

## STUDY OF DRUG UTILIZATION PATTERN OF ANTIHYPERTENSIVE DRUGS IN HYPERTENSIVE NEPHROPATHY IN A TERTIARY CARE TEACHING HOSPITAL, BAREILLY, U.P.

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### ABSTRACT

**Objective:** To determine the drug utilization pattern of antihypertensive agents in patients of hypertensive nephropathy in a tertiary care teaching hospital.

**Materials and Methods:** This was a prospective observational study carried out in Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, over a period of three months. A total of 60 patients aged 40-79 years taking treatment for hypertension with associated nephropathy were enrolled in the study. All the relevant data were collected and drug utilization pattern of antihypertensive agents was determined. The study evaluated the percentage of use of multidrug therapy, drugs prescribed from Essential Drug List (EDL) and prescriptions with generic name. The cost of antihypertensive drugs used per day was calculated and linked with socioeconomic status of the patients.

**Results:** Evaluation of the prescriptions demonstrates that a total of 63.3% males and 36.7% females with mean age of 58.9±11.9 years were enrolled out of which 70% patients were on multidrug therapy while only 30% were on monotherapy. The most common drug prescribed was amlodipine and around 60% drugs were from EDL 2011. Though only 16.67% patients were prescribed generic drugs but it did not affect the economic condition of the patient as most of enrolled patients belong to upper middle class.

**Conclusion:** The prescriptions analysed were in accordance to guidelines of JNC-8 (Joint National Committee – 8) and most of the prescriptions were found to be rational and it also shows that management of hypertensive nephropathy needs combination therapy.

**Keywords:** Drug utilization, hypertensive nephropathy, monotherapy, FDCs (Fixed Drug Combinations)

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### BACKGROUND

Hypertension is a major chronic disease affecting portions of world population and uncontrolled hypertension leads to severe long term consequences such as stroke, heart failure, congestive heart disease (CHD), end stage renal disease (ESRD). It is also associated with chronic renal failure (CRF) and diabetes mellitus (DM). Hypertension is estimated to affect 972 million adults worldwide, with 66% of those affected are from low and middle income countries, including India [1]. The overall burden of hypertension related disease is rapidly rising in the developing world as a consequence of the aging population and increasing urbanization [2]. Hypertensive nephropathy is one of the leading causes of end stage renal disease. Chronic hypertension leads

to renal damage known as hypertensive nephropathy or hypertensive nephrosclerosis. It is one of the most frequent causes of end stage renal disease requiring chronic dialysis. The adequate treatment of hypertension according to International Standards would allow decrease in the number of patients with hypertensive nephropathy. Management of hypertensive nephropathy requires both pharmacological and non-pharmacological interventions.

Poor management affects the morbidity and mortality of the patient and on the other hand pharmacological management is associated with many adverse effects like hypotension, GI disturbances, impaired sexual function etc. which adversely affects the quality of life of patients. Drug utilization study is a

component of medical audit that monitors and evaluates prescribing practices and recommends necessary modifications to achieve rational drug use and is defined as “marketing, distribution, prescription and use of drugs in a society, with special emphasis on resulting medical, social and economic consequences” [according to WHO in 1977]. Drug utilization research also provides insight into the efficiency of drug use i.e. whether a certain drug therapy provides value for money and the results of such research can be used to help to set priorities for the rational allocation of health care budgets. The ultimate goal of drug utilization research must be to assess whether drug therapies is rational or not. In this regard, a drug utilization study was conducted.

### OBJECTIVES

1. To determine the drug utilization pattern of antihypertensive agents in patients of hypertensive nephropathy in a tertiary care teaching hospital.
2. Percentage of use of combination therapy and FDCs.
3. Percentage of drugs prescribed from EDL and with generic names.
4. Cost of antihypertensive drugs per prescription per day.
5. Evaluation of ADRs.
6. Evaluation of rationality in reference to JNC VII guidelines.

### MATERIALS AND METHODS

This was a prospective observational study conducted in outpatient of medicine

department in Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, and a tertiary care teaching centre. The study was done for a period of 3 months between May to July 2014.

The study intended to determine the drug prescribing pattern in adult patients diagnosed as hypertensive with its complications attending tertiary care centre. Patients over 40 years of age diagnosed with and treated for hypertension, attending the facility for atleast 3 months were included in our study. There are specific “chronic diseases/life style diseases days” at our tertiary care centre where physician consultation is facilitated for diseases such as hypertension, diabetes mellitus and asthma.

