



A STUDY ON DRUG UTILIZATION PATTERN OF ANTIHYPERTENSIVE DRUGS IN TERTIARY CARE HOSPITAL

Uday Singh*, Gurjeet Singh, Randhir Singh

M M College of Pharmacy, Maharishi Markandeshwar (Deemed to be University), Mullana, Ambala, Haryana, India.

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ABSTRACT:

Background: The JNC 8 guidelines published in 2014 are the most recent guidelines for the management of hypertension in different clinical settings. The study was designed to analyze the prescription pattern of antihypertensive drugs in concordance with the guidelines.

Aim: The aim of the study is the utilization of anti-hypertensive drugs.

Method: A total of 150 patients were recruited in the study and prescriptions of 150 patients were analyzed to study the pattern of utilization of antihypertensive drugs at the medicine department of MMIMSR, Mullana. The collected data was sorted on the basis of demographic characteristic, co-morbidities and maximum usage of antihypertensive drug category.

Result: It was found that prevalence of hypertension was more in male patients (52%) as compared to females (48%). Most of the patients were found to have stage I hypertension. The patients were commonly diagnosed with diabetes as the co morbid condition. The prescribed category of antihypertensive drugs utilized were ACEI/ARB (68.6%), diuretics (45.4%), calcium channel blocker (38%), beta blocker (26.6%) and alpha blockers (3.4%). The ACEI/ARB was the most frequently prescribed antihypertensive class of drug.

Conclusion: ACEI/ARB was the most common antihypertensive drug category used for the patients of hypertension for better therapeutic outcomes.

KEY WORDS: Hypertension, antihypertensive drug utilization, prescription pattern study.

Corresponding Authors: Uday Singh

E-mail: udaysinghanttal@gmail.com

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1. INTRODUCTION

The increasing prevalence of hypertension has been attributed to population growth, ageing and behavioral risk factors, such as unhealthy diet, excess use of alcohol, sedentary lifestyle, obesity, and exposure to persistent stress. A whopping 9.4 million deaths occur worldwide every year because of hypertension. Epidemiological studies demonstrated that prevalence of hypertension is increasing rapidly in India, varying from 4 to 15 % in urban and 2-8 % in rural population⁽¹⁾.

The World Health Organization (WHO) has projected that 1.5 billion people globally are likely to suffer from hypertension by 2025⁽²⁾. Hypertension is the utmost concern of leading countries because of the high risk attributing to morbidity and mortality. It is the root factor responsible for conditions like stroke, myocardial infarction, and coronary heart disease and also associated with diabetes and renal disease⁽³⁾.

Treatment of hypertension is constantly evolving, with the addition of new drugs at a rapid pace (Johnston A, 2010). Several recommendations are already available for treatment of hypertension, such as WHO, ISH guidelines. Moreover, recently guidelines by Joint National Committee (JNC-VIII) of USA on prevention, detection, evaluation and treatment of high blood pressure suggests the rationale administration of drugs by providing algorithms for the treatment as per the stages of hypertension⁽⁴⁾.

The treatment of hypertension is based upon stages of hypertension. The patients having stage I and stage II hypertension needs pharmacological treatment whereas pre hypertensive patients can be treated by adopting non pharmacological measures like diet control and exercise. The older patients are more prone to hypertensive conditions and have lowest rate of blood pressure control⁽⁵⁾.

The aim of the study focuses on the management of hypertensive patient for better therapeutic outcome.

The purpose of the clinical evaluation is to establish the diagnosis and grade of hypertension, screen for potential secondary causes of hypertension, identify factors potentially contributing to the development of hypertension, identify concomitant CV risk factors and identify concomitant diseases⁽⁶⁾.

2. MATERIAL AND METHODS

This prospective observational study was conducted in the department of medicine, MMIMSR, Mullana. This study was approved by the Institutional Ethical Committee of Maharishi Markandeshwar Deemed to be University (MMDU). Permission from the university was taken and the participant's written consent was taken.

Hypertensive patients who were either newly diagnosed or had history of hypertension were included in the study while non hypertensive patients and those below 18 years of age were excluded from the study.

