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A prospective observational study on risk factors and management of hypertension in a tertiary care corporate hospitals

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ABSTRACT

Background

Hypertension represents the major health problem primarily because of its role in contributing to the initiation and progression of major cardiovascular diseases. The aim of the present study was to evaluate and determine the risk factors and management of hypertension in a tertiary care corporate hospital.

Methods and materials

A hospital based prospective observational study on risk factors and management of hypertension was carried out among the patients who were above 30 years of age and inpatients in the tertiary care corporate hospital. The collected were sorted and analyzed on the basis of demographic characteristics and comorbidities.

Result

It was a prospective observational study in which 200 patients were selected. Among 200 patients, 188 patient data from cardiology department and 12 from other departments, in them 68 are males and 132 are females. Prevalence rate and the incidence rate among all the individuals which were included in the study are found to be 33.33 and 44.5 respectively.

Conclusion

Total 200 members are involved in the study; female patients are higher than males, only male patients have the potential social habits and the prevalence and incidence rate among all found to be 33.33 and 44.5 respectively.

Keywords: Hypertension, Cardiovascular diseases, Prevalence rate and Incidence rate.

INTRODUCTION

Hypertension is defined as elevated levels of arterial blood pressure above normal. It is a major global concern and is one of the key preventable factors for cardiovascular events. It has massive disturbing impact on the population's health, resulting in unnecessary morbidity and mortality. Hypertension alone is held accountable for more than 5.8 % of death worldwide, loss of 11.9 % year of life and adjusted life of 1.4 %. [1,2] The assessment, management and control of hypertension still carry a great challenge for health care researchers. Within the context of hypertension management, a number of factors are targeted as influencing agents but non-adherence to treatment is still counted as one of the major contributing factors to poor management and control of hypertension. High blood pressure is dangerous because it makes the heart work too hard and contributes to atherosclerosis (hardening of the arteries). It increases the risk of heart disease and stroke, which are the first- and third- leading causes of death among Americans. High blood pressure also can result in other conditions, such as congestive heart failure, kidney disease, and blindness. A blood pressure level of 140/90 mmHg or higher is considered high. About two-thirds of people over age 65 have high blood pressure. If your blood pressure is between 120/80 mmHg and 139/89 mmHg, then you have prehypertension.[3,4] This means that you don't have high blood pressure now but are likely to develop it in

the future unless you adopt the healthy lifestyle changes. [3,4] Hypertension still carries a great challenge for health care researchers. Within the context of hypertension management, a number of factors are targeted as influencing agents but non-adherence to treatment is still counted as one of the major contributing factors to poor management and control of hypertension. [5,6]

Classification

High blood pressure is dangerous because it makes the heart work too hard and contributes to atherosclerosis (hardening of the arteries). It increases the risk of heart disease and stroke, which are the first- and third-leading causes of death among Americans. High blood pressure also can result in other conditions, such as congestive Hypertension is defined as elevated levels of arterial blood pressure above normal. [7,8] It is a major global concern and is one of the key preventable factors for cardiovascular events. It has massive disturbing impact on the population's health, resulting in unnecessary morbidity and mortality. [9,10] Hypertension alone is held accountable for more than 5.8 % of death worldwide, loss of 11.9 % year of life and adjusted life of 1.4 %. The assessment, management and control of heart failure, kidney disease, and blindness. [11, 12, 13]

Classification of hypertension for adults aged >18yrs according JNC

Category	Systolic (mm Hg)	Diastolic (mm Hg)
Normal	90-119	60-79
Prehypertension	120-139	80-89
stage 1 Hypertension	140-159	90-99
Stage 2 Hypertension	>160	>100
Isolated systolic Hypertension	>=140	<90

Fig. 1 JNC-8 Classification of Hypertension

Risk factors for hypertension

Risk factors are conditions or behaviors that increase your chances of developing a disease. When you have more than one risk factor for heart disease, your risk of developing heart disease greatly multiplies. So, if you have high blood pressure, you need to take action. [14,15]

Major factors

Multiple factors are associated with an increased risk of hypertension. These are commonly categorized:

RISK FACTORS YOU CAN CONTROL	RISK FACTORS BEYOND YOUR CONTROL
<ul style="list-style-type: none"> Abnormal cholesterol Tobacco use Diabetes Overweight Physical inactivity 	<ul style="list-style-type: none"> Age (55 or older for men, 65 or older for women) Family history of early heart disease (having a father or brother diagnosed with heart disease before age 55 or having a mother or sister diagnosed before age 65) Gender Ethnicity Genetic disposition

Non- modifiable risk factors

Age, Gender, ethnicity and Genetic disposition.

