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A prospective observational study on prescribing patterns of antihypertensive drugs in a teaching hospital

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ORIGINAL RESEARCH ARTICLE

ABSTRACT

Background: Hypertension is a growing worldwide problem and presents an increased risk of cardiovascular disease. The aim of the present study was to determine the existing practices of prescribing pattern of antihypertensive medication in a teaching hospital of Hyderabad, Telangana, India. The prescribing pattern was investigated to ascertain whether it was in accordance with standard prescribing guidelines for hypertension (JNC-7).

Subject and Methods: A hospital-based prospective, observational study on prescribing patterns of antihypertensive drugs was carried out among patients who were above the age of 18 years and attending inpatient department. A total of 178 previously treated and untreated patients were included in the study to analyze the prescribing patterns and were evaluated according to JNC-7 guidelines.

Results: It was an observational, prospective, non-interventional study in which 178 patients met the inclusion criteria. 82% of the study populations were males; 78.65% were known hypertensive's while 21.34% were denovo hypertensive. The present study disclosed that a high proportion of the hypertensive patients were on dual therapy in which maximum combinations were of CCBs with ACE inhibitors (27.63%) which lead to the maximum reduction in systolic BP. CCBs were the most frequently prescribed class of drug in both mono and combination therapy while thiazide diuretics ranked last in our study.

Conclusion: Our study represents the current prescribing trends of antihypertensive agents. It was noted that calcium channel blockers were the most commonly prescribed class of drugs in both mono and combination therapy. Significant reduction in systolic and diastolic blood pressure was seen with ACE inhibitors.

Key words: HTN, cardiovascular diseases, calcium channel blockers, diuretics, beta blockers, ACE inhibitors.

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INTRODUCTION

Hypertension is the most common condition seen in primary health care which may lead to myocardial infarction, stroke, renal failure if not detected early and is the major cause of premature death worldwide (Hossain et al., 2015). It is currently affecting one in three adults worldwide estimating 1.56 billion adults will be living with hypertension by 2025 (Chobanian et al., 2003; WHO, 2011; Chaitanya and Tausif, 2015). It is one of the most preventable causes of premature morbidity and mortality world-wide (Chobanian et al., 2003).

Hypertension is a major risk factor for stroke (hemorrhagic and ischemic), peripheral vascular disease, myocardial infarction, heart failure and chronic kidney disease. With advancing age, prevalence of hypertension increases (Tandon et al., 2014). Hypertension, when left untreated is associated with progressive increase in blood pressure, resulting in a treatment resistant state due to associated vascular and renal damage (Chobanian et al., 2003). More than two-thirds of hypertensive individuals cannot be controlled on one

drug and will require two or more antihypertensive drugs (Amruth et al., 2015).

The guidelines of hypertension such as Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure in 2003 (JNC 7) and the currently released, Eighth Joint National Committee (JNC 8) report on Evidence Based Guideline for the management of high blood Pressure in adults are recognized as gold standards for hypertension management (James et al., 2014). Factors that contribute to the failure in controlling blood pressure (BP) include poor adherence to therapy.

Hypertension is defined as a clinical state where the systolic blood pressure is above 139 mmHg and the diastolic blood pressure is above 89 mmHg persistently, according to Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. Blood pressure (BP)-lowering is a cornerstone of cardiovascular risk reduction in patients with hypertension and heart failure (HF). Antihypertensive agents recommended by current international guidelines for such individuals include angiotensin converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs), β -blockers and diuretic agents (Chobanian et al., 2003).

The aim of the present prospective study was to assess the current trends in prescribing patterns of antihypertensive drugs in the treatment of hypertension and related co-morbid conditions. Prescribing patterns need to be evaluated from time to time to increase therapeutic outcomes and decrease the adverse effects. An important part of a medical audit in the study of prescribing pattern of antihypertensive drugs is to monitor the pattern of drug use and to achieve better medical care (Shukrala and Gabriel, 2015; Beg et al., 2014; Konwar et al., 2014). Present study was designed to compare the current prescribing trend with that of the standard guidelines and to provide feedback to the prescribers to create awareness of the rational drug use.

