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Research Article

**CURRENT TREND IN PRESCRIBING PATTERN OF
ANTIHYPERTENSIVE DRUGS IN A TERTIORY CARE
TEACHING HOSPITAL: A PROSPECTIVE OBSERVATIONAL
STUDY****P. Ramesh Kumar Reddy* and D. Swathi**Pharm-D Intern, Department of Pharmacy Practice, CES College of Pharmacy, Kurnool,
Andhra Pradesh.**Abstract:**

Background: Hypertension is one of the major chronic diseases resulting in high mortality and morbidity worldwide. A total of 972 million people were affecting worldwide. Prevalence of Hypertension in India is reported to vary from 4-15% in urban and 2-8% in rural population. It is estimated that the worldwide prevalence of hypertension would increase from 26.4% in 2000 to 29.2% in 2025.

Main aim of our study is to identify the irrational prescribing habits to drive a remedial message to the prescribers. Therefore, drug utilization studies, which evaluate and analyze the medical, social and economic outcomes of the drug therapy, are more meaningful and observe the prescribing attitude of physicians with the aim to provide drugs rationally.

Method: This prospective study was conducted for a period of three months from September 2017 to November 2017 in vishwabharathi superspeciality hospital, Kurnool, AP. The cases which had found in Medicine department, details of cases including patient name, age, sex, and other relevant information was collected. The collected prescriptions were entered into Microsoft Office Excel sheet according to their age, gender, therapeutic category and prescription.

Results: Among the study population (100 patients) most of them are males (69%) and large number of patients were above 60years. By measuring both systolic and diastolic blood pressure most of the patients we observed that large number of patients were in stage 1 hypertension. We included the patients with co-morbid conditions; diabetes is the most common co-morbidity in our population. In a total study population, most of the patients i.e. 51 patients were on dual drug therapy, Among them most of the patients were prescribed with a combination of calcium channel blockers + beta blockers followed by ARB's+ diuretics. Only 42 patients were prescribed with monotherapy i.e. single antihypertensive drug. In monotherapy Angiotensin receptor blockers were majorly prescribed followed by beta blockers and calcium channel blockers.

Conclusion: Our Present study represents the current prescribing trend for antihypertensive agents. It implies that calcium channel blockers are the leading group of antihypertensive agents followed by diuretics.

Key words: Hypertension, drug utilization, comorbidities, hypertensive drugs, tertiary care hospital.

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INTRODUCTION:

Hypertension is defined by persistent elevation of arterial blood pressure. Elevated systolic blood pressure is usually defined as a systolic reading ≥ 140 mm Hg and diastolic reading ≥ 90 mm Hg ($\geq 140/90$ mm Hg)¹. Hypertension is a disease of complex etiology, affecting 972 million people worldwide. Prevalence of HTN in India is reported to vary from 4-15% in urban and 2-8% in rural population. It is estimated that the worldwide prevalence of hypertension would increase from 26.4% in 2000 to 29.2% in 2025 [4].

Hypertension is one of the major chronic diseases resulting in high mortality and morbidity worldwide [1,2]. It is a leading risk factor for coronary heart disease, stroke and chronic renal disease. Evidence from large clinical trials now suggests that lowering blood pressure effectively prevents these adverse outcomes [3,4].

The 7th report of JNC on detection, evaluation and treatment of high blood pressure added a prehypertension category which includes individuals with systolic blood pressure readings of 120-129 mmHg or diastolic blood pressure of 80-89 mmHg. This category is now included in contemporary management strategies.

Table 1: JNC 7 HYPERTENSION CLASSIFICATION

Blood pressure classification	Systolic (mmofHg)	Diastolic (mmofHg)
Normal	<120 and	<80
Prehypertension	120-139 or	80-89
Stage 1	140-159 or	90-99
Stage 2	>160 or	>100

Blood pressure = (stroke volume X heartrate) X Total peripheral vascular resistance(TPR).

