Research Article

Pharmaceutical Sciences

STUDY OF PRESCRIBING PATTERNS OF ANTIHYPERTENSIVE DRUGS

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ABSTRACT

Hypertension is a growing worldwide problem associated with an increased risk of cardiovascular morbidity and mortality. Statistics reveals that many patients with hypertension do not have their blood pressure under control. Poor control of this highly prevalent disease can lead to the development of Ischemic heart disease, Stroke, Chronic renal failure. Treatment pattern of hypertension provide valuable information for health care providers. The aim of the present prospective study was carried out to assess the current trends in prescribing patterns of Antihypertensive drugs in the treatment of hypertension. The current study was carried out in Sathya hospital with following objectives: To study the prevalence of hypertension in patients, to study demographic profile of the patients suffering from hypertension, to study the prescribing pattern of drugs used in the management of hypertension.

Patterns of drug use were derived from a careful examination of medications in a prospective study of six months duration in 360 patients at Sathya Hospital (Vanamala Clinic), Warangal. Data for present study were collected by scrutinizing the patients case reports, out-patients cards and laboratory reports. The data collected were analyzed for the Prescribing patterns of antihypertensive drugs and Demographic profile of the patients suffering from hypertension. The patients enrolled in the study were grouped based on the number of antihypertensive drugs prescribed. Out of 360 patients during study period, 59% were male and 41% were female. Maximum number of patients were in the age group of 50-59 years (32.2%).Majority of the patients (42.2%) belonged to Grade 2 (SSLC/PUC).The results of pharmacotherapy revealed that dual therapy was the most preferred choice of treatment in reducing systolic blood pressure with ARBs + β-blockers (P < 0.0011) than ARBs used alone. Whereas in diastolic blood pressure there is a higher percentage of reduction was found with ACEI + CCBs (P < 0.001) compare to ACEI used alone and also the prescribing pattern of antihypertensive drugs follows the standard treatment algorithm as per the JNC VII guidelines for hypertension.

KEYWORDS

Prescribing patterns, Antihypertensive Drugs.

INTRODUCTION

Hypertension is one of the major chronic diseases resulting in high mortality and morbidity in today's world. Poor control of this highly prevalent disease can lead to the development of Ischemic heart disease, Stroke, Chronic renal failure. According to a recent review on "Global Burden of hypertension", the estimated prevalence of hypertension (in aged 20 years and older) in India in 2000 was 20.6% among males and 20.9% among females and is projected to increase to 22.9% and 23.6% respectively in 2025[1].

The main aim of this present prospective study was carried out to assess the current trends in prescribing patterns of Antihypertensive drugs in the treatment of hypertension. The current study was carried out in Sathya hospital to study the prevalence of hypertension in patients at Sathya Hospital in Warangal, to study demographic profile of the patients suffering from hypertension and to study the prescribing pattern of drugs used in the management of hypertension.

MATERIALS AND METHODS

SETTING

The prospective study was conducted at Sathya hospital (Vanamala Clinic), Warangal, with the official permission of the Director of Hospital. The

information from the Patient who visited the hospital were collected under the supervisions of Dr. B. Murali Krishna and Y.Radhika, Associate Professor, Department of Pharmacy Practice, St.Peter's Institute of Pharmaceutical Sciences Hanamkonda, Warangal. The data was collected for about two months and analyzed for one month.

SAMPLE SIZE

A total of 360 prescriptions for essential hypertension were studied. Data was obtained from a prospective series of 360 patients by scrutinizing the out-patients cards and laboratory reports attending the medicine out-patients department of the hospital.

INCLUSION CRITERIA

All patients of either sex with primary hypertension in medicine outpatient department who are willing to participate are included in the study.

EXCLUSION CRITERIA

Patients below the age of 18 years, pregnant women, patients who are not willing to participate in the study, patients with secondary hypertension are excluded from the study.

DATA COLLECTION

Data for present study were collected by scrutinizing the patients case reports, out-put cards and laboratory reports. The data collected were analyzed for Prescribing patterns of antihypertensive drugs, Demographic profile of the patients suffering from hypertension, The patients enrolled in the study were grouped based on the number of antihypertensive drugs prescribed, The data collected was analyzed for demographic profile of the patients and prescribing pattern of antihypertensive drugs in the treatment of these patients.

STATISTICAL ANALYSIS

The results were analyzed and tabulated statistically by students't' test using Graph pad prism 5 software. P value $< 0.05*$ indicated as significant, $< 0.01**$ considered significant, $< 0.001***$ is moderately significant, $< 0.0001***$ is highly significant.
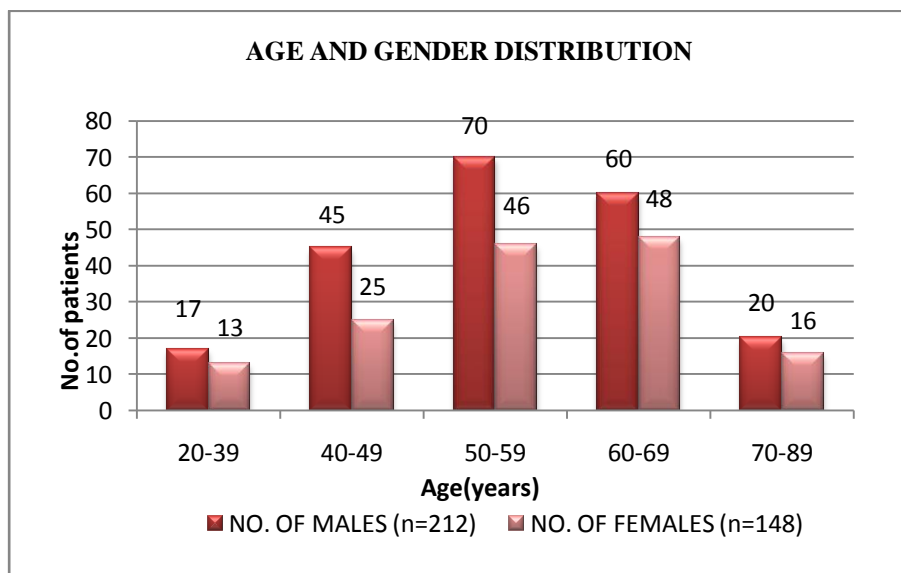
RESULTS AND DISCUSSION

