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A REVIEW ON ANTIHYPERTENSIVE DRUG UTILIZATION PATTERN IN CHRONIC KIDNEY DISEASE PATIENTS

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ABSTRACT

Uncontrolled hypertension and its leading cause, cardiovascular disease, are associated with an increased risk of developing chronic kidney disease (CKD). Because of the interplay between hypertension and CKD, patients with impaired renal function are at a higher risk of cardiovascular and cerebrovascular outcomes. The purpose of this study was to examine the characteristics of people with chronic kidney disease who are also hypertensive, as well as the current antihypertensive treatment pattern in CKD patients. The ESH recommended dual and triple therapy, which was prescribed. Given how hypertension and CKD interact, it is crucial to treat hypertension aggressively to improve cardio and Reno protection in these CKD patients. Antihypertensive drug use patterns among CKD patients provide an individual's BP control and related renal outcomes. In individuals with hypertension CKD, a sensible multimodal antihypertensive regimen can improve patient outcomes.

KEYWORDS: Antihypertensive, Chronic kidney disease, and Drug Use Trend, epidemiology. Drug Utilization Pattern.

INTRODUCTION

The marketing, distribution, prescribing, and use of drugs in a community, with a particular focus on the resulting medical, social, and economic consequences, as defined by the World Health Organization (WHO).[1,4] The prevalence of the non-communicable disease chronic kidney disease (CKD) is a major public and medical health concern in India.[2] Kidney damage, with or without a drop in GFR, persists for more than three months, marking this condition as distinctive. Renal impairment or not, a glomerular filtration rate (GFR) of less than 60 ml/min/1.73m 2 for three or more months constitutes chronic kidney disease.[3,17] Damage to the kidneys prevents them from performing their normal function of filtering blood. Because of this, the body retains fluid and cellular waste from the blood, which can wreak havoc on other systems.[4] Hypertension, infections, diabetes mellitus, coronary artery disease, and other comorbidities have all been linked to chronic kidney disease.[5,12,16] In patients with chronic kidney disease, hypertension is common and, if left untreated, can damage the kidneys over time. There is an increasing number of patients with hypertension in chronic kidney disease, and this condition is associated with a high risk of death. WHO recommends aiming for a BP of SBP 140 mmHg or more and DSP of 90 mmHg or more in patients with worsening hypertension and chronic kidney disease.[3] In addition to kidney disease, patients often suffer from other health problems. Patients with CKD, with or without hypertension, are advised to take antihypertensive medications due to the agents' cardioprotective and Reno protective properties.[4] The Kidney Disease Outcomes Quality Initiative (NKF KDOQI) of the National Kidney Foundation suggests a blood pressure target of 130/80mmHg.[4,6] Irrational drug use can be uncovered through the examination of prescription drug utilization patterns in each setting. To achieve the rationality of medicines, a specific method of assessment is required. As a result, the World Health Organization (WHO) has established standard measures of drug utilization in epidemiological studies of health care delivery. Using World Health Organization core drug use indicators, this study aims to assess the utilization pattern in patients with chronic kidney disease.[7] Additionally, JNC-8 offers guidance to help make certain antihypertensive medications more secure for use.[8,15] Although angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) are the most prescribed medications for controlling hypertension, other combinations of these four agents can be given to achieve the optimal goal of BP.[3,9] Hypertension in patients with CKD up to the age of 75 must be managed with ACE inhibitors and ARBs. There is no proof that renin-angiotensin system inhibitors are effective in treating

CKD in patients older than 75. The use of thiazide diuretics and calcium channel blockers to reduce blood pressure is also being considered.[8,14]

EPIDEMIOLOGY

Increasing prevalence, dismal prognosis, and prohibitively high cost of care has emerged as a major public health concern According to the World Health Organization's (WHO) Global Burden of Disease Study, kidney disease and other issues with the urinary system are thought to be responsible for close to 850,000 yearly deaths.[9] High blood pressure (BP) is common in people whose kidneys are gradually failing, and antihypertensives are used to treat this condition. In addition, hypertension is the second most common cause of CKD. It is predicted that by the year 2025, 1.56 billion people will have hypertension, up from the current estimate of over 1 million adults. Patients with hypertension who want to reduce their risk of a poor prognosis from chronic kidney disease (CKD) should have their blood pressure (BP) carefully managed.[8,13]

