

**ASSESSMENT OF CO-MORBIDITIES IN HYPERTENSION IN TERTIARY CARE  
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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. Multi morbidities is common in old age. **Objectives:** To analyse co-morbidities in hypertension Mandya Tertiary Care Teaching Hospital. **Study Design:** An analysis of co-morbidities in 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 females and 40.5% were males. Major of the patients (22.5%) have co-morbidities i.e., Hypertension with Diabetes Mellitus and 19.5% of Cardiovascular system disease co-morbidity. 48.5% of patients were stayed for 3-4 days for treatment and discharged.

**Conclusion:** Among 200 patients, 198 patients are having hypertension with associated co-morbidities. Major co-morbidity is Diabetes Mellitus.

**KEYWORDS:** Co-Morbidity, Hypertension, Diabetes Mellitus, Retrospective, MIMS.

**INTRODUCTION**

Hypertension is a common disease that is simply defined as persistently elevated arterial blood pressure (BP).<sup>[1]</sup> 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.<sup>[2]</sup> Hypertension (HTN) is a challenge for public health bodies all over the world.<sup>[3]</sup> Hypertension is the commonest cardiovascular disorder and now regarded as major public health problem.<sup>[4]</sup> 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.<sup>[5]</sup>

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.<sup>[6]</sup> 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.**<sup>[7, 8]</sup>

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.<sup>[9]</sup> 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.<sup>[10]</sup> 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.<sup>[5]</sup>

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.<sup>[11]</sup>

### 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.<sup>[2]</sup>

## 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.<sup>[7]</sup>

### Effect 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 nicking 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.

### 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<sup>[7]</sup>

### 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	Age
Sedentary lifestyle ( lack of physical activity)	Race
Tobacco usage	Family History
Unhealthy diet (high in sodium)	
Excessive alcohol usage	
Stress	
Sleep apnea	
Diabetes	

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.

The primary goal in hypertension treatment is to reduce long-term cardiovascular risk. However, recent studies have focused on the health-related quality of life (HRQOL) in hypertensive patients to improve daily functioning, minimize physical and psychological suffering, and enable full participation in family and social life. The HRQOL of hypertensive patients is worse than that of healthy individuals 3-8 and is dependent on blood pressure, organ damage, comorbidities (including

obesity), and treatment (both pharmacological and non-pharmacological). As in the general population, lower HRQOL values in hypertensive patients are associated with older age, female sex, low socioeconomic status, and lower educational level.<sup>[10]</sup> Comorbidities in hypertensive patients have been observed to reduce the effect of therapy and to decrease the HRQOL. These concurrent diseases can be divided into 3 groups: conditions causally related to hypertension (overweight and obesity, diabetes, hyperthyroidism, chronic glomerulopathies), complications of hypertension (atherosclerosis, ischemic heart disease, myocardial infarction, heart failure, stroke), and conditions unrelated to hypertension (degenerative disc disease, neurotic disorders, chronic obstructive pulmonary disease [COPD] and asthma, peptic ulcer disease). A number of studies have suggested that the presence of complications

and comorbidities influences the HRQOL in hypertensive patients more than hypertension itself.<sup>4,6</sup> Although the effect of comorbidities on the HRQOL in hypertensive patients is becoming apparent, few studies have investigated this relationship in detail. Therefore, the primary aim of this study was to determine the association between comorbidities and the HRQOL.<sup>[12,13]</sup>

**OBJECTIVES**

To analyse the c-morbidities in 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.1)

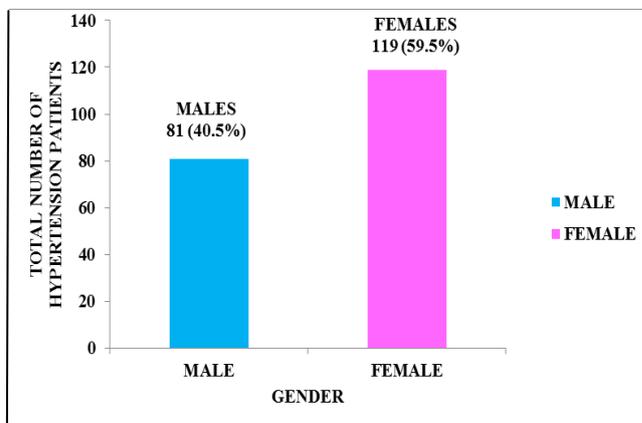


Fig 4: Sex Wise Distribution of Hypertension Patients.