Informed consent was taken from the patients. Eight different groups of anti-hypertensive drugs were screened namely Angiotensin converting enzyme inhibitors (ACEIs), Angiotensin receptor blockers (ARBs), Calcium channel blockers (CCBs), beta blockers (BBs), a blockers, a agonists, diuretics and Fixed Dose Combinations (FDCs).

### RESULTS

During the study period a total of 60 prescriptions were evaluated. All the patients were literate and most of them (76%) belonged to class II (upper middle class) according to modified kuppusswamy scale which has been summarized in table 1

**Table 1: Socioeconomic status: (Modified Kuppusswamy Scale)**

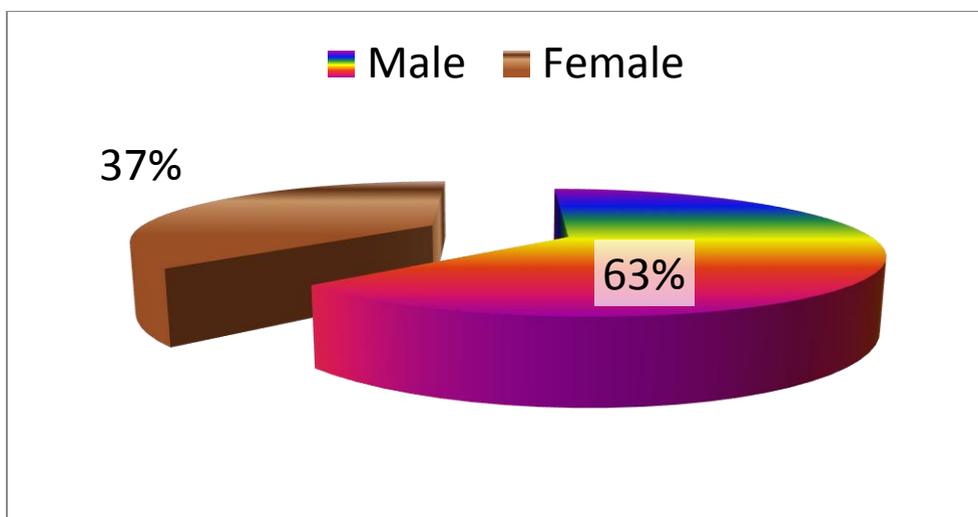
S.No.	Class	Percentage
1.	Class I (upper)	4%
2.	Class II (upper middle)	76%
3.	Class III (lower middle)	16%
4.	Class IV (upper lower)	4%
5.	Class V (lower)	0%

The mean age was 58.9±11.9 years and is depicted in table 2.

**Table 2: Age and Sex wise distribution**

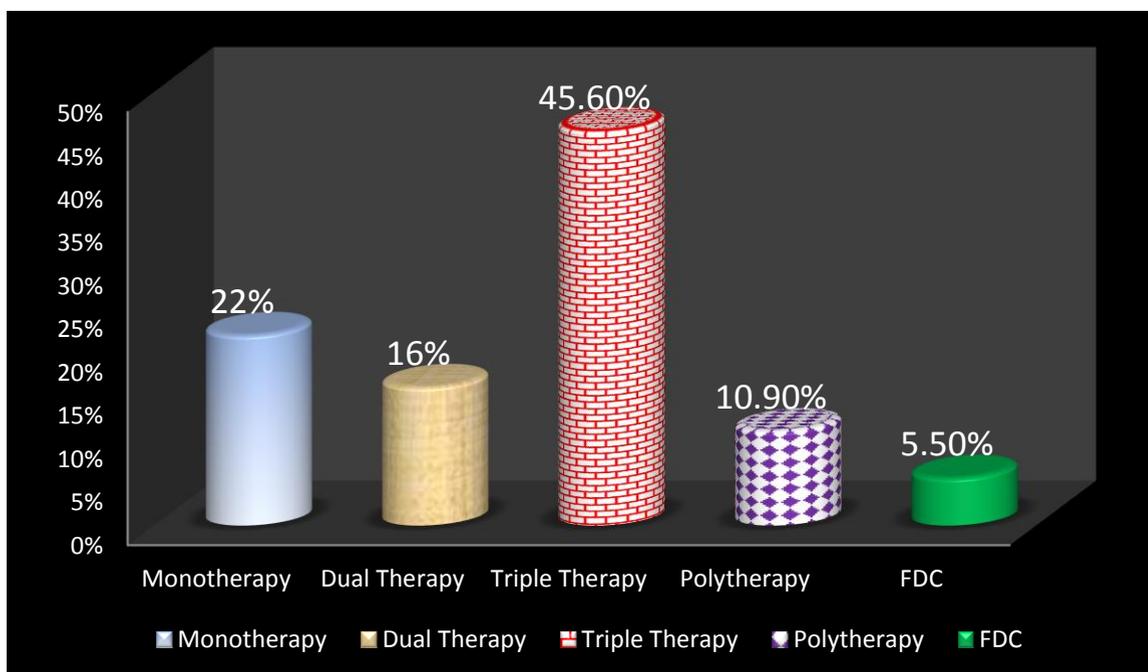
Parameters	40-49	50-59	60-69	70-79
Mean Age (years)	44±3.04	55±3.29	66±2.65	70.5±0.71
Sex ratio (M : F)	1.9 : 1	1.71 : 1	0.4 : 1	5 : 0
Veg : Nonveg	17 : 12	7 : 12	7 : 0	3 : 2