The study outcomes were based on the observation of maximum utilized class of antihypertensive drugs and their usage in other comorbid conditions along with hypertension.

2.1 Statistical Analysis

Statistical data analysis was done using statistical software. Data is summarized in the form of proportions and frequent tables for categorical variables.

3. RESULT

3.1 Patient categorized according to gender

Prevalence of hypertension was found to be more common in males (52%) than in females (48%). Prevalence adjusted for 2011 census population and the WHO reference population was 29.7% and 32.8%, respectively (Ramakrishnan S, 2019).

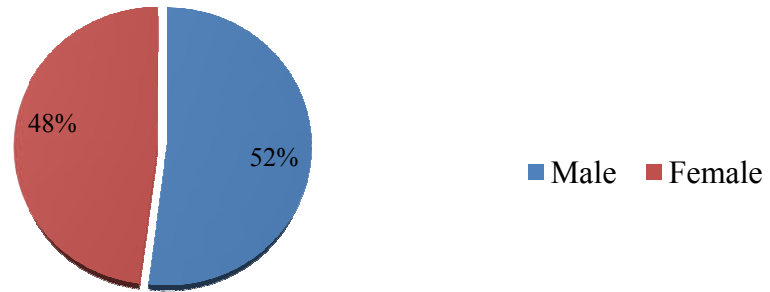


Figure 1: Percentage of total number of patients according to gender

3.2 Distribution of patients according to age group

The most common age group prone to hypertension

was found between the age group of 41-50 years (30%) followed by patients of age group 51-60 (28.6%).

Table 1: Distribution of patients according to age group (in years)

Age (in years)	No (%)
21-30	3(2%)
31-40	14(9.4%)
41-50	45(30%)
51-60	43(28.6%)
61-70	36(24%)
71-80	8(5.4%)
81 above	1(0.6%)

3.3 Categorization of patient on the basis of hypertensive stages

Out of 150 patients, 40 patients (26.6%) were found to have pre hypertensive stage, where stage 1 was found to be most prevalent (41.4%) and 48 patients (32%) were found to among stage II hypertension.

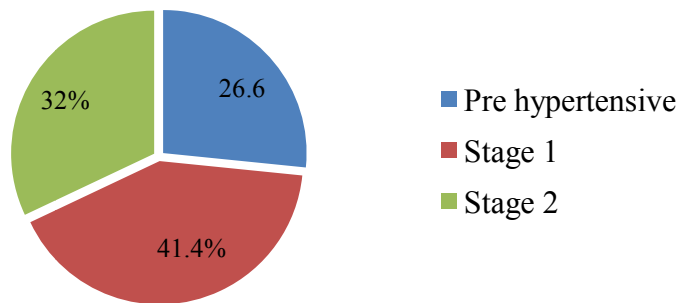


Figure 2: Percentage of hypertensive patients on the basis of stages of hypertension

3.4 Utilization of drugs on the basis of age group

In the age group of hypertensive patients between 21-60 years , the amount of drugs prescribed of

diuretics category were 54 (36 %) , ACEI were 61 (40.6%) , CCBs were 47 (31.3%) , beta blockers were 24 (16 %) and alpha blockers were 06 (04%).

