol per day) with the risk of CVD.^[14]

Mechanism of alcohol induced hypertension

The mechanisms of alcohol-mediated hypertension include potentiation of the renin-angiotensin-aldosterone system (RAAS). This is reflected in significantly elevated circulating angiotensin II levels, elevated cardiac angiotensin converting enzyme expression and increased cardiac expression of angiotensin type 1 (AT1) receptors. AT1 receptors have been implicated in ventricular dysfunction, elevations of end-diastolic pressure, and alcohol-induced vascular injury. Signalling through the AT2 receptor antagonizes the effects of AT1

signalling. Its contribution to alcohol-induced modulation of blood pressure is debatable^[15](Fig 1).

The harmful use of alcohol is a risk factor for multiple adverse health and social outcomes, including hypertension, acute myocardial infarction, cardiomyopathy, cardiac arrhythmia, cirrhosis of the liver, pancreatitis, neuropathy and encephalopathy. Hazardous and harmful drinking was responsible for 2.5 million (3.8%) deaths worldwide in 2004. More than 50% of these deaths were due to CVDs, liver cirrhosis and cancer.

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When consumed in large quantities, alcohol can cause irregular heartbeat (arrhythmia) and even smaller doses of alcohol can increase heart rate (tachycardia). Long term heavy drinking also has negative effects on the heart muscle, causing enlargement of the heart and a loss of some contractility resulting in insufficient blood flow to the rest of body.^[16]

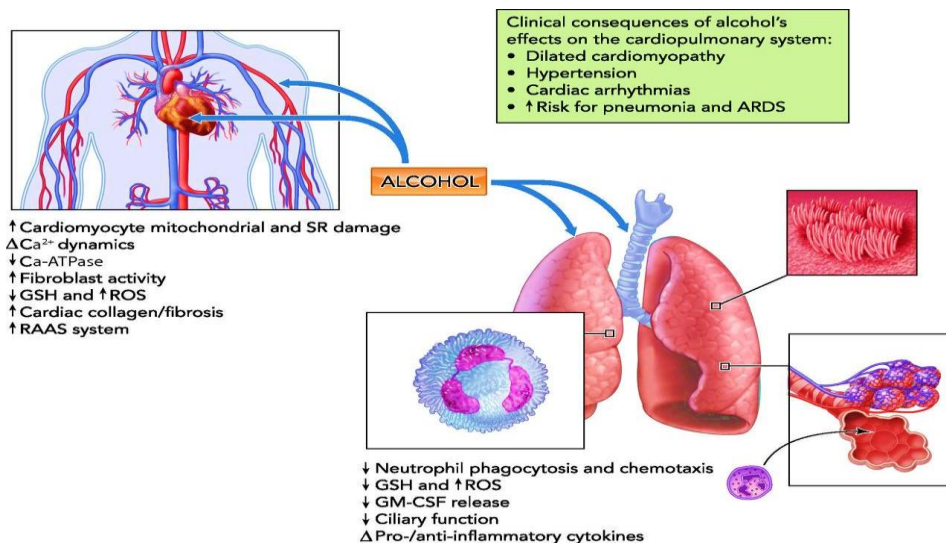


Fig. 1. Alcohol and the cardiopulmonary system

SMOKING

"From a short pleasure can come a long repentance."

Cigarette smoking is the leading cause of preventable morbidity and premature death in developed countries. Smoking causes an immediate increase in blood pressure (both systole and diastole) and heart rate persists for more than 15 minutes after one cigarette when compared to non- smokers. Although smoking is known to increase the risk of developing hypertension, there is currently no evidence that smoking cessation directly reduces blood pressure in people with hypertension.

Epidemiological data show a linear relationship between alcohol consumption and hypertension prevalence.^[13] Nicotine accelerates the heart rate and raises blood pressure makes the heart beat faster and it increases the heart's demand for oxygen, narrows the blood vessels, reducing the blood supply to tissue cells.^[17]

Hypertension has become a major cause of morbidity and mortality worldwide and it is now ranked third as a cause of disability-adjusted life-years. The world Health Report states that elevated blood pressure alone contributes to about 50% of cardiovascular disease

