ISSN: 2091-2331 (Print) 2091-234X (Online)

Journal of Nobel Medical College

Volume 12, Number 01, Issue 22, January-June 2023, 8-12

Original Article

Pattern of Drug Prescription in Patients with Chronic Kidney Disease Maintained on Hemodialysis in a Tertiary Care Hospital

Nabin Kumar Yadav*[1], Kamal Kandel [2], Rinku Ghimire [1]

[1]Department of Pharmacology, Nobel Medical College Teaching Hospital, Biratnagar, Nepal

[2]Department of Pharmacology, Lumbini Medical College Teaching Hospital, Palpa, Nepal

Article Received: 24th November, 2022; Accepted: 14th March, 2023; Published: 30th June, 2023

DOI: https://doi.org/10.3126/jonmc.v12i1.56263

Abstract

Background

Chronic kidney disease affects the structure and function of the kidneys over a specific period of time. It is a worldwide public health related problem. It is usually associated with increasing age, hypertension, diabetes, cardiovascular disease and lack of exercise.

Materials and Methods

It was a cross-sectional observational study conducted at Nobel Medical College Teaching Hospital. A total 150 patients were enrolled in this study from March 2021 to February 2022. Patients aged 18 years and above diagnosed with chronic kidney disease and treated with dialysis were included in this study. Statistical tools were used to describe the relevant data.

Results

Chronic kidney disease was more predominant among males 90 (60%) than females 60 (40%). Thecommon co-morbid conditions were hypertension 51(34%) followed by hypertension & diabetes 40 (26.66%). 115 (76.66%) patients were receivinghemodialysis twice followed by 26 (17.33%) who were receiving it thrice a week. An average of 7.03 drugs per prescription was advised. Commonly used drugs were hydrocortisone 145 (96.66%), torsemide 90 (85.71%), and vitamin D_3 105 (75%). Among the complications, the most commonly occurred were chills & rigor 15 (10%) followed by backache 12 (8%).

Conclusion

Hydrocortisone, torsemide and Vit.D_3, were prescribed medications in CKD patients maintained on hemodialysis. Hydrocortisone was commonly used at this tertiary care hospital. Chills & rigor and backache were complication occurred during hemodialysis.

Key words: *Chronic kidney disease, Hypertension, Non-communicable disease*

***Corresponding Author:**
Dr. Nabin Kumar Yadav
Lecturer
Email: nabinmaharan@gmail.com
ORCID: https://orcid.org/0000-0002-4898-4809

Citation
Yadav NK, Kandel K, Ghimire R. Pattern of Drug Prescription in Patients with Chronic Kidney Disease Maintained on Hemodialysis in a Tertiary Care Hospital, JoNMC. 12:1 (2023) 8-12.

Introduction

Chronic kidney disease (CKD) is a heterogeneous disorder that affects the structure and function of the kidney [1]. CKD is defined as a gradual and permanent loss of renal function over a period of three months without any etiology [2].CKD is a major non-communicable disease. It is a worldwide risk to the public health population [3,4]. The Prevalence of CKD in Nepal is around 10.6% [5]. Hypertension, diabetes mellitus, interstitial diseases, and glomerular diseases are common causes of CKD [6].

Dialysis is a process that is used for removing waste products and excess water from the blood. It uses an artificial replacement for lost kidney function in patients with renal failure. Hemodialysis is called an artificial kidney. It is an adjunct of life-saving therapy in renal failure patients [7, 8]. Hypotension, muscle cramps, chest pain, hypoglycemia, and chills & rigor are the common complications that occur during dialysis [9].

This study was designed to analyze the prescribing pattern of drugs in CKD patient maintained on hemodialysis.

Materials and Methods

This study was a cross sectional observational study conducted at Department of Nephrology, Nobel Medical College and Teaching Hospital from March 2021 to February 2022. Data was collected after obtaining the ethical clearance from the Institutional Review Committee [Ref No.: IRC-NMCTH 418/2021] and permission from Department of Nephrology, NMCTH. All chronic kidney disease patients undergoing hemodialysis aged above 18 years were included in the study where as those who were not willing to take part in the study and patient on hemodialysis for acute renal failure were excluded from the study. The proforma was prepared by reviewing the literature of the related articles. The structured proforma consisted of the following parts. First part included the socio-demographic profile of the patient, second part included the provisional diagnosis and third part included the different drugs used in different system. The prepared proforma was reviewed by the subject expertise before obtaining the ethical clearance. The data was collected directly from face-to-face interview after getting the consent from the participants. The sample was taken by convenient sampling method. For the sample size estimation "$n=Z^2pq/d^2$" formula was used, p= 10.6% [5], with precision of ±5% and a level of confidence 95%. Based on these parameters, the sample size was 150. The collected data were entered in MS-Excel and analyzed by using SPSS version 18. Percentage, mean, standard deviation and range of age were used to describe the relevant data.

Results

A total of 150 CKD patients maintained under dialysis were included in the study. Among 150 patients, 90 (60%) were males, and 60 (40%) were females. The mean age of the patient was 49.99±9.99 years, and the maximum age was 77 years. The most commonly involved age group was 41- 60 years, followed by above 60 years old. The common co-morbidities that occur in CKD patients were hypertension 51(34%) followed by hypertension and diabetes both 40 (26.66%). Table 1 shows the demographic status of the patients.

