



STUDY ON DRUG UTILIZATION PATTERN OF ANTIHYPERTENSIVE USED IN TREATMENT OF ESSENTIAL HYPERTENSION IN SANTOSH MEDICAL COLLEGE AND HOSPITAL, GHAZIABAD UTTAR PRADESH, INDIA.

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ABSTRACT

BACKGROUND: Hypertension is a major common disease and affects a million of people worldwide and is having risk factor for other diseases like cardiovascular diseases, stroke etc. **AIMS AND OBJECTIVE:**

The main objective of the study is to assess the utilization pattern of antihypertensive in a tertiary care hospital. The aim of this study was to assess the incidence and causality of ADRs to antihypertensive agents used for the essential hypertensive patients.

MATERIAL AND METHODS: This prospective, observational study was conducted for a period of one year six months in out-patient department of medicine in Santosh medical college and hospital from April 2010 to September 2011. **RESULT:** In this present study, calcium channel blocker 40(28.6%) were the most commonly prescribed antihypertensive agents followed by beta blockers 36(25.7%), angiotensin receptor blocker 26(18.5%), diuretics 23(16.5%), ACE inhibitors 12(8.6%), alpha blockers 3(2.1%). **CONCLUSION:** The results of this study concluded that antihypertensive drugs able to induce the development of adverse drug reactions.

KEYWORDS : Antihypertensive agents, Essential hypertension, Adverse drug reactions,

INTRODUCTION:

Hypertension is a chronic illness associated with high morbidity and mortality. Once hypertension is diagnosed, starting antihypertensive therapy on a long-term basis along with regular follow up is important.

Hypertension is a significant contributor to rising morbidity and mortality because of its associations with cardiovascular, renal and cerebrovascular complications. The prevalence and impact of the disease on health care a drug utilization study becomes essential to determine the current drug utilization pattern.

Every drug has the potentiality to cause an adverse drug reaction (ADR). ADRs are a major problem in drug therapy. Hypertension is a global public health issue. It is a significant contributor to rising morbidity and mortality because of its associations with cardiovascular, renal and cerebrovascular complications. For the individual patient, the rational use of a drug implies the prescription of a well-documented drug at an optimal dose, together with the correct information, at an affordable price. 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 [1]. High blood pressure is defined as a systolic blood pressure (BP) 140 mm Hg and/or diastolic blood pressure 90 mm Hg [2]. The diastolic pressure represents the pressure during ventricular relaxation in diastole whereas the systolic pressure represents the peak pressure due to ventricular contraction during systole. Either or both pressures have specified upper limits of normal and elevation in either or both pressures are used to define hypertension [3]. According to the seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and treatment of High Blood Pressure JNC 7th report (2004) defined and classified hypertension in adults, as shown in TABLE-1. [4].

Hypertension is defined conventionally as a sustained increase in blood pressure (BP) $\geq 140/90$ mm Hg, a criterion that characterizes a group of patients whose risk of hypertension related cardiovascular disease is high enough to merit medical attention. Actually, the risk of both fatal and nonfatal cardiovascular disease in adults is lowest with systolic blood pressures (SBP) of <120 mm Hg and diastolic

blood pressure (DBP) <80 mm Hg; these risks increase progressively with higher systolic and diastolic blood pressures [5].

Worldwide prevalence estimates for hypertension may be as much as one billion individuals, and approximately 7.1 million deaths per year may be attributable to hypertension. The World Health Organization (WHO) reports that suboptimal BP (>115 mmHg SBP) is responsible for 62% of Cardiovascular disease (CVD) and 49% of ischemic heart disease (IHD), with little variation by sex. In addition, suboptimal BP is the number one attributable risk factor for death throughout the world [6].

In addition to the distress of the patients actually suffering from one or several ADRs, the cost of ADRs has been estimated to be high due to prolongation of hospital visits [7] Achieving BP goals usually requires two or more antihypertensive agents (AHAs); however; increasing the number of AHAs in a regimen may lead to even more adverse effects [8].

AIMS AND OBJECTIVE:

The main objective of the study is to assess the utilization pattern of antihypertensive in a tertiary care hospital and to assess the incidence and causality of ADRs to antihypertensive agents used for the essential hypertensive patients attending at the general medicine out patients department.

