DRUG PRESCRIBING PATTERNS AND QUALITY OF LIFE AMONG CHRONIC KIDNEY DISEASE PATIENTS IN A TERITARY CARE HOSPITAL

Nimmy Babu[1]*, J. S. Venkatesh[2], Nimmy P. George[3]*, Neethu Samuel[4]*, Mahin M. G.[5]*, Vinuth Chikkamath[6]

[1,3,4,5]Pharm D Interns, SCS College of Pharmacy, Harapanahalli.

[6]Professor, SCS College of Pharmacy, Harapanahalli.

[2]Assistant Professor, SCS College of Pharmacy, Harapanahalli.

*Corresponding Author

Mahin M. G.

Pharm D Interns, SCS

College of Pharmacy,

Harapanahalli.

ABSTRACT

Objectives: Chronic Kidney Disease is a worldwide public health problem with an increasing incidence and prevalence, poor outcomes and high cost of treatment due to comorbidities and polypharmacy. The aim of this study is to assess the current prescribing pattern and quality of life among CKD patients. **Methods:** A prospective observational study was carried out for a period of 6 months in inpatient medicine department of Chigateri District Hospital, Davangere to evaluate the current prescribing pattern and QoL among the CKD patients. All patients having CKD and on hemodialysis were included in our study. **Results:** A total of 120 patients were enrolled out of which 99 patients were males and 21 were females. Most of the patients belongs to the age group of 45-53 years. Among the 120 patients, 72 patients belongs to stage V followed by 33 patients on stage IV and 10 patients on stage III. Out of total patients, 91 patients were on haemodialysis and 29 patients were not on haemodialysis. Among 120 patients, 80 patients had hypertension followed by DM in 63 patients, and anemia in 55 patients. In the study, 141 antihypertensive agents were prescribed followed by 132 diuretics. CCBs (9.9%) were the most prescribed drug class. Mean MCS (42.5) lower than the mean PCS score (48.6). 71 patients had moderate QOL, 33 patients had high QOL and 16 patients had poor QOL. **Conclusion:** The study concluded that males could be more affected by CKD. Antihypertensive agents were the most prescribed drugs followed by diuretics, antidiabetic agents, calcium and vitamin D_3 and gastrointestinal agents. The highest comorbidity seen within CKD patients is

hypertension followed by diabetes mellitus, anemia, thyroid disorders and others. Most of the patients had a moderate QOL.

KEYWORDS: Chronic Kidney Disease, Prescribing Patterns, Antihypertensive Agents, Quality of Life.

INTRODUCTION

Chronic Kidney Disease (CKD) is a general term for heterogeneous disorders affecting kidney structure and its function. It is defined as either kidney damage or a decreased glomerular filtration rate of less than 60 ml/min/1.73 m^2 for 3 or more months.[2] CKD is a widely prevalent non communicable disease that has become a global burden on the health service system and has been recognized as a major threat to humans, particularly in reducing quality of life.[3] The Global Burden of Disease study state data showed that the incidence and the prevalence of CKD globally increased by 84% and by 87% from 1900 to 2016 respectively. CKD has an estimated global prevalence of between 11% and 13%.[4]

In India, the prevalence of CKD was observed to be 17.2% with ~ 6% having CKD stage 5 or worse and it is more seeing among males compared to females due to stress, alcoholism, hypertension, diabetes mellitus, smoking and cumulative risk factors of chronic vascular disease.

The most common causes of chronic kidney disease includes hypertension, diabetes mellitus, pyelonephritis and certain nephrotoxic drugs such as aminoglycosides, antiretroviral, analgesics, antidepressants etc

The **Kidney Disease Improving Global Outcomes (KDIGO)** Organization has summarized stages of CKD based on Glomerular Filtration Rate.

Table 1.1: Stages of CKD based on Glomerular Filtration Rate.