Modifiable risk factors

Lack of sleep, Hyperlipidaemia, Hypertension, Diabetes, Smoking, Poor diet and nutrition, Physical inactivity, over-consumption of alcohol, Depression and mental stress and Pollution. In some cases, history of renal disease, heart failure, chronic obstructive pulmonary disease.^[16,17]

Non-modifiable risk factors Age

The risks for hypertension increase with age. About 85% of people who die from hypertension are over the age of 65.^[18,19]

Gender

Men have a greater risk for hypertension and are more likely to have heart attacks earlier in life than women. Women’s risk for hypertension increases after menopause, and they are more likely to have angina than men.^[20,21]

Genetic factors and family history

Certain genetic factors increase the likelihood of developing important risk factors such as diabetes and heart diseases. Heart disease tends to run in families. People whose parents or siblings developed hypertension at a younger age are more likely to develop it themselves.^[22,23]

Race and ethnicity

African-Americans have the highest risk of hypertension related heart diseases , in part due to the diabetes and obesity.^[24,25]

Modifiable risk factors Smoking

Smoking is the most important risk factor for hypertension. Smoking can cause elevated blood pressure, worsen lipids, and make platelets very sticky, raising the risk of clots. Although heavy cigarette smokers are at greatest risk, people who smoke as few as three cigarettes a day are at increased risk for blood vessel abnormalities that endanger the heart. Regular exposure to second- hand smoke also increases the risk of hypertension in Non-smokers.^[26]

Alcohol

Moderate alcohol consumption (one or two drinks a day; 5 ounces wine, 12 ounces beer, or 1.5 ounces hard liquor is one drink) can help boost HDL “good” cholesterol levels. Alcohol may also prevent blood clots and inflammation. By contrast, heavy drinking harms the heart. In fact, heart disease is the leading cause of death in alcoholics.

Physical inactivity

Exercise has a number of effects that benefit the heart and circulation, including improving cholesterol and lipids, lowering blood pressure and blood sugar levels, and improving weight control. People who are sedentary are almost twice as likely to suffer from heart attacks as are people who exercise regularly.^[28]

Diet

Diet plays an important role in the health of the heart, especially in controlling dietary sources of cholesterol and restricting salt intake that contributes to high blood pressure.

Obesity and metabolic syndrome

Excess body fat, especially around the waist, can increase the risk for hypertension. Obesity also increases the risk for other conditions (such as myocardial ischemia and diabetes) that are associated with cardiac disease.^[29]

Sleep apnea

Obstructive sleep apnea is a condition in which tissues in the upper throat sag at intervals during sleep, thereby blocking the passage of air. Patients with severe, untreated apnea are at increased risk for high blood pressure, CAD, stroke, and heart attack.

Poor diet and nutrition

A diet that's high in fat, salt, sugar and cholesterol can

Role of stress in hypertension

Stress is the body's natural defense against predators and danger. It flushes the body with hormones to prepare systems to evade or confront danger. This is known as the "fight-or-flight" mechanism. The stress response is the body's way of protecting. When working properly, it helps in staying focused, energetic, and alert. In emergency situations, stress can save lives by giving extra strength to defend from that situation. For example, if a person is walking in the forest on a sunny day and suddenly, he realized that he is facing a hungry grizzly bear. A grizzly bear is a REAL stressor. Stress hormones, such as cortisol, adrenaline, and noradrenalin are released into our bloodstream. Heart rate and blood pressure increases. His breathing becomes faster to meet the increased oxygen demands of muscles and organs. All senses are primed, all muscles are tensed, and he is ready to either fight or flee to save his life. Stress affects one's behavior and factors that increase heart disease risk: high blood pressure and cholesterol levels, smoking, physical activity, and overeating. Some people may choose to drink too much alcohol or smoke cigarettes to "manage" their chronic stress, however, these habits can increase blood pressure and may damage artery walls leading to cardiovascular disease.

Subjects and methods

The study was a hospital based prospective observational study which was conducted in all departments (cardiology, Gastroenterology, Neurology, Urology, and Endocrinology) especially focusing to the cardiology department cases, sunshine hospitals, paradise, Hyderabad during the period of 6 months from November 2018 to April 2019.

