_____Research Article

A STUDY ON PRESCRIPTION PATTERN OF DRUGS AMONG CHRONIC KIDNEY DISEASE PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

This study analyses the current prescribing trends in the management of CKD in a tertiary care hospital. This cross-sectional observational study was conducted in nephrology department of Vivekanandha Medical Care Hospital, Tiruchengode over a period 8 months from May to November 2019. Study was approved by institutional ethics committee and written informed consent was obtained from each patient before enrolment. A specially designed proforma was used to collect the demographic, clinical, and medication details. Among the 176 patients, 103 (58.52%) were females and 73 (41.48%) were males. The mean (±SD) age of total study population was 52±19.9 years and the prevalence of CKD increased with ageing in both males and females. Prevalence of CKD was found to be higher for stage 3, 24 (13.64%) male and 41 (23.30%) female patients had stage 3 CKD. Type 2 diabetes mellitus was found to be highly prevalent co-morbid condition, followed by hypertension, anaemia and coronary artery disease. Polypharmacy was seen in almost all the patients. None of the patients received monotherapy. The most common drug prescribed was vitamin and mineral suppliments (17.8%). This study revealed the prescribing pattern of the various drugs used in CKD patients. Type 2 diabetes mellitus was found to be the highly prevalent co-morbid condition in CKD. This study provides a framework for continuous prescription audit in a hospital setting and suggests possible improvement in prescription practices in patients suffering from CKD.

Keywords: Chronic kidney disease, Polypharmacy, Diabetes mellitus, Anaemia, Hypertension.

INTRODUCTION

Chronic kidney disease (CKD), characterized by progressive decline in glomerular filtration rate (GFR), is a major public health issue worldwide and is associated with high morbidity and mortality[1]. CKD 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 by The Kidney Disease Outcomes Quality Initiative (K/DOQI) of the National Kidney Foundation (NKF) [2]. CKD accounts for 850,000 deaths worldwide as reported by World Health Organization[3].

Rapidly occurring urbanization has contributed to the rise of kidney disease and other non-communicable diseases in low- and middle-income countries[4]. Commonly associated lifestyle changes, e.g. a switch to high-calorie, sodium-rich diets and decreased physical activity, rapid urbanization has led to crowded cities with environmental pollution, a limited infrastructure and poor levels of sanitation and waste disposal. More and more people are living in settings where a growing prevalence of non-communicable diseases like diabetes, hypertension and obesity is juxtaposed with environmental toxins and numerous infectious diseases is meant by such urbanization[5].

The study of prescribing pattern is a component of medical audit that does monitoring and evaluation of the prescriber as well as recommends necessary modifications to achieve rational and cost-effective medical care[6]. Irrational prescription of drugs is of common occurrence in clinical practice and prescribing habits of clinicians[7]. Inappropriate prescribing habits lead to ineffective and unsafe treatment, prolongation of illness, distress and unnecessary economic burden to the patient[8]. Studies of prescribing pattern and drug utilization are useful to identify the problems and provide feedback to prescribers so as to create awareness about rational use of drugs[9].

Appropriate drug selection for patients with chronic kidney disease (CKD) is important in order to avoid unwanted drug effects and to ensure optimal patient outcomes[10, 11]. Rational drug prescription is a difficult task in CKD patients. These patients are at higher risk of drug-related problems since they need complex therapeutic regimens that require frequent monitoring and dosage adjustments. In addition, they usually

have other co-morbidities including diabetes mellitus, hypertension, coronary artery disease and infection[12-14].

Inappropriate use of medications can increase adverse drug effects, which can be reflected by excessive length of hospital stays, excessive health care utilization, and costs[10, 15-17]. As indicated by an estimation done by the World health organization (WHO), more than half of all medications are endorsed, administered or sold improperly. Likewise, half of all patients come up short to take the endorsed prescription effectively. The abuse, underuse or misuse of prescriptions results in wastage of rare assets and far-reaching wellbeing perils. Therefore, steps need to be taken to ensure rational use of medications worldwide, so that an adequate standard of treatment is provided at all levels of the health care delivery system[18]. It is important to study the drug utilization continuously over a period of time as drug utilization changes with time period, physician, disease conditions and population. In CKD patients drug utilization studies help to understand and build evidence for the drug use[19]. As CKD patients need to take medicines lifelong, it is very important to study the prescribing trend on a regular basis. The findings of this study are expected to provide relevant and useful feedback to physician.