Ckd category	Egfr(ml/min/1.73m^2)	Term
G1	>90	Normal
G2	60-89	Mildly decreased
G3a	45-59	Mild to moderately decreased
G3b	30-44	Moderate to severely decreased
G4	15-29	Severely decreased
G5	<15	Kidney failure

Glomerular filtration rate (GFR) describes the flow rate of filtered fluid through the kidney. GFR in conjunction with albuminuria is an optimal way to determine the extent of CKD.

Patients with CKD present with other comorbidities such as diabetes mellitus, hypertension, coronary artery disease and infection. The presence of comorbidities increases the cost of treatment and also poses a challenge for the treatment of CKD patients.[11] In addition patients with comorbidities have a greater chance of disease progression and have higher risk of developing complications like anemia, increased incidence of cardiovascular disease, hyperlipidaemia and metabolic bone disorders. They should be assessed for the presence of complication and receive optimal treatment to improve the quality of life.[12] Inappropriate use of medications can increase adverse drug effects, which can be reflected by excessive length of hospital stays, excessive healthcare utilization and cost.[2] The administration of multiple medications simultaneously, continuously or both, as well as poor compliance with drug regimen and drug interactions may contribute to drug related problems.[13] Hence these patients require complex therapeutic regimen requiring frequent monitoring.

The treatment will be according to various stages of CKD. The first step in the treatment is to determine the underlying cause and treating it. Renal transplantation and dialysis are considered in the later stages of CKD.[2]

Hypertension is the most commonly associated comorbidity seen with CKD patients.[2] Good adherence to antihypertensive treatment has been associated with a lower risk of acute cardiovascular events thereby a reduction in the risk of chronic heart failure events and end-stage renal disease.[14] According to JNC-8 patients of any age with diabetes or CKD have a goal of less than 140 mmHg systolic and less than 90 mmHg diastolic. Angiotensin Converting Enzyme inhibitors or Angiotensin 2 Receptor Blockers are an essential part of hypertensive management in patients up to the age of 75 years with CKD, though currently patients with greater than the age of 75 years with CKD there is no authentication supporting renin-angiotensin system inhibitors treatment. While Angiotensin Converting Enzyme inhibitors or Angiotensin 2 Receptor Blockers are been used, CCBs and thiazide diuretics can also be considered.[15]

Diabetes mellitus is also a leading cause for end-stage renal disease in most countries worldwide. Good glycaemic control is the mainstay for preventing microvascular complications in patients with CKD and hyperglycemia. No clear recommendations exist for

Antidiabetic therapies in patients with moderately to severe CKD and individualized treatment approaches and targets are so far recommended.[16] Among hypoglycemic agents, most commonly used are glibenclamide, glimepiride, glipizide and Acarbose.[2]

Anemia is a well-known complication in CKD and associated with progression of CKD, poor quality of life, and increase in morbidity and mortality.[17] Treatment of anemia by erythropoiesis stimulating agents is expected to reduce mortality and cardiovascular disease risk in patients with CKD.[18]

In CKD patients, if phosphorous or intact PTH levels cannot be controlled within the target range despite dietary phosphorous restriction, phosphate binders should be prescribed. The dietary restriction of phosphorous intake is associated with reduced protein intake which may contribute to poor nutrition and increased mortality risk. Controlling serum phosphate with phosphate binders has the potential advantage of permitting a diet with less protein restriction, which may contribute to improved nutritional status and potentially prolong survival.[21]

Calcium carbonate and calcium acetate are commonly used phosphate binders and also as calcium supplements as it is affordable because of its low cost when compared to sevelamer hydrochloride and lanthanum carbonate.[2]

National Kidney Foundation-Kidney Disease Outcomes Quality Initiative (NKF-KDOQI) guidelines recommend vitamin D supplementation in patients with stage 3 to 4 CKD with 25(OH)D levels <30 ng/ml. Vitamin D plays a central role in calcium and phosphorous homeostasis. Vitamin D deficiency is associated with albuminuria and a higher prevalence of cardiovascular disease and mortality. Hence potential benefits of vitamin D supplementation are greater in CKD patients.[22]

CKD impacts several dimensions such as individual quality of life, family income, and reduction in contributions to social and national development. Moreover CKD patients have become major consumers of public health resources particularly in haemodialysis clinics.[3] Those patients require multiple medications to mitigate symptoms and progression of consequences and comorbidities associated with CKD.