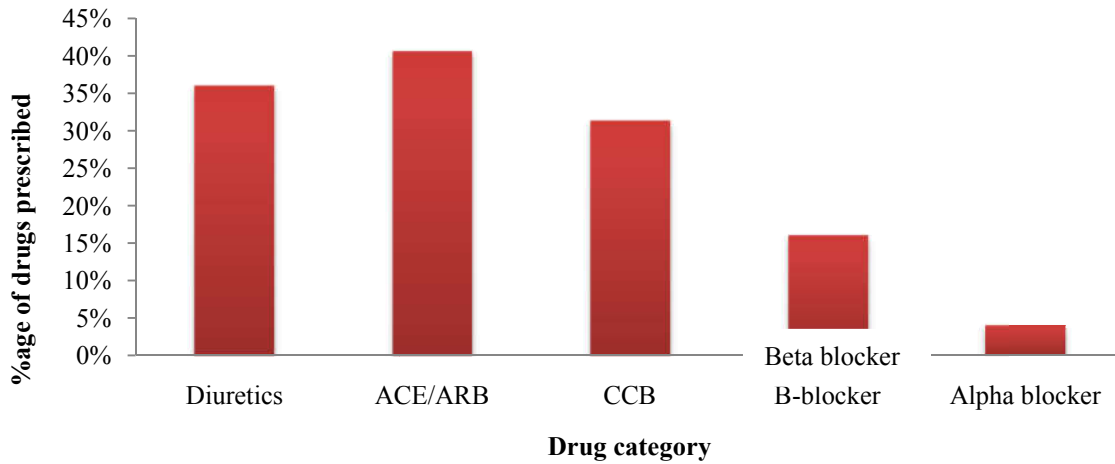


Figure 3: Percentage of utilization of antihypertensive drugs between ages 21-60 year

In the age group of hypertensive patients above 60 years, the percentage of diuretics were 12% , ACEI were 26.6% , CCBs were 06% and beta blockers

were 08 % of usage. The data shows that patients of above 60 years were mostly prescribed with ACEI/ARB drug category.

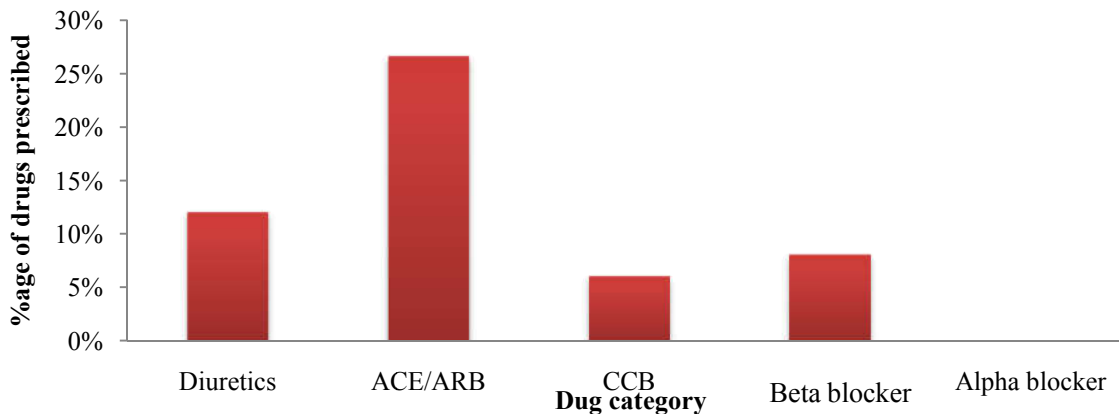


Figure 4: Percentage of utilization of antihypertensive drugs by patients of age more than 60 years

3.5 Overall utilization of antihypertensive drugs

103 prescriptions included the drug category

ACEI / ARB with 68.6%. Diuretics were 45.4%, CCBs were 38% , beta blocker were 26.6% and alpha blockers were only with 3.4%.

Table 2 Number of antihypertensive drugs utilized

Antihypertensive drugs	No.(%age)
Diuretics	68(45.4%)
ACEI/ARB	103(68.6%)
CCB	57(38%)
Beta blocker	40(26.6%)
Alpha blocker	5(3.4%)

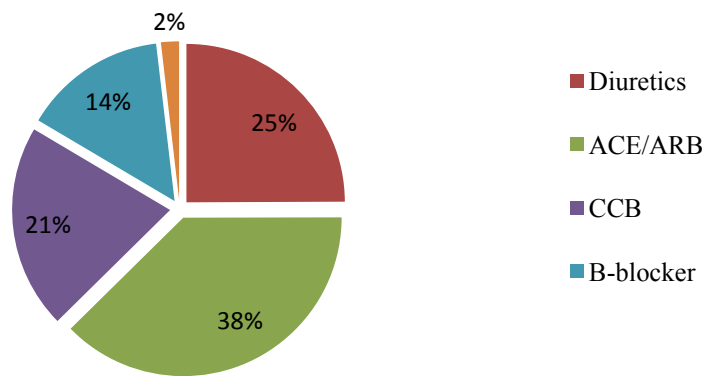


Figure 5: Percentage of utilization of various categories of antihypertensive drugs

Among these drugs furosemide were used highly among the hypertensive stage 1. Torsemide were equally distributed between the stage 1 and stage 2 of

hypertension. In stage 2 hypertension, the amount of chlorthiazide and chlorthiadone was 03.

