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RESEARCH ARTICLE

A RETROSPECTIVE OBSERVATIONAL STUDY ON THE PRESCRIPTION PATTERN AMONG CHRONIC KIDNEY DISEASE

[1]Devika, S., [2]Jyothy, A., [3*]Sharon Emilia James, [4]Dr. Akhila, S. and [5]Dr. Anitha Mary Mathews

[1,2,3]Pharm, D Interns, KVM College of Pharmacy, Kokkothamangalam, Cherthala, Kerala, India
[4]Assisstant Professor, Department of Pharmacy Practice, KVM College of Pharmacy, Kokkothamangalam, Kerala, India; [5]Associate Professor, Department of Pharmacy Practice, KVM College of Pharmacy, Kokkothamangalam, Cherthala, Kerala, India

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**Corresponding Author:*
Sharon Emilia James

ABSTRACT

Chronic Kidney Disease (CKD) is defined by a reduction in the glomerular filtration rate (GFR) and/or urinary abnormalities or structural abnormalities of the renal tract.Objective of the study was to analyse the prescription pattern among patients with chronic kidney disease. A retrospective observational study was conducted over a period of six months in a tertiary care hospital. A total of 100 patient case records satisfying the inclusion criteria were analysed. Case records were retrospectively reviewed for the demographic data, clinical presentation, investigational management and outcomes. Data analysis were conducted using Microsoft Excel 2010, SPSS (Version 1.0.0.1406). There were more male patients (67%) as compared to the female patient (33%) and majority of the patients were in the age group of 61-80 years (49%).The number of patients were greater in the stage 5(67), followed by stage 4 (25). This study reveals that hypertension is the most diagnosed comorbidities in both male and female patients, followed by diabetes mellitus. The average number of drugs per prescription was 16.67, the percentage of drugs prescribed by generic name was 6.67%, percentage of drugs prescribed from national essential drug list was 72.04%, percentage of prescriptions with injection(s) prescribed was 99% and percentage of prescriptions with antimicrobial(s) was found to be 69%.

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INTRODUCTION

Chronic Kidney Disease (CKD) is defined by a reduction in the glomerular filtration rate (GFR) and/or urinary abnormalities or structural abnormalities of the renal tract.

The different stages of CKD according to their GFR -
Stage 1 with normal or high GFR (GFR > 90 ml/min)
Stage 2 Mild CKD (GFR = 60-89 ml/min)
Stage 3 Moderate CKD (GFR = 30-59 ml/min)
Stage 4 Severe CKD (GFR = 15-29 ml/min)
Stage5 End Stage CKD (GFR <15 ml/min)

CLINICAL MANIFESTATION

The onset of symptoms is slow and insidious in CKD so that patients may not realise that they are unwell. It is not uncommon for patients to present in end stage renal disease and require immediate dialysis at their first contact with the medical profession. The clinical features of CKD include

- **Hypertension and fluid overload:** Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Most patients with CKD will have hypertension and this may be a cause or a consequence (or a combination of both) of their kidney disease. Furthermore, raised blood pressure may exacerbate renal damage and lead to accelerated deterioration of CKD.

Severe renal impairment leads to sodium retention, which in turn produces circulatory volume expansion with consequent hypertension. Lesser degrees of renal impairment reduce kidney perfusion, which activates renin production, with subsequent angiotensin-mediated vasoconstriction. Fluid retention can manifest as peripheral and pulmonary oedema and ascites.

Uraemia: Many substances including urea, creatinine and water are normally excreted by the kidney and accumulate as renal function decreases. Some of the substances responsible for the toxicity of uraemia are phosphate, guanidine, phenols and organic acids. The symptoms of uraemia include anorexia, nausea, vomiting, constipation, foul taste, pruritis and skin discolouration.

Anaemia: Anaemia is a condition in which the number of red blood cells or the haemoglobin concentration within them is lower than normal. This results in symptoms such as fatigue, weakness, dizziness, breathlessness at rest and on exertion, lethargy, angina, feeling cold, poor concentration, reduced appetite, tachycardia and palpitations. Anaemia is a common consequence of CKD and affects most people with CKD stages 4 and 5. The fall in haemoglobin level is a slow, insidious process accompanying the decline in renal function. A normochromic, normocytic pattern is usually seen with haemoglobin levels falling to around 8g/dl by end stage renal disease.

Electrolyte disturbances: Kidneys play a crucial role in the maintenance of volume, extracellular fluid composition and acid–base balance, damage in the kidney results in disturbances of electrolyte levels. Sodium -Serum sodium levels can be relatively normal even when creatinine clearance is very low. However, patients may exhibit hypo- or hypernatremia depending upon the condition and therapy employed. Potassium- Potassium levels can be elevated in CKD. Potassium levels of over 7.0mmol/L are life-threatening and should be treated as an emergency. Hyperkalaemia may be exacerbated in acidosis as potassium shifts from within cells. Hydrogen ions- Hydrogen ions (H+) are a common end-product of many metabolic processes and about 40–80mmol are normally excreted via the kidney each day. In renal failure, H+ is retained, causing acidosis. The combination of H+ with bicarbonate (HCO_3^-) results in the removal of some hydrogen as water, theelimination of carbon dioxide via the lungs, and a reduction in serum bicarbonate level.[2]