Appropriate drug selection for patients with CKD is important in order to avoid unwanted drug effects and to ensure optimal patient outcome. Rational drug prescription is a difficult

task in CKD patients.[25] Pharmacokinetic parameters in these patients are often compromised and result in drug accumulation, toxicity and adverse drug events (ADEs). Furthermore, CKD patients carry heightened risk for ADEs due to multiple comorbidities and use of many medications. In addition presence of these comorbidities can increase the treatment cost as well as treatment challenges.

When evaluating and improving healthcare in chronic diseases, symptoms, function in daily life and well-being are important patient outcomes. Health Related Quality of Life (HRQoL) is a significant key indicator of how a condition affects the patient's life.[27] QOL is defined as an individual's perception of their position in life in context of the culture and value system where they live, and in relation to their goals, expectations, standards and concerns. It is a comparison between patient's expectation and reality. QOL also reflects treatment quality in patients with CKD since adapting to CKD involves physical, psychological and social processes to achieve the best outcome.[28]

CKD stages 1-3 are not usually considered to impact on the individual's health experience, although some disturbances may already have emerged. However, in stage 4 the individual perceives an increasing amount of symptoms which may affect their quality of life. Conditions like malnutrition, anemia, cognitive dysfunction, sleep disorders, depression, reduced social interaction, physical and sexual functioning and comorbidities like diabetes and cardiovascular disease also impair HRQoL in these patients.

HRQoL assessment is essential in evaluating the quality and effectiveness of patient care, comparing alternative treatments, clinical outcomes, facilitating the rehabilitation of CKD patients and enhancing patient satisfaction. Data from this study will provide baseline information and serve as a basis for further intervention.

Since CKD patients need to take medicines lifelong, studying prescribing trend on a regular basis helps to understand and build evidence for drug use. Hence this study is aimed to identify current use and pattern of drugs from particular therapeutic categories where the problems can be anticipated. As compared with pre marketing clinical trials, post marketing studies are helpful to improve the therapeutic strategy and to monitor the incidence of adverse drug reactions and drug interactions.

METHODOLOGY

This is a prospective observational study was conducted in the medicine department of Chigateri District Hospital, Davangere (a tertiary care teaching hospital). The study will be carried out for a period of six months after receiving the clearance and approval from Institutional Ethical Committee. Relevant data was collected on data collection form which includes patient demographics, current medication, previous medical and medication history, laboratory results, diagnosis, comorbid conditions, stages of CKD and prescription analysis. In order to assess the quality of life, information gathered and completed the KDQOL-SF^{TM} version 1.3.The data was obtained from the patient case profiles. Patients having CKD and on hemodialysis were included in our study. Exclusion criteria included children, pregnant and lactating women, terminally ill patient who is not in a position to be interviewed, patients with surgical condition and those who are not willing to give informed consent to participate in the study. Datas were analysed using Microsoft Excel and results were presented in graphs and tables.

RESULTS

The study recruited 120 CKD patients after getting an informed consent. The demographic details and current prescription pattern of CKD patients were collected in the suitable data collection form. The survey questions (KDQOL-SF^{TM} version 1.3) regarding quality of life of patients were also recorded.

➤ **Gender wise distribution of CKD patients**

During the study period a total number of 120 patients were included and assessed for evaluating prescribing patterns in CKD patients In our result, among 120 patients 99 (N= 82.5%) were males and 21 (N=17.5%) were females.

Table 1: Gender wise distribution of CKD patients.