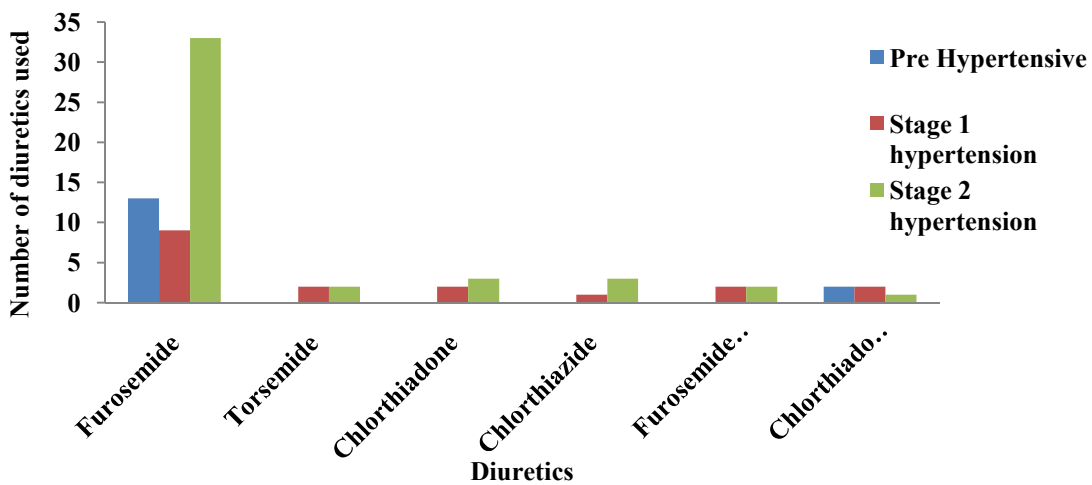


Figure 6 Number of diuretics utilized at the different stages of hypertension

Telmisartan was the most common ACEI prescribed to the hypertensive patients along with ramipril in stage II hypertension and the combination of

telmisartan and amlodipine was given in the stage I hypertension vastly. ACEIs/ARBs decrease the activity of angiotensin II.

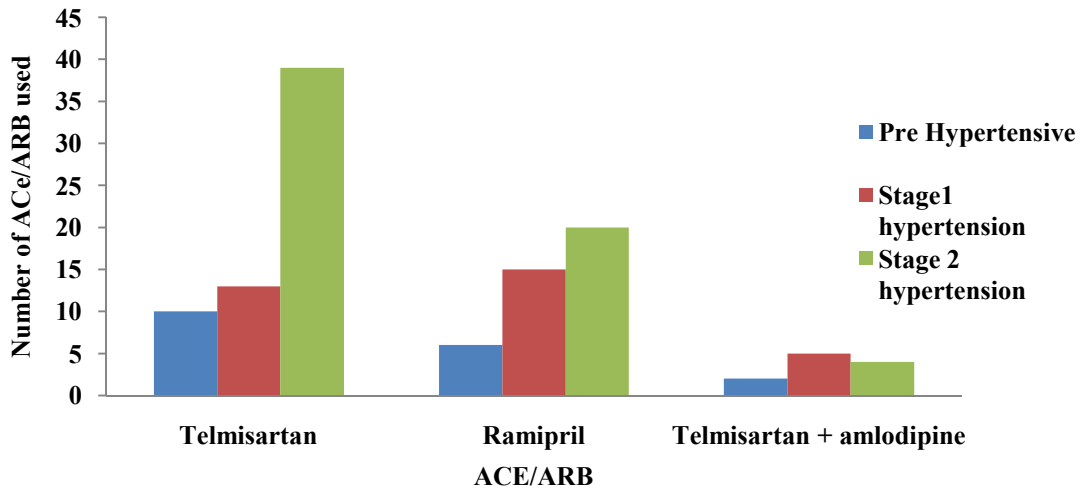


Figure 7 Number of ACEI/ARB utilized in different stages of hypertension

Propranolol drug is the common beta blocker prescribed in the stage 2 hypertension and in stage 1. Metoprolol was prescribed effectively in stage 1 hypertension as same amount as in stage 2