PATHOPHYSIOLOGY OF CHRONIC KIDNEY DISEASE

Progression of kidney disease to ESRD generally occurs over months to years and is assessed by the rate of decline in eGFR. Progressive loss of nephron function results in adaptive changes in remaining nephrons to increase single nephron e GFR. Over time, the compensatory increase in single nephron eGFR leads to hypertrophy and an irreversible loss of nephron function from sustained increase in glomerular pressure. Glomerulosclerosis (glomerular arteriolar damage) develops from prolonged elevation of glomerular capillary pressure and increased glomerular plasma flow leading to a continuous cycle of nephron destruction. Regardless of the cause, a predictable and continuous decrease in kidney function occurs in patients when eGFR drops below a critical value, to approximately one-half of normal. The rate of decline remains fairly constant for an individual, but can vary substantially among patients and disease states.[3]

TREATMENT

- **TREATMENT OF DIABETES MELLITUS IN CKD**

As diabetic kidney disease progresses, the requirements for insulin to maintain glycemic control diminish as renal metabolism and excretion of insulin concomitantly and progressively decreases. Thus, the three mainstays of optimal DKD treatment are:

- Strict glycemic control
- Tight BP control
- Intensive therapy including insulin and oral hyperglycemic agent reduces the microvascular complication like nephropathy.

Therapeutic targets

HbA1C - <7% (estimated average glucose ,154mg/dl)
BMI - 18.5-24.9kg/m²

TREATMENT OF HYPERTENSION IN CKD: The Seventh Report of the Joint National Committee (JNC7) issued a set of compelling indications for the treatment of hypertension, which should also be followed in CKD patients. KDOQI guidelines propose a pre dialysis blood pressure of <140/90mmHg and a post dialysis blood pressure of <130/80mmHg. ACEI ARBs, dihydropyridines calcium channel blocker are the preferred agents. Modification of lifestyle and dietary interventions should always be enforced in hypertensive CKD patients. Sodium restriction can produce substantial BP, reductions and primarily entails reducing the intake of "salty" processed foods.

Therapeutic targets:

BP 130/80mmHg - CKD without proteinuria
BP 120-129/75-79mmHg - CKD with proteinuria
FIRST LINE AGENTS:
GFR (20ml/min/1.73m²) - ACEI or ARB
SECOND- AND THIRD-LINE AGENTS:
GFR≥40mL/min/1.73m² - Add thiazide diuretics and/or CCB, if anti-RAAS agent is first line.
GFR<40ml/min/1.73m² - Add loop diuretics eg: bumetanide or furosemide (twice-daily dosing) and / CCB, if anti-RAAS agent started as first line therapy.

FOURTH-LINE AGENTS

HR>80bpm - Beta blocker or alpha/ beta blocker HR≤80bpm - Consider adding ARA (Spironolactone or eplerenone), if proteinuria present

•Sodium: intake >100 mEq/day and/or ineffective diuretic treatment are common causes of" resistant" HTN. High sodium intake reduces effectiveness of antihypertensive therapies and is determined best by a 24-h urine sodium collection. AHA sodium limit is 1500 mg/day.

•Loop diuretics should be generally be used twice daily, in the morning and in the mid- to late-afternoon. Once daily dosing is often ineffective due to compensatory stimulation of the RAAS with sodium retention. Thiazide diuretics are generally ineffective, if SCr is >1.7 mg/dl or eGFR is < 40 ml/min/1.73 m². Metolazone: 5-20mg/d may be effective at these lower GFR levels due to its greater potency relative to thiazide-type diuretics.
•Sympathomimetic agents (pseudoephedrine, diet pills, cocaine) and NSAIDS (COX-1/2 and selective COX-2 inhibitors) may aggravate HTN.

TREATMENT OF ANEMIA IN CKD: Iron Ferrous sulphate: 200 mg elemental iron/24-h (alternative- ferrous fumarate). Iron dextran: 500–1000 mg iv infusions of low molecular weight iron dextran. Iron sucrose: 100–200 mg iv infusions in non-dialysis-dependent CKD. Ferumoxytol : 500–1000 mg iv in non-dialysis-dependent CKD. Parenteral iron is contraindicated during active infection. Epoetin alfa: 10–40,000 Units, subcutaneously, q1–4 wks; begin therapy at Hb <10g/dl at starting dose- 100 Units/Kg/wk. Darbepoetin alfa 40-300 mcg, subcutaneously, q2-4wk or q1month; begin therapy at Hb < 10g/dl at starting dose- 0.9mcg/kg/q² week. ESAs are contraindicated during acute blood loss.