MATERIAL AND METHODS:

The study was conducted at the Department of Pharmacology and in collaboration with the Department of Medicine, Santosh Medical College, Uttar Pradesh. The Medicine department was taken as the research area since it has sufficient number of patients on hypertension and is well staffed, organized, and has relatively good recording of the clinical events.

A prospective observational study was planned to be conducted for a period of 18 months in IPD of General Medicine of a tertiary care teaching hospital after getting approval from the hospital ethical committee. The relevant data were collected on the day of admission in a specially designed data entry form, which includes patient demographics (age, sex and outcome of the patients), diagnosis, investigations, and drug details, duration of

therapy and details of any concomitant medications. The laboratory data were noted down on follow-up. For assessing the drug utilization pattern, individual prescriptions were screened and drugs were classified into different groups based on their category. Risk factors were identified from the data collected from the patient's case record. Drug interactions were identified using the Micromedex drug data base. All patients with proven hypertension were put on antihypertensive medications, recruited from the Department of Medicine. The total duration of the study was one year six months i.e. April 2010 to September 2011. The diagnosis of hypertension was confirmed prior to enrolment. Patients were allotted a unique patient identification number for ease of follow up. On the first visit, a case record form (CRF) designed as per the study protocol was filled according to the prescription of the patient which includes patient demographic details, treatment charts, and investigation reports of patients of medicine. Charting of blood pressure was also done on the first visit. The patient medication chart was recorded every follow-up visit and at 3 months for keeping a record of prescriptions and improvement in terms of clinical parameters. If any serious interaction was observed, health care professional for necessary modifications was informed.

The association and causality assessment, between antihypertensive drugs and ADR were evaluated by using the WHO-UMC scale and Naranjo scale [9, 10].

INCLUSION CRITERIA:

1. Patients of either sex of age 22 to 58 years.
2. Patients of hypertension (diagnosed according to JNC8 criteria; systolic blood pressure >140 mmHg, diastolic pressure > 90 mmHg).
3. Patients having no associated comorbidities.

EXCLUSION CRITERIA:

1. Patients with chronic liver disease such as cirrhosis, chronic hepatitis, cigarette, drug addiction, alcohol, acute viral hepatitis.
2. Terminally ill or comatose patients.
3. Patients with concurrent major psychiatric illness and/or concurrent major medical illnesses.
4. Patients already on treatment from some other institution for other indications.
5. Patients taking alternate medicines along with the prescribed one.
6. Patients unwilling to participate and did not give consent to the study.
7. Patients are unable to give an interview.
8. Pregnancy/breastfeeding.
9. Patients with incomplete medical records.

Drug Utilization Indicators: On the basis of WHO core prescribing indicator. Data were expressed according to a number of encounters and percentage frequency.

Defined Daily Dose (DDD): World Health Organization (WHO) has defined the unit of drug utilization research as a measure of defined daily dose (DDD) which uses anatomical therapeutic chemical [ATC] classification. Thus, drug utilization was expressed as:

Average dose prescribed per day and DDD/1000 patients /day.

DDD/1000 patients/day was calculated by applying the following formula:

Total amount of drug consumed during the study period × 1000 / WHO recommended DDD of a drug × duration of treatment × sample size.

Drug Use Indicators: In this study, the WHO drug utilization

indicators were analyzed. The average number of drugs encountered per prescription was 4. Whereas prescriptions with the generic name were 36% and drugs from an essential drug list were found to be 72%. During the study, indicators of patient care such as mean consulting time were found to be 5.6 min.

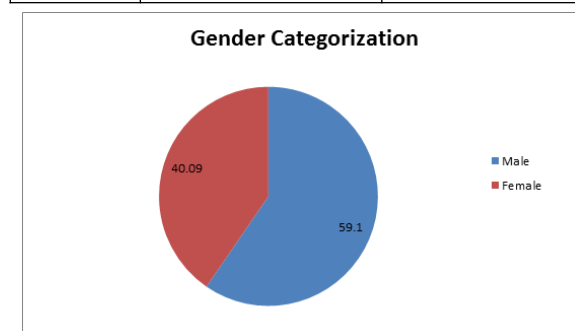
STATISTICAL ANALYSIS:

Data were analyzed using SPSS (Statistical package for the Social Sciences, SPSS) with latest software version. Descriptive and inferential analyses were conducted as appropriate, and level of significance was set at P <0.05.