A hypertensive crisis (blood pressure greater than 180/120 mm Hg) may be categorized as either a hypertensive emergency (extreme blood pressure elevation with acute or progressing target organ damage) or a hypertensive urgency (severe blood pressure elevation without acute or progressing target organ injury).

Pathophysiologically, hypertension can be classified

into two main groups.

1. Essential or Primary Hypertension – where the cause for rise in blood pressure is not known.
2. Secondary Hypertension – where rise is due to renal disease e.g. chronic diffuse glomerulonephritis, pyelonephritis; due to some vascular disease e.g. renal artery disease or due to some endocrinal disorders e.g. pheochromocytoma, Cushing's syndrome and primary aldosteronism.

Clinically, hypertension can be divided into three stages e.g. mild, moderate and severe hypertension. The diastolic blood pressure between 90 – 104 mm Hg is graded as mild, 105 – 114 mm Hg is graded as moderate and above 115 mm Hg is graded as severe hypertension. The person having systolic blood pressure more than 160 mm Hg with low diastolic blood pressure is termed as 'Isolated Systolic Hypertension' commonly seen in elderly person.²

Selection of antihypertensive agents should therefore be based primarily on their comparative ability to prevent these complications. It is therefore important that once the diagnosis of hypertension is established, blood pressure should be adequately controlled through regular follow-up, lifestyle modification, exercise and effective antihypertensive drugs⁵. The study of prescribing pattern is a component of medical audit which seeks monitoring, evaluation and necessary modifications in the prescribing practices of the prescribers to achieve rational and cost effective medical care⁵. It is necessary to define prescribing pattern and to identify the irrational prescribing habits to drive a remedial message to the prescribers. Therefore, drug utilization studies, which evaluate and analyze the medical, social and economic outcomes of the drug therapy, are more meaningful and observe the prescribing attitude of physicians with the aim to provide drugs rationally³.

MATERIALS AND METHODS:**Study site:**

This study was conducted in Medicine department of Viswabarathi superspeciality Hospital, a 250 bedded tertiary care teaching hospital providing health care services.

Study design:

The research approach adopted in this study was prospective study in Medicine Department of a tertiary care teaching hospital.

Study period:

This study was conducted for a period of three months from november 2017 to January 2018.

Study subjects:

This study includes hospital In-patients treated for hypertension in Medicine department.

Study criteria:

Patient who meets the following criteria was enrolled where, Inclusion criteria was patients aged ≥ 18 years of both genders and age group of 18-90 years along with their comorbid conditions like diabetes mellitus, anemia, cardiac problems, renal problems etc. Exclusion criteria were patients with diseases like psychiatry, cancer, Pregnant and nursing mothers.

Study procedure:

The cases which had found in Medicine department, details of cases including patient name, age, sex, and other relevant information was collected. The collected prescriptions were entered into Microsoft

Office Excel sheet according to their age, gender, therapeutic category and prescription

Study approval:

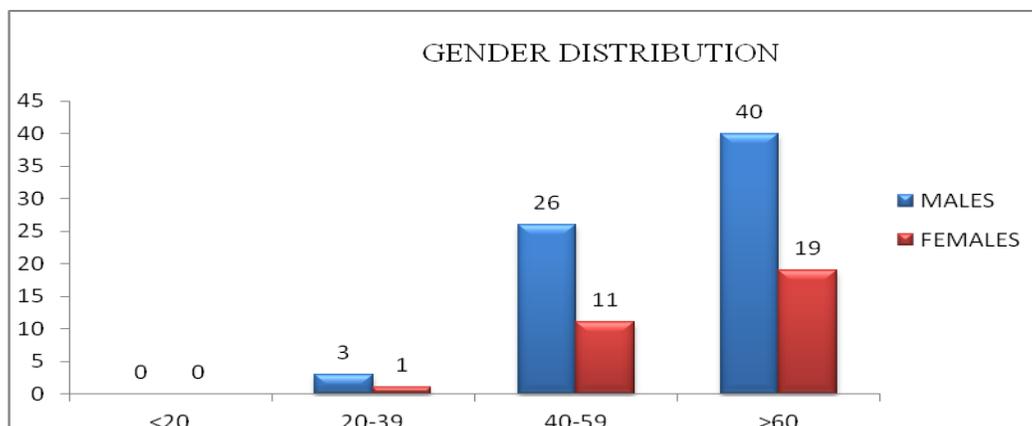
The study protocol was approved by the Institutional Human Ethics Committee and Informed consent from patients was taken.