TREATMENT OF CAD IN CKD: The mainstay of medical management of CVD is therapy with Aspirin, Statins, ACE inhibitors or Angiotensin receptor blocker (ARBs) and beta blockers. STEMI patients with CKD received thrombolytic therapy. Aspirin, beta-blockers, angiotensin-converting enzyme inhibitors, glycoprotein IIb/IIIa receptor antagonists and thrombolytic therapy has been observed in CKD patients due to concerns of bleeding risk, worsening of renal function, and comorbidities. A fixed dose combination reduces the need for multiple drugs and increases the patient's compliance[4]. Antibiotic resistance possesses a significant threat to global public health and was given special mention as a serious threat to public health, economic growth and global economic stability. The creatinine clearance of each patient was calculated prior to the provision of antibiotics by applying the following formula:

ClCr (ml/minutes) = ([140−age] body weight)/(72 × SCr)

where SCr- serum creatinine concentration of the patient with CKD.[5]

MATERIALS AND METHOD

A retrospective study was conducted among the in-patients admitted to SH Medical Centre hospital, a tertiary care hospital in Kerala, India. The patient who was 18 years and above admitted in the general medicine department were collected of patients having CKD stage 3 to 5. Data such as age, gender, diagnosis, grade/stage of disease and provision was given in the format to enter laboratory investigations like BP, pulse rate, RBC count, Hb count, MCV, MCH, MCHC, PCV, TLC, platelet count, ESR, CRP, RBS, FBS, HbA1C, differential counts, blood urea, serum creatinine and urine routine examination was collected to data form. Drugs used, dose, frequency and duration of treatment also was collected. This data in this study belongs to patients who have already been discharged and which was collected at the end of the treatment, so this study is not in a violation of the rights and interests of the participants and has little impact on their mental or physical health. The study was approved by the IEC of the SH Medical Centre, Kottayam. Therefore, informed consent was not required.

STATICAL ANALYSIS: A retrospective study was conducted among the in-patients admitted to hospital. The data of patients having CKD stage 3 to 5. Descriptive statistics was used to summarize variable demographic parameters and study objectives. Discrete variables were tabulated, chi square test and Z- test were used to analyze it. A p value of <0.05 was considered as significant.

RESULT AND DISCUSSION

GENDER DISTRIBUTION OF PATIENTS

Table 1.

N=100

GENDER	NUMBER	RELATIVE FREQUENCY (%)
MALE	67	67
FEMALE	33	33

The above table concludes that out of 100 patients, 67(67%) males and 33(33%) females were in the study. This may because men are at increased risk of reaching kidney failure sooner than women because of differences in hormone levels. Higher testosterone levels in men may cause a loss in kidney function and life style changes like alcoholism, smoking etc.

Gender distribution of patients

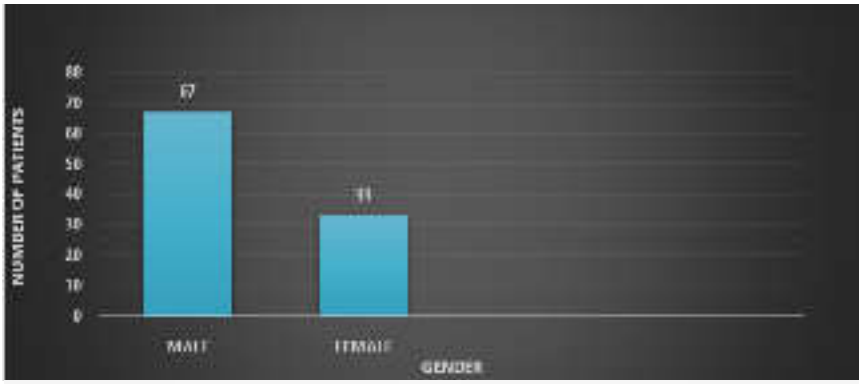

Figure 1.

AGE DISTRIBUTION OF PATIENTS

Table 2.

N=100

AGE (YEARS)	NUMBER OF PATIENTS	RELATIVE FREQUENCY (%)
18-40	2	2
41-60	36	36
61-80	49	49
>80	13	13

The above table revealed that majority of the patients, n=49 (49%) was in the group of 61-80 years, followed by 41-60 years n= 36(36%), it was similar to the study conducted by R*akshana and Preetha Selva* in which most of prescriptions were in age group of 61-80 years.

AGE DISTRIBUTION OF PATIENTS

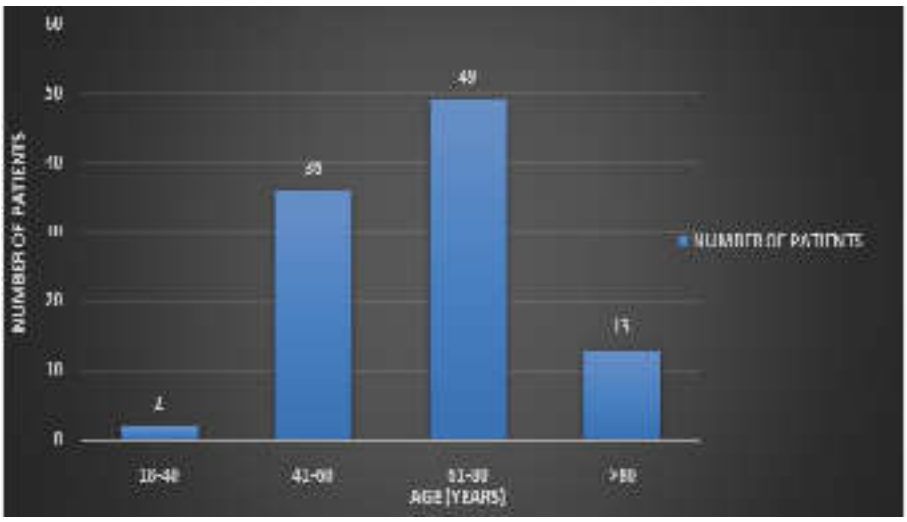

Figure 2.