Gender	No. of patients and %
Male	99 (82.5 %)
Female	21 (17.5%)

➤ **Distribution of CKD patients according to their age groups**

Among the patients evaluated, majority of patients were in the age group of 45 – 53 years i.e., 37 patients (30.8%). 34 patients (28.3 %) were in the age group of 54-62 whereas 15 patients (12.5 %) were observed in the age group of 36-44. 14 patients (11.6%) belong to the age group of 63-71. 7 patients (5.8 %) were observed in the age group of 18-26 and 27-35 age

groups respectively. Least number of patients were observed in the age group of 72-80 i.e., 6 patients (5%).

Table 2: Distribution of CKD patients according to their age groups.

Age distribution	Frequency of patients (n)	% of patients
18-26	7	5.8%
27-35	7	5.8%
36-44	15	12.5%
45-53	37	30.8%
54-62	34	28.3%
63-71	14	11.6%
72-80	6	5%

➢ **Stage wise distribution of CKD patients**

Out of 120 patients, 77 patients (64.1 %) belonged to stage 5, followed by stage 4 which had 33 patients (27.5%). Least number of patients were observed in stage 3 which had 10 patient (8.3%). The stage wise distribution of CKD patients are summarized in table 3.1 and figure 3.2.

Table 3: Stage wise distribution of CKD patients.

Stages	No. Of patients	Percentage
Stage 3	10	8.3%
Stage 4	33	27.5%
Stage 5	77	64.1%

➢ **Distribution of patients on maintenance hemodialysis**

Out of 120 patients 91 patients (75.8%) were found to be on MHD and remaining 29 patients (24.1%) were not on hemodialysis

Table 4: Distribution of patients on maintenance hemodialysis.

Hemodialysis	No and % of patients
On Hemodialysis	91 (75.8%)
Not on hemodialysis	29 (24.1%)

➢ **Risk and Comorbidities associated with CKD patients**

The risk and comorbidities associated with these patients was hypertension 65% (78), diabetes mellitus 42.5% (51), anemia 13.3% (16), alcoholics 11.6% (14), smoking 10.83% (13), thyroid disorder 6.66% (8), coronary artery disease 5.0% (6) and others 30% (36). It is summarized in table 4.1 and figure 4.2.

Table 5: Risk and Comorbidities associated with CKD patients.

Risks and Comorbidities	No. of patients	Percentage
Hypertension	80	66.6%
Diabetes Mellitus	63	52.5%
Anemia	55	45.5%
Alcoholics	46	38.3%
Smoking	43	35.8%
Others	38	31.6%
Thyroid disorder	25	20.8%
Coronary Artery disease	16	13.3%

➢ **Analysis of prescriptions in chronic kidney disease**

A total of 884 drugs were prescribed in 120 prescriptions. The number of drugs associated with CKD was found to be 262 and 19 conditions were found to be untreated and thus no drugs were prescribed.

Table 6: Analysis of prescriptions in chronic kidney disease.

Total no of drugs prescribed	884 (76%)
No of drugs associated with CKD	262 (22%)
Untreated conditions	19
No of drugs prescribed by generic Name	0

➢ **Polypharmacy assessment**

A total of 120 prescriptions were reviewed, 98 prescriptions had more than 5 drugs and 22 prescriptions had less than 5 drugs. The average number of drugs prescribed per prescription was 7.3.

Table 7: Polypharmacy assessment.

No of drugs	No of prescription n (%)
Less than 5 drugs	22 (18.3%)
More than 5 drugs	98 (81.6%)
Average no. of drugs/ prescription	7.3

➢ **List of most frequently prescribed medications**

Out of 120 prescriptions, the most frequently prescribed medications were Furosemide [109], Calcium and vitamin D,[67] Sodium bicarbonate,[60] Ceftriaxone,[56] Ranitidine,[52] Calcium acetate,[41] Amlodipine,[37] Insulin,[33] and Pantoprazole.[29]

Table 8: List of most frequently prescribed medications.