Results:

A total of 100 cases which includes antihypertensive medications and which are admitted in hospital were analysed. In the total cases 69% are males followed by 31% of females. In age wise distribution more number of patients were seen in the age group of >60 followed by age group of 40-59 respectively.

Table 2: Gender Distribution

AGE	MALES	FEMALES	TOTAL
<20	0	0	0
20-39	3	1	4
40-59	26	11	37
>60	40	19	59
Total	69	31	100

**Fig 1: Gender Distribution**

When blood pressure was measured in terms of systolic blood pressure and diastolic blood pressure 43 cases were observed as stage 1 HTN i.e.(140-159) followed by 35 cases in stage 2 (160-179), in terms of diastolic blood pressure 52 cases were observed in stage 1 HTN i.e.(90-99) followed by 26 cases in stage 2 HTN i.e. (100-110).

Table 3: Systolic & Diastolic blood pressure

SYSTOLIC BLOOD PRESSURE			
N <120	0	1	1
Pre HTN (120-139)	8	4	12
Stage 1(140-159)	28	15	43
Stage 2(160-179)	26	9	35
HTN emergency >180	6	3	9
DIASTOLIC BLOOD PRESSURE			
NORMAL <80	0	1	1
Pre HTN(80-89)	14	6	20
Stage 1(90-99)	33	19	52
Stage 2 (100-110)	22	4	26
HTN emergency >120	1	0	1

