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HYPERTENSION-PRESCRIPTION PATTERN AND CONTROL IN PATIENTS ATTENDING ON OP DEPARTMENT IN A TERTIARY CARE HOSPITAL

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ABSTRACT

The study is aimed at determining the prescribing pattern and control of antihypertensive drugs in hypertensive patients at a tertiary care hospital. Hypertensive patients are treated depending on the level of their blood pressure. As there is a growing evidence of irrational prescribing of antihypertensive, which also lead to an increased cost burden on health care system, so it is necessary to analyze the prescribing patterns and the extent of adherence to prescribing guidelines, by the prescribers. This study will help to find out the prescribing pattern of antihypertensive. This study is **Prospective** Observational study conducted in outpatient Department of Medicine, MES Medical College, Perinthalmanna. Study population who satisfy the inclusion criteria and exclusion criteria. Study period is 6 months and sample size 200 patients. Inclusion criteria are patients treated with antihypertensive agents, patients of either gender $\geq$ 18 years of age. Exclusion criteria are patients from all department, except medicine department, pregnancy and breast feeding and patients with illegible, improperly and incompletely prescription. From these study calcium channel blockers are found to be more commonly prescribed compared to the other antihypertensive drugs. From the above antihypertensive drugs calcium channel blockers accounts for 50.34, followed by Angiotensin receptor blockers 24.13%, ACEIs 18.62%, Beta blockers 6.89% and least common agent was diuretics.

Key words: Joint National Committee, DASH , Diabetes Mellitus ,American Heart Association, Body Mass Index.

INTRODUCTION

Hypertension is an increasingly important medical and public health issue. Hypertension is a major risk factor for cardiovascular diseases and stroke. The risk of cardiovascular morbidity and mortality is directly correlated with blood pressure. The choice of drugs for the treatment of hypertension changes at short intervals. Efficacy, side effects, both short term and long term effects on other systems and cost are some of the factors responsible for the change. The market potential of these drugs causes the synthesis and release of newer drugs at a rapid rate which contributes in its own way to the choice of drugs made by physicians [1]. Hypertension is prevalent worldwide and is one of the most important risk factors for cardiovascular events. About 30% population has high BP. Prevalence is 30.1% and 27.1% among men and women, respectively according to estimates from National Health and Nutrition Examination survey from 1999 - 2000. Hypertension is very common in the elderly. Up to the age of 55 years more women have hypertension. 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. In case of India, the prevalence rate has increased 30 times in urban population, and 10 times in rural population in the last 36 years. It has

been documented that adequate control of elevated blood pressure can reduce cardiovascular morbidity and mortality [2]. Primary hypertension: Primary or essential hypertension is the most prevalent hypertension type, affecting 90 – 95% of hypertensive patients. Although no direct cause has been identified, there are many factors such as sedentary lifestyle, smoking, stress, visceral obesity, potassium deficiency, obesity, salt (sodium) sensitivity, alcohol intake, and vitamin D deficiency that increase the risk of developing hypertension. Risk also increases with aging, some inherited genetic mutations, and having a family history of hypertension. Secondary hypertension: Secondary hypertension by definition results from an identifiable cause. Fewer than 10% of patients have secondary hypertension. Secondary cause include chronic kidney disease, Cushing's syndrome, coarctation of aorta, parathyroid disorders, primary aldosteronism, thyroid disorders, certain tumors of the adrenal medulla (e.g. pheochromocytoma) and certain prescription and illegal drugs such as sympathomimetic amines, estrogens, erythropoietin, NSAIDS, steroids etc [3]. Major risk factor for developing hypertension includes: Age (>55 years for men, >65 years for women), Cigarette smoking, Diabetes mellitus, Dyslipidemia, Family history of premature cardiovascular disease (men <55 years or women <65),Kidney disease (microalbuminuria or GFR <60 ml/min),Obesity (BMI >30kg/m2,Physical inactivity.First line treatment for Based on Antihypertensive and Lipid Lowering to Reduce Heart Attack Trail (ALLHART) data, JNC 7 recommends diuretics as first line therapy for the management of stage 1 hypertension and a combination of two drugs as initial therapy in those with stage 2 hypertension, one of which should preferably be a diuretic. This recommendation is specifically for those without compelling indication and is best available evidence demonstrating reduction in morbidity and mortality. In addition to thiazide diuretics, JNC 7 guidelines also recommend ACE inhibitors, angiotensin receptor blockers, beta blockers, and calcium channel blockers as first line therapy for hypertension. Since the publication of JNC 7 guidelines, studies have shown that beta blocker therapy might not be effective and in effective and in fact might increase the risk of stroke. ACEIs are indicated in hypertensive patients with co-existing heart failure, and in those diabetes [4] Anti-hypertensive drugs were categorizing according to the 1999 World Health Organization Society Hypertension Guidelines for the management of hypertension and 7th report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. There are mainly nine classes of drugs. Previous studies include H. Tiwari, et al, 2004, conducted a study on prescription monitoring of antihypertensive drug utilization at the Punjab university health center in India. They found that during the whole study period, 38.9% were males and 61.6% were females. Overall, 57.8% patients were treated with a single anti-