On an average 63% of the prescriptions were of male patients and is shown by the pie chart below (Fig 1)



**Figure 1: Sex wise distribution of prescriptions**

40% of the prescriptions were found to be with monotherapy while 60% were with multidrug regimen amongst which a combination of Calcium channel blocker, beta blocker and diuretics was the most commonly prescribed multidrug therapy. This is shown by figure 2



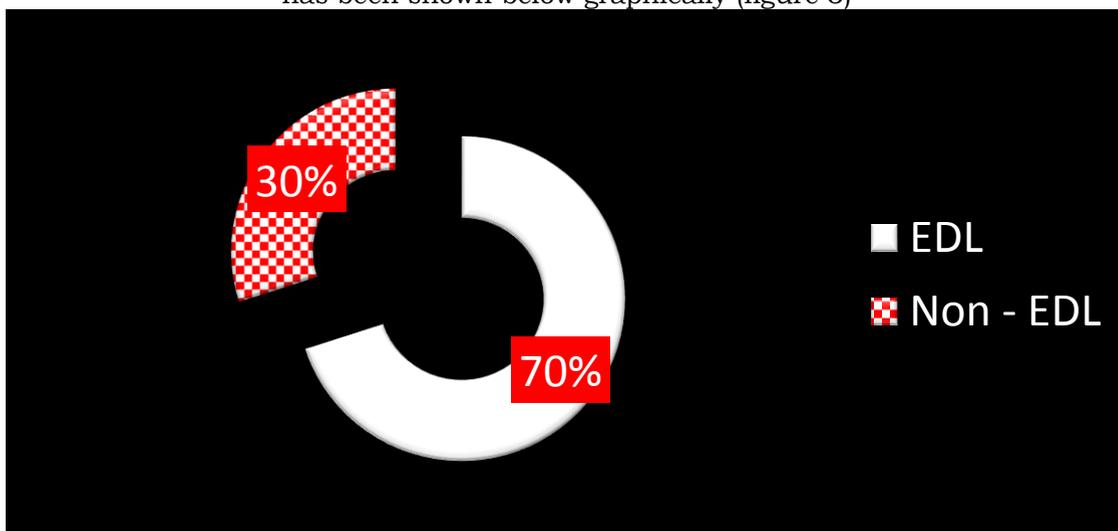
**Figure 2: Percentage of monotherapy v/s multidrug regimen**

Amongst the various drugs prescribed in our study group, calcium channel blocker ranked first followed by beta blockers and then diuretics which is shown by table 3 below.