(CVD) worldwide. Furthermore, the risk for CVD starts even at upper limits of the normal levels of blood pressure. The prevalence of hypertension has remained stable or has decreased in economically developed countries during the past decade. However it has dramatically increased in developing countries like India, where marked changes have occurred in food consumption patterns changing from 'traditional' to 'western' due to rapid nutritional transition. A greater understanding of the risk factors that account for the increase in hypertension could potentially contribute to its future prevention by addressing its root causes. Public health efforts to reduce the prevalence of hypertension have rightly focused on non-pharmacological approaches that lower blood pressure. The world health organisation (WHO) reports that a 2% reduction in diastolic blood pressure could prevent 3,00,000 deaths from CVD by 2020. Current guidelines recommended lifestyle modifications, including salt-reduction, as one of the most effective approaches to prevent hypertension and indeed as first line treatment for mild hypertension.^[18]

The average prevalence of hypertension in India is 25% in urban and 10% in rural inhabitants. Prevalence of hypertension has been found to increase in traditional populations undergoing modernization. There is a strong correlation between changing lifestyle factors and increase in hypertension.^[11] Even today there is scarcity of the studies in rural areas of India. With this background, present study has been undertaken to study the prevalence of hypertension, its associated factors as well as to increase the awareness on importance of lifestyle modifications among rural population visiting MIMS hospital.^[13]

OBJECTIVES

To analyse prevalence and risk factors of hypertension in tertiary care teaching hospital MIMS.

ETHICAL CLEARANCE

The Ethical clearance for the study was obtained from the Institutional Ethics committee, Mandya Institute of Medical Sciences and Teaching Hospital, Mandya.

MATERIALS AND METHODOLOGY

The present study was conducted at MIMS teaching hospital. It is a 500-bedded tertiary care teaching hospital. This hospital provides specialized health care services to people in and around Mandya city and nearby villages.

This was retrospective observational study conducted in medical record department of MIMS. The essential data for the retrospective observational study was collected using a well-designed patient data collection form. A total of 200 Hypertension patient's files were screened and data was analysed. Both male and female patients with Hypertension of age > 20 years admitted to hospital were selected.

Inclusion criteria

- All adult male and female Hypertension patients of age > 20 years.
- Individuals giving consent for study.

Exclusion criteria

- Individuals who are not willing to be a part of the study.
- All pregnant women and lactating mothers.
- All out patients in OPDs.
- Seriously and mentally ill patients.
- Paediatrics.

Patient files were screened for the demographic information such as name, age, sex, date of admission, department and unit in which he/she was admitted and diagnosis. It also includes the present complaints, past medical history, past medication history, family history, social history (including diet, alcohol/smoking habits, sleep, bowel and bladder, appetite, exercise habit), physical examination and systemic examination were recorded in a suitably designed patient data collection form.

Study procedure

Eligible patients were enrolled based on inclusion and exclusion criteria. The data collection form which was made by department of clinical pharmacy was used for collecting the details. This form mainly contains demographic details, social habits, current medication, past medical and medication history, laboratory investigations and other relevant data needed for present study were collected from patient's progress records and laboratory reports.

Source of data

- Patient data collection form.
- Patient case sheet/medication chart.
- Lab reports.

Statistical analysis

Collected information was analysed using Microsoft Office (MS-Word and Excel) 2010. Descriptive data analysis has been performed in the form of percentage of demographic variables. For the analysis of the results, simple percentage calculations were used to arrive at a conclusion of our study.

RESULTS

A total number of 200 case sheets of Hypertension patients admitted to MIMS hospital were analysed. Among these 200 Hypertension patients, majority of the patients were male $n=81$ (40.5%) and $n=119$ (59.5%) were females. The patients were divided into 8 groups based on their age and the age group being kept at an interval of 10 years (Figure No.2).