Figure 1: Age and Gender Distribution

This figure shows the gender distribution of the patients recruited for the present study. The results reveal that out of 360 patients recruited for the present study, 212 (59%) of the patients were

males and 148 (41%) of the patients were females and maximum number of patients were in the age group of 50-59 years 116 (32.2 %) followed by 108 (30%) of the patients in the age group of 60-69

years and 70 (19.5%) of the patients in the age group of 40-49 years .Careful literature review reveals that there is no consistency in the gender distribution of the patients suffering from hypertension. While, some of the studies have reported higher percentage of them are male patients [2] and some studies have reported lower percentage of them are male patients[3].In case of age higher percentage of the patients in the age group of 51-60 years has been reported in the earlier study[4].
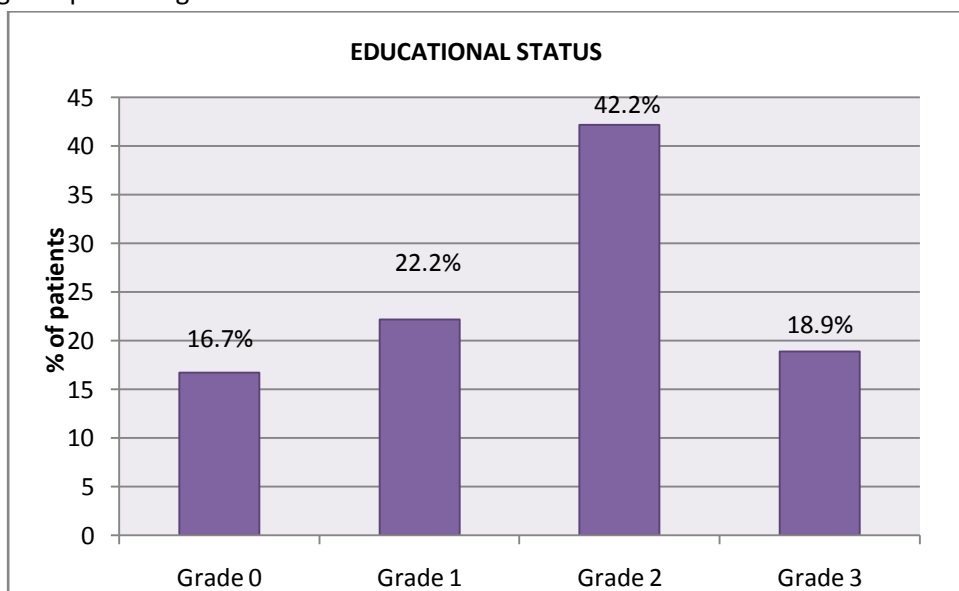
EDUCATIONAL STATUS

Figure 2: Details showing Educational status

The above figure shows the educational status of the patients recruited for the present study. The results revealed that, maximum number of patients 152 (42.2%) belonged to Grade 2 (SSLC/PUC) followed by 78 (21.7%) in Grade 1 (up to 9th), 70 (19.4%) in Grade 3 (Graduates /PGs) and 60 (16.7%) were uneducated i.e. Grade 0. In the earlier studies similar results were found [2].
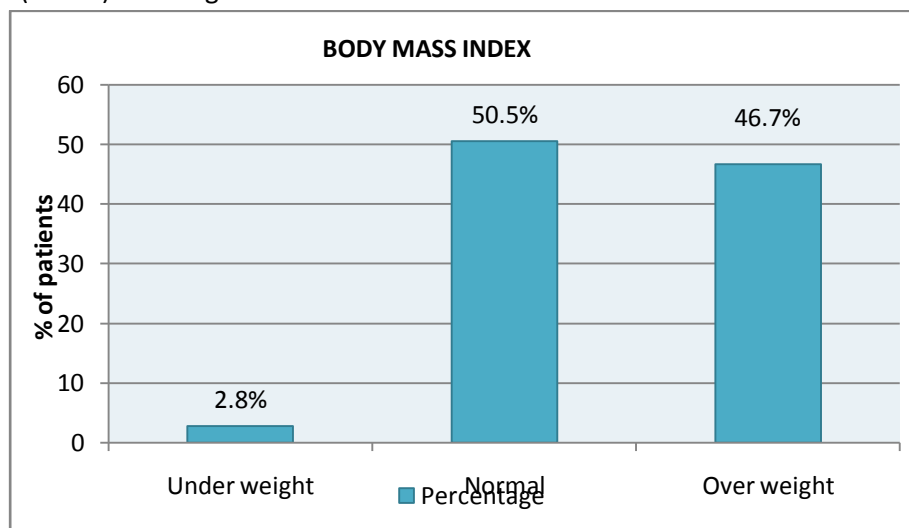
BODY MASS INDEX

