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PREVALENCE OF KIDNEY DISEASE IN HYPERTENSIVE PATIENTS AND PRESCRIBING PATTERN OF ANTIHYPERTENSIVES IN KIDNEY DISEASE PATIENTS

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ABSTRACT

Kidney disease is a decrease in the kidney's ability to remove waste and may have an impact on the other functions of the kidney. Hypertension is one such contributing risk factor, and is said to be very frequent in patients with renal disease and progresses with time. This study was aimed to assess the prevalence of kidney disease in hypertensive patients and prescribing patterns of antihypertensive in kidney disease based on the staging of hypertension and CKD on their respective scales. A prospective type of observational study was conducted among 130 hypertensive subjects in a follow-up tertiary care hospital for a period of six months. The information was taken down on data collection forms and were analyzed using statistical software. Out of 130 patients screened, the age was between18-80years, and 91 were males and 39 were females. The overall prevalence of kidney disease in hypertensive patients was found to be 68.4% among them males were 61.75% and females were 38.2%.The antihypertensive prescribed the most were CCB's 73(27.97%), loop diuretics 70 (26.82%), beta-blockers 42 (16.09%).The study concludes that the prevalence of kidney disease is significant in hypertensive patients' i.e. 68.4%.

KEYWORDS: ACE- Angiotensin-converting enzyme,CKD- chronic kidney disease, CCB- calcium channel blockers, AKI-Acute kidney injury, ARB- Angiotensin II receptor blockers.

INTRODUCTION

Kidney disease is a global health issue, and its consequences are a major source of worry for the global population. Renal dysfunction affects around 11% of the US population, with many instances going undiagnosed.[1] As long as kidney disease gets worse, accumulation of wastes can build up toxins in blood. The measurement of creatinine clearance has long been regarded the gold standard for assessing renal function. Filtration, secretion, and reabsorption, as well as metabolic and endocrine activities, are all part of renal function.[2,3] The prevalence of CKD was 13.4%, with a pooled prevalence of CKD among patients with hypertension being greater than the overall population (24.7%).[4] Hypertension affects about one out of every seven patients, and roughly one out of every five people, or 20%, has CKD. 13 percent of adults in the United States are black or African American.[5]

MATERIAL AND METHODS

The aim of the study is to assess the prevalence of kidney disease in individuals with hypertension and antihypertensives prescription pattern in kidney disease.

Study population The study includes 130 patients.

Study type It is a prospective observational study for six months at a tertiary care hospital (Yashoda hospital, Secunderabad).

Study material Case sheets, lab results, and medical history records were used to gather the necessary information.

Inclusion criteria The age group above 18 years with hypertension using antihypertensive drugs, co morbidities.

Exclusion criteria Subjects under the legal supervision of a caretaker, below 18 years, serious psychological disorders, a history of trauma, or surgery that lasted fewer than 90 days, pregnant and lactating women.

Software used Graph Pad Prism version 6.The data is represented with graphs, charts, and descriptive analysis using chi-square, t-test.

RESULTS

The sampled population consisted of 130 patients with hypertension from a tertiary care hospital. Among 130 hypertensive patients, there were 91 males (70%) and 39 females (30%) (Figure 1); 77(59.2%) from urban and 53(40.7%) rural, 22 were in the pre-hypertension phase, 46 were in stage 1 and 62 in stage 2 hypertension phase (Figure 3). The median range of age of the patients was 44 years (18-80) years. Out of 130 hypertensive patients, 89 (86.4%) patients have kidney disease, among them 55(61.8%) were male and 34(38.2%) were female. Out of 77 urban hypertensive patients, 51(66.2%) have kidney disease and out of 53 rural hypertensive patients, 38(71.6%) have kidney disease.

The prevalence of kidney disease in hypertensive patients was 68.4%.

The prevalence of kidney disease in hypertensive males was 61.7% and in females was 38.2%.

Table 1: Gender distribution of hypertensive patients.

