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# PROSPECTIVE STUDY ON PRESCRIBING PATTERNS OF ANTIHYPERTENSIVE DRUGS

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## ABSTRACT

This was a prospective and observational study will be conducted in the department of General Medicine & Cardiology Department In a tertiary care hospital including total of 305 patients. A total of 305 patients were included in the study and we found that the Males 196 (64.3%) were more than that of the females109 (35.7%) suffering with HTN and the patients of age group between 61-70 years were found to be 37%. Monotherapy patients prescriptions were found to be 220 (72.1%) and others 85, (27.9%) and among them 96 (31.5%) patients treated with Calcium Channel Blockers (CCB), 41 (13.4%) patients treated with beta blockers. The Combination therapy patients prescriptions were found 84 (27.5%) and among them 22 (32.4%) Patients treated with LD+PSD (Loop diuretics + Potassium sparing diuretics) followed by 18 (26.5%) patients treated with ARB+TD (Angiotensin II Receptor Blocker +Thiazide diuretics). **Conclusion:** In our study, analysis of prescribed patterns revealed that most of the patients were prescribed with CCBS and Beta-Blockers under monotherapy, combination of Loop diuretics & Potassium sparing diuretics and combination of Angiotensin II receptor blockers & Thiazide diuretics under combination therapy. Disease pattern revealed that Type-2 DM, CRF, COPD were the most common comorbidities observed.

**KEYWORDS:** Hypertension , Prescribing , Antihypertensives.

## INTORDUCTION

Hypertension is the most common modifiable risk factor for cardiovascular diseases (CVD), stroke and renal failure[1]. It is the second leading cause of chronic kidney disease (CKD). The untreated HTN (Hypertension) leads to many cardiovascular complications like myocardial infarction, angina pectoris, coronary heart disease, stenosis, arrhythmias etc.

Despite the hypertension and its complications are still an important cause of adult morbidity and mortality[2]. Hypertension is defined by persistent elevation of arterial blood pressure (BP). The Seventh Report of the Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) classifies adult BP. Patients with diastolic blood pressure (DBP) values <90 mm Hg and systolic blood pressure (SBP) values ≥140 mm Hg have isolated systolic hypertension. A hypertensive crisis (BP >180/120 mm Hg) may be categorized as either a hypertensive emergency or a hypertensive urgency.[3] In general, the optimal blood pressure (BP) for nonelderly adults is <120/80 mm Hg. Consistent systolic blood pressure (SBP) ≥140 mm Hg or a diastolic blood pressure (DBP) ≥90 mm Hg defines hypertension in many cases. Higher prevalence of hypertension (HTN)[4] Antihypertensive medications are a class of drugs that are used to treat hypertension . Six major categories of antihypertensive drugs generally are available, including angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), beta-blockers (BBs), calcium channel blockers (CCBs), diuretics, and others (all other antihypertensive classes including alpha-blockers). Antihypertensive therapy seeks to prevent the complications of high blood pressure such as stroke, myocardial infractions, coronary heart disease (CHD) and kidney failure. The problem is, irrational prescription of antihypertensive drugs is a common occurrence in clinical practices.[5] The risk of nephropathy increases three fold in diabetics when there is a family history of hypertension.[6] Hypertensive vascular disease is a common entity readily detectable, asymptomatic at times, easily treatable usually and often known to lead to lethal complications if left untreated.[7] The report of World Health Organization 2002 states that high blood pressure is the primary or may be secondary cause in some cases for 50% of cardiovascular diseases and subsequent deaths worldwide.[8] 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.[9] Prescription pattern is defined by WHO as the process of evaluating "prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences". Regular evaluation of the antihypertensive prescribing patterns are essential these days due to the growing epidemic of hypertension, increasing number of new antihypertensive drugs and the increasing number of drug combinations that are introduced into the market each year together with alteration in guidelines The prescribing pattern of antihypertensive drugs by different physicians is not in compliance with that of the standard guidelines given by WHO/JNC-7.[10] Since prescription patterns are an alarming cause for poor control of

Hypertension. It must be addressed by all health care providers and pharmacist needs to play a major role in improving the health care of the patients Therefore this study is mainly aiming at analysing the prescribing pattern to assess the mono and combination therapy of antihypertensive drugs. This study also provides the information regarding the quality of treatment and disease patterns of antihypertensive drugs. Therefore, the present study was conducted to analyse the prescribing patterns of anti- hypertensive agents in view of reported and actual practices for pharmacological management of hypertension.[11]

## OBJECTIVES

### Primary objective

"Prospective study on prescribing patterns of antihypertensive drugs".

### Secondary objectives

1. Assessing the mono therapy of Antihypertensive drugs.
2. Assessing the combination therapy of Antihypertensive drugs.
3. Assessing and evaluation of disease patterns of Antihypertensive drugs.