SUBJECTS AND METHODS

The research work is a hospital based prospective observational study which was conducted in the department of General Medicine, Osmania General Hospital, Afzal Gunj, Hyderabad, Telangana, India for a period of 6 months from December 2014 to May 2015.

Study design

The present study was designed to evaluate prescribing patterns of antihypertensive drugs. This study was approved by institutional review boards (IRB). At study center, from hospital case records, patient details were collected in a standard Patient profile form designed for in-patients which included: patient demographic details, history of present illness, past hypertensive history, past medical and medication history, family and social history, clinical investigations, name of the drug and its

dosage regimen. The study included the prescriptions of all consecutive patients admitted in in-patient department of either sex above 18 years of age who were previously treated or untreated for hypertension and willing to participate in the study. Patients below 18 years of age, pregnant and lactating females, patients who were not willing to participate were excluded from the study.

Statistical analysis

The data obtained throughout the study were analyzed by unpaired t-test as hypothesis testing method and excel is used as a tool for calculations. The data were analyzed during hypothesis testing was averages of BP values before and after treatment with a number of subjects in each treatment group as n value. Statistical confidence is kept at 95%.

RESULTS

Table 1. Patient characteristics.

	N (%)
Median Age (years)	59.5 (20-99)
Males	146 (82.02)
Females	32 (17.97)
Past hypertensive history	
Known Hypertensive	140 (78.65)
Non-hypertensive	38 (21.34)
On medication	76 (42.71)
Irregular medication	8 (4.49)
Not on medication	56 (31.46)
Smoking history	
Smoker	21 (11.79)
Alcoholics	29 (16.29)
Both Smoker and alcoholic	54 (30.33)
Other	3 (1.68)
None	71 (39.88)
Family history of hypertension	
Father	1 (0.56)
Mother	3 (1.69)
Siblings	4 (2.25)
Both Father and mother	4 (2.25)
None	112 (62.92)
Unknown	54 (30.33)

A total of 178 In-patient prescriptions were included within the age group of 18 to 99 years with male predominance. Hypertension was more prevalent in the age group 50-59 in males and 60-69 in females (Table 1).

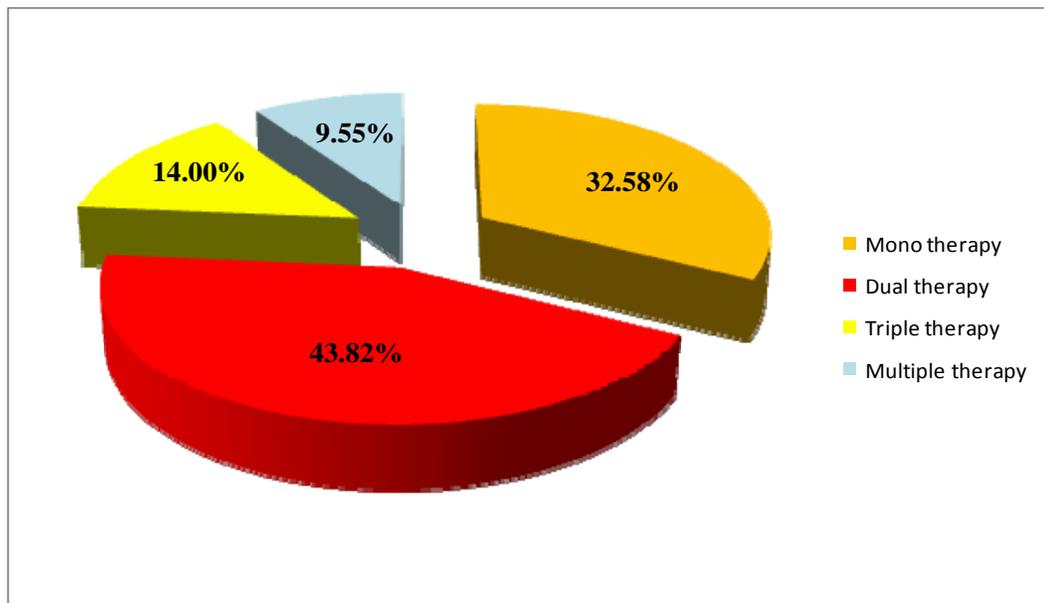


Figure 1. Details of pharmacotherapy of the study population.