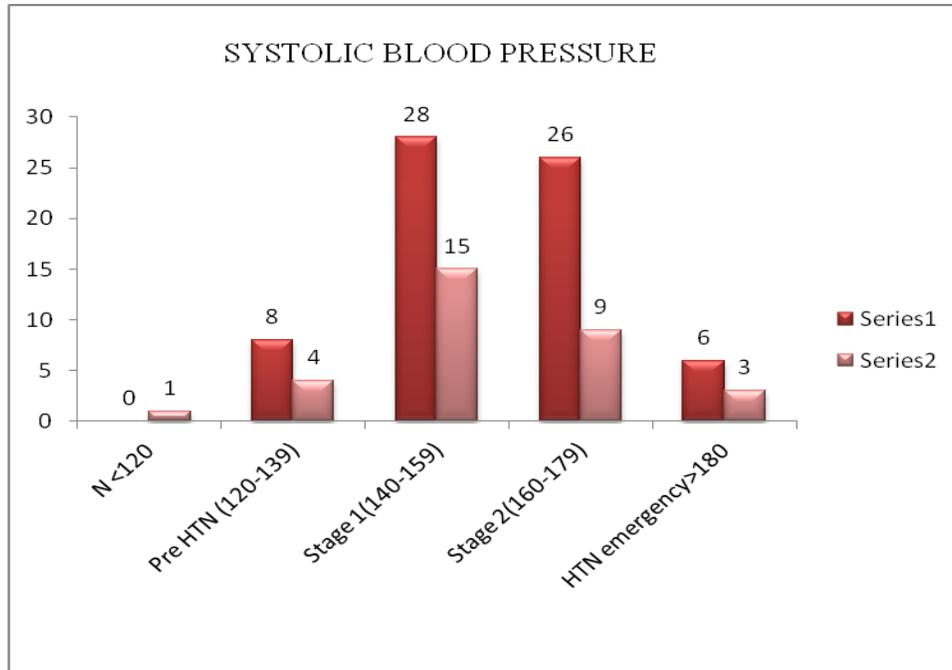


Fig. 2: systolic blood pressure

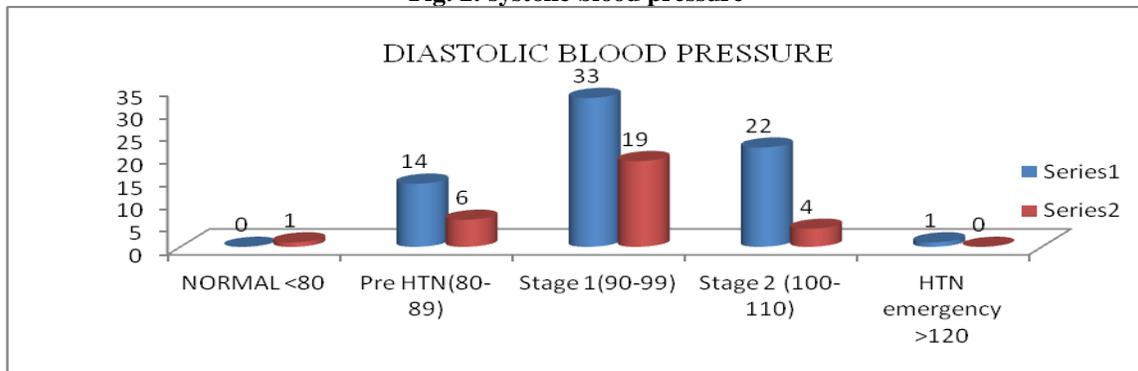


Fig.3: Diastolic blood pressure

Table 3: Comorbid conditions

COMORBID CONDITIONS	
Diabetes Mellitus	54
Cardiovascular System	4
Central Nervous System	46
Renal	17
Liver	4
Lungs	6
Hyperthyroidism	1
Anaemia	2
Others	8

Many comorbid conditions leads to occurrence of hypertension. In this study the comorbid conditions were analyzed by conducting patient interview. The most common comorbid condition in this study was Diabetes mellitus followed by Central nervous system related comorbidities.

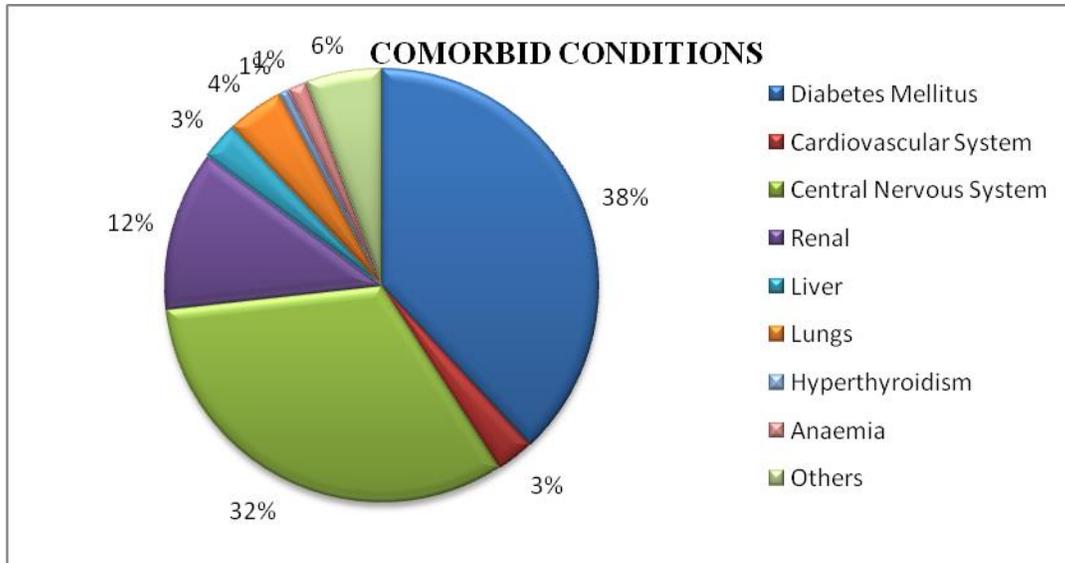


Fig. 4: Comorbid conditions

Table 4: Monotherapy

MONOTHERAPY	
Angiotensin receptor blockers	16
Beta blockers	13
Calcium channel blockers	12
Diuretics	1

In this study in overall 100 patients 42 patients were prescribed with monotherapy i.e. single antihypertensive drug. In monotherapy Angiotensin receptor blockers were majorly prescribed followed by beta blockers and calcium channel blockers.