Particulars		Numbers		Percentage	
No. of hypertesive patients		Male	Female	Male	Female
130		91	39	70%	30%
Urban	77	47	30	61.03%	38.90%
Rural	53	40	13	75.47%	24.50%
Kidney disease	89	55	34	61.80%	38.20%
Kidney disease					
89		55	34	61.80%	38.20%
Urban	51	30	21	58.80%	42.20%
Rural	38	25	13	65.70%	34.20%

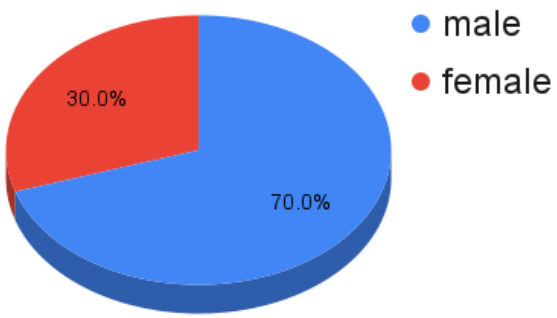

Figure 1: Distribution of study population based on gender.

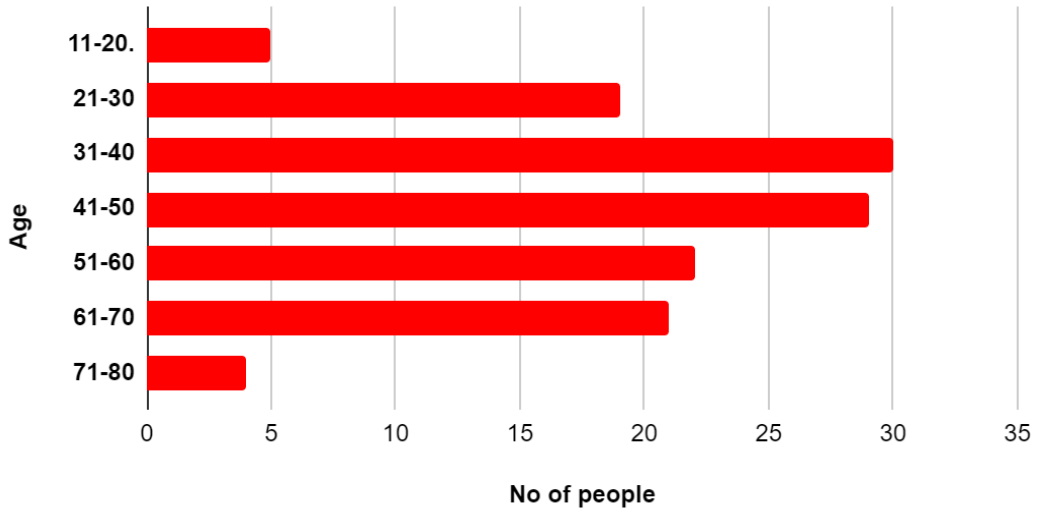

Figure 2: Distribution of study population based on age.