## MATERIALS AND METHODS

This was a Prospective and Observational study performed on 305 patients In the Medicine & Cardiology department of Apollo Multi Specialty Hospital & Research Center for six months starting from September 2016 to March 2017. The study was carried out after obtaining the approval from institutional ethical committee. WHO based prescription auditing proforma were used for data collection**,** which includes the medication information (name, dose, frequency, route etc.) and patient information details (name, age, and sex), socioeconomic parameters, past medical history, disease diagnosed and duration of treatment. The antihypertensive medications used in the hypertensive patients of general medicine and cardiac department were recorded along with the other necessary details such as demographics, the antihypertensive medication prescribed etc were also documented in a data collection form designed for the study. The antihypertensive medications used to treat the patients was then analyzed and compared with accepted standard JNC- VII treatment guidelines.

### Inclusive Criteria

1. Patients of either sex aging >20 years of age
2. Patients who were diagnosed as hypertensive with and without comorbidities

3. In prescription one Antihypertensive should be their.

**Exclusion Criteria**

1. Pregnancy and Lactating women
2. Patients who are not willing to participate in the study
3. less than 20 years.

## RESULTS

### Patient demographic data

**Table 01: Age wise distribution of hypertensive patients.**

| Age in years | No. of patients | % |
|---|---|---|
| 21-30 | 3 | 1.0 |
| 31-40 | 10 | 3.3 |
| 41-50 | 29 | 9.5 |
| 51-60 | 73 | 23.9 |
| 61-70 | 113 | 37.0 |
| 71-80 | 56 | 18.4 |
| 81-90 | 19 | 6.2 |
| >90 | 2 | 0.7 |
| **Total** | **305** | **100.0** |

Mean ± SD: 63.18±12.16

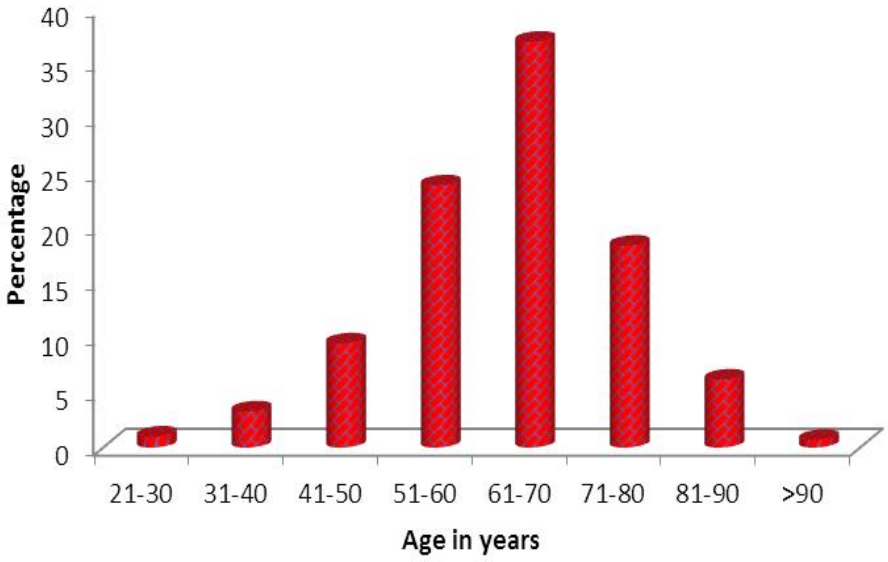


**Fig: 01**

**Table 2: Gender distribution of patients studied.**

| Gender | No. of patients | % |
|---|---|---|
| Female | 109 | 35.7 |
| Male | 196 | 64.3 |
| Total | 305 | 100.0 |

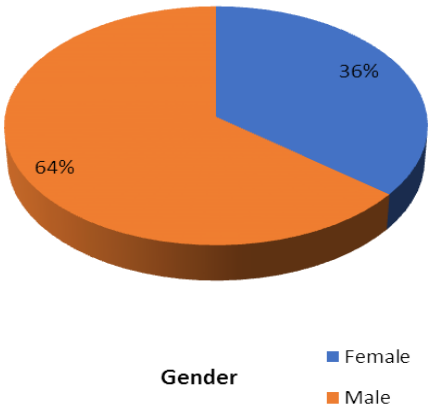


**Fig. 2.**

**Table 3: Occupation distribution of patients studied.**

| Occupation | No. of patients | % |
|---|---|---|
| Business | 99 | 32.5 |
| Housewife | 95 | 31.1 |
| Other | 59 | 19.3 |
| Professional | 36 | 11.8 |
| Farmer | 8 | 2.6 |
| Worker | 8 | 2.6 |
| Total | 305 | 100.0 |