Medications	No of medications
Furosemide	132(14.9%)

Calcium and vitamin D	93 (10.5%)
Amlodipine	88 (9.95%)
Insulin	78 (9%)
Sodium Bicarbonate	61 (7%)
Ceftriaxone	58 (6.5%)
Calcium acetate	52 (6%)
Ranitidine	42 (5%)

➢ **Drug prescribing patterns for CKD patients**

In this study it was found that antihypertensive agents were prescribed most frequently (n=141, 15.9%). Following which diuretics (n=132, 14.9%), antidiabetic agents (n=120, 13%), calcium & vitamin D (n=93, 10.5%), gastrointestinal agents (n=73, 8.25%) antibiotics (n=65, 7.35%), alkalinizing agents (n=61, 6.9%), anemic agents(n=55, 6.22%), phosphate binders (n=52, 5.88%), multivitamins (n=31, 3.5%), antiplatelet agents (n=22, 2.48%). The least prescribed agents are thyroid drugs 9n=18, 2.05%), hypolipidemic drugs (n=10, 1.13%), antiemetic drugs (n=8, 0.90%), antianginal drugs (n=4, 0.45%)

Table 9: Drug prescribing patterns for CKD patients.

Drug class	No. of drugs n (%)
Antihypertensive agents	141 (15.9%)
a) CCB	88 (9.9%)
b) ACE inhibitors	21 (2.3%)
c) Beta blockers	14 (1.5%)
d) ARBs	9 (1.01%)
e) CCB+Beta blocker	6 (0.67%)
f) Alpha-2 adrenergic agonist	3 (0.3%)
Diuretics	132 (14.9%)
Antidiabetic agents	120(13.5%)
a) Insulin	78(8.82%)
b) Oral hypoglycemic agents	42(4.7%)
Calcium and Vitamin D	93 (10.5%)
Gastrointestinal agents	72(8.14%)
a) H2 receptor blocker	42(4.7%)
b) PPI	30(3.39%)
Antibiotics	65(7.35%)
Alkalinizing agents	61(6.9%)
Anemic agents	55(6.2%)
Phosphate binders	52(5.8%)
Multivitamins	31(3.5%)
Antiplatelet agents	22(2.48%)
Thyroid drugs	18(2.03%)
Hypolipidemic agents	10(1.13%)
Antiemetic agents	8(0.09%)
Anti anginal drugs	4(0.4%)

➢ **Percentage of different drug classes used**

Out of 120 prescriptions, diuretics were the most prescribed drug class (n=132,14.9%) followed by CCBs (n=88,9.9%), insulin (n=78,8.82%), alkalinizing agents (n=61, 6.9%), H2 receptor blockers (n=42, 4.7%) oral hypoglycemic agent(n=42,4.7%), PPIs(n=30,3.39%), ACE inhibitors (n=21,2.3%), thyroid drugs(n=18, 2.3%) and beta blockers (n=14, 1.5%),

Table 10: Percentage of different drug classes used.

Drugs	No.of drug (%)
CCB	88(9.9%)
ACE Inhibitors	21(2.3%)
Beta blockers	14(1.5%)
Diuretics	132(14.9%)
Insulin	78(8.82%)
Oral hypoglycemic agents	42(4.7%)
H2 receptor blocker	42(4.7%)
PPI	30(3.39%)
Thyroid drugs	18(2.03%)
Alkalinizing agents	61(6.9%)

➢ **QOL scores for physical component Summary and Mental component summary**

The overall mean QOL score was 45.55. Mean mental component summary (MCS) score (42.5) was significantly lower than the mean physical component summary (PCS) scores (48.6). The scores for the various subdomain are shown in table 11.1

Table 11: QOL scores for physical component summary & mental component summary.