Among 178 patients dual therapy (43.82%) was highly prescribed, followed by monotherapy (32.58%). Triple

therapy (14%) and multiple therapy (9.55%) were less frequently prescribed (Figure 1).

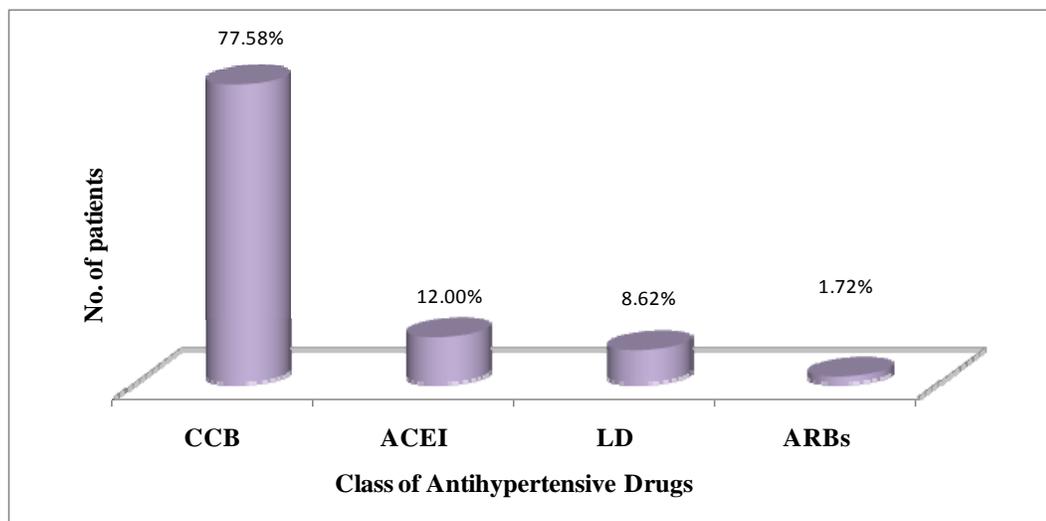


Figure 2. Distribution of subjects based upon the drugs prescribed in monotherapy.

The results revealed that among 178 patients included in the study, monotherapy was prescribed in 58 patients. Here, CCBs (77.58%) were highly prescribed. ACEIs (12%), loop diuretics (8.62%) and ARBs (1.72%) were prescribed to a lesser degree in monotherapy of patients. Amlodipine was the most preferred calcium channel blocker in monotherapy (Figure 2).

Dual therapy was prescribed in 78 patients wherein CCB + ACEI (26.92%) were the most prescribed combination, followed by CCB + loop diuretic (20.51%) and CCB + β -Blocker (11.53%). Amlodipine and Enalapril was the drug of choice in dual therapy (Figure 3).