Fig 4: 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

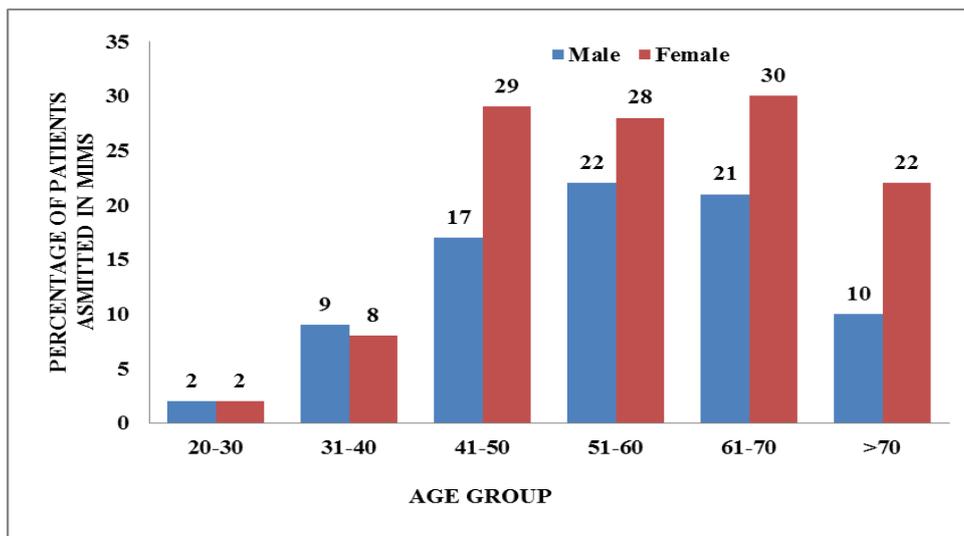


Figure No.1: Age group Categorization of patients.

Table 4: Comorbidity.

S. NO	Comorbidity	NO: of Patients	Percentage
1	HTN + DM + OTHERS	45	22.5
2	HTN + CVS + OTHERS	39	19.5
3	HTN + RESPIRATORY + OTHERS	31	15.5
4	HTN+ DM + CVS + RESPIRATORY + DM	38	19
5	HTN + OTHERS	45	22.5
6	HTN(HYPERTENSION)	2	1

Regarding co-morbidity, 22.5% of patient was suffered from both HTN & DM and 19.5% patient was suffered from HTN with CVS disease (figure.5)

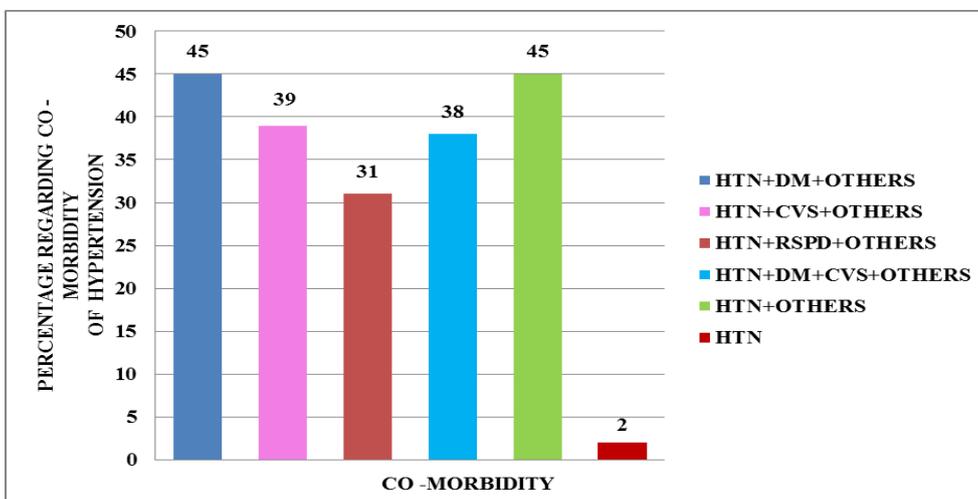


Figure 5: Co-Morbidity of Hypertension.

**DISCUSSION**

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 comorbidities and the number of medications are the primary factors associated with lower HRQOL in hypertensive patients. In addition, we found that lower

HRQOL in hypertensive patients was associated with diabetes, chronic respiratory diseases (e.g., COPD and asthma). The early stages of hypertension are rarely accompanied by physical pain. However, we observed that physical pain was worse in patients with insufficiently controlled blood pressure and with longer duration of hypertension therapy.

The intensity of physical pain was also associated with the coexistence of other chronic diseases, which is consistent with the previous reports. Polymorbidity,

which is common in elderly patients, is an important factor in HRQOL deterioration associated with aging. It should be stressed that comorbidity can affect different aspects of the HRQOL to varying degrees. For example, previous studies suggest that congestive heart failure, cerebrovascular disease, angina pectoris, and obesity are important factors in declining physical health in hypertensive patients. Transient ischemic attacks and myocardial infarctions are associated primarily with poor mental health, while peripheral artery disease is associated with worse perceptions of overall health.

Our study also shows that disease condition i.e. comorbidity affect the prevalence of HTN, 22.5% of patient were suffered from HTN with Diabetes Mellitus and 19.5% are having the HTN with CVD too.

Our study revealed, most patient around half of patients had known case of HTN and were under treatment by different antihypertensive drug.

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. Among 200 patients, 198 patients are having hypertension with associated co-morbidities. Major co-morbidity is Diabetes Mellitus. More often most of them stayed for 3-4 days for treatment, then recovered and discharged.

## 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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