Principal domains	Mean
Physical component summary	49.51
Physical health	60.1
Role physical	41.45
Bodily pain	44.31
General health	52.16
Mental component summary	42.88
Role emotional	37.18
Social function	48.85
Emotional well being	35.18
Energy/fatigue	50.31
Overall mean QOL	46.19

➢ **Level of quality of life**

Out of 120 patients, 33 patients (27.5%) have high QOL, 71 patients (59.1%) have moderate QOL whereas 16 patients (13.3%) have poor QOL.

Table 12: Level of QOL.

Level of QOL	No.of patients and %
Poor	16 (13.3%)
Moderate	71 (59.1%)
High	33 (27.5%)

DISCUSSION

Modernization and changing lifestyle in developing countries like India has enormously increased the statistical figures of alcohol use, smoking and also non-communicable diseases like diabetes mellitus, hypertension, cardiovascular disease and its complications like myocardial infraction, stroke, and retinopathy etc.[2] Management of these risk factors is important and involves the use of multiple drug combination therapy.[41] On the other hand, due to increased incidence of these risk factors, the CKD patients is on the rise worldwide.[30] Furthermore, CKD patients carry heightened risk for comorbidities such as hypertension, diabetes mellitus and CAD.[26] Also these comorbidities necessitate the use of many drugs.[13] Hence an optimal management of CKD is important to prevent complications and there by increases the quality of life of patients. A prospective observational study was conducted in 120 patients for a period of 6 months in the inpatient general medicine department who were diagnosed with CKD. Most of the studies depict men have greater probability of developing CKD due to alcohol abuse, or smoking as compared to females. In the present studies, 99 (82.5%) out of 120 patients were males and 21 (17.5%) were females which is similar to the results made by several other researchers, such as Narayana Murthy BV. et al.[2] CS Shastry et al.[26] etc. The higher incidence of CKD in male patients is also due to role of sex hormone in progress of disease since human-in-vitro studies showed that testosterone can induce apoptosis of kidney's proximal tubular cell. Males also tend to have high protein and calcium intake which is associated with initiation and progression of kidney disease. Demographic analysis shows maximum number of patients fall in the age group of 45-53 (30.8%) with least number in the age group of 18-26 (5.8%), which is similar to the study conducted in Deralaktte, Mangalore (Christina Pothen et al.)[12] In our study, maximum number of patients (n = 77, 64.1%77) were in ESRD which is similar to the study conducted in Nagpur, Maharashtra (Chaitali S Bajaite et al.)[42] and Punjab (Rajeev Ahlawat et al.)[11] followed by 27.5% (n =35) in stage 4 and 8.3% (n = 10) in stage 3 .Among 120 patients' a majority of 91 patients (75.8%) were on haemodialysis and remaining 29 patients (24.1%) were not on haemodialysis which is similar to a study conducted in Malaysia (Rowa Al-Ramahi).[25] In this study the most prevalent comorbidity is hypertension (n=80, 66%) which is found similar