**Table 3: Prescription pattern of drugs in different age groups**

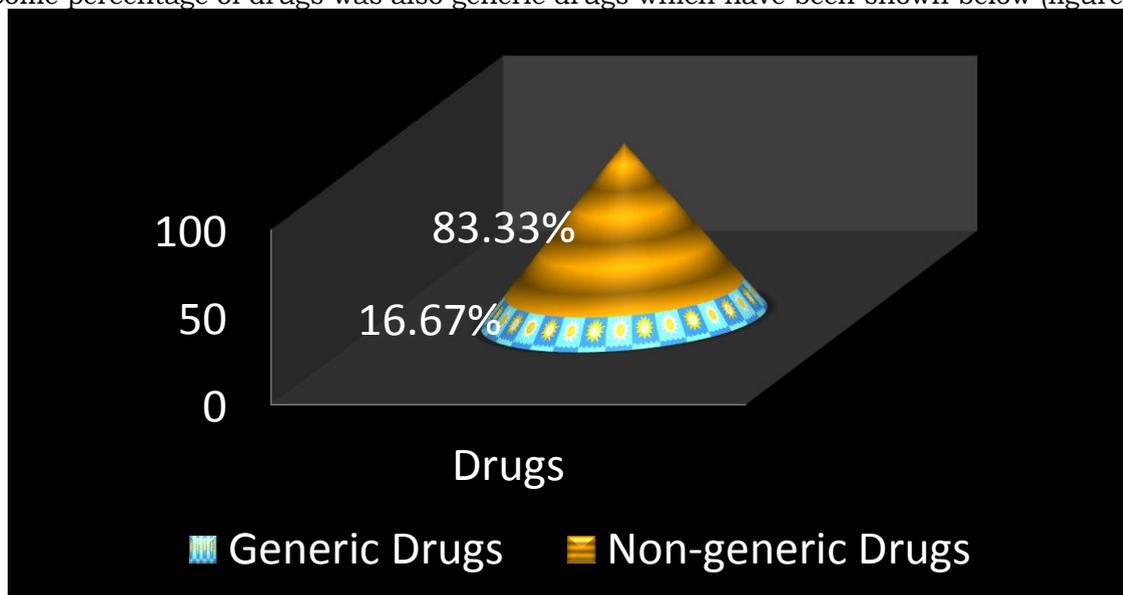
AGE (YRS)	DIURETICS	ACEI	ARB	CCB	BETA BLOCKER	FDC	ALPHA AGONIST	ALPHA BLOCKER
40-49	10(45.45%)	2(100%)	3(60%)	24(55.81%)	7(25%)	0	7(58.33%)	5(29.41%)
50-59	7(31.83%)	0	0	14(32.56%)	14(50%)	1(50%)	5(41.67%)	12(70.59%)
60-69	2(9.09%)	0	0	2(4.65%)	2(7.14%)	1(50%)	0	0
70-79	3(13.63%)	0	2(40%)	3(6.98%)	5(17.86%)	0	0	0
<b>TOTAL</b>	22(100%)	2(100%)	5(100%)	43(100%)	28(100%)	2(100%)	12(100%)	17(100%)

There were a good percentage of drugs being prescribed from essential drug list 2011 which has been shown below graphically (figure 3)



**Figure 3: Percentage of drugs from Essential Drug List (EDL) 2011**

Some percentage of drugs was also generic drugs which have been shown below (figure 4)



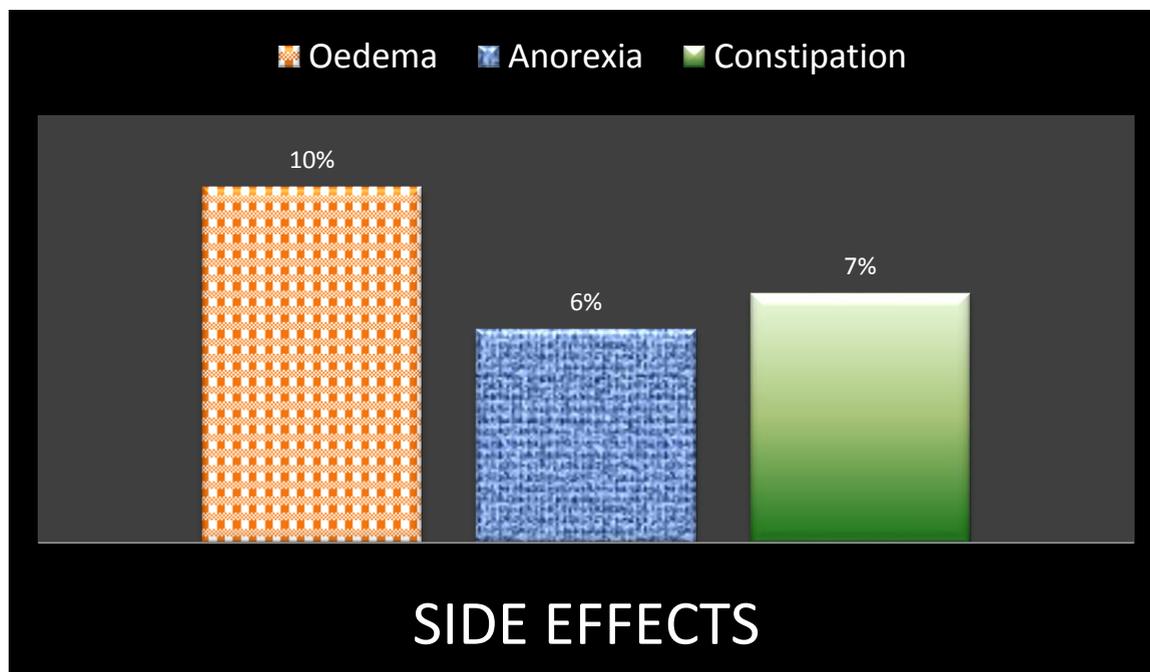
**Figure 4: Percentage of generic drugs**