hypertensive drug, and 42.2% were treated with anti-hypertensive drug combinations. Among those who were treated with drug combinations 92.1% received two drugs and 7.9% received a regimen of three drugs. They observed that four different two drug antihypertensive combinations were prescribed to hypertensive patients namely a beta blocker with CCB (91.4%) a beta blocker with a diuretic (2.9%), a beta blocker with an ACE I (2.9%), and diuretic with a CCBs. Among the mono therapy category, only four classes of drugs were used, namely: CCBs (48.1%), beta blockers (46.2%), ACE I (3.9%), and diuretics (1.9%). In the overall utilization pattern, CCBs (amlodipine and nifedipine; 67.8%) and beta blockers (atenolol; 67.8%) were both the most frequently prescribed classes, followed by ACE I (enalapril and Ramipril; 5.6%) and diuretics (4.4%) [5].

E. Etuk, et al, 2008, conducted a study on prescription pattern of antihypertensive drugs in a tertiary health institution in a Nigeria. During the study, 145 patients studied, 20% (29) were on monotherapy and 80% (116) on combination therapy. Of the patients on combination therapy, 61.2% (71), 33.6% (39) and 5.2% (6) were on 2, 3 and 4 drugs, respectively. Diuretic was the most frequently prescribed drug either as a single agent (44.8%) or as combination therapy (88.8%). Mean reductions in both systolic and diastolic blood pressures were more in patients on calcium channel blocker than those on diuretic monotherapy (t = 2.5 and 3.6 for reductions in systolic and diastolic BP, respectively; $P <$ .05 for both), and, in patients on combination therapy than those on monotherapy (t = 3.64 and 3.27 for reductions in systolic and diastolic BP, respectively; $P <$ .01 for both). Blood pressure control rate was 30.5% [6].

V Pavani et al, 2012, conducted a study on prescribing pattern of anti-hypertensive drugs at Sathya hospital, Warangal, India. They concluded that 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 in the age group of 50-59 years. Majority of patients belonged to grade 2 (SSLC/PUC). The results of pharmacotherapy revealed that dual therapy was the most preferred choice of treatment in reducing SBP with ARB + beta blockers than ARB used alone. Where as in DBP there is a higher percentage of reduction was found with ACEI+CCB compare to ACEI used alone and also the prescribing pattern of antihypertensive drugs follows the standard treatment algorithm as per the JNC 7 guidelines for hypertension.

Aim and objectives;To identify prescription pattern of antihypertensive drug in OP department, To identify the most commonly prescribed antihypertensive drug, To assess whether hypertension was controlled using these drugs.

MATERIALS AND METHODS

Materials includes data collection form,Patient prescription form and methodology Prospective Observational study. Study center**:** Outpatient Department of Medicine, MES Medical College, Perinthalmanna. Study population includes Patient visiting Out Patient Department of Medicine and who satisfy the inclusion criteria and exclusion criteria. Study period is 6 months. Taken sample size 200 patients. Inclusion criteria are out patients of medicine department treated with antihypertensive agents, patients of either gender $\geq$ 18 years of age. Exclusion criteria are patients from all department, except medicine department, pregnancy and breast feeding and patients with illegible, improperly and incompletely prescription.

RESULTS

In this study 200 patients enrolled as per inclusion criteria and demographic variables of samples which are categorized as age, gender, smoking habit, alcoholic and co morbidity are shown in table1.