MATERIALS AND METHODS

This cross-sectional observational study was conducted in nephrology department of Vivekanandha Medical Care Hospital, Tiruchengode over a period 8 months from May to November 2019. Study was approved by institutional ethics committee and written informed consent was obtained from each patient before enrolment. CKD patients of both genders, above 18 years of age, from the in-patient department of nephrology with a discharge summary were included in the study. Patients attending out-patient department, prescription with insufficient data, Patient undergoing peritoneal dialysis, pregnant and lactating women were excluded from the study. The discharge-summary records of 176 CKD patients, admitted to nephrology wards were scrutinized and the data was collected in a specially designed proforma which included the following details:

Demographic data: Name, age, gender, reason for admission, past medical history, past medication history, family history, educational level, marital status, allergies (drugs, foods and others), social history (alcoholic/ smoker/ tobacco/ betel nuts etc.) and anthropometric measurements such as weight, height, waist-hip ratio, body mass index (BMI) and blood pressure.

Disease data: Stage of CKD and co-morbidities

Data pertaining to the drug therapy which included: Drugs prescribed (with group/class), fixed dose combination (if any), dose of the drugs, frequency of prescription, route of administration and usage of generic/brand name. Data was tabulated on Microsoft Excel spreadsheet (version 2007) and analyzed using Microsoft Excel and represented as numbers and percentages.

RESULTS

Among the study population, 103 (58.52%) were females and 73 (41.48%) were males. Gender wise distribution among the study population shows that females are more prone to disease. (Figure 1)
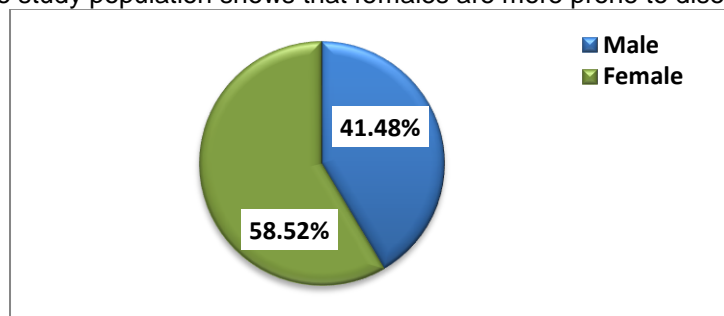

Fig. 1: Gender wise distribution (n=176)

The mean (±SD) age of total study population was 52±19.9 years. 3(1.70%) patients were males and 4 (2.27%) patients were females in the age group 18-28 years, 7 (3.98%) patients were males and 9 (5.11%) patients were females in the age group 29-38 years, 12 (6.82%) patients were males and 14 (7.95%) patients were females in the age group 39-48 years, 13 (7.39%) patients were males and 21 (11.93%) patients were females in the age group 49-58, 17 (9.66%) patients were males and 23 (13.06%) patients were females in the age group 59-68 years, 21 (11.93%) patients were males and 32 (18.18%) patients were females in the age group >68 years. (Table 1)

Table 1: Gender wise distribution among different age groups (n=176)

S. No.	Age in years	No. of patients		Percentage (%)	
		Males	Females	Males	Females
1.	18-28	3	4	1.70	2.27
2.	29-38	7	9	3.98	5.11
3.	39-48	12	14	6.82	7.95
4	49-58	13	21	7.39	11.93
5	59-68	17	23	9.66	13.06
6	>68	21	32	11.93	18.18
7	Total	73	103	41.48	58.52
8	Mean age	52±19.9 Years			

Of the study population, 5 (2.84%) males and 8 (4.55%) female patients had stage 1, 9 (5.11%) male and 18 (10.23%) female patients had stage 2, 24 (13.64%) male and 41 (23.30%) female patients had stage 3, 20 (11.36%) male and 22 (12.50%) female patients had stage 4, 15 (8.52%) male and 14 (7.95%) female patients had stage 5 CKD respectively. (Table 2)