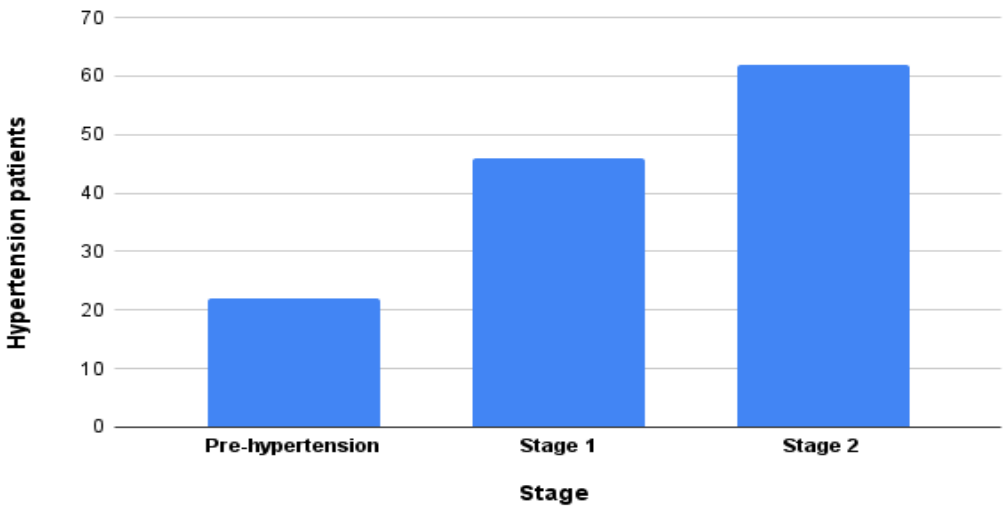

Figure 3: Stages of hypertension in study population

Out of 22 pre-hypertensive patients, 46 stage-1 hypertensive patients, and 62 stage-2 hypertensive patients, 15, 37, and 37 patients respectively have kidney disease (figure 4). Out of 89 kidney disease patients, 71(78.9%) patients have CKD, 11(12.4%) patients have AKI, and 7(7.9%) patients have other kidney diseases such as glomerulonephritis, NSAID induced renal failure, diabetic nephropathy, lupus nephritis, interstitial nephritis, pyelonephritis, diabetic kidney disease (figure 5). 31(34.8%) patients have a creatinine range between 7.1 to 10.0 mg/dL, 21(23.5%) patients have a creatinine range between 5.1 to 7.0 mg/dL, 11(12.3%) patients have creatinine range between 10.1-20.0 mg/dL, and 8(8.9%) patients have creatinine range between 2.1 to 5.0 mg/dL (figure 6).

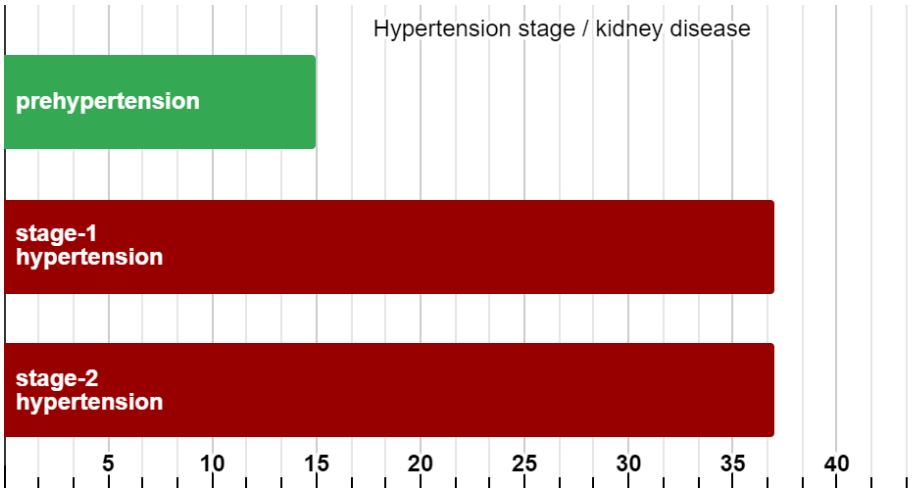

Figure 4: Stages of hypertension in kidney disease patients.

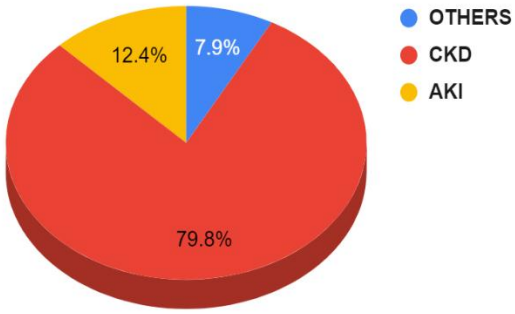

Figure 5: Type of kidney disease in study population.