Figure 3: Details showing Body Mass Index

Distribution of the patients in different weight groups during the present study revealed that ,maximum number of patients 182 (50.5%) were of normal weight (BMI 20-27.5) followed by 168 (46.7%) of patients who were overweight (BMI >27.5) and 10 (2.8%) of patients were under weight (BMI <20).Careful literature review reveals that there is no consistency or any positive correlation

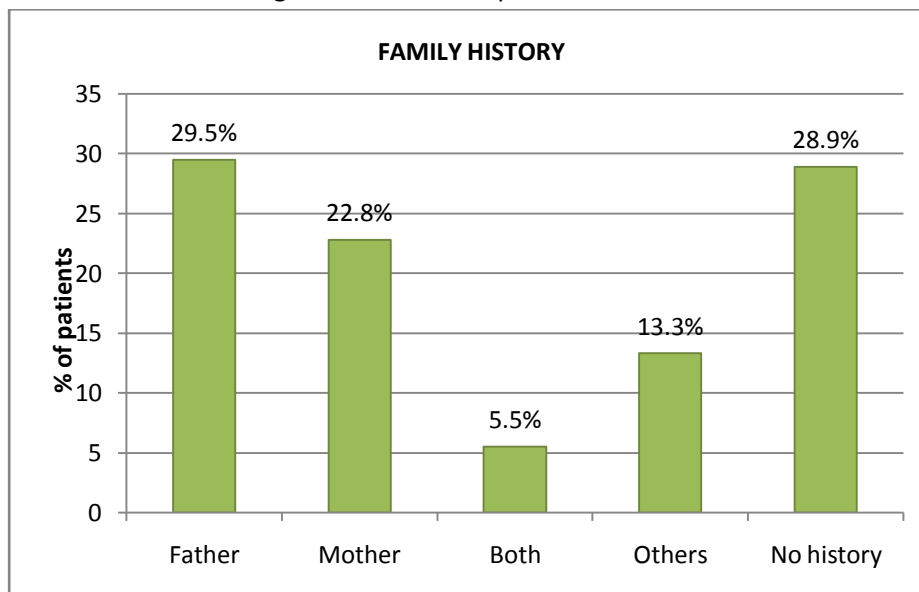existing between BP and increasing BMI in the   patients[5].

FAMILY HISTORY

Figure 4: Details showing Family History

Family history of hypertension of the patients recruited in the present study showed that, 106 (29.5%) of the patients had a family history of father being hypertensive, followed by 82 (22.8%) of mother being hypertensive and 48 (13.3%) of the patients having a family history of other family members being hypertensive. Only 20 (5.5%) of the patients had a family history of both father and mother being hypertensive. 104 (28.9%) of the patients had no family history of hypertension. A total of 256 (71.1%) of the patients having a family history of hypertension reinforces the fact that there is a strong genetic predisposition in hypertension.
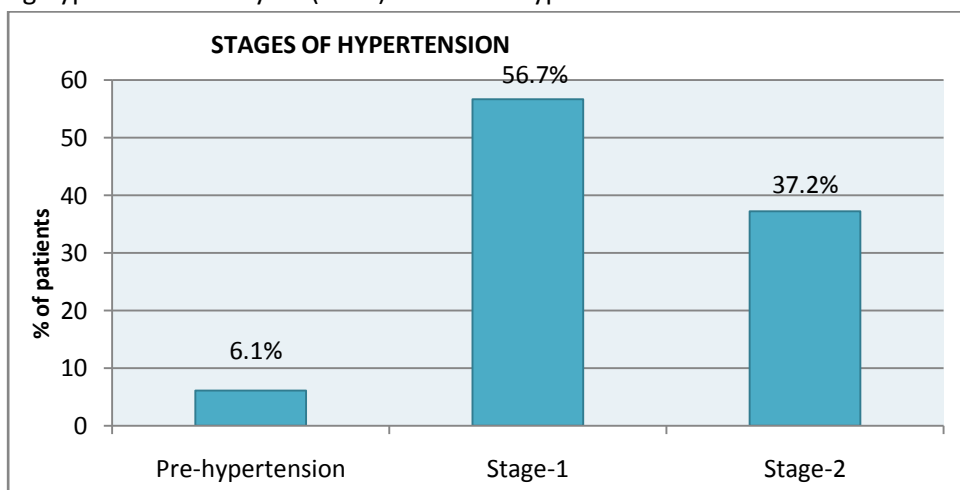
STAGES OF HYPERTENSION