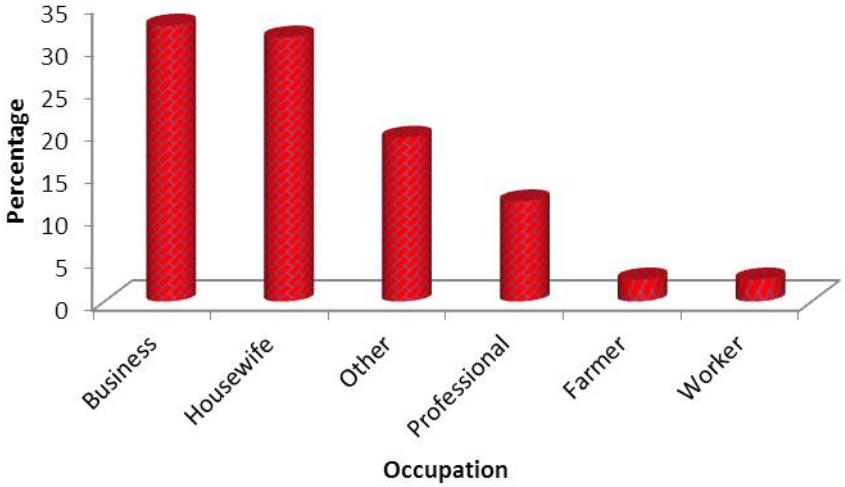


**Fig. 3:**

**Table 4: Education qualification distribution of patients studied.**

| Education qualification | No. of patients | % |
|---|---|---|
| Illiterate | 59 | 19.3 |
| Education | 1 | 0.3 |
| Primary education | 99 | 32.5 |
| Graduate | 124 | 40.7 |
| Postgraduate | 20 | 6.6 |
| Post graduate | 2 | 0.7 |
| Total | 305 | 100.0 |

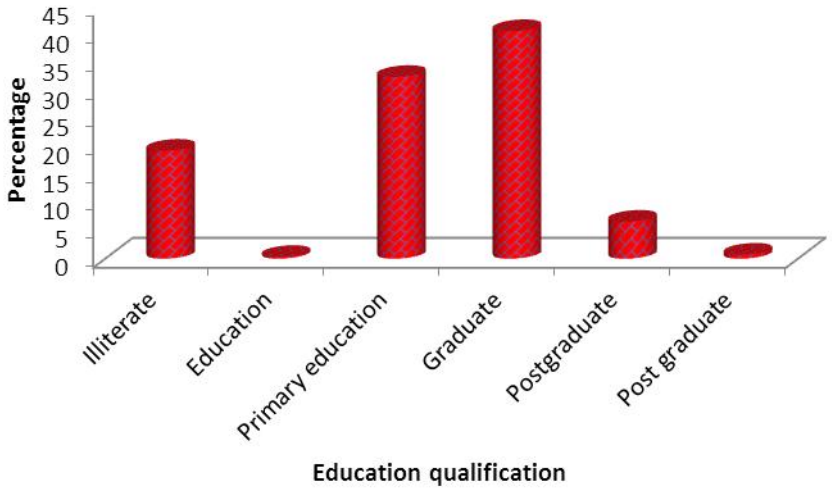


**Fig. 4:**

**Table 5: Diet pattern distribution of patients studied.**

| | No. of patients (n=305) | % |
|---|---|---|
| Veg | 195 | 63.9 |
| Non-Veg | 110 | 36.1 |

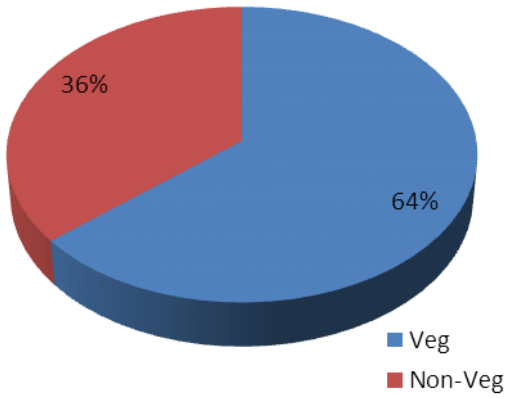


**Fig. 5:**

**Table 6: Habits status distribution of patients studied.**

| | No. of patients (n=305) | % |
|---|---|---|
| Smoker | 33 | 10.8 |
| Non-Smoker | 271 | 88.9 |

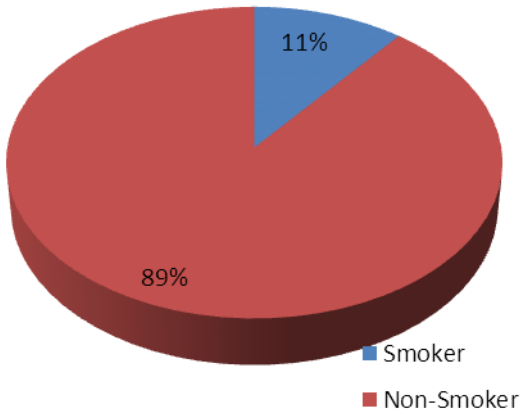


**Fig. 6:**

**Table 7: Alcohol status distribution of patients studied.**

| | No. of patients (n=305) | % |
|---|---|---|
| Alcohol | 29 | 9.5 |
| Non-Alcohol | 275 | 90.2 |