In this study mostly prescribed classification drugs are ACE inhibitors, ARBS, Beta blocker , Calcium channel blocker. Among 200 patients,145 patients were received mono therapy ,49 patients were received dual therapy illustrated in fig 1 and 2 and 6 patients received multidrug therapy Among 6 patients Four were received three drug combinations are beta blocker, ACE inhibitor and calcium channel blocker. Two prescription containing four drug regimen containing beta blocker, calcium channel blocker, angiotensin receptor blocker, and diuretic.

FIG1 shows calcium channel blockers are found to be more commonly prescribed compared to the other antihypertensive drugs. From the above antihypertensive drugs calcium channel blockers accounts for 50.34, followed by Angiotensin receptor blockers 24.13%, ACEIs 18.62%, Beta blockers 6.89% and least common agent was diuretics. The JNC 7 guidelines recommend diuretics as first line therapy for most patients with uncomplicated hypertension. Also ACEI, ARB, BB, CCB, or combination may be considered. Utilization of diuretics in the present study was 0% as mono therapy. Lesser use of diuretics in the present study may be due to adverse effect of diuretics on glucose homeostasis and lipid profile.FIG2 shows CCB+ARB were more prescribed and least prescribed is CCB+CS and ARB+(A+B) B.FIG3 shows calcium channel blocker are the most commonly combined drugs, 41.44% followed by angiotensin receptor blocker 24.33%.

From this fig 4, at first visit high percentage of BP range around 130-138 and first follow up the higher percentage of systolic pressure is 32% at 130-138 and greater than 180 is reduced. From the second follow up, it was found that the BP was reduced in a large group of patients. Systolic BP was found to be controlled.

From fig5 at first visit higher percentage (55%)of diastolic BP, range of 80-88mmHg, the least one is >110 about 3%.From first follow up higher of percentage of diastolic pressure is 80-88 is about 39%, BP is reduced. From the second follow up, it was found that the BP was reduced in a large group of patients. Diastolic BP was found to be controlled (51%).

Table 1. demographic variables of samples.

S.no	VARIABLES	NO. OF PATIENTS	PERCENETAGE (%)
1.	**GENDER**		
	Male	95	47.50
	Female	**105**	**52.50**
2.	**AGE CATEGORY**		
	31-40	11	5
	41-50	25	12.5
	51-60	47	23.5
	61-70	**63**	**31.5**
	71-80	51	25.5
	81-90	3	1.5
3.	**SMOKING HABIT**		
	Smokers	33	16.5
	Non Smokers	**134**	**67**
	Ex smoker	33	16.5
4.	**ALCOHOLIC**		
	Alcoholic	45	22.5
	Non alcoholic	**145**	**72.5**
	Ex alcoholic	10	0.05
5.	**CO MORBIDITY**		
	DIABETES	**158**	**79**