Table 2: Frequency of chronic kidney disease stages

S. No.	Stages of CKD	No. of patients		Percentage (%)	
		Males	Females	Males	Females
1	Stage 1	5	8	2.84	4.55
2	Stage 2	9	18	5.11	10.23
3	Stage 3	24	41	13.64	23.30
4	Stage 4	20	22	11.36	12.50
5	Stage 5	15	14	8.52	7.95

The distribution of medical co-morbidities among CKD patients was studied. Diabetes was the most common co-morbidity (104 patients, 59.10%) observed in the study population, followed by hypertension (66 patients, 37.5%), anaemia (38 patients, 21.59%), coronary artery disease (20 patients, 11.36%), Sepsis (14 patients, 7.95%), congestive cardiac failure (12 patients, 6.82%), ischemic heart disease (10 patients, 5.68%), Pyelonehritis (9 patients, 5.11%), Hyperlipidemia (8 patients, 4.55%), urinary tract infection (6 patients, 3.41%), stones in urinary tract (5 patients, 2.84%), hypothyroidism (5 patients, 2.84%), pulmonary disorders (2 patients, 1.14%), thrombocytopenia (2 patients, 1.14%). Among the study population (5 patients, 2.84%) patients did not have any medical co-morbidity. (Figure 2)
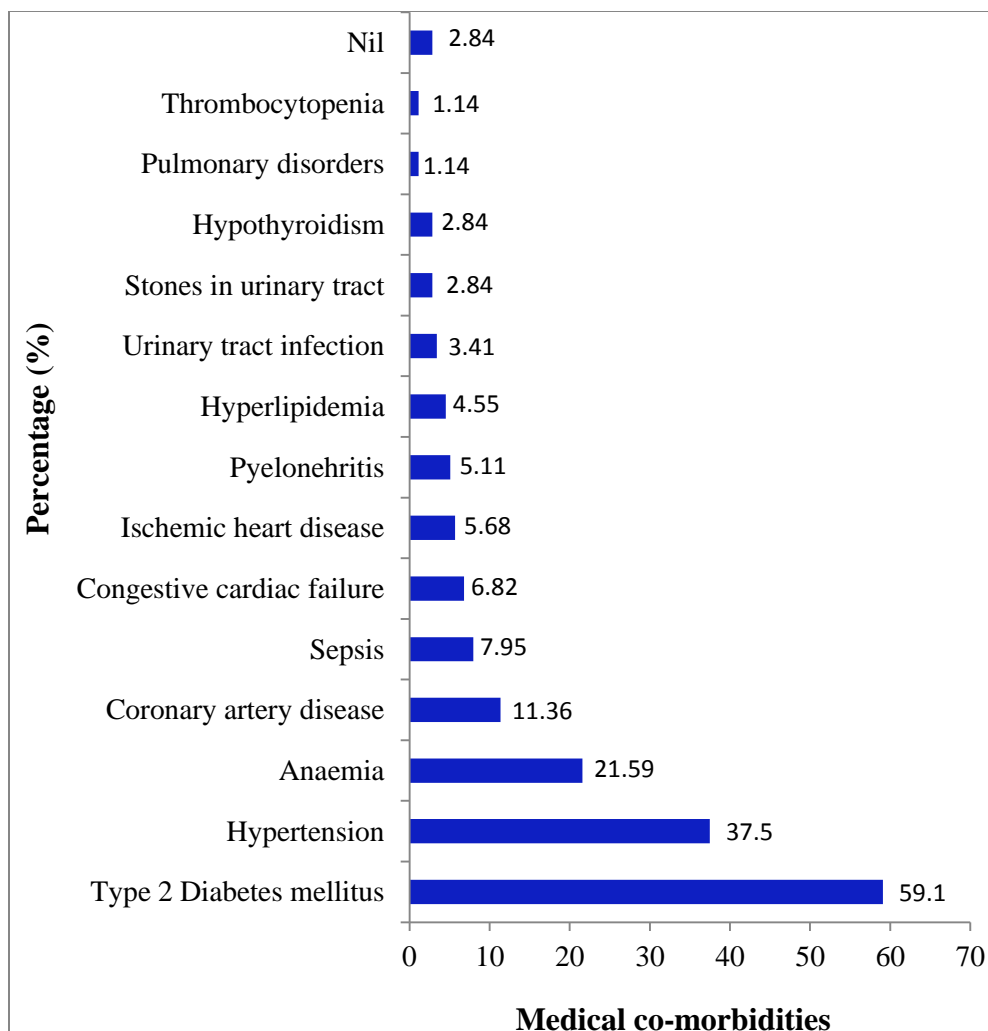
Fig. 2: Distribution of medical co-morbid condition among study population (n=176)