RESULT:

Table No.1 Gender Categorization (n= 110)

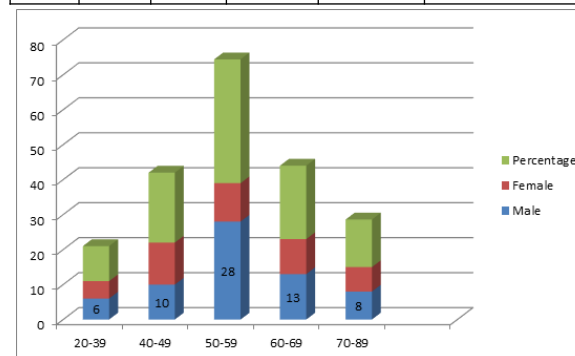
SEX	NO. OF PATIENTS	PERCENTAGE (%)
Male	65	59.1
Female	45	40.9



The study reveals that 65 (59.1) Patients were males and 45 (40.09) were female patients.

Table -2 Age Distribution (n= 110)

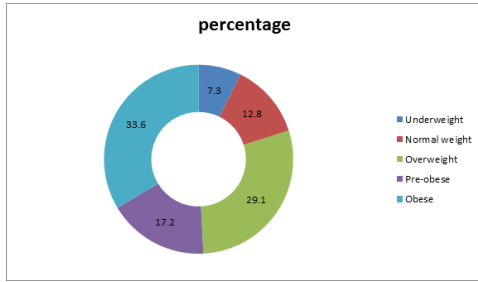
Sl.NO.	AGE (YRS.)	MALE (n=65)	FEMALE (n=45)	NO. OF PATIENTS	PERCENTAGE %
1	20-39	6	5	11	10
2	40-49	10	12	22	20
3	50-59	28	11	39	35.4
4	60-69	13	10	23	21
5	70-89	8	7	15	13.6



The study reveals that the majority of the patients 39(35.4%) were in the age group of 50-59 years followed by 23(21.0%) were in 60-69 years, 22(20.0%) were in 40-49 years, 15(13.6%) were in 70-89 years and 11(10.0%) were in 20-39 years.

Table No.3 Bmi Rangem (n= 110)

CATEGORY	BMI RANGE (KG/M2)	NO.OF PATIENTS	PERCENTAGE %
Underweight	Less than 18	8	7.3
Normal weight	19-25	14	12.8
Overweight	25-30	32	29.1
Pre-obese	30-40	19	17.2
Obese	Over 40	37	33.6



The study shows that majority people of the study group were in obese category 37(33.6%), followed by overweight 32(29.1%), Pre obese 19(17.2%) and lastly normal weight 14(12.8%).

Table No.4 Classification Of Hypertension By Jnc 7 (n= 110)

CLASSIFICATION	NO.OF PATIENTS	PERCENTAGE %
Normal	7	6.3
Pre-hypertension	17	15.4
Stage-1	52	47.2
Stage-2	34	31.1

The study revealed that 52(47.2%) of patients were in stage 1 hypertension followed by 34(31.1%) of patients in stage 2 hypertension and 17(15.4%) of patients in pre-hypertension.

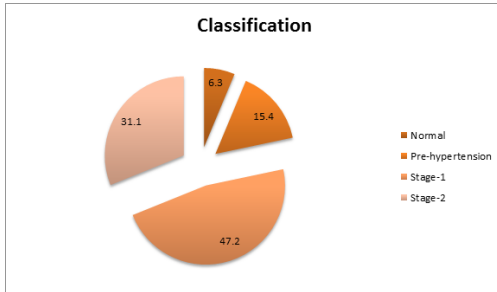


Table No.5 Drug Therapy (n = 110)

TYPE OF THERAPY	NO .OF PATIENTS	PERCENTAGE %
Mono therapy	36	32.8
Dual therapy	48	43.6
More than two drugs	26	23.6

The study shows that 48(43.6%) patients were taking dual therapy, 36(32.8%) patients were taking Monotherapy and 26(23.6%) patients were taking more than two drugs.

Table No.6 Anti-hypertensives Prescribed (n= 140)

CATEGORY	NO. OF DRUGS	PERCENTAGE %
Diuretics	23	16.5
ACE inhibitors	12	8.6
Beta blockers	36	25.7
Calcium channel blockers	40	28.6
Angiotensin receptor blockers	26	18.5
Alpha blockers	3	2.1

In this present study, calcium channel blocker 40(28.6%) were the most commonly prescribed antihypertensive agents followed by beta blockers 36(25.7%), angiotensin receptor blocker 26(18.5%), diuretics 23(16.5%), ACE inhibitors 12(8.6%), alpha blockers 3(2.1%).