DISTRIBUTION OF PATIENTS IN STAGE III, IV, V

Table 3.

N=100

STAGES	NUMBER OF PATIENTS
Stage lll	9
Stage lV	25
Stage V	67

The above table reveals that majority of the patients were in the stage 5(67), followed by stage 4 (25), this is similar to the result reported by a study conducted by *Azizah, et al* in which most of patients were in stage 5.

DISTRIBUTION OF PATIENTS IN STAGE III, IV, V

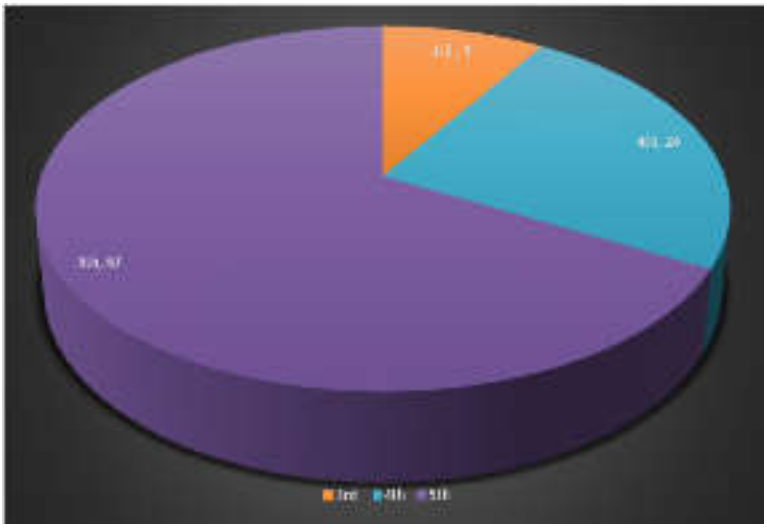

Figure 3

DISTRIBUTION OF STUDY SUBJECTS WITH THE ASSOCIATED COMORBIDITIES

Table 4.

COMORBIDITIES	NUMBER OF PATIENTS (n=460)	RELATIVE FREQUENCY (%)
Hypertension	91	19.78
Diabetes mellitus	76	16.52
Anemia	73	15.86
Infections	68	14.78
CAD	59	12.82
Hypothyrodism	8	1.74
DLP	8	1.74
Seziure	7	1.52
CLD	6	1.3
Others	64	13.9

The above table indicates that majority of the patients n=91(18.45%) were having hypertension followed by diabetes mellitus n= 76(15.41%) as comorbidities.This is in accordance with the study conducted by *Rajendra Panda, Rajashree samal, Namita Mohapatra et al (2017)* which shows hypertension as the main comorbidity. [22]

DISTRIBUTION OF STUDY SUBJECTS WITH ASSOCIATED COMORBIDITIES

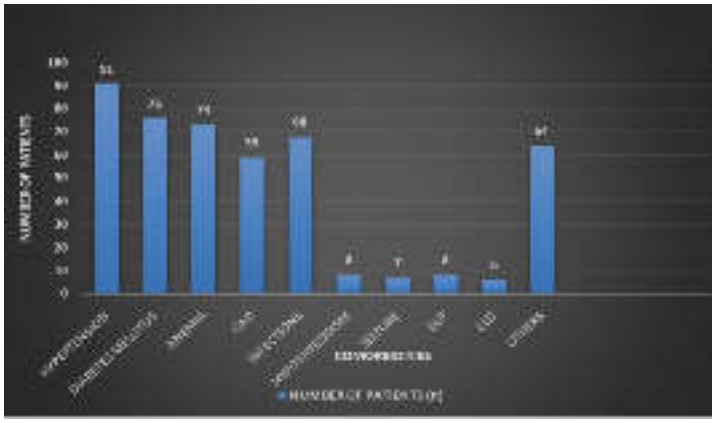

Figure 4.

ASSOCIATION OF DEMOGRAPHIC DETAILS WITH COMORBIDITIES

Table -5

Age group	Hypertension		Diabetes mellitus		Anaemia		CAD		Infection		Total		Percentage (%))	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
18-40	2	0	0	0	0	0	1	0	2	0	5	0	100	0
41-60	20	13	16	9	17	9	10	3	12	7	75	41	64.65	35.34
61-80	28	17	26	15	24	15	22	10	20	14	120	71	62.82	37.17
Greater than 80	9	2	9	1	7	1	10	3	11	2	46	9	83.63	16.36
Total	59	32	51	25	48	25	43	16	45	23	246	121	67.02	32.97
Percentage (%)	64.83	35.16	67.10	32.89	65.75	34.24	72.88	27.11	66.17	33.82	67.02	32.97		

The above table concluded that the incidence of CKD was higher in the patients of the age group of 61-80 years. In the ages between 61-80 years, the comorbidities were found to be greater in males than in females. Most of the patients were associated with more than one comorbidity when they are diagnosed with CKD.