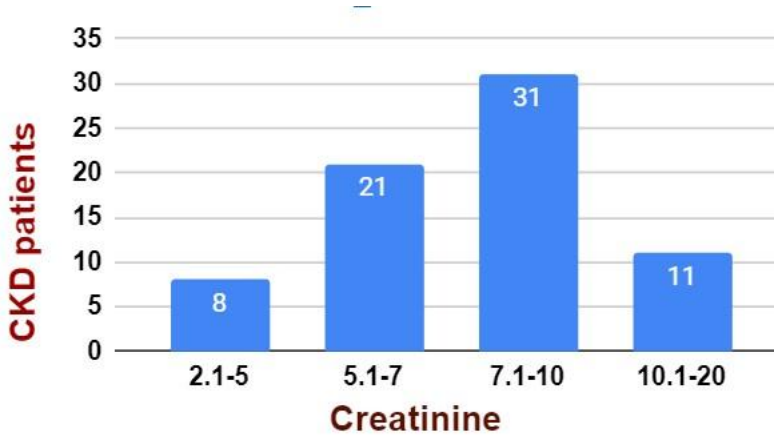

Figure 6: Distribution of CKD patients based on creatinine range

Out of 130 hypertensive patients, 38 are smokers, 67 are alcoholics, 9 have a habit of taking tobacco, 2 patients take gutka, 3 patients take toddy, 6 have a history of NSAIDs usage, 2 patients take herbal medicines (figure 7). 13 patients have mild anemia, 61 patients have moderate anemia, 12 patients have severe anemia, 13 patients have thrombocytopenia, 15 are hyperkaliaemic and 5 are hypokalaemic, 67 patients have hypoalbuminemia, 12 patients have proteinuria, 41 patients have albuminuria, 22 patients have haematuria (table 2). Out of 71 CKD patients, 66 are in CKD stage-V, and 4 patients are in CKD stage IV.

The prevalence of anemia in hypertensive kidney disease patients is 96.6%, hypoalbuminemia 75.2%, and albuminuria 46.06%.

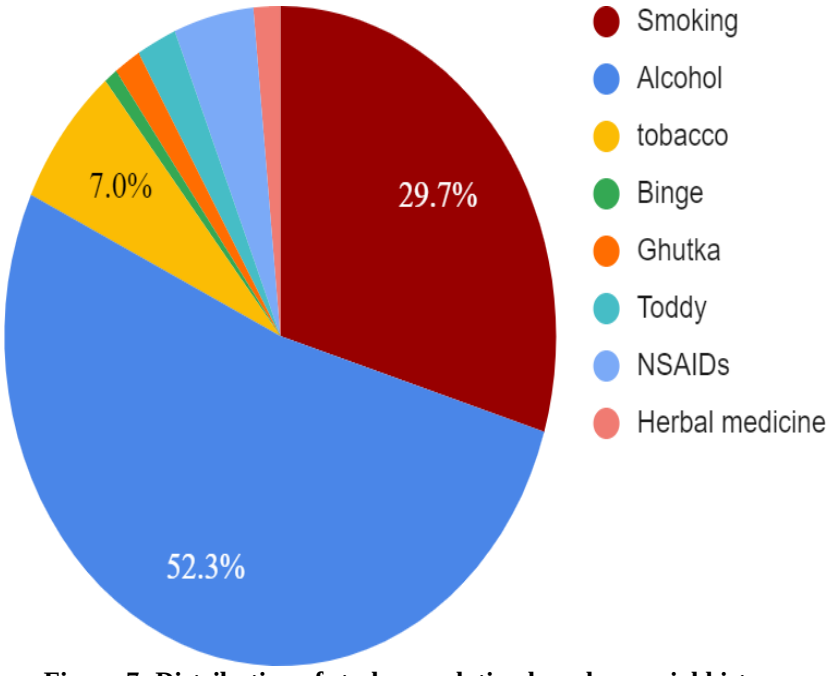

Figure 7: Distribution of study population based on social history

Table 2: Kidney disease in smokers and non-smokers.

	kidney disease	No kidney disease	total	p value
smoker	22	67	89	1.56
non smoker	15	26	41	
total	37	93	130	

P value calculated by chi-square test

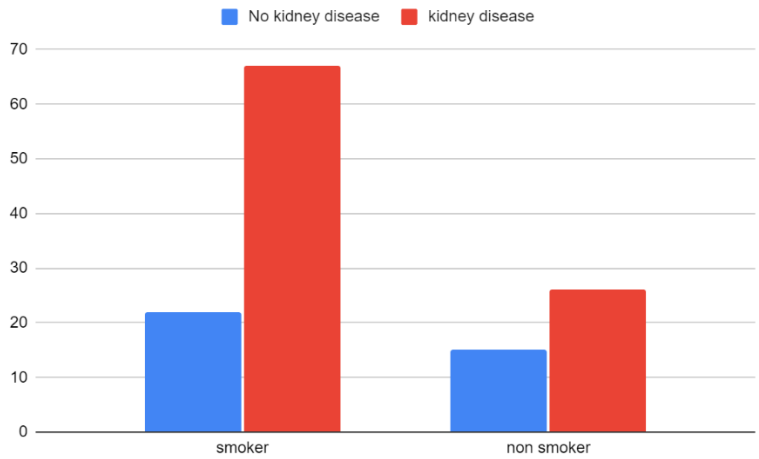

Figure 8: kidney disease in smokers and non-smokers.