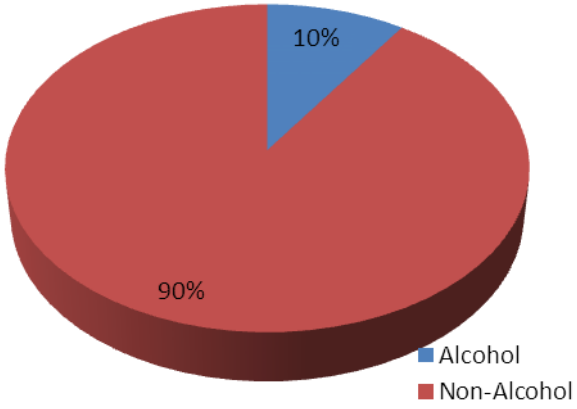


**Fig. 7:**

**Table 8: Vital parameters distribution of patients studied.**

| | No. of patients (n=305) | % |
|---|---|---|
| SBP (mm Hg) | | |
| • <120 | 21 | 6.9 |
| • 120-139 | 219 | 71.8 |
| • 140-159 | 65 | 21.3 |
| • >160 | - | - |
| DBP (mm Hg) | | |
| • <80 | 75 | 24.6 |
| • 80-100 | 228 | 74.8 |
| • >100 | 2 | 0.7 |

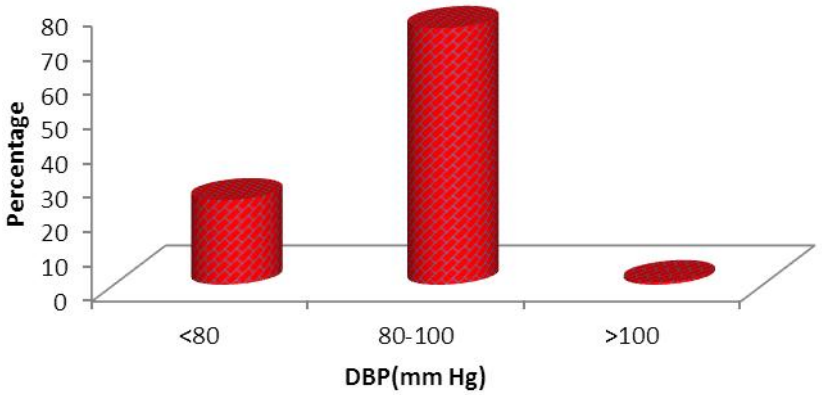


**Fig. 8:**

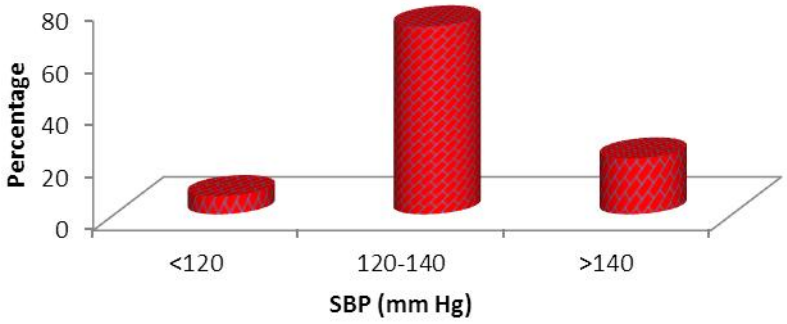


**Table 9: Medication Department distribution of patients studied.**

| Medication Department | No. of patients | % |
|---|---|---|
| No | 123 | 40.3 |
| Yes | 182 | 59.7 |
| Total | 305 | 100.0 |

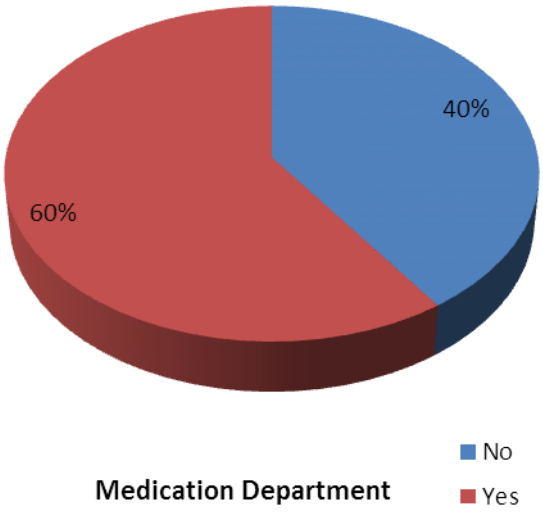


**Fig. 9:**

**Table 10: Cardiology distribution of patients studied.**

| Cardiology | No. of patients | % |
|---|---|---|
| No | 179 | 58.7 |
| Yes | 126 | 41.3 |
| Total | 305 | 100.0 |

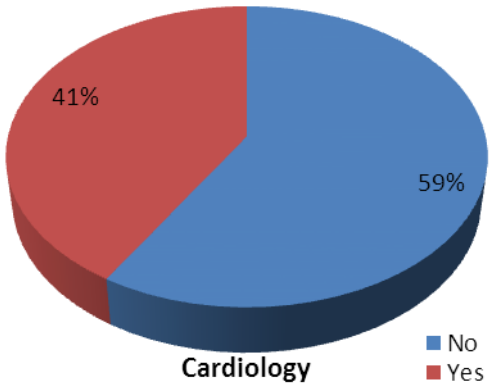


**Fig. 10:**

**Table 11: Mono therapy distribution of patients studied.**

| Mono Therapy | No. of patients | % |
|---|---|---|
| No | 85 | 27.9 |
| Yes | 220 | 72.1 |
| Total | 305 | 100.0 |