ASSOCIATION OF DEMOGRAPHIC DETAILS WITH COMORBIDITIES

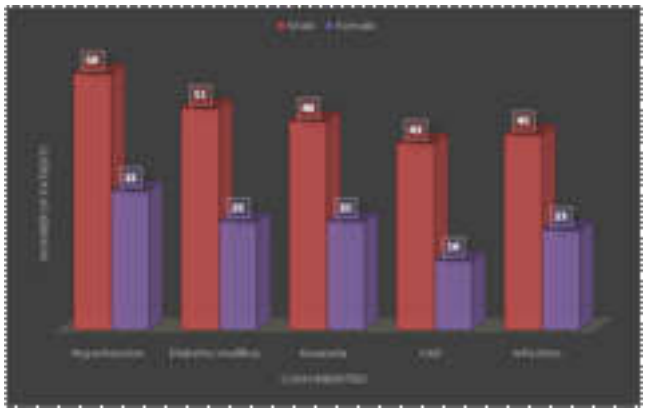

Figure 5.

ASSOCIATION OF COMORBIDITIES WITH STAGES OF CKD

Table 6

Associated Disease→ Stages of CKD ↓	Hypertension	Diabetes mellitus	Anaemia	CAD	Infection
Stage III	8	6	2	6	5
Stage IV	19	19	18	15	18
Stage V	64	51	53	38	45
Total	91	76	73	59	68
Percentage	91%	76%	73%	59%	68%

In stage III, the study population is less affected with various comorbidities. But there is a drastic increase in the comorbidities as the patients reach stage V.

Association of comorbidities with stages of CKD

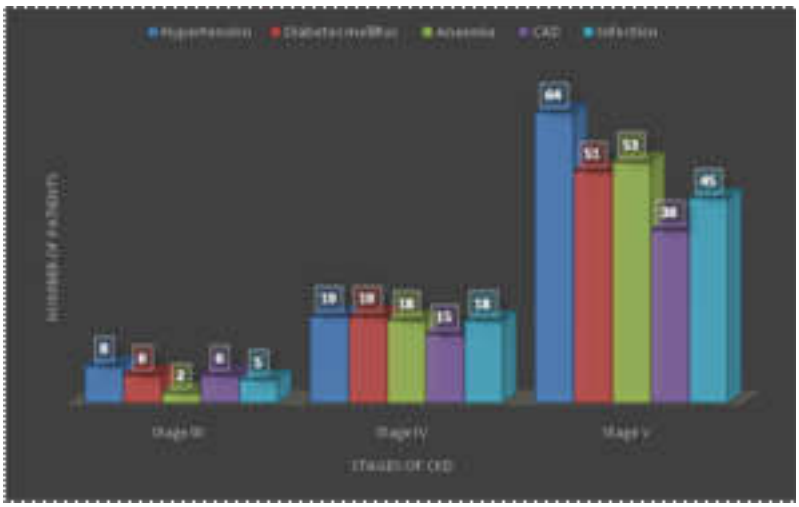

Figure 6.

ASSOCIATION BETWEEN GENDER AND THE STAGES OF CHRONIC KIDNEY DISEASE

Table 8Here *0.229523 <5.991*. So, it is not significant, that there is no association between gender and the stages of CKD.

STAGES OF CKD	MALE	FEMALE	$\chi 2$	df	α value
Stage III	8	1			0.229523348
Stage IV	18	7			
Stage V	41	25	5.991	2	

ANALYSIS OF DRUG UTILIZATION BASED ON WHO PRESCRIBING INDICATORS

Table 7

WHO DRUGS PRESCRIBING INDICATORS	NUMBER	PERCENTAGE (%)
Average drugs per encounter	16.67	
Percentage of drugs prescribed by generic name	112 out of 1667	6.71
Percentage of encounter with antibiotics prescribed	69 out of 100	69
Percentage of encounter with injection prescribed	99 out of 100	99
Percentage of drugs from NLEMS	1201 out of 1667	72.04

COMPARISON OFWHO PRESCRIBING INDICATORS (GLOBAL STANDARD) WITH THE PRESCRIPTION PATTERN OF THE STUDY POPULATION

Table 8.

PRESCRIBING INDICATORS	WHO FINDINGS	OBSERVED FINDINGS
Average number of drugs per prescription	4.02	16.67
Percentage of drugs prescribed by generic name	100%	6.71%
Percentage of prescriptions with antimicrobial(s) prescribed	26.8%	69%
Percentage of prescriptions with injection(s) prescribed	24.1%	99%
Percentage of drugs prescribed from national essential drug list	100%	72.04%

AVERAGE NUMBER OF DRUGS PER PRESCRIPTION GLOBALLY AND AMONG THE STUDY POPULATION.

Figure 7 (a)

Average number of drugs per prescription is four times in the observed population compared to the findings recommended by WHO.

FINDINGS OF OTHER WHO DRUG PRESCRIBING INDICATORS GLOBALLY AND AMONG THE STUDY POPULATION

Figure 7(b)

Among the study population, the percentage of prescriptions with injection(s) and percentage of prescriptions with antimicrobial(s) were higher than the WHO recommendations, whereas percentage of drugs prescribed by generic name and percentage of drugs prescribed from essential drug list was found to be lower than the WHO recommendation.

TESTING THE ASSOCIATION

To determine whether each prescribing indicator recommended by WHO is followed in the study population using statistical tests.