It indicates statistically no significant association between kidney disease and smoking

Out of 89 kidney disease patients, 28 patients are treated with dual drug therapy, 26 patients are treated with triple-drug therapy, 16 patients are treated with quadruple drug therapy, 10 Patients are treated with monotherapy, and 9 patients are treated with more than four drugs (Figure 9). Out of all classes of drugs, the most commonly used drugs are CCBs i.e., 73(27.97%) followed by loop diuretics 70(26.82%), beta-blockers 42(16.09%).

Table 3: Gender distribution based on age and kidney disease.

Particulars	**Numbers**		**Percentage**	
Gender distribution				
Number of male patients	55		61.80%	
Number of female patients	34		38.20%	
Based on age	Male	Female	Male	Female
0-19	2	3	3.63%	9%
20-29	8	4	14.54%	11.76%
30-39	8	10	14.54%	29.41%
40-49	13	4	23.63%	11.76%
50-59	12	5	21.81%	14.70%
60-69	7	7	12.72%	20.50%
70-79	4	1	7.27%	2.94%
80-89	1	0	1.81%	0
Based on comorbidity of HTN and kidney disease	Male	Female	Male	Female
Kidney disease	55	34	60.40%	87.17%
Non kidney disease	36	5	39.56%	12.82%

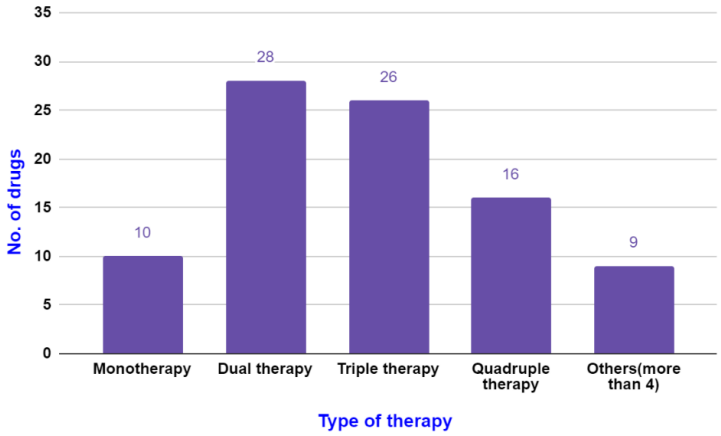

Figure 9: Type of therapy.

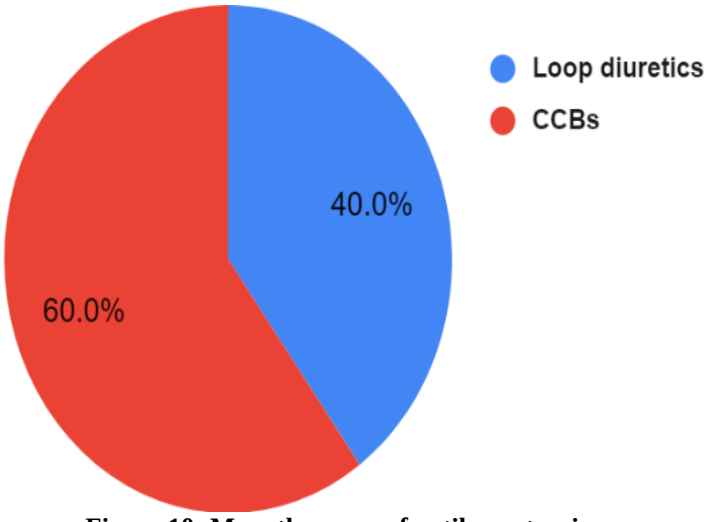

Figure 10: Monothearapy of antihypertensives

Table 4: Dual therapy of anti-hypertensives.