to researches done in Pune, Maharashtra (Manjusha Sajith et al.)[43] and Berlin Germany (Insa M Schmidt et al.)[24] followed by other comorbities and risk factors such as diabetes mellitus (n=63, 52.5%), anaemia (n=55, 45.5%), alcoholics (n=46, 38.3%), smoking (n=43, 35.8%), others (n=38, 31.60%) thyroid disorder (n=25, 20.8%), and CAD (n=16, 13.3%). In our study a total of 884 drugs were prescribed out of which 262 were associated with CKD .19 conditions remain untreated and 0 drugs were prescribed by generic name. In a study conducted in Coimbatore, Tamil Nadu (Tamilselvan T et al)[30] 85.92% prescription contain more than 5 drugs and 14.07% prescriptions contain less than 5 drugs which is similar to our study in which 81.6%(n=98) prescriptions contain more than 5 drugs and 18.3%(n=22) contain less than 5 drugs. The average number of drugs per prescription in the study is 5.26 which is in contrast to our study where the average number of drugs per prescription is 7.3. The most frequently prescribed medication in this study is furosemide (14.9%), calcium and vitamin D3 (10.5%), amlodipine (9.95%) and insulin (9%) which agrees with the study conducted in Ondo state, Nigeria (Olumuyiwa John Fasipe et al.)[41] In our study, hypertension being the most common comorbid condition in the study population, anti-hypertensives (n=141, 15.9%) were the most common prescribed drugs followed by diuretics (n=132, 14.9%), antidiabetic agents (n=120, 13.5%), calcium and vitamin D3 (n=93, 10.5%) and gastrointestinal agents (n=72, 8.14%). This is in accordance with the study conduction in Bengaluru, Karnataka (Renuka Sathish et al.)[44] where anti hypertensives (84.6%) were the most commonly prescribed drugs whereas the study conducted in Nagpur, Maharashtra (Chaitali S Bajait et al.)[42] contradicts this study where hematopoietic agents (20.15%)were the most prescribed drugs followed by cardiovascular drugs (22.14%) despite hypertension being the most common co-morbid among study population. In our study, diuretics (n=78, 14.9%) were the most common drug class prescribed followed by calcium channel blockers (n=88, 9.9%), insulin (n=78, 8.82%), alkalinizing agents (n=61, 6.9%), oral hypoglycaemic agents n=42, 4.7%) and H2 receptor blockers (n=42, 4.7%). This contradicts with the study conducted by CS Shastry et al. in Deralakatte, Mangalore[26], where calcium channel blockers were the most prescribed drug class (n=162,27.6%), followed by diuretics (n= 115,19.6%), alpha 2 agonist (n=95,16.2%) etc. and the study conducted in Punjab by Rajiv Ahlawat et al[11] where phosphate binders (n=372, were the most prescribed drug class followed by minerals and vitamin D3 (n=327,12.2%, oral iron (n=309,11.5%) etc.

Our study showed that overall mean QOL score was 45.5.Mean mental component summary score(42.88) was lower than physical component summary score(49.51).This is in correlation

with research done by Elliot K Tannor et al.[28] where the mean physical component score was 43.3 and mean mental component score was 37.3.In our study, out of 120 patients,71 patients(59.1%) had moderate quality of life,33 patients(27.5%) had a high quality of life where as 16 patients (13.3%) had poor quality of life. This is in correlation with study conducted by Tawatchai Apidechkul et al.[3]

CONCLUSION

In our study male patients outnumbered female patients indicating that males were more susceptible to CKD attributable to social habits such as smoking, alcohol etc. despite more male and female have comorbidities such as hypertension, diabetes mellitus etc. The prevalence of CKD falls in the age group of 45-53 followed by 54-62 and 63-71. Predominant patients belongs to stage V since they become aware of the disease towards the later symptoms of CKD. On account of greater number of patients belong to ESRD, hemodialysis is the life sustaining therapy. Hypertension is the most prevalent comorbidity seen with CKD followed by diabetes mellitus, anemia etc. The highlights the prescribing patterns of CKD. Furosemide is the most frequent prescribed drug in the study population to treat edematous condition seen in renal failure patients. The study was effective in showing the trend in prescribing of antihypertensive agents followed by diuretics, antidiabetic agents, calcium and vitamin D3 etc. The study was successful in showing QOL score and assessed mean mental physical component score and mean physical component score and its subdomains. The study was also effective in showing how many patients had good, moderate or poor quality of life. In brief the study indicated the prescribing pattern of CKD patients and QoL of patients with CKD.

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Authors contribution

All the authors have contributed equally.

Conflict of interest

All the authors declare no conflict of interest.

Ethics declaration

The protocol was verified by the S.C.S College of Pharmacy Institutional Ethics Committee. Informed consent was obtained from all individuals.

Consent for publication

All authors have given their consent for publication.

Competing interests

The authors declare that they have no competing interests.

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