DISCUSSION

Study 01: **Ritika Singh *et al*., (2022**): Conducted a study in which there were a total of 178 participants in the study. The majority of the study population was between the ages of 51 and 70, and the male-to-female ratio was 1.96:1. In terms of prevalence, diabetes emerged as the most common comorbidity, followed by chronic obstructive pulmonary disease, anemia, and hypothyroidism. Stage 5 CKD was the most common, accounting for 50.56 percent of all cases, followed by stages 4 and 3. Nearly half (47%) of patients were taking two antihypertensives, with another 19.7% taking three and 17.99% taking none. When the clinical measures of the included patients were evaluated, more than half of the patients had high normal blood pressure, while about a quarter had Grade- 1 hypertension, and about 20% had Grade- II hypertension. Seventy-two patients were found to have proteinuria when checked with a dipstick. Average values for plasma urea, hemoglobin, serum creatinine, sodium, and potassium were recorded. Calcium channel blockers, beta-blockers, angiotensin receptor blockers, angiotensin-converting enzyme inhibitors (ACE inhibitors), centrally acting drugs, alpha-blockers, and diuretics were all prescribed as antihypertensive. It was discovered that beta-blockers were the most commonly prescribed antihypertensives, being given to 92.69 percent of CKD patients. The next most popular class of drugs was calcium channel blockers (67.97%), then centrally acting drugs (42.13%), then alpha-blockers (44.94%), then angiotensin receptor blockers (19.66%), then diuretics (11.23%), and finally

ACE inhibitors (3.37%). Beta-blockers like metoprolol, nebivolol, bisoprolol, and atenolol were the most commonly prescribed medications. The calcium channel blocker nifedipine was the most commonly prescribed medication, followed by amlodipine and cilnidipine. The most common ARBs and ACE-Is prescribed were telmisartan and ramipril, respectively.

Study 02: Neeta J. Kanani, *et al*., (2019): Conducted in which Male patients accounted for 185 (61.26%) of the total, while female patients made up 117 (38.74%), for a male-to-female ratio of 1.58:1. (185:117). Most patients were between the ages of 41 and 50 (34.44%), with those between the ages of 51 and 60 coming in second (33.44%). There was a mean age difference of 8.93 years or 51.78 years. In total, 2823 drug products were prescribed to patients. From 1 to 18 medications were prescribed on average throughout the course of the study, with the middle third of patients receiving between 6-10 medications, the middle third receiving between 11-15 medications, and the bottom third receiving between 1 and 5 medications. Only 0.99% of patients were given prescriptions for sixteen or eighteen drugs at a time. Drugs totaling 2823 were prescribed to 302 patients. Twenty percent of all drugs prescribed were in the class known as antihypertensive. Diuretics accounted for the largest share of this class of medications (8.11%), followed by calcium channel blockers (4.9%), centrally acting agents (4.96%), nitrates (2.09%), beta-blockers (1.63%), and angiotensin-converting enzyme inhibitors (0.7%).

Study 03: Amish Uprety *et al*., (2019): Conducted a study in which seventy hypertensive patients were enrolled during the study's period. Among the total number of patients, there were 32 (52.8%) women and 38 (54.2%) men. Thirty-seven (52.8%) of the 50 patients were between the ages of 41 and 60, 17 (24.2%) were between the ages of 61 and 80, and 12 (17.1%) were between the ages of 21 and 40. The subjects' average ages were 52.08 and 15.14 years old. Thirteen patients (18.5%), including eight (61.5%) men and five (38.5%) women, were nonsmokers. Fourteen patients (20%), including eight (57.1%) men and six (42.8%) women, were nonalcoholic. There were 23 patients in total (32.8% of the sample), 19 of whom were men (82.6%) and 4 of whom were women (917.3%), who were discovered to have both tobacco and alcohol use habits. Twenty individuals have had no reported habits. From the analysis of 70 patients, it was found that 55.7% had taken two anti-hypertensive medications, followed by 25.7% who took between one and three medications, and 5% who took between four medications. Amlodipine (CCB) was the most commonly prescribed antihypertensive drug (80%), followed by furosemide (loop diuretic) (48.5%), metoprolol