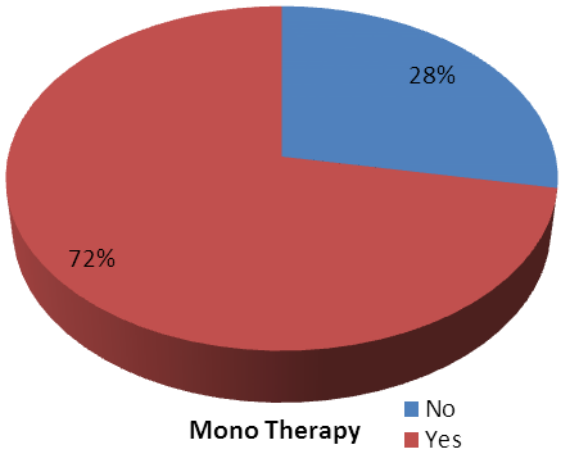


**Fig. 11:**

**Table 12: Mono Therapy based on gender distribution**

| Monotherapy | Gender | | Total |
|---|---|---|---|
| | Male | Female | |
| No | 21(19.3%) | 64(32.7%) | 85(27.9%) |
| Amlodipine | 34(31.2%) | 62(31.6%) | 96(31.5%) |
| Metoprolol | 14(12.8%) | 27(13.8%) | 41(13.4%) |
| Telmisartan | 17(15.6%) | 10(5.1%) | 27(8.9%) |
| Furosemide | 5(4.6%) | 7(3.6%) | 12(3.9%) |
| Losartan | 2(1.8%) | 4(2%) | 6(2%) |
| Nebivolol | 1(0.9%) | 5(2.6%) | 6(2%) |
| Ramipril | 3(2.8%) | 3(1.5%) | 6(2%) |
| Atenolol | 3(2.8%) | 1(0.5%) | 4(1.3%) |
| Carvedilol | 1(0.9%) | 3(1.5%) | 4(1.3%) |
| Clinidipine | 3(2.8%) | 1(0.5%) | 4(1.3%) |
| Nifedipine | 1(0.9%) | 2(1%) | 3(1%) |
| Olmesartan | 1(0.9%) | 2(1%) | 3(1%) |
| Tamsulosin | 0(0%) | 2(1%) | 2(0.7%) |
| Clonidine | 0(0%) | 1(0.5%) | 1(0.3%) |
| Diltiazem | 1(0.9%) | 0(0%) | 1(0.3%) |
| Mannitol | 0(0%) | 1(0.5%) | 1(0.3%) |
| Metazolone | 0(0%) | 1(0.5%) | 1(0.3%) |
| Nimodipine | 1(0.9%) | 0(0%) | 1(0.3%) |
| Verapamil | 1(0.9%) | 0(0%) | 1(0.3%) |
| **Total** | **109(100%)** | **196(100%)** | **305(100%)** |