Figure 5: Details showing Stages of Hypertension

The above table shows different stages in hypertension of the patients recruited in the present study. The results revealed that, 204 (56.7%) of the patients belonged to Stage 1 (140-159/90-99), followed by 134 (37.2%) of patients in Stage 2 (>160/>100) and 22 (6.1%) of the patients belonged to the Pre-hypertension stage.
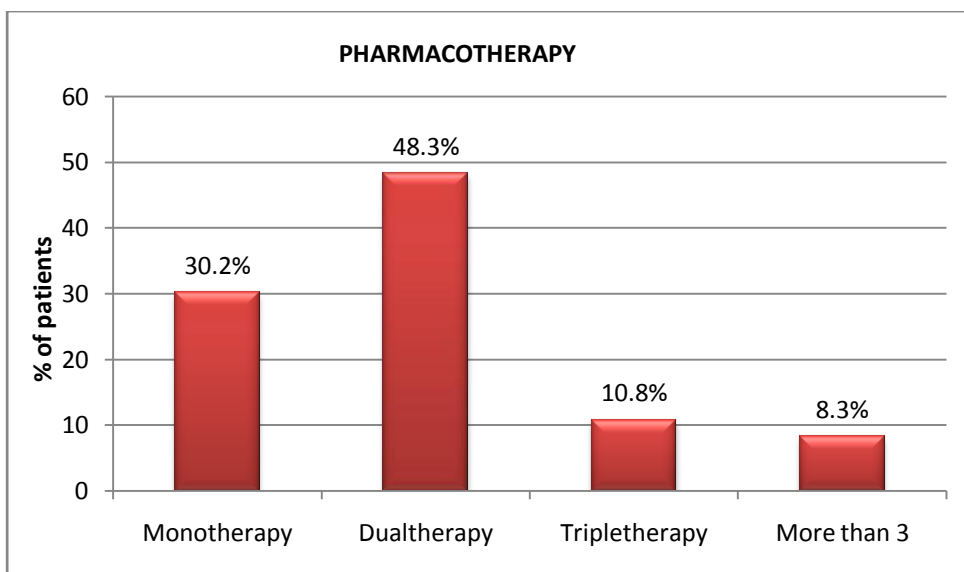
Figure 6: Details showing Treatment of Hypertension

For the purpose of analyzing the prescribing patterns of antihypertensive drugs in the treatment of hypertension the pharmacotherapy was classified as monotherapy, dual therapy, and triple therapy where single antihypertensive, two antihypertensive drugs and three antihypertensive drugs respectively were used for the treatment. When more than 3 antihypertensive drugs were used for the treatment of the patients, they were classified under the group of more than 3 drugs.

The results revealed that, maximum number of patients 174 (48.3%) underwent Dual therapy, followed by 109 (30.2 %) monotherapy, 47 (13 %) of the patients with Triple therapy and 30 (8.3 %) of the patients were treated with more than 3 drugs. It was also observed out of the patients who underwent multiple drug therapy; maximum number of patients were prescribed with fixed dose combinations. The higher choice of fixed dose combination products offer a potential means of reducing pill burden and cost for the patient convenience and compliance [6].
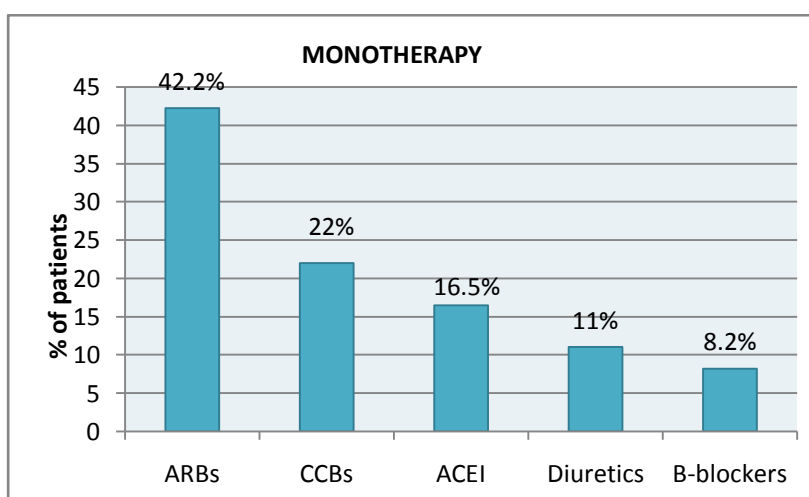

Figure 7: Details regarding Monotherapy of Hypertension

The various antihypertensive drugs and the number of patients in whom they were used under

the class of monotherapy revealed that, out of 109 patients who underwent monotherapy for the

treatment hypertension, 46 (42.2%) of the patients were prescribed with ARBs, followed by 24 (22.0 %) with CCBs, 18 (16.5%) of the patients with ACE inhibitors, 12 (11.0%) of the patients with diuretics