Study design

At study center, patient details were collected according to patient profile form which includes details like: patient demographic details, past medical history, past medication history, social history, BMI, lab investigations, drug therapy (name of the drug, route, frequency, category of antihypertensive medication). The

contribute to the development of hypertension.

Excessive stress

A certain amount of stress may be desirable, in that it keeps people alert and motivated. However, as the stress level builds, especially if prolonged, it can be harmful to health. Stress can exacerbate symptoms in people with pre-existing heart disease and can contribute to high blood pressure.^[30]

study includes only in patients and age greater than 30 were included and who are willing to participate only are enrolled in the study. Those who are not willing to give the consent, amputated patient and patients who are bedridden are excluded from the study. 2008; 196(2):943-952. Pmid: 17466992.

METHODOLOGY

Study site

The study was conducted in the sunshine hospitals, paradise, Secunderabad.

Study period

The study was conducted for a period of 6 months.

Study design

A prospective and observational study.

Inclusion criteria

- Patients age between (30 to 70 years).
- Patients with a medical history of hypertension or diabetes or CVD.
- Patients who are admitted in the hospital for at least for 3 days.

Exclusion criteria

- Patients who are not willing to give the consent.
- Amputated patients.
- Patients who are bedridden.

Source of data collection

Study materials

- Patient consent form.
- Patient profile forms.
- Data collection form.
- Prediction charts.
- Patient information leaflets.

Patient consent form

It contains demographic details of patients, purpose of study and brief detailed explanation of the study with in English.

Patient profile forms

It contains patient demographic details like name, age, sex, date of admission, date of discharge, complaints on admission, medical history, medication history, social history,

family history, previous allergies and it includes physical examinations, provisional diagnosis, final diagnosis, progress chart and medications.

Data collection form

It contains patient details like name, sex, age, weight, height, previous medical history, current medications details, contains questions regarding the stress and stress score for individual patient.

$$\begin{aligned} \text{Prevalence rate} &= \text{all cases of a specific disease/population} \times 100 \\ &= 200/600 \times 100 \\ &= 33.33\% \end{aligned}$$

Study procedure

Study has been conducted in sunshine hospital. This is a prospective observational study. Data was collected from the patients' case sheets those who are willing to enroll in to the study after obtaining the consent. All the data required for the study is entered into the data collection form which has been prepared for the project.

We enrolled 200 patients for the study. A stress question has been asked to the patient under the presence of patient attendee and explains about the hypertension by using information leaflet. All the data obtained.

STATISTICAL ANALYSIS

The data obtained throughout the study were analyzed by calculating prevalence rate and incidence rate.

Incidence rate

- a. Incidence proportion can only be measured in a closed cohort.
- b. Only new onsets are considered.

$$\begin{aligned} \text{Incidence proportion} &= \text{Cumulative Incidence} = \text{Risk} \\ &= \text{no. of disease onsets} / \text{no. initially at risk} \end{aligned}$$

Calculating prevalence rate and incidence rate: ^[31]

Prevalence rate

- a) Prevalence can be measured in an closed cohort or in an open population.
- b) Prevalence in cross-sectional.
- c) "Old" cases and "new" cases are counted in the numerator.
- d) Can be measured at a particular point (point prevalence) or over a period (period prevalence). Normally, when we say prevalence we mean "point prevalence."

RESULTS

The time of follow-up must be specified (e.g., 5-year risk of breast cancer vs. lifetime risk of breast cancer).

- c. Incidence rates (density) can be measured in a closed cohort or in an open population.
- d. Its numerator is the same as incidence proportion, but its denominator is different.

$$\begin{aligned} \text{Incidence rate} &= \text{New cases} / \text{Total Population at risk} \times 100 \\ &= 89/200 \times 100 \\ &= 44.5\% \end{aligned}$$

Table 2: shows number of male and female patients in relation with the age group. Females of age between 51-60 were found to be more prone to hypertension. Males of age between 41-50 were found to be more prone to hypertension.