hypertension. The combination of propranolol and chlorthalidone was given in pre hypertensive and stage 1 hypertension.

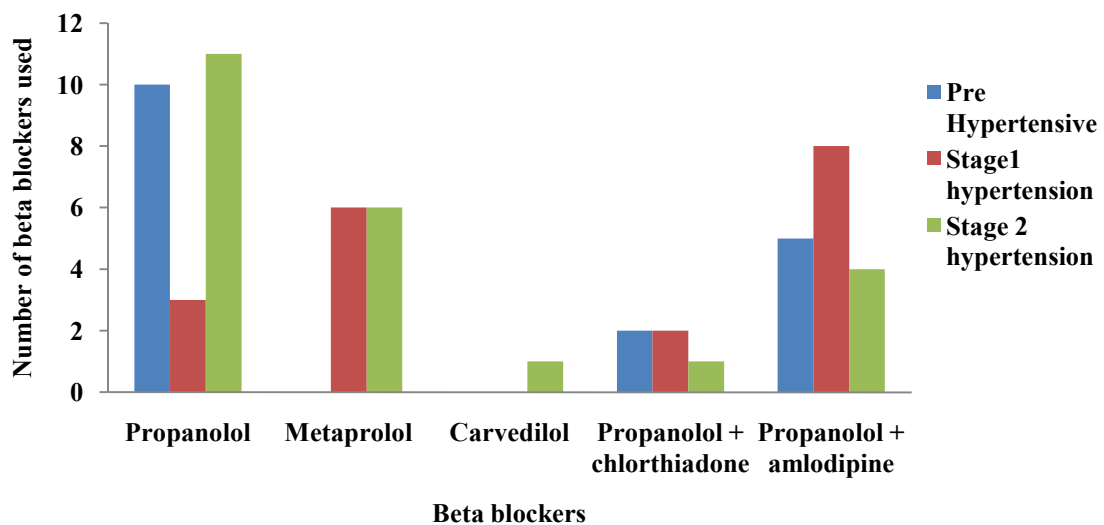


Figure 8 Number of beta blockers utilized in different stages of hypertension

Amlodipine was highly prescribed CCB in the stage 2 of hypertension and there was adequate number of

drug prescribed in pre hypertensive stage. The combination of telmisrtan and amlodipine and the

combination of amlodipine and propranolol was mostly observed in stage 1 of hypertension.