Table 9

PRESCRIBING INDICATORS	Z VALUE	A VALUE	P VALUE
Average number of drugs per prescription	20.64		
Percentage of drugs prescribed by generic name	37.28		
Percentage of prescriptions with antimicrobial(s) prescribed	9.29		
Percentage of prescriptions with injection(s) prescribed	75.37		0.05
Percentage of drugs prescribed from national essential drug list	6.22	1.96	

From the above analysis the hypothesis is found to be significant and conclude that the Percentage of drugs prescribed by generic name is less than that of the standards, should encourage the physician to prescribe the drugs in their generic name. The average number of drugs per prescription was found to be four times higher than that of the WHO recommendation which shows polypharmacy in the study conducted and percentage of drugs prescribed from national essential drug list was much lower than that of standard WHO recommendation which shows a less compliance with the national essential drug list and should encourage the physician to prescribe more from essential drug list to promotes rational use of medicines considering cost, safety and efficacy. In the case of Percentage of prescriptions with injection(s) prescribed and percentage of prescriptions with antimicrobial(s) prescribed was found to be higher than the recommended standard this may increase the risk of adverse events, toxicity and irrational dosing of antibiotics in the patient.

DISTRIBUTION OF DRUGS BASED ON CATEGORIES

Table 10.

DRUGS	NUMBER OF DRUGS (n=1002)	RELATIVE FREQUENCY (%)
Antihypertensives	323	32.23
Antidiabetics	97	9.68
Hematopoietic drugs	63	6.28
Cardiovascular drugs	187	18.66
Alkalinizing agent	43	4.29
Antibiotics	134	13.37
Anti-ulcer drugs	90	8.98
Antiemetics	18	1.79
Vitamins and minerals	20	1.99
Nutritional supplements	27	2.69

Distribution of various drugs prescribed

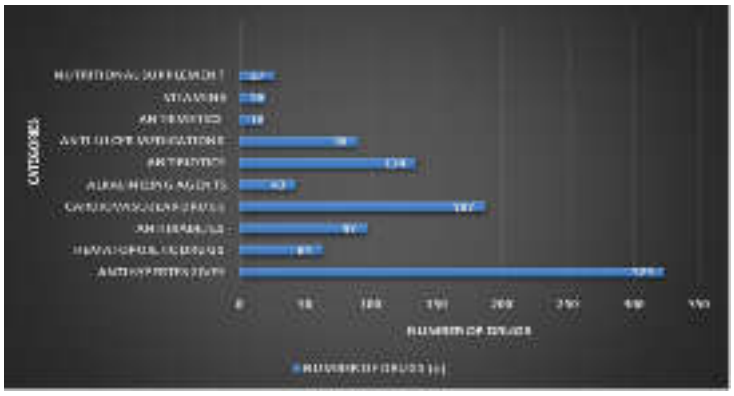

Figure 10.

The above table reveals that majority of the drugs (n=323,32.23%) were antihypertensives, followed by CVS drugs(n=187,18.66%) which is similar to the study conducted by *Purna Atry, Ifanual Haque, Sarita Jangra Bhyan et al*. The most prescribed drugs were antihypertensive (288,17.17%), iron supplements (211,12.58%).

DISTRIBUTION OF ANTIHYPERTENSIVE IN THE STUDY POPULATION

Table – 10(a)

ANTIHYPERTENSIVE	NUMBER OF DRUGS (n=323)	RELATIVE FREQUENCY (%)
Diuretics	106	32.8
Calcium channel blockers	69	21.36
Centerally acting alpha – agonist	51	15.780.3
Beta – blocker	49	15.17
Alpha – blocker	45	13.93
ARBS	2	0.61
Potassium channel opener	1	0.309%

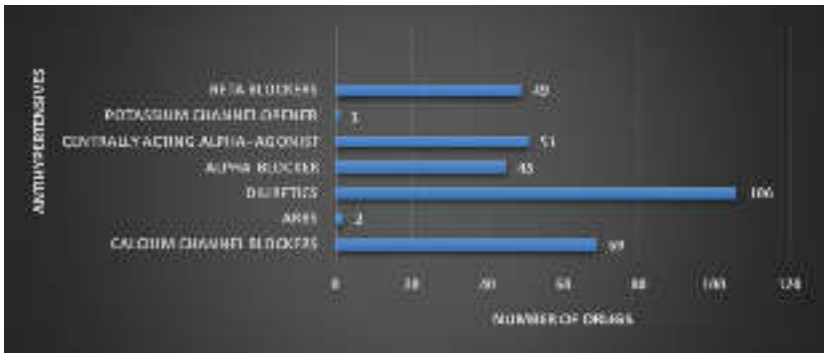

Figure 10(a).

The above figure shows that mostly prescribed antihypertensive drugs were diuretics (106, 32.8%) followed by calcium channel blockers (69, 21.39 %) which is in contrast to the study conducted by *Rajendra Panda , Rajashree samal , Namita Mohapatra et al,* where the most prescribed antihypertensives were calcium channel blockers (73.04 %) followed by beta blockers (60 %).