Age	Male	Female
21-30	3	0
31-40	6	10
41-50	19	30
51-60	18	42
61-70	10	20
71-80	12	30

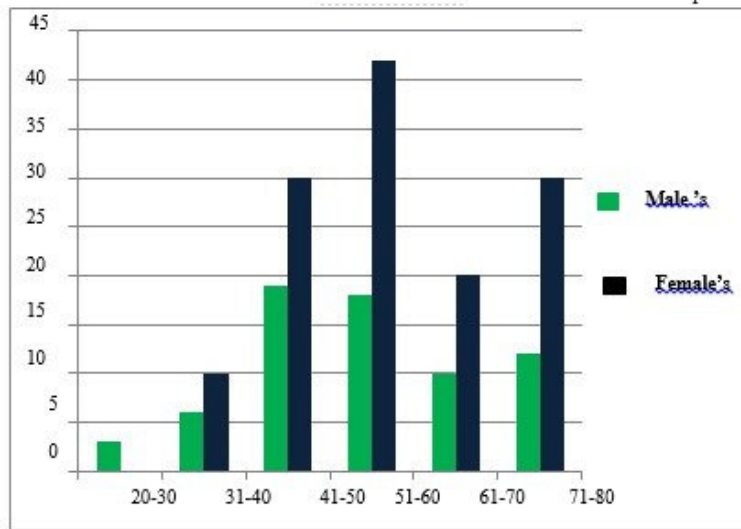


Fig 1. Age v/s Gender Chart

Table-3: Shows number of male and female patients in association with their physical lifestyle.

PHYSICAL ACTIVITIES	MALE	%	FEMAL	%
Sedentary	S 18	9%	ES 56	285
Moderately active	39	19.5%	60	30%
Extremely active	13	6.5%	16	8%
Smokers	25	12.5%	-	-
Non-smokers	43	21.5%	132	66%
Alcoholic	43	21.5%	-	-
Non-alcoholic	25	12.5%	132	66%

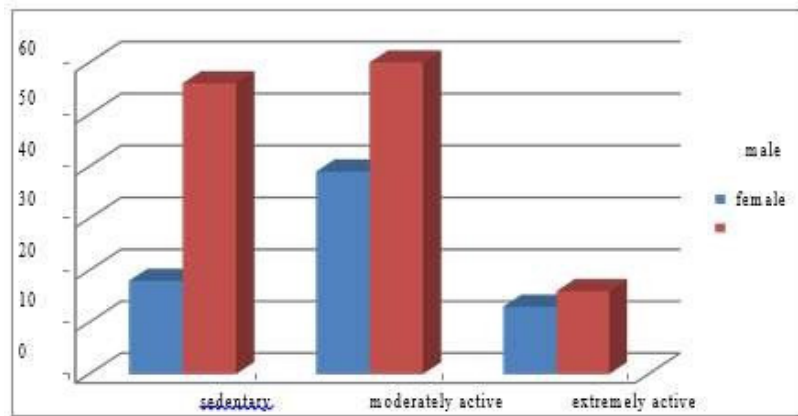


Fig 2. Gender v/s Physical Lifestyle

Table 4: Shows number of male and female patients having comorbidities with hypertension. Out of 200 patients, highest number of patients in both male and female categories were found to have diabetes mellitus as a comorbidity.

COMORBIDITIES	MALES	%	FEMALES	%
Essential hypertension	68	34%	132	66%
Diabetes mellitus	41	20.5%	72	36%
Heart disease	12	6%	32	16%
Chronic obstructive pulmonary disease (COPD)	8	4%	4	2%
CVD	7	3.5%	24	12%

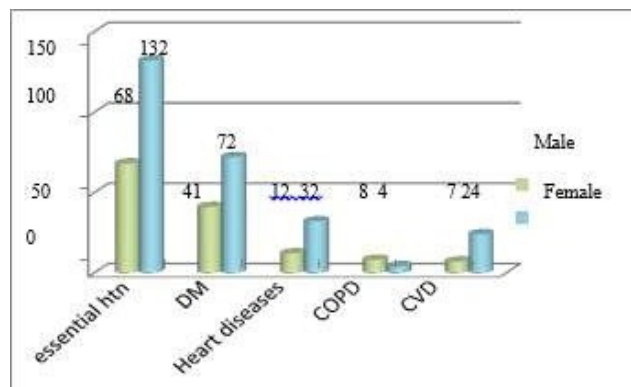


Fig 3. Gender v/s Comorbidities

Table 5: shows number of male and female patients showing different stages of hypertension. This showed that both males and females had pre-hypertensive stage of hypertension

Stages of hypertension	Males	%	Females	%
Normal	16	8%	30	15%
Prehypertension	22	11%	67	33.5%
Stage-1 HTN	20	10%	23	11.5%
Stage -2 HTN	10	5%	12	6%