Among the study population, 1 (0.6%) patients were prescribed with 3 drugs, 15 (8.5%) patients were prescribed with 4 drugs, 50 (28.4%) patients were prescribed with 5 drugs, 30 (17.0%) patients were prescribed with 6 drugs, 31 (17.6%) patients were prescribed with 7 drugs, 20 (11.4%) patients were prescribed with 8 drugs, 15 (8.5%) patients were prescribed with 9 drugs, 4 (2.3%) patients were prescribed with 10 drugs, 3 (1.7%) patients were prescribed with 11 drugs, 2 (1.1%) patients were prescribed with 12 drugs, 3 (1.7%) patients were prescribed with 13 drugs, 1 (0.6%) patients were prescribed with 12 and 13 number of drugs individually. (Table 3)

Table 3: Frequency of number of drugs prescribed per patient in the study population (n= 176)

S. No.	No. of drugs per patient	Frequency of patients	Percentage (%)
1	3	1	0.6
2	4	15	8.5
3	5	50	28.4
4	6	30	17.0
5	7	31	17.6
6	8	20	11.4
7	9	15	8.5
8	10	4	2.3
9	11	3	1.7
10	12	2	1.1
11	13	3	1.7
12	16	1	0.6
13	19	1	0.6

A total of 1039 drugs were prescribed to 176 patients who were part of the study, of which 185 (17.8%) drugs were vitamin and mineral suppliments, 26 (2.5%) drugs were serum lipid reducing agents, 104 (10.0%) drugs were anti-diabetic drugs, 45 (4.3%) drugs were calcium channel blockers, 34 (3.3%) drugs were β blockers, 149 (14.3%) drugs were diuretics, 142 (13.7%) drugs were for gastrointestinal disorders, 83 (8%), 44 (4.2%), 67 (6.4%), 11 (1.2%), 12 (1.2%), 52 (5.0%), 24 (2.3%), 61 (5.9%) drugs were bronchodilators, analgesics, antibacterials, antianginal, antihypertensives, CNS drugs, corticosteroids and miscellaneous. drugs respectively. (Figure 3)
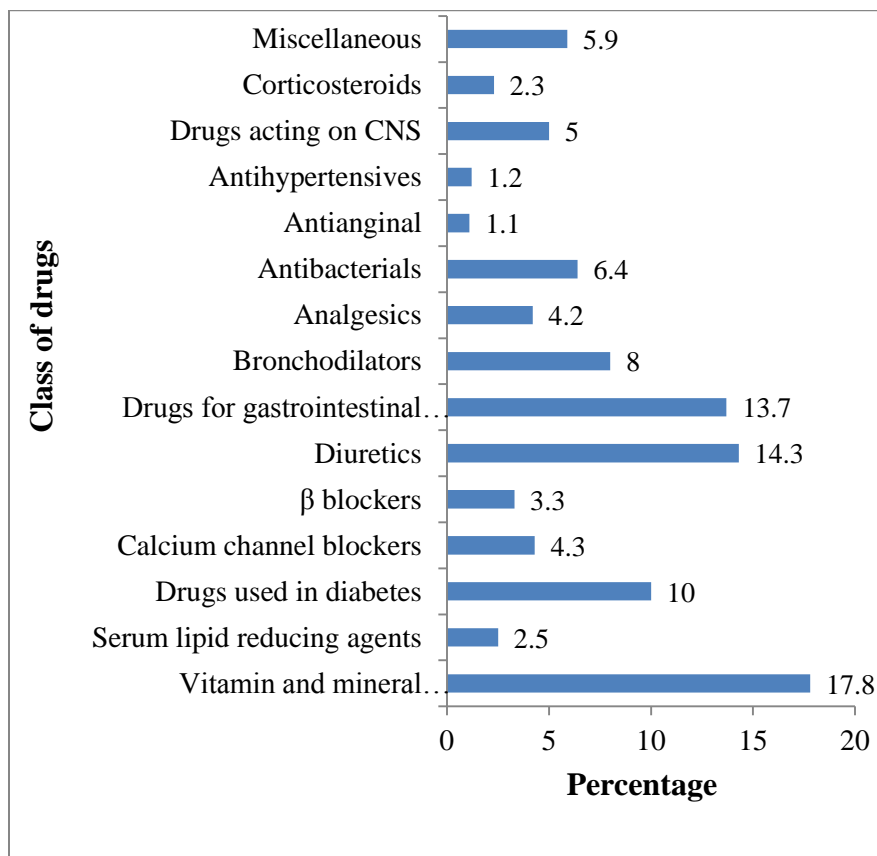