Class	No of Drugs
CCBs+Beta blockers	5
CCB+Loop diuretics	11
CCB+Central sympatholytic	2
ARBs+Loop diuretics	1
Beta blockers+Loop diuretics	4
CCBs+ARBs	1
Loop diuretics+Vasopressin antagonist	1
CCBs+Alpha blockers	1
CCBs+Alpha and beta blockers	1
Loop diuretics+Alpha blocker	1

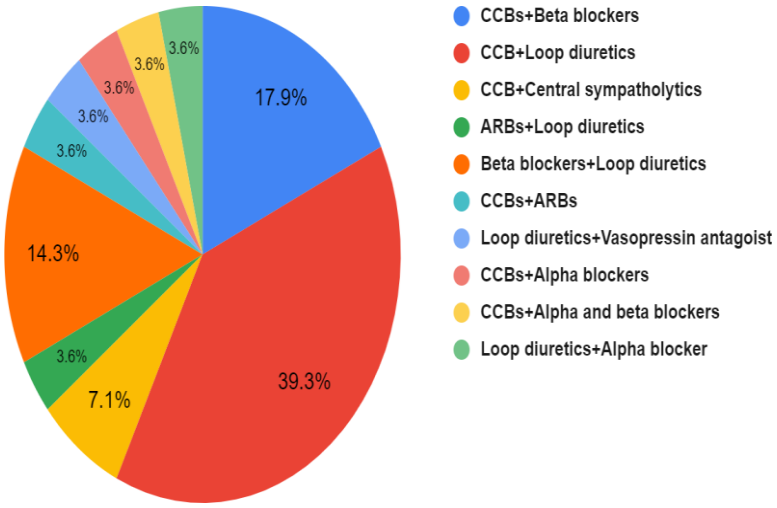

Figure 11: Dual therapy of antihypertensives

Table 5: Triple therapy of anti-hypertensives.

Class	no. of drugs
CCBs+Betablockers+Loop diuretics	17
CCBs+Loopdiuretics+Alpha and beta blockers	1
CCBs+Loopdiuretics+Central sympatholytic	1
CCBs+Loopdiuretics+Diuretics	1
Loop diuretics+Alphablockers+Central sympatholytic	1
Beta blockers+Loopdiuretics+Central sympatholytic	1
CCBs+Alpha and beta blocker+Loop diuretics	1
CCBs+Loopdiuretics+Alpha and beta blocker	1
ARBs+Centralsympatholytic+Diuretics	1
Beta blockers+Alphablocker+Loop diuretics	1

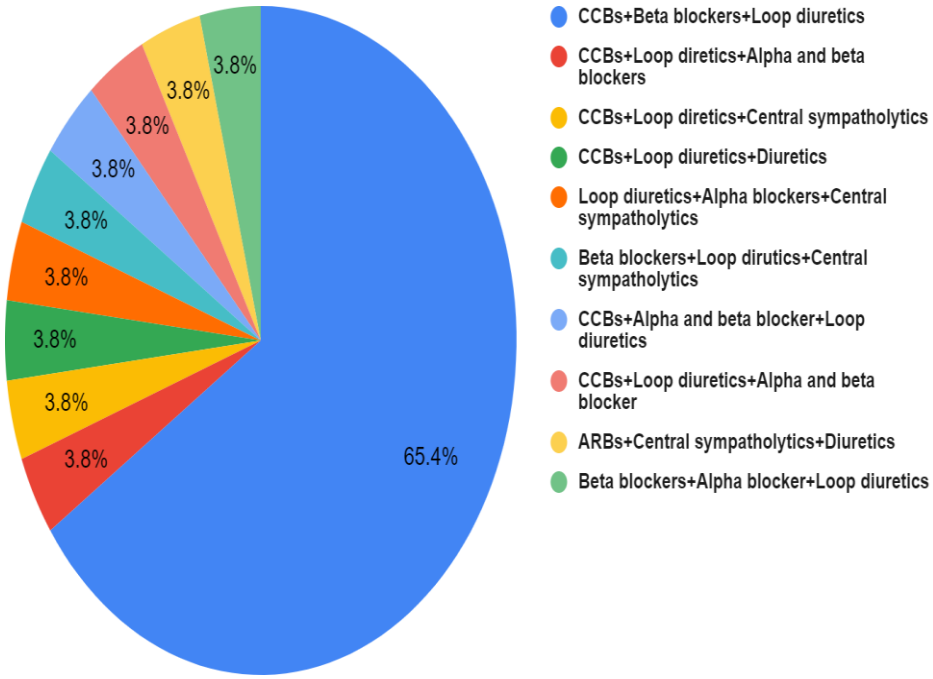

Figure 12: triple therapy of antihypertensives.