**Table 4: Cost of antihypertensive drugs per prescription per day.**

DRUGS	COST
<b>Monotherapy</b>	Rs. 0.472 to Rs. 16.23
<b>Dual Therapy</b>	Rs. 1.972 to Rs. 23.49
<b>Triple Therapy</b>	Rs. 2.672 to Rs. 30.18
<b>Polytherapy</b>	Rs. 5.622 to Rs. 39.88

The cost of antihypertensive drugs per prescription per day is shown with the help of a table 4.

Certain side effects were observed which has been shown with the help of a bar diagram (figure 5).

**Figure 5: Percentage of side effects**

## DISCUSSION

Out of the 60 prescriptions evaluated in our study, 38(63.3%) were males and 22 (36.7%) were females. Males predominated in the study population which is in agreement with the results of various other studies (3,4).

The (mean±SD) age of the patients was 58.9 ± 11.9 years with a range between 40 and 79 years. It was higher than that reported in other studies [4,5]. This difference could be because of the reason that we did not include younger patients in our study group. Mostly combination therapy was used in our study when compared with the monotherapy which was in accordance with earlier studies [6,7]. Combinations of anti-hypertensive drugs with complementary actions may minimize

adverse effects and reduce clinical outcomes by improving BP control and organ protection [7].

Most commonly a combination of 3 drugs was prescribed and amidst various drugs prescribed a CCB (Amlodipine) was the most commonly prescribed drug as it is recommended in older age group and also for chronic use. The most common drug prescribed is comparable to study done by Datta S et al and Almas A et al. [8,9,10]; although few studies have also shown differing results [11].

We also found that 70% of the drugs were prescribed from Essential drug list 2011 implying that there was no drug procurement problem and though only 16.67% patients were prescribed generic drugs but still these should be prescribed

more often so that the patients can get the options of choosing drug according to his economic conditions.

Most of the patients in our study group belonged to middle socioeconomic status and the cost of the prescription varied from Rs.0.50 to Rs.40 (approx).

## CONCLUSION

Our results of the study demonstrate that the prescriptions were in accordance to JNC VIII guidelines.

Calcium channel blockers was the most commonly prescribed drug class followed by Beta Blockers and from the study it can also be said that hypertensive nephropathy needs combination of three or four drugs along with lifestyle modifications for adequate management.

## List of Abbreviations

1. CHD - Congestive Heart Disease
2. ESRD - End Stage Renal Disease
3. CRF - Chronic Renal Failure
4. DM - Diabetes Mellitus
5. WHO - World Health Organization
6. EDL - Essential Drug List
7. ADRs - Adverse Drug Reactions
8. JNC - Joint National Committee
9. ACEIs - Angiotensin Converting Enzyme Inhibitors

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10. ARBs - Angiotensin Receptor Blockers
11. CCBs - Calcium Channel Blockers
12. BBs - Beta Blockers
13. FDCs - Fixed Dose Combinations

## Author's contributions

Dr. Anju Madhwar has collected the data, analysis of the data and formatted the manuscript. Dr. Dharmender Gupta has collected the data, analysis of the data and formatted the manuscript. Dr. Sujata Singh has provided the necessary research articles and helped in editing of the manuscript. Dr. N.A. Ansari has provided the necessary research articles and helped in editing of the manuscript.

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**Conflict of interest:** There is no conflict of interest.