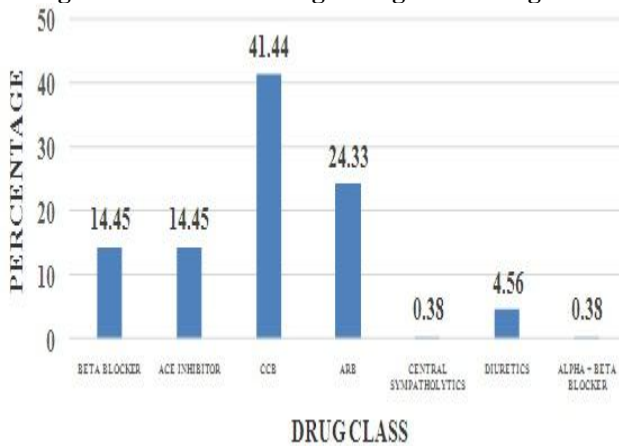|	CKD	1 0	0.05
	COPD	0	0
	CAD	25	12.5

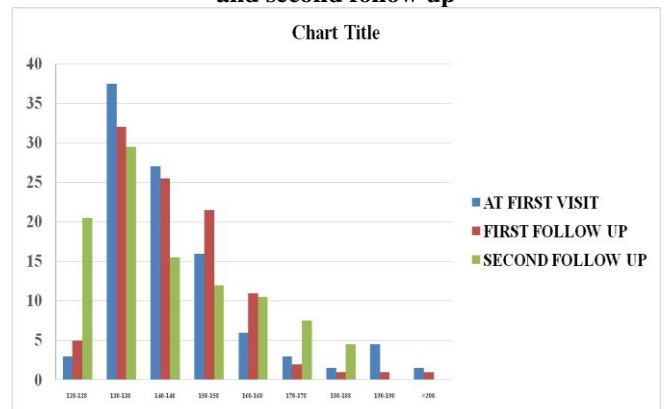**Fig1. Different classes of antihypertensive used in mono therapy**
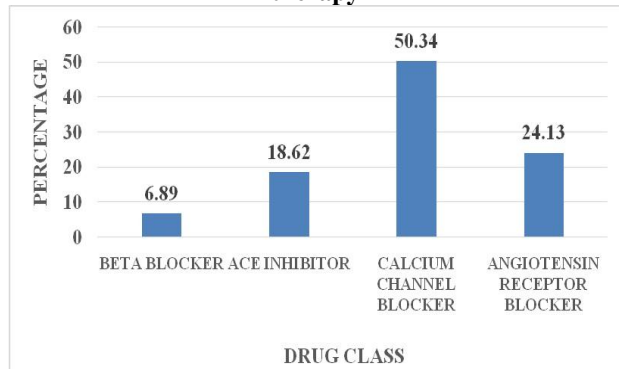
Fig 2. Different class of drugs used in dual therapy; CS-central sympatholytics (A+B)B-alpha beta blocker
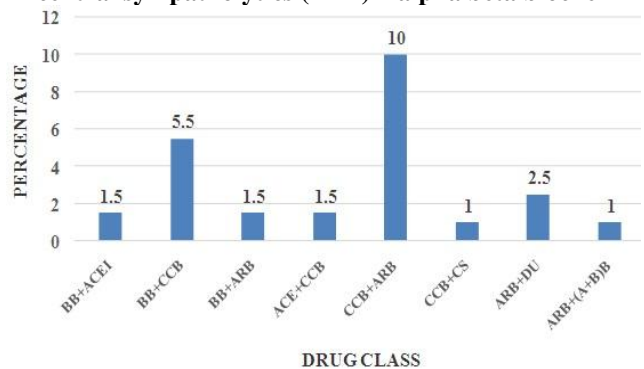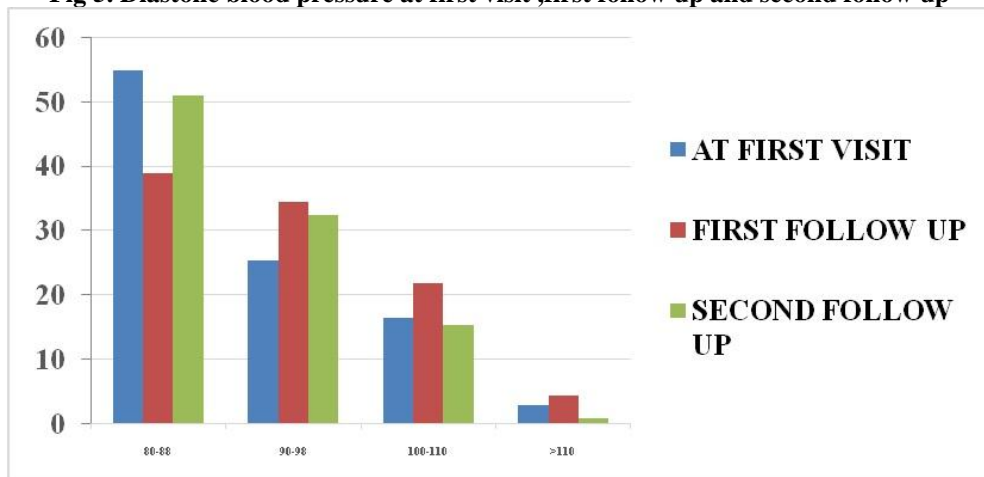

Fig 3. Distribution of single drug with all regimen

Fig 4. Systolic blood pressure at first visit ,first follow up and second follow up

Fig 5. Diastolic blood pressure at first visit ,first follow up and second follow up

DISCUSSION

As there is a strong epidemic rise in hypertension in our country, the present prospective observational study was carried out to assess the prescribing pattern and control of antihypertensive drugs in the treatment of hypertensive patients, at the MES Medical College, Perinthalmanna. During the study period, all patients suffering from stage1 and stage2 hypertension who visited

the medicine outpatient department were included in the study. Patient data was collected from outpatient cards of the patients recruited for the study. The data collected was analyzed for demographic profile of the patients and prescribing pattern of Antihypertensive drugs [6].