Fig. 3: Common classes of drugs prescribed in the study population (n= 176)

DISCUSSION

Prescription pattern studies are done to evaluate the quality of care given to the patients in the health care system. Appropriate selection of the drug therapy ensures maximum benefit to the patients and decreases the side effects.

In our study of 176 CKD patients 103 (58.52%) were females and 73 (41.48%) were males. A study conducted by Leila Malekmakan et al., resulted that 59.6% CKD cases accounts females and 40.4% for males. The result of this study was found to be similar with above study and indicated that female gender was the strongest risk factor for CKD.

In this study, mean (±SD) age of total study population was 52±19.9 years. 53 (30.11%) patients were in the age group of >68 years. The result of this study coincides with the study conducted by Leila Malekmakan et al., and Lin et al., which resulted that the prevalence of CKD increased with ageing in both males and females and the prevalence of CKD was higher in women than in men in almost all age groups respectively.

In our study, using CKD EPI equation used to mobile application to calculate eGFR, prevalence of CKD was found to be higher for stage 3. 24 (13.64%) male and 41 (23.30%) female patients had stage 3 CKD. The result of this study is in contrast to the study conducted by Kore C et al., which showed the prevalence of CKD is higher for stage 5 and lower for stage 3 and stage 4.

The prevalence of medical co-morbidities was analyzed and Type 2 diabetes mellitus was found to be highly prevalent, followed by hypertension and anaemia in our study. This is in contrary to the previous study reports showing hypertension at the first place, which may be attributed to the socio-economic status and other medical conditions of the study population.[20-23]

Polypharmacy was seen in almost all the patients. None of the patients received monotherapy (Table: 3). This study result coincides with the study results of Tamilselvan et al., and Kantanavar KA et al., Polypharmacy has been variously defined. It has been defined as the concurrent use of multiple drugs, and some researchers have discriminated between minor (two drugs) and major (more than four drugs) polypharmacy[24-26]. Others have defined it as the use of more drugs than are clinically indicated or too many inappropriate drugs[24, 27], as two or more medications to treat the same condition and as the use of two or more drugs of the same chemical class[28]. Polypharmacy is inevitable in CKD patients because of the prevalence of large number of co-morbidities.

Of the 1039 drugs prescribed to 176 patients, the most common drug prescribed was vitamin and mineral suppliments (17.8%). Our study result is found to be similar to the study result conducted by Rowa et al.,

CONCLUSION

There is a high burden of chronic kidney disease in Indian population that accounts for a high prevalence of morbidity and mortality. This study revealed the prescribing pattern of the various drugs used in CKD patients. Type 2 diabetes mellitus was found to be the highly prevalent co-morbid condition in CKD. This study provides a framework for continuous prescription audit in a hospital setting and suggests possible improvement in prescription practices in patients suffering from CKD.

ACKNOWLEDGMENTS

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