DISTRIBUTION OF ANTIDIABETICS IN THE STUDY POPULATION

Table – 10(b)

ANTIDIABETICS	NUMBER OF DRUGS (n=97)	RELATIVE FREQUENCY (%)
Regular human insulin	52	53.60
Sulphonylureas	15	15.46
DPP4 inhibitors	13	13.4
Insulin aspart	12	12.37
Insulin mixtard	3	3.09
Biguanides	1	1.03
Sulphonylureas + Biguanides	1	1.03

DISTRIBUTION OF ANTIDIABETICS IN THE STUD POPULATION

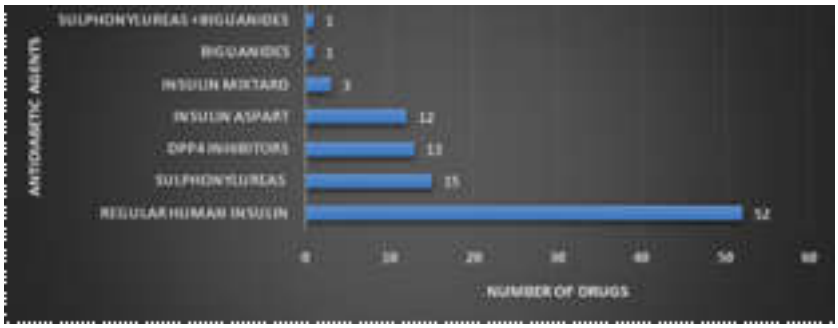

Figure 10(b).

The above figure shows that the most prescribed antidiabetic drugs was regular human insulin (52, 53.6%) and followed by sulphonylureas (15, 15.46%).

DISTRIBUTION OF CVS DRUGS IN THE STUDY POPULATION

Table no -10(c)

CVS DRUGS	NUMBER OF DRUGS (n=187)	RELATIVE FREQUENCY (%)
Nitrates	39	20.85
Antiplatelets	31	16.57
Anticoagulants	30	16.04
Statins	28	14.97
Statins + Antiplatelets	25	13.36
HCN channel blocker	15	8.02
Aspirin + Clopidogrel	13	6.95
Antiarrythmic	6	3.20

DISTRIBUTION OF CVS DRUGS IN THE STUDY POPULATION

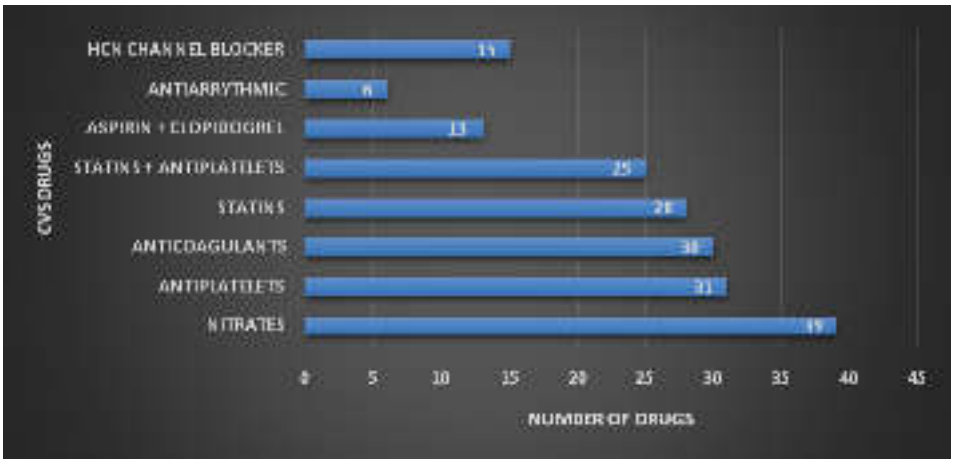

Figure 10(c).

The above figure shows that the most prescribed CAD drugs was nitrates (39, 20.85%) followed by antiplatelet (31, 16.57%)

DISTRIBUTION OF HEMATOPOIETIC DRUGS IN THE STUDY POPULATION

Table 10(d).

n=63

HEMATOPOIETIC DRUGS	NUMBER OF DRUGS	RELATIVE FREQUENCY (%)
Erythropoietin alpha	41	65.07
Ferrous fumerate	6	9.52
Folic acid	5	7.93
Darbepoetin	2	3.17
Methylcobalamine	1	1.58
Polybion	2	3.17
Injection iron	2	3.17

Distribution of hematopoietic drugs in the study population

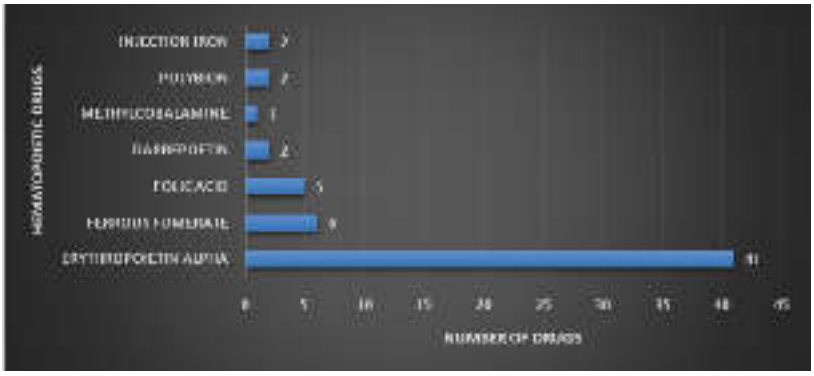

Figure-10(d)

The above figure depicted that most prescribed haematopoietic drug was erythropoietin (41 out of 63 drugs).