and 9 (8.2%) of the patients with β-blockers.Similar pattern of prescribing ARBs, CCBs and ACEI were found in previous study[7].
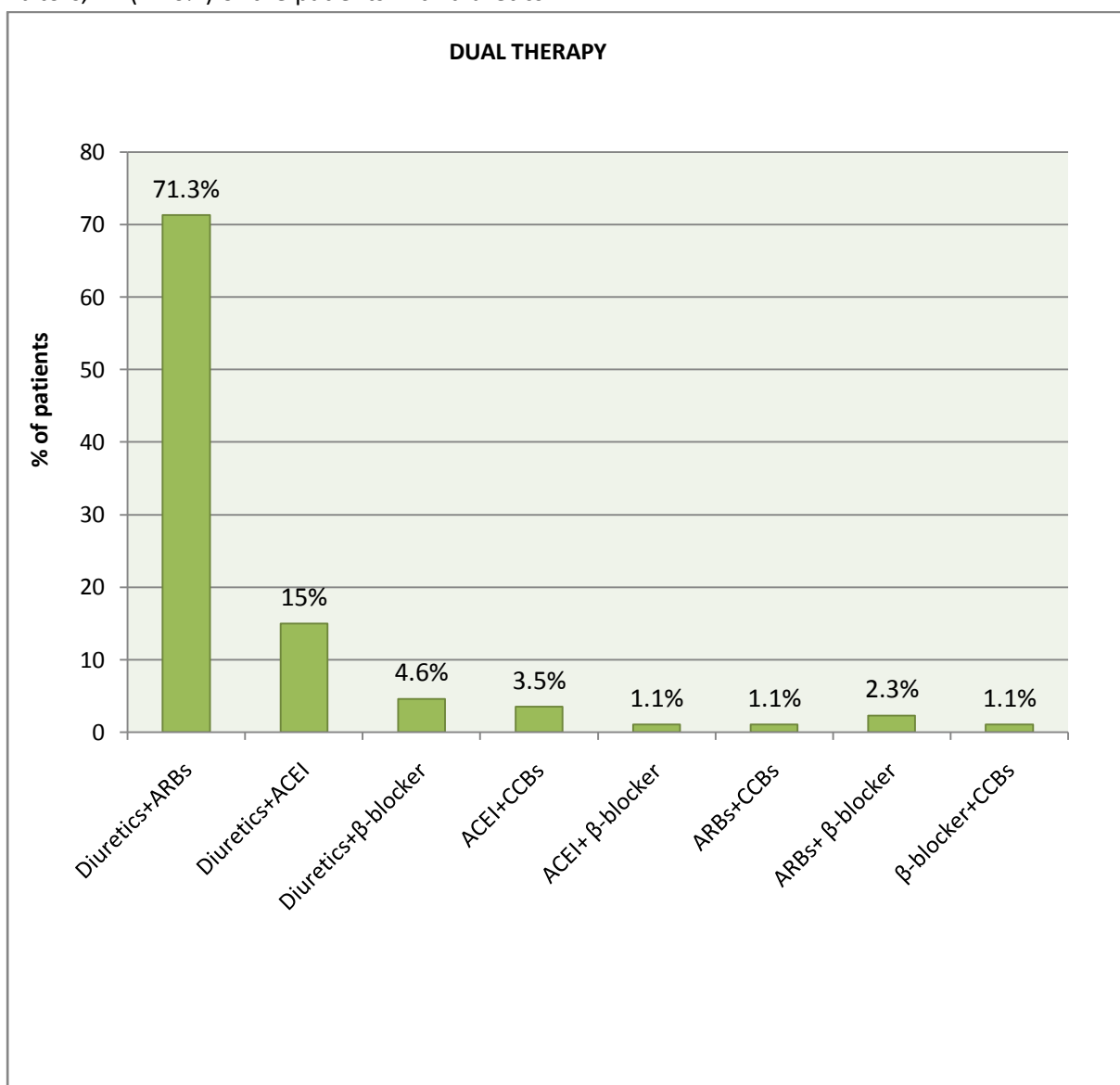

Figure 8: Details showing Dual therapy of Hpertension

The above table revealed that, out of 174 patients in whom two antihypertensives were prescribed, 124 (71.3%) of the patients were prescribed with a combination of Diuretics and ARBs followed by 26 (15%) of patients with Diuretics and ACE I and 8