Most of the patients were from the age group of 61 - 70. Female population was found to be more hypertensive than male. The results showed that (52.5%) of female patients and (47.5%) of male patients were having hypertension. A study conducted by Shyamal Kumar Das et al, in assessing the growing trend of prevalence of hypertension in India reveals that more women were found to have hypertension compared to men [7].

In case of social habits associated with hypertension, out of total study group, 22.5% are found to be alcoholic, 0.05% are ex-alcoholic and 72.5% are non-alcoholic. In case of smoking, 16.5% are smokers, 16.5% are ex-smokers and rest 67% is non-smokers [8].

In the case of co morbidity associated with hypertension, diabetes is the most common co morbidity associated with hypertension around 79%. This co morbid condition is a very deadly combination [9].

The results show that 7 patients (0.05%) have CKD, 1 patient has (0.0%) COPD and 25 patients (12.5%) CAD as co morbidity associated with hypertension [10].

Among the different approaches of treatment, mono therapy was predominant in 72.5 %(145) of population, followed by dual therapy in 24.5 %(49), and triple therapy around 2 %(4), and four regimens 1 %(2).

Further analysis revealed that calcium channel blocker was the preferred drug class. Amlodipine was found to be the drug of choice under calcium channel blocker. Most of the patients have stage1 hypertension [11].

Only 24.5% of the study population was on dual therapy, calcium channel blocker and angiotensin receptor blocker combination drugs were commonly used. Combination of CCB and ARB were mostly prescribed. Fixed dose combination of CCB and beta blocker and combination of ARB and diuretics are least prescribed. Fixed dose combination products reduce pill burden and increases patient convenience and compliance [12].

6 patients received multidrug therapy Among 6 patients Four were received three drug combinations are beta blocker, ACE inhibitor and calcium channel blocker. Two prescription containing four drug regimen containing beta blocker, calcium channel blocker, angiotensin receptor blocker, and diuretic [13].

Analysis of the overall usage of different classes of antihypertensive drugs for the treatment of hypertension revealed that, the overall usage of Calcium channel blockers during the study period was in 41.44%(109) of

the prescription, followed by Angiotensin receptor blockers 24.33%(64), ACEI 14.45% (38),Beta blockers 14.45% (38), and least common agent was diuretics and central sypatholytics The JNC 7 guidelines recommend diuretics as the first line therapy for most patients with uncomplicated hypertension. Also ACEI, ARB, BB, CCB, or combination may be considered for uncomplicated hypertension. Utilization of diuretics in the present study was 4.56% as mono therapy. Lesser use of diuretics in the present study may be due to the adverse effects of diuretics on glucose homeostasis and lipid profile [14]

From this study, it is observed that, blood pressure of most of the patients is declined after each review. After first follow up there is an increase of 6 patients who achieved control systolic BP of below 130 mm Hg. After on second follow up this raised to 10. There is an improvement of achieving decided systolic BP in each range.2 patients with systolic BP above 200 at one time of enrollment in one study is also achieved. Systolic pressure on elevation controlled, 3 patients with one systolic BP above 200, an 80 pressure controlled to safe level. Most of the patients, blood pressure control is achieved [15].

CONCLUSION

The study showed that in patients with hypertension, mono therapy was found to be predominant because most of the patients were having stage1 hypertension. Also, it was found that diuretics were less commonly prescribed though it is the first line drug for uncomplicated hypertension recommended by JNC. In view of overall usage of antihypertensive agents, calcium channel blockers were found to be highly prescribed. The prescription pattern in a tertiary care hospital set up may be decided by the cost, accessibility and availability of drugs. Also this study shows that, after taking the antihypertensive drugs, the blood pressure reduces gradually to normal level. This kind of medical audit can help to make the prescribing practice of physicians more rational and prudent and thereby, help in improving the patient healthcare. Continuing education for the clinicians to keep themselves abreast of the latest developments in the field of treatment of hypertension would also contribute in the effective management of hypertension. Most of the patients, blood pressure control is achieved.

CONFLICT OF INTEREST
No interest

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