Table 6: Quadruple therapy of anti-hypertensives.

Class	no. of drugs
CCB+Betablocker+Loop diuretic + Central sympatholytic	7
CCB+Loopdiuretic+Central sympatholytic +Alpha and beta blocker	2
CCB+Alphablocker+Centralsympatholytic+Beta blocker	1
CCB+ARB+Loopdiuretic+ACEI	1
Loop diuretic+Alphablocker+Centralsympatholytic+Diuretic	1
Loop diuretic+Alphablocker+Centralsympatholytic+Alpha and beta blocker	1
CCB+Betablocker+Alphablocker+Central sympatholytic	1
CCB+Alpha and beta blocker+Alphablocker+Central sympatholytic	1
CCB+Loopdiuretic+Alphablocker+Vasodilator	1

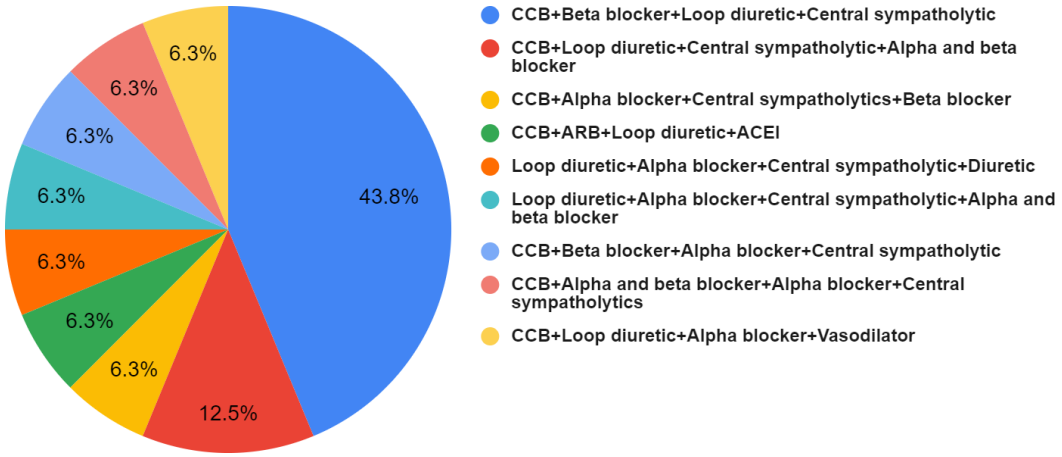

Figure 13: Quadruple therapy of antihypertensives

Table 7: Others (more than 4) antihypertensives.

Class	no. of drugs
CCB+Betablocker+Loopdiuretic+Centralsympatholytic+ACEI	1
CCB+Loopdiuretics+Alphablocker+Centralsympatholytic+Alpha and beta blocker	1
CCB+Betablocker+Loopdiuretic+Centralsympatholytic+Diuretic	1
CCB+Loopdiuretic+Alphablocker+Centralsympatholytic+Alpha and beta blocker	2
CCB+Betablocker+ARB+Loopdiuretic+Alphablocker+Central sympatholytic	1
CCB+Betablocker+Loopdiuretic+Alphablocker+Centrasympatholytic+Vasodilator	1
CCB+Alpha and beta blocker+ARB+Loop diuretic +Alpha blocker+Vasodilator+Diuretic	1
CCB+Betablocker+Loopdiuretic+Alphablocker+Centralsympatholytic+Vasodilator+Diuretic	1

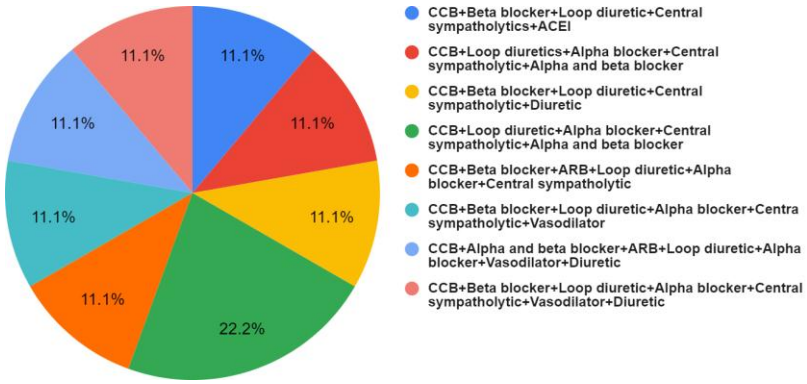

Figure 14: others (more than 4) antihypertensives

Table 8: List of drugs.