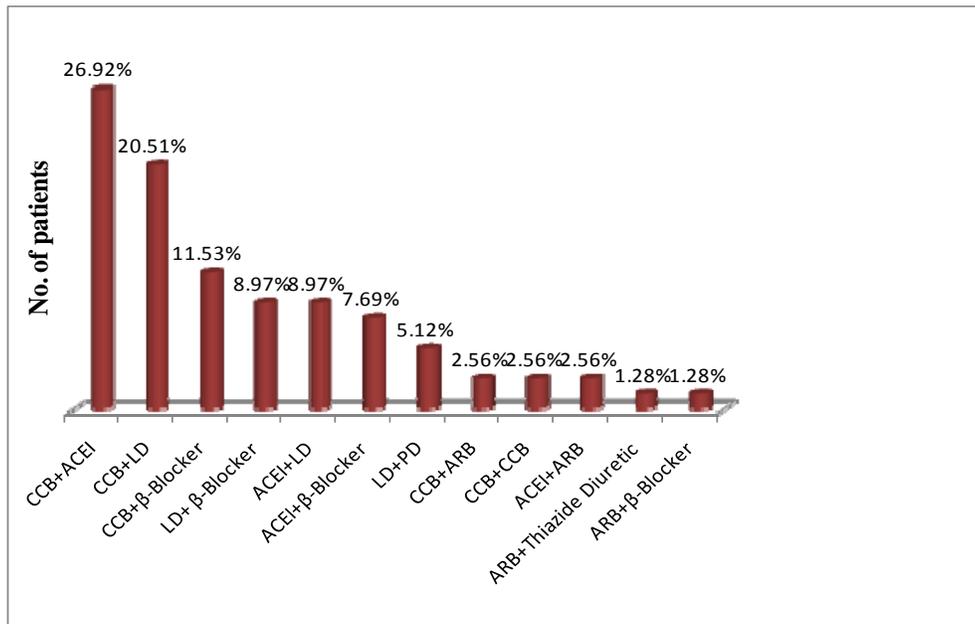


Figure 3. Distribution of subjects based upon the drugs prescribed in dual therapy.

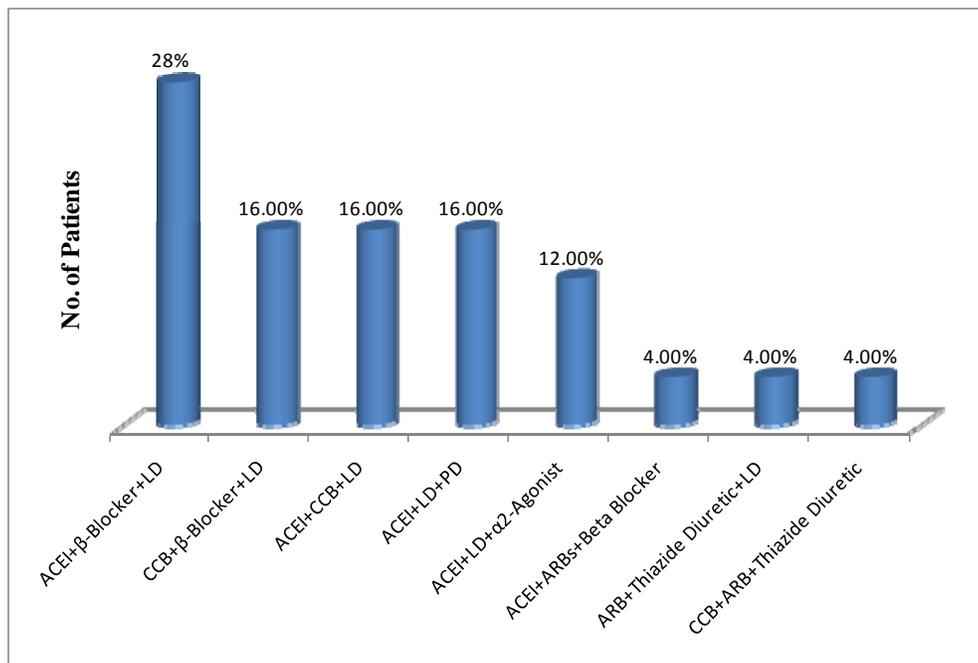


Figure 4. Distribution of subjects based upon the drugs prescribed in triple therapy.

The results revealed that among 178 patients included in the study, triple therapy was prescribed in 25 patients; in which ACEI, loop diuretic and β blocker (28%) was the most preferred combination (Figure 4).

Multiple therapy was prescribed only in 17 patients, wherein ACEI + Potassium sparing Diuretic + β Blocker + Loop Diuretic (35.29%) was highly prescribed, followed by Loop diuretic + CCBs + ACEI + β Blocker (29.41%) (Figure 5).