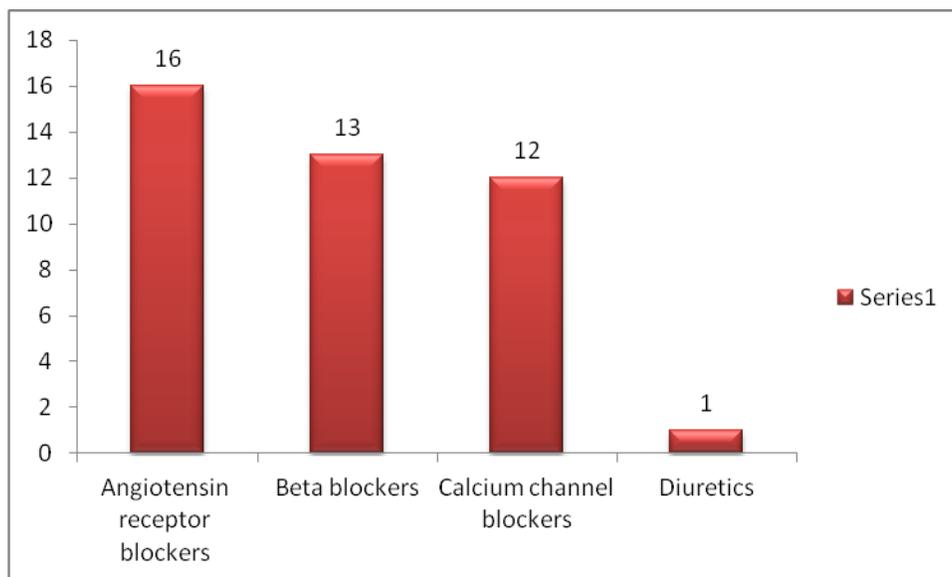


Fig. 5: Monotherapy

Table 5: combination therapy/double drug regimen

COMBINATION THERAPY DOUBLE DRUG REGIMENS	
Angiotensin receptor blockers+diuretics	14
Beta blockers +calcium channel blockers	20
Angiotensin converting enzyme inhibitors +diuretics	3
Beta blockers+angiotensin receptor blockers	5
Angiotensin receptor blockers+ calcium channel blockers	5
Beta blockers+ diuretics	1
Angiotensin receptor blockers+ Angiotensin receptor blockers	1
Beta blockers+ Beta blockers	1
Calcium channel blockers+ Angiotensin converting enzyme inhibitors	1

In combination therapy or dual drug regimen 51 patients were prescribed with two drug regimen. In two drug regimen Beta blockers +calcium channel blockers (20) were majorly prescribed followed by Angiotensin receptor blockers+diuretics (14).