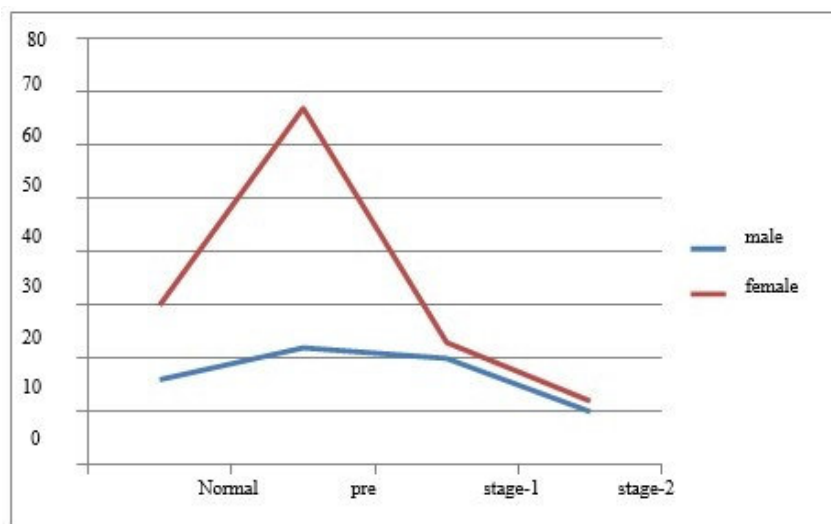


Fig 4. Stages of Hypertension

DISCUSSION

A total of 200 prescriptions were studied and analyzed in a super specialist hospital during six months of study period. Among 200 patients, 188 patient data from cardiology department and 12 patients are from other departments. In 200 patients, 68 are males and 132 are females. Around 68 patients of all the patients who are into the study have reported their social habits. In that 25 are smokers, 43 members are alcoholic and 68 members are both smoker and alcoholic. Among all the patients 68 males and 132 females are with essential hypertension, 41 males and 72 females are with diabetes mellitus, 12 males and 32 females are having heart diseases, 8 males

and 4 females are having chronic obstructive pulmonary disease. [32] Prevalence rate and the incidence rate among all the individuals which were included in the study are found to be 33.33 and 44.5 respectively. Many studies had explained about the impact of stress in causing hypertension. Stress questionnaire we developed were similar to Merridy casson's questionnaire. Among all the patients participated in the study it was found that 7 male patients and 4 females are with low stress, 103 males and 49 of females are with the moderate stress, 102 males and 35 females are with high risk of stress. As per our research results patients are with the cardiovascular problems has the high stress and most of the people who are with no history of cardiovascular events in their life are with border line moderate stress. [33]

CONCLUSION

Total 200 members are involved in the study; female patients are higher in number than the male admitted in the hospital. Only male patients have the potential social habits that can trigger hypertension. We have observed that patient with the age less than 21- 40 years are mostly <10% of risk in both the predictive tools irrespective of their social habits. Most of the research studies in India based on WHO/ISH found that social habits have influenced a lot in prediction of risk. The hypertension risk was also high amongst the retired person because of aging & age related risk factors, while high risk in executives was mainly due to diabetes & obesity. Our results have shown hypertensive patients are with high range of stress from long time than the non-hypertensive patients. It's proved that hypertensive patient how are with the chronic stress have a great chance of re-hospitalisation. In order to control the re-hospitalisation proper prediction is necessary regarding the incidence of the disease among the individual patient. Prevalence rate and the incidence rate among all the individuals which were included in the study are found to be 33.33 and 44.5 respectively. Stress can be as an acute stress and chronic stress some studies show that 5-6 out of 10 members are having the stressful life it may be due to various factors.

Due to the lack of proper risk prediction in Indian population this leads to the rise in the cardiovascular diseases death rate every year. In order to predict incidence of 10 years risk of hypertension few risk prediction models has developed based on the various aspects of their ethnicity of the populations. In the developed countries like America, European and some other independent health organizations has been created the risk prediction models but among this only few are suitable. But where as in the developing countries like India, eastern world countries and under developed countries like Africa, World health organization has conducted a research in order to provide the prediction of hypertension and CVD which has been started in the middle of the 19th century. After the current situation in their country most of the counties has stopped using them because changing in their life style, environment and some other factors. Its leads to the underestimate or over estimate in the population. National cholesterol education program has released an adult treatment panel 3 at 2001 has released with a few new features regarding the intervention in the treatment of the disease and therapeutic life changes those steps need to be opt for treatment. As per National cholesterol education program has released an adult treatment panel 3 Physician need to prescribe the lipid lowering drugs as per the cholesterol levels in the patients.

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