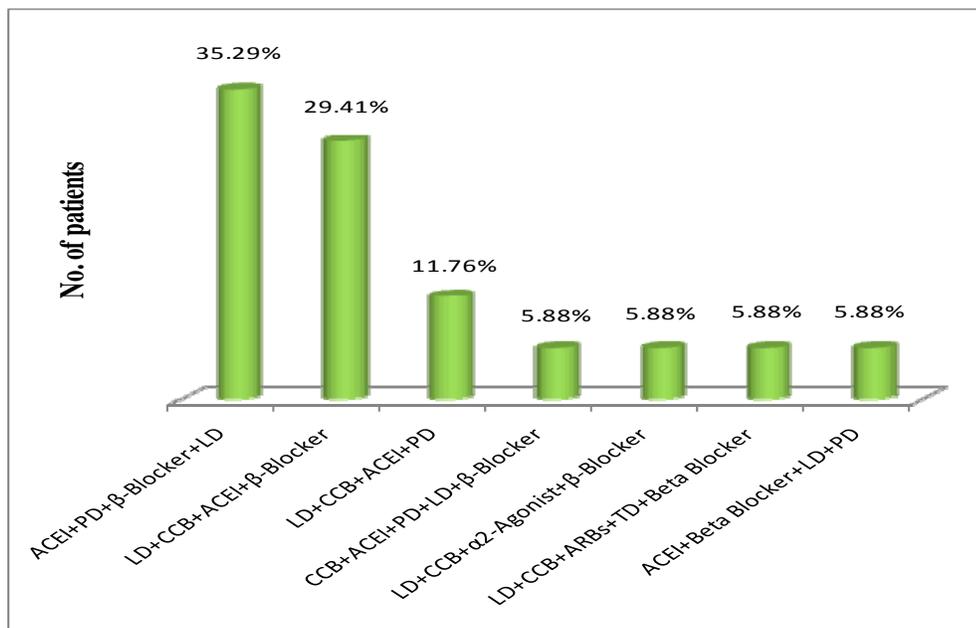


Figure 5. Distribution of subjects based upon the drugs prescribed in multiple therapy.

Table 2. Comparison of subjects Systolic and Diastolic BP on different class of drugs in monotherapy.

Class of Drug	Before Systolic BP	After Systolic BP	% Reduction	P Value	Before Diastolic BP	After Diastolic BP	% Reduction	P Value
CCBs	156.81±35.82	135.22±23.23	21.59	0.002	93.63±16.68	83.63±10.80	10	0.002
ACEI	170±24.49	132.85±22.86	37.15	0.435	107.14±24.29	87.14±9.51	20	0.019
Diuretics	162±49	126±18.16	36	0.040	88±22.80	82±13.03	6	0.151

Table 3. Comparison of subjects Systolic and Diastolic BP on different class of drugs in dual therapy.

Class of Drug	Before Systolic BP	After Systolic BP	% Reduction	P Value	Before Diastolic BP	After Diastolic BP	% Reduction	P Value
CCBs+ ACEI	175.71±28.03	136.19±16.27	39.52	0.009	100±10	87.14±10.55	12.86	0.593
CCBs+ Diuretics	163.5±57.98	130.71 ±43.84	32.86	0.145	95.71±15.55	84.28±15.55	11.43	0.5
ACEI+ Diuretic	151.25 ±18.85	128.75 ±20.31	22.5	0.569	91.87±14.12	78.75±18.07	13.12	0.719

The results reveal that, in monotherapy the % reduction in both systolic and diastolic blood pressures were more in patients on ACE Inhibitors, followed by CCBs. In combination therapy, the % reduction in systolic blood pressure was more on CCB+ACEI combination whereas % reduction in diastolic blood pressure was more in patients on ACEI + Diuretics combination.