(beta blocker) (31.4%), cilnidipine (CCB) (11.4%), torsemide (diuretic) (5.7%), telmisartan (ARB) (5.7%), losartan (ARB) (2.8). Five of the 70 hypertensive CKD patients in the study had severe hypertension requiring intensive anti-hypertensive therapy with more than one antihypertensive agent, thirteen had moderate hypertension requiring pharmacological intervention, and the remaining 32 had blood pressure under control. Sixty-two patients, or 60%, were in stage 5, with 26 (61.9%) being male and 16 (38.09%) being female out of the total 70. There were 13 people in stage 4 (18.5%), with 6 men (46.1%) and 7 women (53.85%). The percentage of patients in stage 3 was 18.5%, with 4 (30.7%) being male and 9 (69.5%) being female. 2 male patients, 1 in stage 1, and 1 in stage 2, both of whom were diagnosed as having cancer.

Study 04: **Latha Kamath *et al.*, (2018)** conducted a study in which during the 6-month study period, the prescription data of 120 CKD patients were analyzed. Only 22 (18.3%) of the 120 patients studied were female. There were more men than women involved in the study. The majority of CKD patients were middle-aged (41.7%), with a mean age of 47.56 years, the majority of patients were also in stage 4 or higher of the disease. Hypertension (40%) and the combination of hypertension and diabetes (7.5%), both common in CKD patients, were the most common comorbidities. Anti-hypertensive class of drugs was commonly prescribed class drugs (39.9%), in which the diuretics were n=51(8.28%), calcium channel blockers n=111(18.02%), CCB+BB n=0(0%), beta-blockers n=17(2.76%), alpha-blockers n=26(4.22%), ACE inhibitors n=3(0.49%), ARBs n=2(0.32%), ARB+DU n=0(0%), others (Nitrates, ARB+CCB, ACE inhibitors + diuretics) n=36(5.84%). Analysis of prescription data revealed an average of 2.05 antihypertensive medications per prescription.

Study 05: Pavitra R Y *et al.*, (2014): Conducted a study in which Researchers looked at the medical histories of 120 people with hypertension, 54 (45%) had diabetes, while 66 (55%) did not. The ratio of male to female patients was 74 to 26, and 30% were between the ages of 51 and 60 while 27% were between the ages of 61 and 70. Two-drug combinations were prescribed to 66.6% of diabetic hypertensive patients, and three-drug combinations were prescribed to 30%. Two of the most common combinations were cilnidipine and torsemide (52%), amlodipine and furosemide (28%), and metoprolol and cilnidipine (11%). Among the top three drug combinations used, metoprolol + cilnidipine + prazosin (62%) and Metoprolol + torsemide + prazosin (25%) was the most common. Metoprolol + furosemide + prazosin (45%) and Cilnidipine + torsemide + prazosin (33%), as well as amlodipine + furosemide

(46%), metoprolol + torsemide (33%), were the most common triple-drug combinations for nondiabetic hypertensives.

CONCLUSION

To improve cardio and renoprotection in these CKD patients, it is crucial to manage hypertension aggressively given how hypertension and CKD interact. A better understanding of the state of BP management and associated renal outcomes in CKD patients can be gained from the antihypertensive drug usage patterns among these individuals. The ESH (Environment, health and safety) recommended dual and triple therapy, which was prescribed. In this health center, some therapeutic reasoning is highlighted by this study. Yet, educating prescription writers specifically and disseminating treatment recommendations could promote sensible medication usage and adherence to recommendations. Patients with hypertension CKD may benefit from a sensible multimodal antihypertensive regimen for better patient outcomes.

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