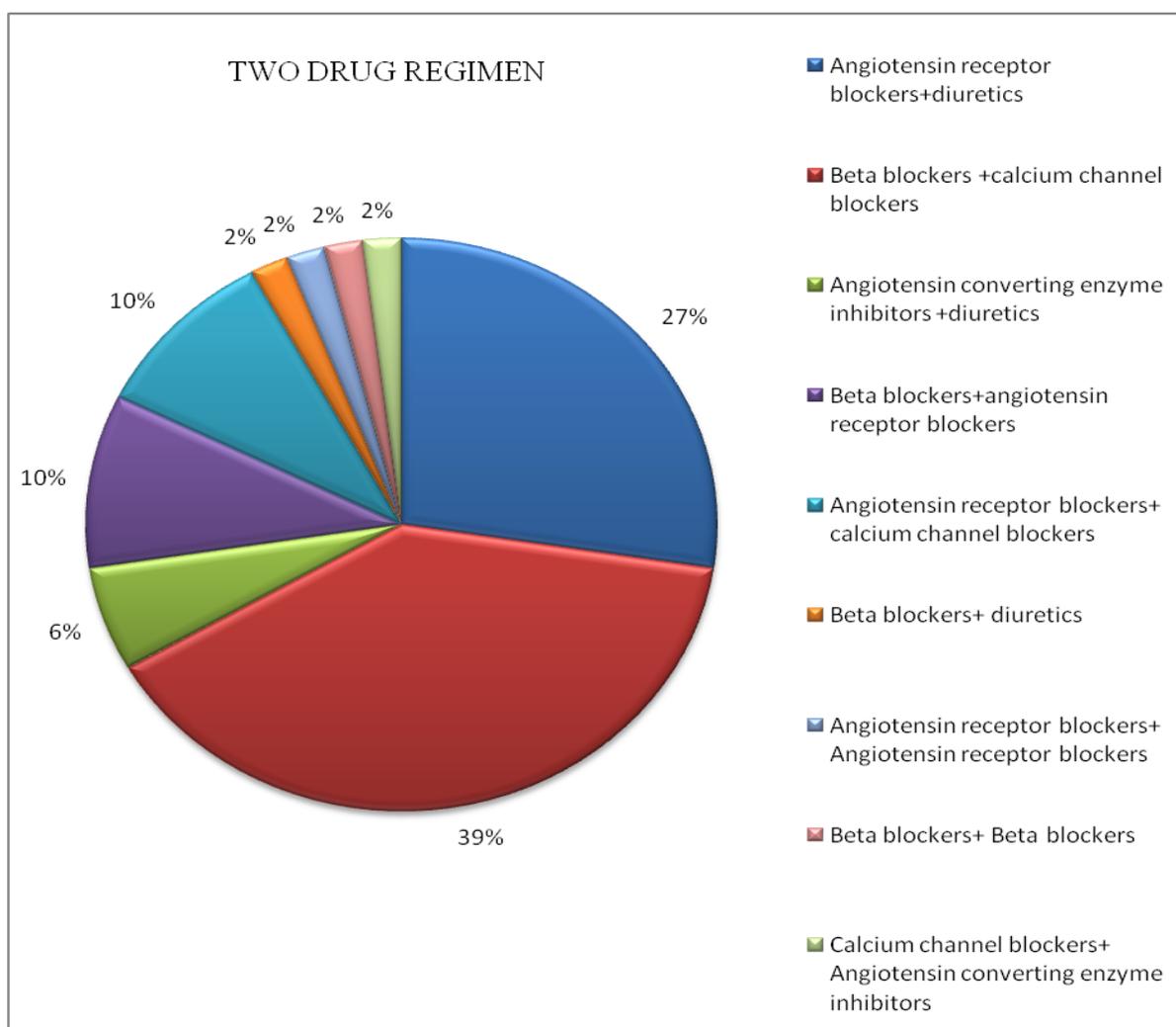
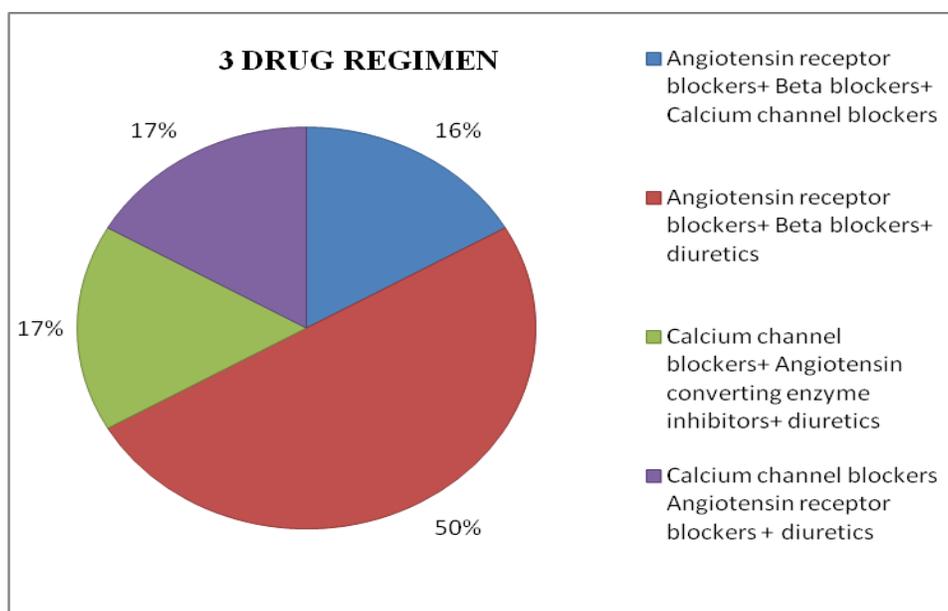
**Fig. 6: combination therapy/double drug regimen**