Drug name	No. of drugs
Nifedipine	63
Amlodipine	5
Cilnidipine	3
Benidipine	1
Diltiazem	1
Metoprolol	42
Telmisartan	5
Olmesartan	1
Furosemide	63
Torsemide	7
Prazosin	13
Moxonidine	3
Clonidine	27
Dihydralazine	2
Isosorbide mononitrate	1
Nitro-glycerine	1
Enalapril	2
Carvedilol	12
Metolazone	5
Hydrochlorothiazide	1
Tolvaptan	1

Table 9: Various classes of drugs.

Drug name	Count	Percentage
CCBs	73	27.97%
BB	42	16.09%
ARBs	6	2.30%
loop diuretics	70	26.82%
alpha blockers	16	6.13%
Central sympatholytic	29	11.11%
Vasodilators	4	1.53%
ACEI	2	0.77%
Alpha and beta blockers	12	4.60%
diuretics	6	2.30%
vasopressin antagonist	1	0.38%

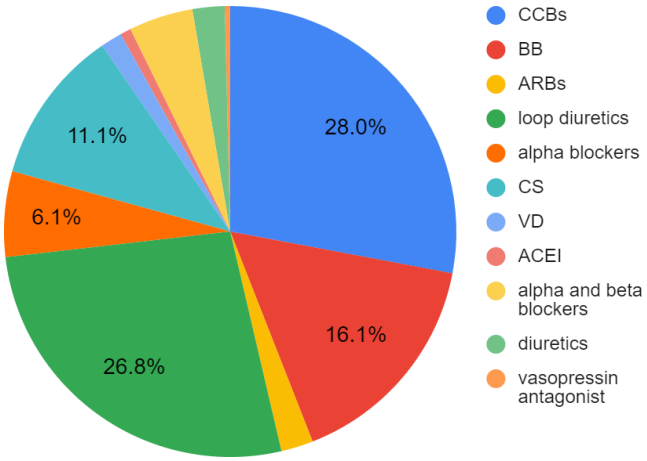

Figure 15: Various classes of antihypertensives.

DISCUSSION

Our study findings were higher than the study conducted in Ghana (46.9%) Osafo, C et al.6On the other hand, from the previous study, the settings were polyclinic and 9 times more likely to develop chronic kidney disease among adult hypertensive patients as compared to their counterparts. This result is similar to a study conducted in Accra,Nigeria. The prevalence of CKD was found to be around 78.9% among the patients compared with the prevalence of kidney disease in our study results in lesser findings i.e. 68.4% and majority of antihypertensives used are loop diuretics and then calcium channel blockers, AntenehHunegnaw et al. 2020.7.

According to this study, proteinuria was associated with chronic kidney disease among adult hypertensive patients, which showed that patients with proteinuria were 4.59 times more likely to develop chronic kidney disease in comparison. This finding is similar to a study conducted in Ethiopia.

CCBs are the most often utilized medicines in our study, accounting for 73 percent (27.97 percent), followed by loop diuretics (70 percent) (26.82 percent),this finding is comparable to study conducted in which majority of antihypertensives used are loop diuretics and then calcium channel blockers. Prabitha P et al. 2019.

From the results observed, the monotherapy of antihypertensives included either only loop diuretics or only CCBs, the dual therapy of antihypertensives included CCB + Loop diuretics mostly. CCBs +Beta blockers +Loop diuretics constitute the mostly used triple therapy and CCBs+ Beta-blockers + Loop diuretics +Central sympatholytic constitute the widely used quadruple therapy.

CONCLUSION

The study concludes that the prevalence of kidney disease is much more clinically significant in hypertensive patients and found to be 68.4%. occurrence along with anaemia, albuminuria, and proteinuria are also more prevalent. Antihypertensive drugs like calcium channel blockers and loop diuretics are used to control blood pressure, most CKD patients with hypertension are in stage 5.Proper guidance and counseling can lead to better management of hypertension as well as hypertension induced kidney diseases.

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