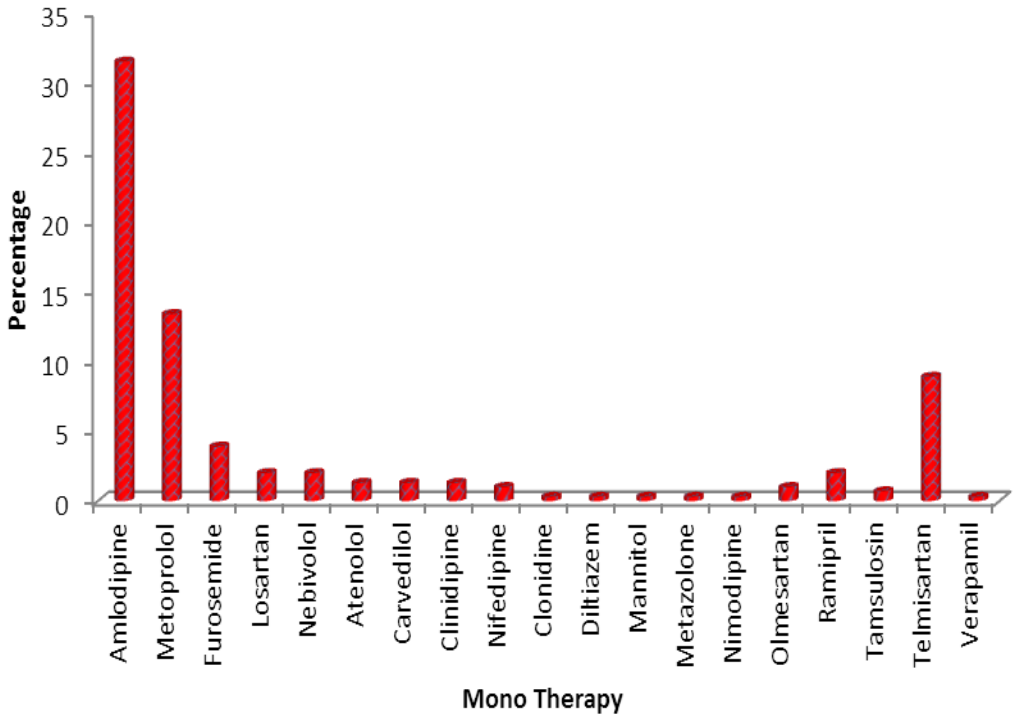


**Fig. 12:**

**Table 13: Combination therapy distribution of patients studied.**

| Combination Therapy | No. of patients | % |
|---|---|---|
| No | 221 | 72.5 |
| Yes | 84 | 27.5 |
| Total | 305 | 100.0 |

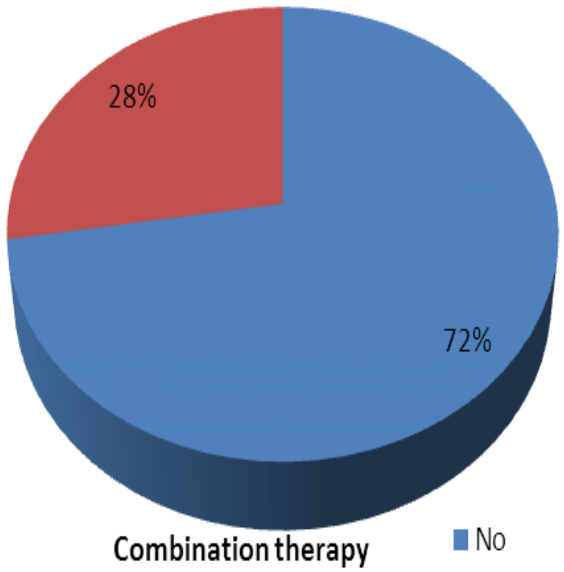


**Fig. 13:**

**Table 14: Combination of therapy based on gender distribution.**

| Combination therapy drugs | Male (n=40) | | Female (n=28) | | Total (n=68) | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Combination therapy | 40 | 41.7 | 28 | 50.9 | 68 | 45.1 |
| LD+PSD | 13 | 32.5 | 9 | 32.1 | 22 | 32.4 |
| ARB+TD | 11 | 27.5 | 7 | 25.0 | 18 | 26.5 |
| C+B | 6 | 15.0 | 7 | 25.0 | 13 | 19.1 |
| A+TD | 6 | 15.0 | 3 | 10.7 | 9 | 13.2 |
| ARB+C | 3 | 7.5 | 1 | 3.6 | 4 | 5.9 |
| C+TD | 2 | 5.0 | 0 | 0.0 | 2 | 2.9 |
| D+C | 3 | 7.5 | 2 | 7.1 | 5 | 7.4 |
| AP+AL | 3 | 7.5 | 0 | 0.0 | 3 | 4.4 |
| LD+C | 1 | 2.5 | 0 | 0.0 | 1 | 1.5 |
| B+TD | 1 | 2.5 | 0 | 0.0 | 1 | 1.5 |
| ARB+LD | 0 | 0.0 | 1 | 3.6 | 1 | 1.5 |