(4.6%) of the patients treated with Diuretics and β blockers. Earlier studies shows that diuretics and ACE I can alone or in combination with different antihypertensive drugs can be used [8].
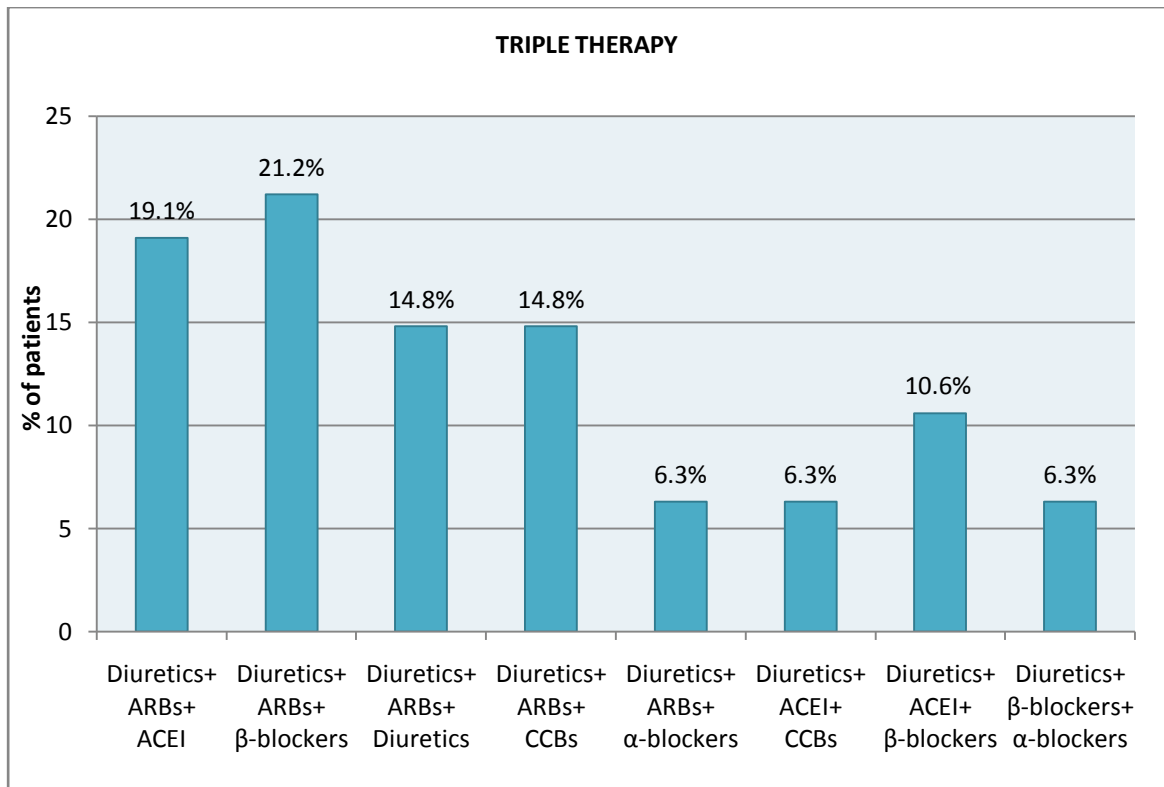
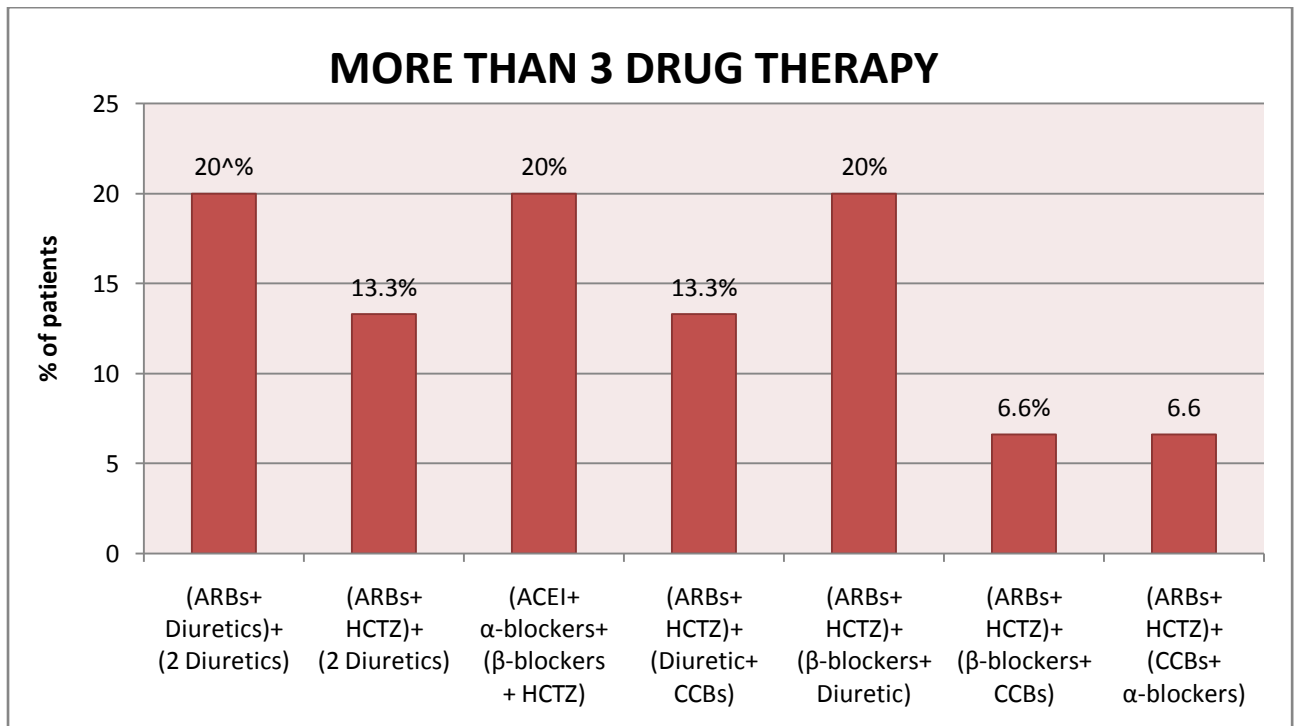**Figure 9: Details regarding Triple therapy of Hypertension**

Figure 10: Details showing Therapy with More than three drugs

Results of the triple therapy revealed that, out of 47 patients treated with triple therapy maximum number of patients were treated with Diuretics in combination with ARBs, ACE I, α-blockers. [10

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(21.2%)] of the patients were prescribed with Diuretics along with ARBs and β-blockers,followed by 9 (19.1%) of the patients prescribed with a combination Diuretics + ARBs + ACE I and Diuretics + ARBs + CCBs respectively. This indicates that Diuretics is used as first line therapy which complies with JNC VII guidelines. Previous studies have also shown the same results [9, 10]. The data of various Antihypertensive drugs used in combinations in 30 patients who were treated with more than 3 Antihypertensive drugs showed that, at least 1 fixed dose combinations was used in the treatment regimen in all the 30 cases. Among the 30 patients, 22 patients were prescribed with 2 fixed dose combinations containing 4 Antihypertensive drugs, remaining 8 patients were prescribed with 1 fixed dose combinations containing 2 drugs and other 2 Antihypertensive drugs. The use of fixed dose combinations, were more than 3 Antihypertensive drugs were prescribed for the patients is justified as it would lead to better patient convenience and compliance.

Table 1: COMPARISION OF PATIENTS SYSTOLIC BLOOD PRESSURE ON DIFFERENT CLASS OF DRUGS IN MONOTHERAPY

DRUG CLASS	BSBP	SYSTOLIC BP	% REDUCTION IN SBP	P VALUE
ARBs	159.68±10.57	126.86±8.61	20.62	<0.0001
CCBs	157.25±11.67	129.47±9.64	17.83	<0.0001
ACEI	157.23±12.5	139.5±11.62	12.02	<0.0001
Diuretics	154.6±13.5	134.1± 10.8	9.33	<0.0005
β-blockers	149.50±11.6	136.3±10.8	13.54	<0.0237