Table 6: Triple combination & 4 drug regimen.

TRIPLE COMBINATION	
Angiotensin receptor blockers+ Beta blockers+ Calcium channel blockers	1
Angiotensin receptor blockers+ Beta blockers+ diuretics	3
Calcium channel blockers+ Angiotensin converting enzyme inhibitors+ diuretics	1
Calcium channel blockers Angiotensin receptor blockers + diuretics	1
4 DRUG REGIMEN	
Calcium channel blockers+ Angiotensin receptor blockers + diuretics+blockers	1

In triple drug regimen 3 cases were prescribed with Angiotensin receptor blockers+ Beta blockers+ diuretics followed by combination of ARB's,BB's,CCB's.

In four drug regimen only one case was prescribed with 4 drug regimen which was a combination of Calcium channel blockers+ Angiotensin receptor blockers + diuretics+blockers.

**Fig. 7: Triple combination****DISCUSSION:**

In recent decades, the world has undergone a demographic transformation with a rapid growth of the elderly population, resulting in an increased demand for funds to maintain their health and drug consumption. As a result of which drug utilization studies are conducted in a ladder like fashion. Majority of the population are prone to hypertension in the present trends due to the factors like sedentary life style, habits like alcohol and smoking, mental stress etc [6].

Our present study on drug utilisation pattern was higher in males i.e. 69% than females i.e. 31%.This was strongly in liaison with the study conducted by Shri Sathya Sai Medical College & Research Institute

where females were 61% and males are 39% [7].

Further our study shows the maximum hypertensive patients were seen in the age group of >60 years of age both males and females of same age group, along with comorbid conditions like Diabetes Mellitus, Cardiovascular System, Central Nervous System, Renal, Liver, Lungs, Hyperthyroidism, Anaemia. The common comorbid condition observed in our study is Diabetes mellitus followed by Central nervous system damage followed by Renal system.

Anti-Hypertensive therapy shows that more combination therapy i.e. 2 drug regimen was most commonly prescribed i.e. 51%. Betablockers and calcium channel blockers are more commonly prescribed in combination therapy followed by

combination of angiotensin receptor blockers and diuretics. 41% of patients are treated with Monotherapy i.e. with a single drug. In patients treated with monotherapy the most commonly prescribed class of drug was Angiotensin Receptor blockers followed by Calcium channel blockers. In 3 drug regimen combination of Angiotensin receptor blockers, beta blockers and diuretics are majorly prescribed. Because of comorbid conditions combination therapy was majorly prescribed. This study can be extended further by increasing the sample size and time period of data collection

CONCLUSION:

Present study represents the current prescribing trend for antihypertensive agents. It implies that calcium channel blockers are the leading group of antihypertensive agents followed by diuretics.

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CONFLICT OF INTEREST: None

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