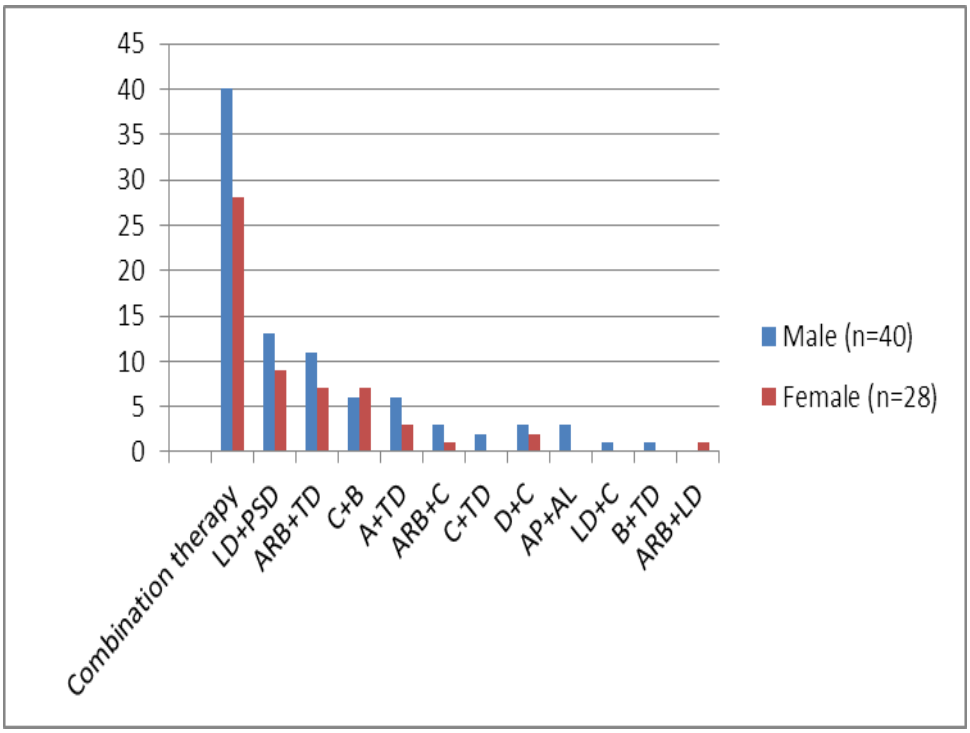


**Fig. 14:**

**Table 15: Final Diagnosis distribution of patients studied**

| Final Diagnosis | No. of patients | % |
|---|---|---|
| Accelerated hypertension | 14 | 4.6 |
| HTN | 94 | 30.8 |
| CKD | 34 | 11.1 |
| IHD | 25 | 8.2 |
| Type II DM | 80 | 26.2 |
| Left breast cancer with brain metastasis | 10 | 3.3 |
| DM | 7 | 2.3 |
| U.T .I with acute abdomen | 6 | 2.0 |
| Osteoarthritis | 3 | 1.0 |
| COPD | 2 | 0.7 |
| Stage V CKD | 2 | 0.7 |
| ARF | 1 | 0.3 |
| Benign prostate hyperplasia for turp | 1 | 0.3 |
| Bilateral knee osteoarthritis | 1 | 0.3 |
| Bronchial asthma | 1 | 0.3 |
| CRF | 1 | 0.3 |
| Dengue | 1 | 0.3 |
| Dialated cardiomyopathy | 1 | 0.3 |
| Epistatis | 1 | 0.3 |
| Fluid overload | 1 | 0.3 |
| Generalized seziures | 1 | 0.3 |
| GERD | 1 | 0.3 |
| Gullian barre syndrome | 1 | 0.3 |
| Hepatic encephalopathy | 1 | 0.3 |
| Hernia | 1 | 0.3 |
| Intracranial bleed | 1 | 0.3 |
| Multiple myeloma | 1 | 0.3 |
| Myocardial infraction | 1 | 0.3 |
| Pancreatic cancer | 1 | 0.3 |
| Para umbilical hernia | 1 | 0.3 |
| Peripheral vascular disease | 1 | 0.3 |
| Pneumonia | 1 | 0.3 |
| Pyelonephritis | 1 | 0.3 |
| Rectal ulcer | 1 | 0.3 |
| RTI | 1 | 0.3 |
| S/p for cp angle tumor with hypertension | 1 | 0.3 |
| Scrotal cellulitis | 1 | 0.3 |
| Seizures | 1 | 0.3 |
| Solitary thyroid nodule | 1 | 0.3 |
| Stress fracture upper end tibia and fibula left | 1 | 0.3 |
| **Total** | **305** | **100.0** |

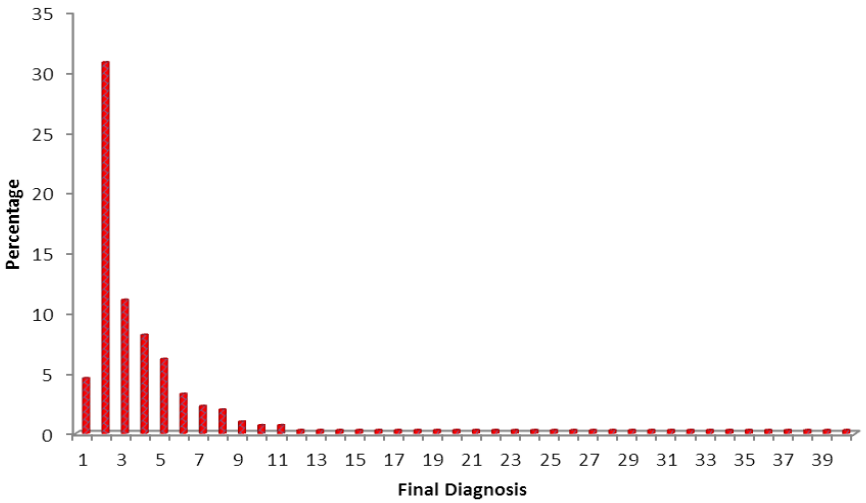


**Fig. 15:**

**Table 16: Distribution of drugs therapy usage pattern**

| Drug therapy | Male (n=96) | | Female (n=55) | | Total (n=151) | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Mono therapy | 56 | 64.4 | 27 | 32.53 | 83 | 54.9 |
| Combination therapy | 40 | 58.82 | 28 | 41.17 | 68 | 45.1 |