Table 2: COMPARISION OF PATIENTS DIASTOLIC BLOOD PRESSURE ON DIFFERENT CLASS OF DRUGS IN MONOTHERAPY

DRUG CLASS	BDBP	DIASTOLIC BP	% REDUCTION IN DBP	P VALUE
ARBs	98.64±6.89	85.64±6.23	13.13	<0.0001
CCBs	96.22±6.12	86.82±6.88	9.37	<0.0001
ACEI	95.62±7.45	87.42±6.25	8.33	<0.0011
Diuretics	92.31±6.5	86.88±4.6	5.43	<0.0274
β-blockers	96.28±6.3	88.54±5.2	7.29	<0.0118

Table 3: COMPARISION OF PATIENTS SYSTOLIC BLOOD PRESSURE ON DIFFERENT CLASS OF DRUGS IN COMBINATION THERAPY

DRUG CLASS	BSBP	SYSTOLIC BP	% REDUCTION IN SBP	P VALUE
Diuretics+ARBs	158.3±11.5	130.4±10.35	17.7	<0.0001
Diuretics+ACEI	163.4±15.8	133.7±14.53	18.41	<0.0001
Diuretics+ β-blockers	161.8±14.3	135.12±11.75	16.14	<0.0011
ACEI+ CCBs	160.7±11.6	126.78±11.0	20.62	<0.0004
ARBs+ β-blockers	165.3±8.4	120.14±8.2	25.16	<0.0001

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Table 4: COMPARISION OF PATIENTS DIASTOLIC BLOOD PRESSURE ON DIFFERENT CLASS OF DRUGS IN COMBINATION THERAPY

DRUG CLASS	BDBP	DIASTOLIC BP	% REDUCTION IN DBP	P VALUE
Diuretics+ARBs	97.64±6.89	85.64±5.83	12.2	<0.0001
Diuretics+ACEI	95.82±6.12	81.12±7.88	15.6	<0.0001
Diuretics+ β-blockers	97.62±8.45	80.42±6.95	18.3	<0.0006
ARBs+ β-blockers	99.71±10.21	80.18±7.32	19.6	<0.0034
ACEI+CCBs	100.1±6.6	81.44±5.4	20.2	<0.0001

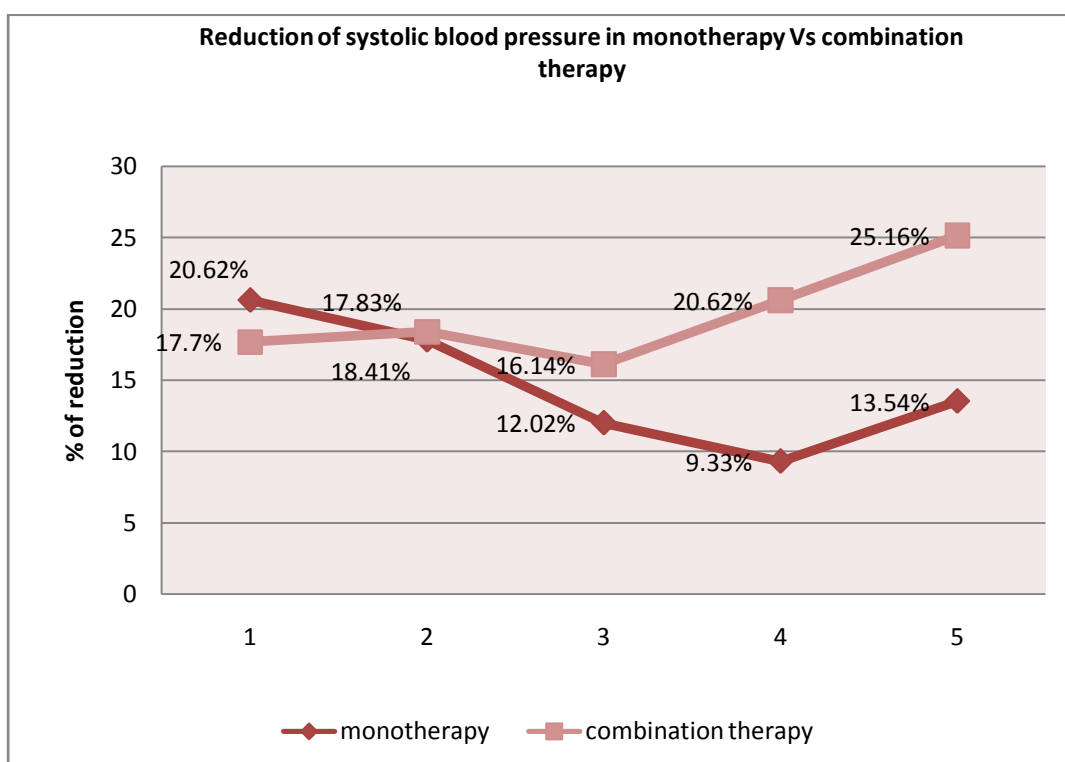**Figure 11: REDUCTION OF SYSTOLIC BLOOD PRESSURE IN MONOTHERPAY Vs COMBINATION THERAPY**

Table1 , results revealed that when compared with baseline systolic blood pressure and systolic blood pressure after the monotherapy with ARBs they significantly (p < 0.0001) reduced the systolic blood pressure by 20.6% followed by CCBs with 17.8%(p<0.0001) and 12.02% (p<0.001) with ACEI. Only 13.54% (p<0.0237) was found with diuretics and lower percentage of 9.3% (p=<0.0005) was observed with β-blockers.

Table 2, results revealed that when compared with baseline diastolic blood pressure and diastolic blood pressure after the monotherapy with ARBs they significantly (p=<0.001) reduced the systolic blood pressure by 13.3% followed by CCBs with 9.3 % (p= <0.001) and 8.33 % (p=<0.0011) with ACEI. Only 3.26 % (p= <0.0274) was found with diuretics and lower percentage of 7.29 % (p=<0.0118) was observed with β-blockers.