DISTRIBUTION OF ANTIBIOTICS IN THE STUDY POPULATION

Table –10 (e)

SL. NO	ANTIBIOTICS	ANTIBIOTICS PRESCRIBED (n=134)	RELATIVE FREQUENCY
1	Cephalosporins	29	21.64%
2	Cephalosporins + Beta lactamase inhibitors	32	23.88%
3	Penicillin + Beta lactamase inhibitors	24	17.91%
4	Carbapenem	20	14.92%
5	Macrolide antibiotics	12	8.95%
6	Fluroquinolones	8	5.97%
7	Glycopeptide antibiotics	1	0.74%
8	Oxazolidinones	5	3.73%
9	Lincosamide antibiotics	2	1.49%
10	Nitrofuran derivatives	1	0.74%
11	Rifaximin	2	1.49%
12	Nitroimidazole	4	2.98%

Distribution of antibiotics in the study population

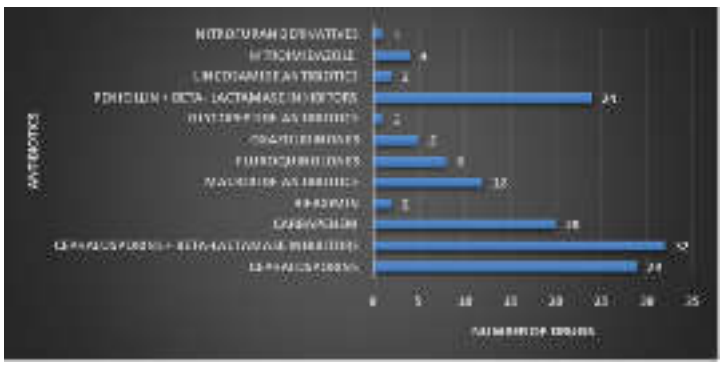

Figure-10(e)

The above table reveals that, majority of the patients (n=32,23.88%) were treated with cephalosporins + beta lactam antibiotics, followed by cephalosporins (n=29,21.64%). This is because cephalosporins are beta lactam antimicrobials used to manage a wide range of infections from gram positive and gram-negative bacteria. This is similar to the study conducted by *Azizah,et al*, in which the most utilized antibiotics were cephalosporins (690) followed by ciprofloxacin (255).

CONCLUSION

This study provided an insight into the drug utilization and prescription pattern among patients with CKD. In our study, 100 prescriptions were analysed according to WHO indicators. In this study, it was found that there were more male (67%) compared with female (32%). There were more patients' admission on Stage 5 (66%) compared with Stage 4 (25%). This study shows that the incidence of CKD was higher in the patients of the age group of 61-80 years. This study also reveals that hypertension is the most diagnosed comorbidities in both male and female patients, followed by diabetes mellitus. Analysing the prescriptions according to WHO indicators, there is significant difference in this prescription pattern as compared to standard WHO findings, we can conclude that the Percentage of drugs prescribed by generic name and percentage of drugs prescribed from national essential drug list was less than that of the standards. But average number of drugs per prescription, Percentage of prescriptions with injection(s) prescribed and percentage of antimicrobials prescribed was much higher than the standards.

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REFERENCES

Dipiro T Joseph, Talbert L Robert, Yee C Gary *et al*. Pharmacotherapy a pathophysiologic approach sixth edition. McGRAW-HILL medical publishing division.2002:821-850.

Roger walker, Whittlesea Cate. Clinical pharmacy and therapeutics. 5th ed. British library cataloguing in publication data.2012:272-294.

Marye Anne Koda Kimble,Lloyd Yee Young,Brain K Alldredge *et al*. Applied Therapeutics. The clinical use of drugs.9th edition. Wolters Kluwer Lippincott Williams and Wilkins.2009:31-4.

Qiangjun Cai, Venkata K. Mukku, Masood Ahmad. Coronary Artery Disease in patients with Chronic Kidney Disease: A clinical update. Current Cardiology reviews.2013;9(4):331-339.

Azizah *et al*. Evaluation of antibiotics utilization and dosing for management of patients with chronic kidney disease. Asian Journal Of Pharmaceutical And ClinicalResearch.2015;8(1):299-302.

Dr Gandra Sumanth. Update of the 2019 WHO AWaRe classification of antibiotics.2021;1-6.

Rani P, Tiwari P, Sharma V. A comparison of antimicrobial usage in ICUs and wards of private tertiary care hospital: A prospective study. Indian Journal of Pharmacy practice, 2020; 13(3):256-251

Ahmad A, Revankar M, Haque I *et al*. Study the prescription pattern of antibiotic in medical department in a teaching hospital: A descriptive study. International journal of toxicological and pharmacological research.2014;6(2):43-46.

Nunes Patricia *et al*. Antibiotic prescription and deviation of prescribed daily dose from the defined daily dose in critical care patients: A point prevalence study. Frontiers in pharmacology 2022;13:1-9.

Sharmin Sarosh Bala,Vinay G Pawar, Shashikala Shivaprakash *et al*. Assessment of the cautionary antimicrobial consumption pattern using defined daily dose as a part of antimicrobial stewardship program. Journal of the Academy of Clinical Microbilogists.2018;20(1):52-56.

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