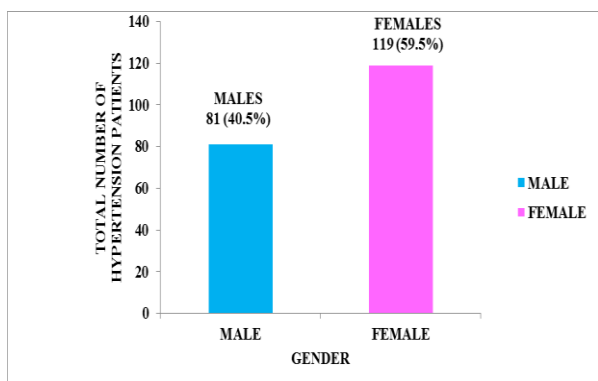


Fig.2 Sex Wise Distribution of Hypertension Patients

Table 3: Age group and Sex Wise Distribution of Hypertension Patients

AGE	MALE	FEMALE
20-30	2	2
31-40	9	8
41-50	17	29
51-60	22	28
61-70	21	30
70	10	22

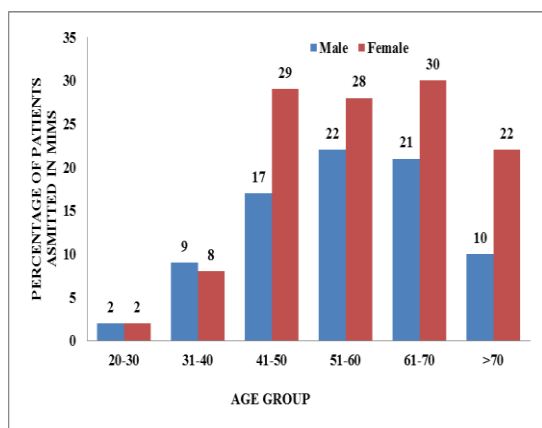


Figure No.3: Age group Categorization of patients

TABLE 4: ALCOHOLIC PATIENTS

NATURE	ALCOHOL	PERCENTAGE
OCCASSIONAL	14	7
CHRONIC	23	12
NON ALCOHOLIC	163	81

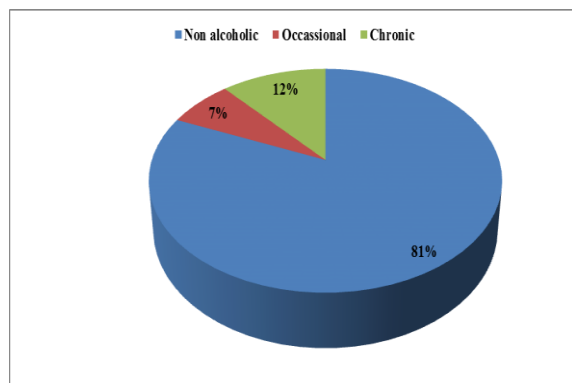


FIGURE 4: ALCHOLIC PATIENTS

TABLE 5: SMOKER PATIENT

NATURE	SMOKING	PERCENTAGE
SMOKER	44	22
NON-SMOKER	156	78

In 200 patients 22% of patient was found to be chronic smoker (figure.4)

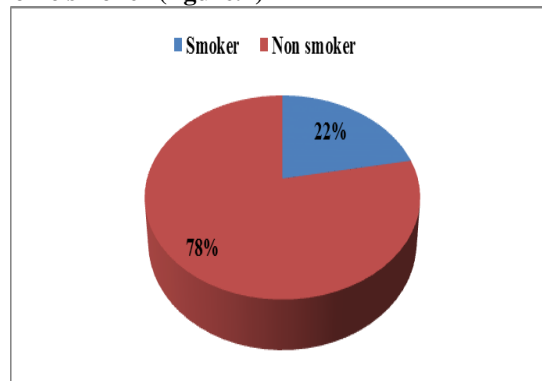


FIGURE 5: SMOKER PATIENT

DISCUSSION

Better healthcare services will have a positive impact on healthcare system. Our finding, provide direct evidence of an increasing burden of hypertension among the rural population of Mandya. Especially among the elderly aged population. Prevalence of HTN increase with increasing age highest percentage of 27.16% had suffered from HTN within the age of 50-60 years and 25.92% of 60-70 years.

Our study shows that around 22% of patient had smoking habit and 18.5% have alcoholic behavior which can be determine as well established risk factor for HTN.

In this study, prevalence of HTN associated with increasing smoking and Alcohol consumption. Alcohol has been identified as a risk factor for global burden of disease, attributing an increased risk of cardiovascular problem. In our study alcohol and smoking was found to be significant risk factor for hypertension.

Among those with hypertensive patients, which were treated in Mandya hospital, 48.5% of patients were admitted for 3-4 days.

The overall prevalence rate risk of treatment of HTN in Mandya Hospital in 200 patients were observed, analyzed and documented.

CONCLUSION

In present study, among 200 patients with HTN in Mandya hospital the demographic data shows that prevalence of HTN is more in females than males and most of them of age group of 50-60 years. Smoking and alcohol are found to be significant risk factors.

FUTURE DIRECTION

- Establishment guidelines for treating hypertensive patients will helps in proper utilization of drugs.

- Pharmacoeconomic evaluation studies can also be done.

CONFLICT OF INTEREST

All the authors declare that there is no potential conflict of interest in the study.

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