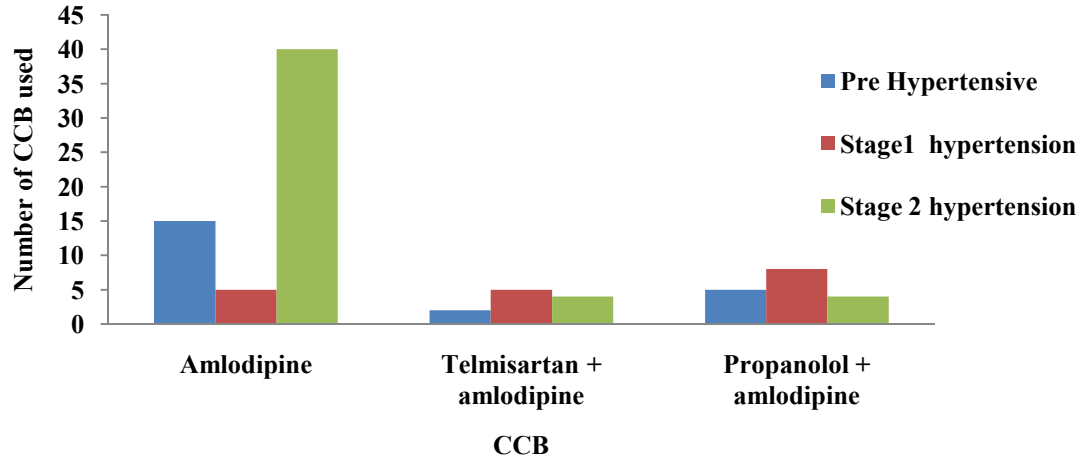


Figure 9 Number of CCBs used in different stages of hypertension

Prozasin is the only alpha blocker observed among the hypertensive patients of sample. The drug was

observed to be prescribed in the stage 2 of hypertension.

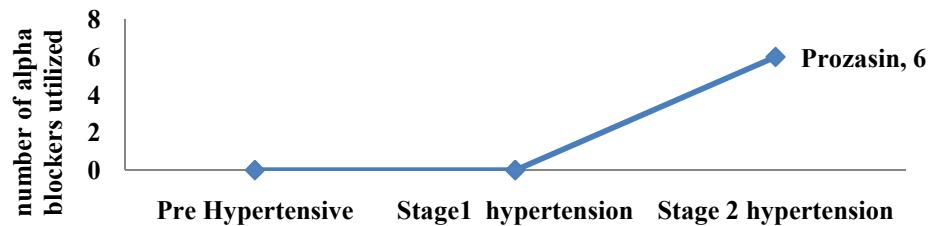


Figure 10 Number of alpha blockers used in different stages of Hypertension

3.6 Associated conditions with hypertension

Diabetes mellitus was the most frequent associated condition found with the hypertension with 43.3%. The patients associated with CKD condition were 20%, COPD patients were 06% , CLD patients were 02% , ALD patients were 4.6% , the patients with cirrhosis were 2.6% , with hepatitis were 02% , with CAD were 7.3%, patient of CCF were 2.6% , AGE were 2.6% , patients of RA were 02% , LBA were 1.3% , MI were 0.6%, asthma patients were 0.6% , patients with headache were 02% and CVA were 0.6%.

3.7 Pattern of Utilization of drugs on the basis of co-morbid conditions

In the diabetic condition ACEI/ARB was prescribed highly with 40 % and then the diuretics (16%) , CCB were 12% , beta blockers were 04%. In the case of renal condition diuretics were drug of choice with 17.3% followed by CCB (13.3%) along with ARBs with 06, beta blockers were 1.3%

In patients with hepatic condition the most commonly prescribed drugs were diuretics with 06% , beta blockers were 5.3% , CCBs were 3.3% and ACEI were 1.3%. For the gastric conditions ACEI were

4.6% majorly then diuretics (0.6%), whereas in the cardiac condition ACEI were 17.3% , diuretics were 8.6%, beta blockers were 6%.

For the orthopedic condition ACEI were the primary drug of choice with 8% same amount as in

respiratory conditions. Alpha blockers were given in diabetic condition and in renal condition with 2%. In the case of other hypertensive conditions most commonly prescribed drugs were CCB (4.6 %) and later followed by ACEI (3.3%).

Table 3 Overall utilization of antihypertensive drugs according to the various disease condition

Conditions	Diuretic	ACEI/ARB	CCB	b-blocker	a-blocker
Diabetic	24(16%)	60(40%)	18(12%)	06(04%)	03(02%)
Renal conditions	29(17.3%)	09(06%)	20(13.3%)	02(1.3%)	03(02%)
Hepatic condition	09(06%)	02(1.3%)	05(3.3%)	08(5.3%)	-
Gastric condition	01(0.6%)	07(4.6%)	01(0.6%)	-	-
Cardiac condition	13(8.6%)	26(17.3%)	04(2.6%)	09(06%)	-
Orthopedic condition	-	12(08%)	-	-	-
Respiratory condition	01(0.6%)	12(08%)	01(0.6%)	03(02%)	-
Other hypertensive conditions	03(02%)	05(3.3%)	07(4.6%)	01(0.6%)	-