Table 3, shows that when compared with baseline diastolic blood pressure and diastolic blood pressure after the combination therapy with ARBs+ β-blockers they significantly (p=<0.0001) reduced the systolic blood pressure by 25.1% followed by ACEI+ CCBs with 20.6 % (p= <0.0004) and 18.4 % (p=<0.0001) with Diuretics+ ACEI. Only 17.7 % (p= <0.001) was found with Diuretics + ARBs and lower

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percentage of 16.1 % (p=<0.0011) was observed with Diuretics+ β-blockers.

Table 4, results revealed that when compared with baseline diastolic blood pressure and diastolic blood pressure after the combination therapy with ACEI + CCBs they significantly (p=<0.0001) reduced the systolic blood pressure by 20.2% followed by ARBs+ β-blockers with 19.6 % (p= <0.0034) and 18.3 % (p=<0.0006) with Diuretics+ β-blockers. Only 15.6 % (p= <0.0001) was found with Diuretics

+ ACEI and lower percentage of 12.2 % (p=<0.0001) was observed with Diuretics+ ARBs.

In comparison of reduction of systolic blood pressure in monotherapy Vs combination therapy there is higher percentage of reduction was found in combination therapy of ARBs + β-blockers than ARBs used alone. Whereas in diastolic blood pressure there is a higher percentage of reduction was found with ACEI + CCBs compare to ACEI used alone.

Figure 12: REDUCTION OF DIASTOLIC BLOOD PRESSURE IN MONOTHERPAY Vs COMBINATION THERAPY
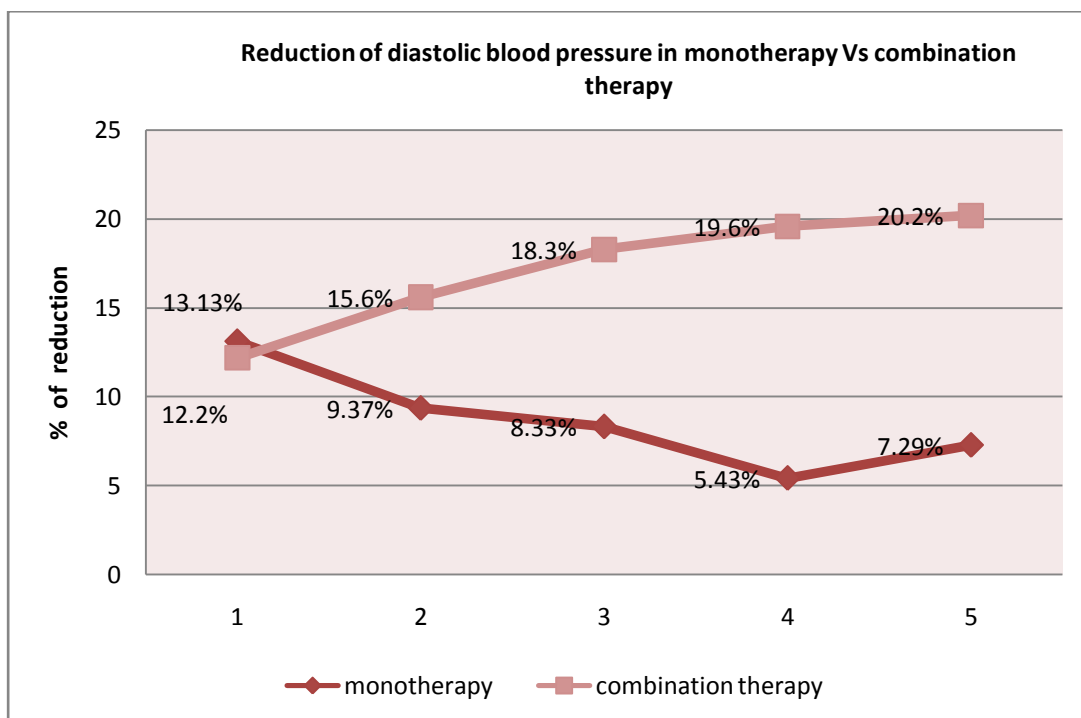
CONCLUSION

As there is a strong epidemic rise in hypertension in our country, the present prospective study was carried out to assess the prescribing patterns of Antihypertensive drugs in the treatment of hypertension in the medical outpatient department of Sathya Hospital (Vanamala Clinic), Warangal. The study revealed that, among the different approaches of treatment, dual therapy was found to be the most preferred choice of treatment, and in this, Diuretics + ARBs was the most preferred combination of drugs at low dose dual therapy as per JNC VII guidelines.

Among the different approaches of treatment, combination therapy was found to be the most preferred choice of treatment in reducing the systolic blood pressure with ARBs + β-blockers (P < 0.0011) than ARBs used alone. Whereas in diastolic blood pressure there is a higher percentage of reduction was found with ACEI + CCBs (P < 0.001) compare to ACEI used alone.

Results of Stages of hypertension in the patients revealed that 102(56.7%) of the patients had stage 1 Hypertension (140-159/90-99), followed by 67(37.2%) of patients with Stage2 (>160/>100) Hypertension and 11(6.1%) of the patients had Pre-

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hypertension. Counseling and educating the patient on the importance of diet and exercise in the management of hypertension are of vital importance. The importance of educating hypertensive patients is appreciated by pioneering clinicians to keep themselves abreast of the latest development in the field of hypertension treatment would also contribute in the effective management of hypertension.

ACKNOWLEDGEMENT

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