Table No.7 Anti-hypertensives Prescribed (n= 140)

CLASS OF DRUGS	NAME OF DRUGS	NO. OF DRUGS	PERCENTAGE%
Calcium channel Blockers (CCB)	Amlodipine	24	17.1
	Clinidipine	7	5.2
	Nifedipine	5	3.6

Beta blockers	Atenolol	18	13.08
	Metoprolol	9	6.4
	Nebivolol	6	4.3
	Propranolol	2	1.42
Angiotensin converting enzyme (ACE)	Ramipril	12	8.5
Angiotensin receptor blocker (ARB)	Telmisartan	17	12.1
	Losartan	7	5.2
	Olmesartan	4	2.9
Diuretics	Spironolactone	10	7.1
	Furosemide	8	5.8
	Torsemide	7	5.2
Alpha blockers	Prazosin	3	2.1

Table No.8 Drug Interactions

Sl. no.	DRUGS	EFFECTS	SEVERITY	MANAGEMENT
1	Spironolactone + Telmisartan	Life threatening hyperkalemia	Major	Monitor serum k levels in patients with renal dysfunction
2	Ramipril + Spironolactone	Hyperkalemia	Major	Monitor serum k levels for persistent elevation in patients with renal dysfunction
3	Ramipril + Aspirin	Decreased ramipril effectiveness	Moderate	Clinician should weigh the benefits against the risks
4	Ramipril + Diclofenac	Decreased antihypertensive effect	Moderate	Monitor patient for hyperkalemia or acute renal failure
5	Metoprolol + Amlodipine	Hypotension/Bradycardia	Moderate	Monitor cardiac function carefully
6	Amlodipine + Clopidogrel	Decrease response to clopidogrel	Moderate	It may decrease the effect of clopidogrel on platelet inhibition
7	Amlodipine + Diclofenac	Increased risk of GI haemorrhage	Minor	The antihypertensive effects may be antagonized
8	Atenolol + Aspirin	Decreased efficacy of atenolol	Minor	Monitor BP level
9	Furosemide + Aspirin	Decreased efficacy of diuretics	Minor	Monitor BP level
10	Digoxin + Spironolactone	Digoxin toxicity	Minor	Monitor BP level
11	Aspirin + Spironolactone	Hyperkalemia	Minor	Monitor BP level
12	Metoprolol + Aspirin	Decreased efficacy of metoprolol	Minor	Monitor BP level

DISCUSSION:

A total of 110 subjects were included in the study and their prescriptions were analyzed. Among them males were 59.1%

and females were 40.09%. In present study distribution, Males are more as compare to females. These reflects the overall higher prevalence of the disease process in the male gender and associated with other factors such as cigarette smoking, alcohol consumption, strenuous lifestyle etc. [11]. A relative male preponderance also observed in other studies like Xavier D et al, pattern of drug use in hypertension in tertiary care hospital [12]. Age group of 51 to 60 years (42%), and 61-60 years (24%). These show that the disease process is linked to late middle age and the elderly age group. Many studies have been quoted that various factors are responsible to the development of hypertension and diabetes mellitus in the susceptible age group [13, 14]. Out of 110 patients 92% are old cases and 8% are newly diagnosed. These show that better awareness and better tool are available to physicians even in relatively remote areas. Early detection appropriate treatment of hypertension and diabetes can vastly reduce the morbidity and mortality.

The study result reveals that the rate of hypertension in male patients was higher than that of female population [Table No.1]. A similar study was conducted by Vikas Pandey et al (2014) [15], reported that the proportion of males was on the higher side as compared with females.

CONCLUSION:

In the present study antihypertensive drugs commonly used are angiotensin receptor blockers, angiotensin converting enzyme inhibitors, calcium channel blockers and beta blockers. Other co-morbidities associated with hypertension are diabetes and also hypo and hyperthyroidism and respiratory infection. Majority of the drugs were prescribed as generic and most of them are from essential drug list. The injections used in present study were insulin prescribed for the treatment of diabetes.

The trend of hypertension is on the rise, if treated rationally this disease can be overcome. Patients too need to express their interest to know more about the drugs they have been prescribed, and this can promote a safe knowledge on their illness and special care, which would improve their quality of life.

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