4. DISCUSSION

The modification of guidelines and the development of new drugs, results changes in prescription pattern. The JNC 8 guidelines published in 2014 are the most recent guidelines for the management of hypertension in different clinical settings. These guidelines were developed based on a systematic review of literature to help clinicians for better patient management ⁽⁷⁾. The JNC-8 guidelines recommend that the general nonblack population's initial pharmacologic therapy should include a diuretic, CCB (calcium channel blocker), ACEI (angiotensin-converting enzyme inhibitor), or ARB (angiotensin receptor blocker). In contrast, the general black population's initial therapy should include a thiazide type diuretic or CCBs ⁽⁸⁾.

The drug category of ACEI/ARB was efficiently used between the both the age group of patients and utilization of the drug was mostly observed in age group of patients 21-60 years. The British Hypertension Society Guidelines ⁽⁹⁾ recommends the use of ACEI/ARBs or beta blockers in younger hypertensive and CCBs or diuretics for elderly (lower renin levels). Lesser use of diuretics in the present study may be due to adverse effect of diuretics on glucose homeostasis and lipid profile ⁽¹⁰⁾. The target SBP for older hypertensive patients was set at 140–

150 mmHg because this was the range of systolic values achieved by major outcome trials demonstrating a beneficial effect of antihypertensive treatment in these patients ⁽¹¹⁾.

A similar SBP target was suggested by the HYVET trial, in which treating to an SBP target of <150 mmHg in the very old (>80 years) demonstrated significant reductions in mortality, fatal stroke, and heart failure, with the caveat that the 'very old' patients in this study were active and independent ⁽¹²⁾. The clinically important ramifications of this include arterial and venous dilation, increased potassium concentrations, and reduced glomerular filtration pressure ⁽¹³⁾.

The stage 1 of hypertension had most number of propranolol and amlodipine combination. Beta-blockers are known to alter glucose metabolism and mask hypoglycemia necessitating caution when used in patients at risk for diabetes ⁽¹⁴⁾.

ACEI based therapy has been recommended to be an integral component of any antihypertensive regimen in patients with diabetes and renal disease ⁽¹⁵⁾. The efficacy of ACEI inhibitors on blood pressure was reported to be marked in patients with an activated rennin - angiotensin - aldosterone system ⁽¹⁶⁾. Beta-blocker is appropriate for initial hypertension therapy except when another indication requires beta-blocker

use, such as heart failure, rate control, MI, or migraine prophylaxis⁽¹⁷⁾.

Studies show that combination therapy improves the blood pressure rate in less time with equivalent or better tolerability than higher dose of monotherapy. The present report the two drug combination of propranolol + amlodipine and telmisartan + amlodipine was prescribed more in stage I and stage II of hypertension. The fixed combination of beta blocker and calcium channel blocker provides efficiency and tolerability in the treatment of arterial hypertension. ACEI/ARB-based treatments also favorably affect the progression of diabetic nephropathy and reduce albuminuria, and ARBS reduce progression to macro-albuminuria. Hence, ACEI and ARBs should be first considered when starting a diabetic patient on anti-hypertensive medications. The anti-hypertensive drug combination therapy should be able to minimise or counteract the reflex compensatory mechanisms that often limit the fall in blood pressure⁽¹⁸⁾.

5. CONCLUSION

From the result it is concluded that the prevalence of hypertension is more in males than in females. The higher percentage of patients was observed in the stage I of hypertension (41.4%). The most commonly prescribed drug category was ACEI/ARB (68.6%) as initial drug therapy for stage II hypertension. In the observed data, the patients of age group above 60 years utilized ACEI/ARB more and the diminished use of diuretics was seen. The moderate utilization of beta blockers (26.6%) and the CCBs (38%) was observed. The study also shows that ACEI/ARB is highly utilized drug category in patients with coexisting diabetes. Whereas in hypertensive patients associated with renal condition the drug of choice was diuretics (17.3%). The drug utilization of antihypertensive drugs was in accordance with the guidelines to provide effective clinical management and satisfactory patient care.

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