DISCUSSION

The most effective method to assess and evaluate the prescribing patterns of physicians is considered to be prescription based survey. The main objective of the present prospective and observational study was to

assess prescribing patterns of antihypertensive drugs in a teaching hospital. The results of the present study indicates higher incidence of HTN in males (n=71) than in females (n=16); and the age group of 50-59 indicates higher incidence of HTN associated with increase in age, which is comparable to earlier studies (Sindhu and Srinivas, 2013; Pavani et al., 2012). With regards to the relation between hypertension and family history, it was observed that maximum number of patients (62.9%) had no family history of hypertension. In a total of 178 patients, 58.19% had no social history of smoking and alcohol consumption where as 39.88% had social history of both smoking and alcohol consumption.

For analyzing the prescribing patterns of antihypertensive drugs, the pharmacotherapy was classified as mono, dual, triple, and multiple therapy. The results revealed that maximum number of patients underwent dual therapy (42.69%) followed by monotherapy (32.02%), triple therapy (15.73%); whereas less number of patients (9.55%) were found to take more than three antihypertensive drugs. Dual therapy is of paramount importance in the study as it was most frequently prescribed among all therapies. In dual therapy, Amlodipine + Enalapril were the preferred combination in the hypertensive patients who were admitted to the hospital. A combination of CCBs + ACEI was the leading drug combination that was prescribed, which is contradictory to Popuri et al, Anand Kale, Pavani et al. (Sindhu and Srinivas, 2013; Khale and Maniyar, 2013; Pavani et al., 2012).

The most frequently prescribed antihypertensive drugs were CCBs either as monotherapy or in combination therapy (Elkhalifa and Ali, 2015). In monotherapy, higher % of patients were treated with CCBs which is comparable with Amara L. Nwaka and Popuri et al study; (Nwaka et al., 2015; Sindhu and Srinivas, 2013) and this results contradict Mohammed Arief et al study in which ACEI was the most commonly prescribed antihypertensive drug in monotherapy (Arief et al., 2013). The drug of choice in CCBs was amlodipine. Triple therapy (15.73%) and multiple therapy (9.55%) were less frequently prescribed. The principal findings reveal that ACEI + loop diuretic + β -blocker were the most prescribed combination in triple therapy.

The % reduction in both systolic and diastolic blood pressures in monotherapy was found to be more in patients who were on ACE Inhibitors, followed by CCBs. In Combination therapy the % reduction in systolic blood pressure was more in CCB + ACEI whereas % reduction in diastolic blood pressure was more in patients on ACEI + diuretics. The findings in our study reveals that CCBs + ACEI were most effective in reducing systolic blood pressure and ACEI was more effective in reducing diastolic blood pressure which is contradictory to Pavani et al. study in which ARBs + β -blockers were effective in reducing systolic blood pressure and ACEI + CCBs were more effective in reducing diastolic blood pressure in combination therapy (Pavani et al., 2012).

Thiazide diuretics were underutilized in this study despite thiazide diuretic being the first line treatment to treat hypertension alone or in combination with calcium channel blocker, angiotensin converting enzyme inhibitor and angiotensin receptor blockers. These results are similar to Mohammed Arief et al. studies (Arief et al., 2013).

CONCLUSION

Present study represents the current prescribing trend of antihypertensive agents. Calcium channel blockers were the most frequently prescribed class of drug in both monotherapy and combination therapy. Maximum

number of patients underwent dual therapy in which combination of Calcium Channel Blocker (CCB) and Angiotensin Converting Enzyme Inhibitor (ACEI) was the preferred combination. Thiazide diuretics were very less frequently prescribed which is not in accordance with JNC-7 and JNC-8 guidelines. Significant reduction in systolic and diastolic BP was seen with ACE inhibitors. The study points out a need for improved patient education on adherence to therapy. Counseling and educating the patient on importance of diet and exercise in the management of hypertension are of vital importance.

Further studies focused on the rationale for choice of drugs based on demographic data and adverse effects of antihypertensive drugs would give additional insights into prescribing patterns of antihypertensive drugs. The study provides the baseline data for similar studies in future, as patterns of prescribing antihypertensive drugs keep changing.

CONFLICT OF INTEREST

None declared.

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