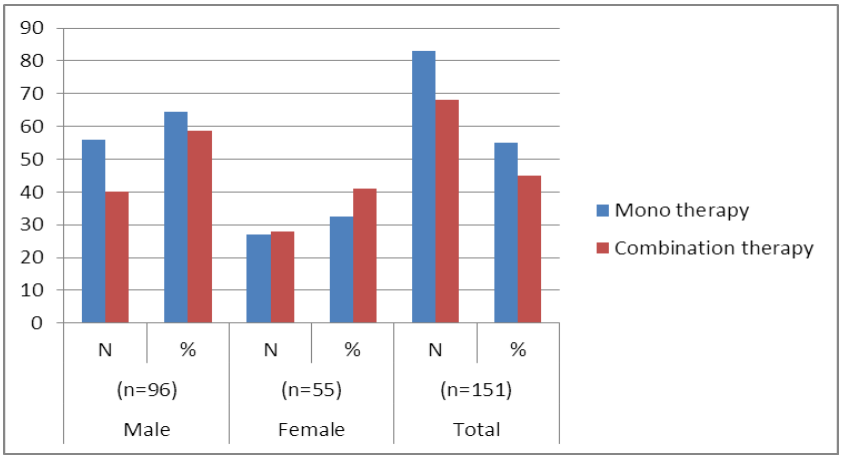


**Fig. 16:**

## DISCUSSION

A total of 305 prescriptions were reviewed and we found that, hypertension was more prevalent in males than females and age group of 61-70 years old patients were mostly affected**,** most of the patients were found to be on business, 124 (40.7%) were graduates, 195 (63.9%) were vegetarians and non vegetarian 110 (36.1%). Non-smoker, 271 (88.9) and smoker 33, (10.8%). non-alcohol, 275 (90.2%) and alcohol patients 29, (9.5%) Pre hypertension, SBP were 120 - 140 mm Hg 219, (71.8%) and >140 mm Hg 65 (21.3%),

hypertensive patients were from DBP 228, (74.8%) and less number of hypertensive patients were from DBP <80 mm Hg, 75, (24.6%) results showed that the patients with pre-hypertension are more than that of stage-1 and stage -2 hypertension. In medicine department, hypertensive patients were 123 (40.3%) and non hypertensive patients were found 182(59.7%). In cardiology department, non-hypertensive patients were 179 (58.7%) and hypertensive patients were found 126 (41.3%), the monotherapy patients were found 220 (72.1%) and others 85, (27.9%). In monotherapy 96 (31.5%) patients treated with Calcium Channel Blockers (CCB), 41 (13.4%) patients treated with beta blockers , 12 (3.9%) patients treated with Anti diuretics, and some patients were found to be less usage of Clonidine 01 (0.3%), Diltiazem 01 (0.3%), Mannitol 01 (0.3%), Metazolone 01 (0.3%), Nimodipine 01 (0.3%), and Veerapamil01 (0.3%). The Combination therapy patients prescriptions were found 84 (27.5%) and others 221 (72.5%) among them 22 (32.4%) patients treated with LD+PSD (Loop diuretics + Potassium sparing diuretics) , followed by 18 (26.5%) patients treated with ARB+TD (Angiotensin II receptor blocker+ Thiazide diuretics) and some patients were found to be less usage 1(1.5%) patients treated with ARB+LD (Angiotensin II receptor blocker + Loop diuretics). In Hypertension the most commonly seen co-morbidities were TYPE II Diabetes mellitus 80(26.2%), Chronic Renal Failure 14(9.3%),chronic obstructive pulmonary disease 6(3.9%), Asthma 3(1.9%) Acute Renal Failure(ARF) 2(1.3%), Alcoholic liver disease 1(0.7%) and hypo/hyperthyroidism 2(1.3%).

## CONCLUSION

This study gives a clear understanding of antihypertensive Prescription patterns and we concluded from the study that among 305 patients, Most of the patients Age group was between 61-70 years of age, among which males were more than females. Vegetarians were more compared to Non vegetarians. Non-smokers were greater than smokers. Among which non alcohol patients were more than alcohol patients. In our study more number of hypertensive patients were found to be Pre hypertensive, SBP were 120 - 140 mm Hg and DBP 80-90 mm Hg. In our study, analysis of prescribing patterns revealed that most of the patients were prescribed with CCB’s and Beta-Blockers under monotherapy, Loop diuretics + Potassium sparing diuretics (LD+PSD) and Angiotensin II receptor blockers + Thiazide diuretics (ARB+TD) under combination therapy. Disease pattern revealed that Type-2 DM, CKD, COPD were the most common co-morbidities.

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I deeply indebted to GOD almighty and my parents, for enabling me to complete this dissertation in a fine manner I owe a great deal of thanks to many people who supported me with their time and encouragement throughout this enormous project. I am grateful to RGUHS for granting me permission to do this study. The present study has been undertaken and completed under the expert guidance and encouragement of Mr. Ramesh. C, Guide and Associate Professor Department of Pharmacology & Mrs. MAHADEVAMMA L, Co-Guide and Head of the Department, East West College of Pharmacy. I specially express my whole hearted thanks to my near and dear one, Anithavani. M for moral support and encouragement during the entire period of my study.Last but not least, extend my thanks to all those who have been directly or indirectly associated with my study , Tambe Danieal Atem, Asish Lamsal , Sunil Adhikari , Sami Prajuli , Kejeeya Baskota , for their contribution.

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