Table 1: Demographic profile of chronic kidney disease patients

Titles	Number	Percentage (%)
Age		
< 40	35	23.33%
41- 60	65	43.33%
>60	50	33.33%
Gender		
Male	90	60%
Female	60	40%
Co-morbidities		
None	25	16.66%
HTN	51	34%
DM	20	13.33%
HTN & DM	40	26.66%
HTN & Others	9	6%
DM &Others	5	3.33%
Total Patients	150	
Mean age (± SD)	49.99±9.99 years	
Range of age	26 -77 years	

Only 115 (76.66%) patients obtained hemodialysis twice a week, and 26(17.33%) required dialysis thrice a week. Table 2 shows the frequency of hemodialysis.

Table 2: Numbers of dialysis per week in chronic kidney disease

Dialysis	Number of patients	Percentage (%)
Once/week	9	6%
Twice/week	115	76.66%
Thrice /week	26	17.33%

Among 150 CKD patients, 11 (7.33%) were taking less than five medicine per day, 112(74.66%) were taking 5-8 drugs per day, and 27(18%) were taking more than eight drugs per day. Table 3 shows the number of medicines administered per patient.

Table 3: Grouping of patients by number of drugs administered in chronic kidney disease maintained on hemodialysis

Number of drugs	Number of patients	Percentage
<5	11	7.33%
5-8	112	74.66%
>8	27	18%

Number of drugs administered per patient minimum- 3 and maximum- 10

A total of 1055 medicines were prescribed during this study period with an average of 7.03 medications per prescription. Among 150 patients,hydrocortisone was prescribed to 145 patients (96.66%),torsemide to 90 patients (85.71%), vitamin D3 to 105 patients (75%), insulin to 35 patients(70%), and phosphate binderscalcium carbonate to 80 patients (56.33%) were prescribed as elaborated in table 4.

Table 4: Commonly prescribed drugs in chronic kidney disease patients maintained on hemodialysis

Drug class	Drug name	Number (%)
CVS	Amlodipine	110 (47.82%)
	Losartan	15 (6.52%)
	Telmisartan	55 (23.91%)
	Metoprolol	30 (13.04%)
	Atenolol	20 (8.69%)
Diuretics	Torsemide	90 (85.71%)
	Furosemide	15 (14.28%)
Antidiabetic drugs	Insulin	35 (70%)
	Glimepiride	10 (20%)
	Linagliptin	5 (10%)
Haematopoietic agents	Iron	83 (56.08%)
	Erythropoietin	65 (43.91%)
Phosphate binder	Calcium carbonate	80 (56.33%)
	Calcium acetate	62 (43.66%)
Corticosteroids	Hydrocortisone	145 (96.66%)
H_2 blocker	Pantoprazole	25 (55.55%)
	Omeprazole	12 (26.66%)
	Lansoprazole	8 (17.77%)
Antimicrobial agents	Ceftriaxone	23 (57.5%)
	Amoxicillin+ Clavulanic acid	10 (25%)
	Vancomycin	7 (17.5%)
Antithyroid drugs	Levothyroxine	10 (6.66%)
Vitamins	Vitamin D_3	105 (75%)
	Calcitriol	33 (23.57%)
	Multi-vitamin	2 (1.42%)

During dialysis, the common complications that occurred were chills & rigor 15 (10%) followed by backache 12 (8%), nausea & vomiting 10 (6.66%), hypotension 9 (6%), and muscle cramp 5 (3.33%) as elaborated in table 5.

Table 5: Complications in chronic kidney disease maintained on hemodialysis

Complication	Number	Percentage
Chills & rigor	15	10%
Backache	12	8%
Hypotension	9	6%
Muscle cramp	5	3.33%
Nausea & vomiting	10	6.66%
Chest pain	4	2.6%
Hypoglycemia	3	2%

Discussion

The majority of the CKD patients maintained on hemodialysis were males.CKD was common in the 41- 60 years of age group population. The mean age of the population was 49.99±9.99 years, similar to the previous study, i.e., 49.53±15.09 years and 51.21±13.47 years in studies done by Oommen JM et al. [10] andPothen C et al. [11] respectively. In this study, 90 males (60%) and 60 females (40%) were suffering from CKD. The male and female ratio showed that male patients were more common than females. Similar findings were showed in a study done by Pokhrel A et al. which had 59% males [12] and Bartaula B et al., which had 61.8% male [13].

HTN 51(34%) was the most common co-morbidities in CKD patients. The findings are similar to the study done by Chaudhary SK et al. with HTN in 36.4% [14] and 54.95% [15] in study by Bajait CS et al.115 (76.66%) CKD patients received twice-weekly dialysis. Similar findings were in a previous study done by Oommen JM et al. with twice weekly dialysis in 78.31% [10] and 34.2% [13] in study done byBartaula B et al. The number of drugs prescribed per patient was seven, similar to the study conducted by Sgnaolin V et al. with 6.3 drugs per prescription [16] and Al-Ramahi R et al. with 7.8 drugs per prescription [17]. Among CKD patients, 112 (74.66%) had taken 5-8 drugs per day. Chaudhary SK et al. [14] also reported that 66.43% of patients had to take 5-8 per prescription, and Fasipe OJ et al. [18] showed that 41.5% of patients had taken 6-10 drugs per prescription.

The five most commonly used drugs were hydrocortisone 145 (96.66%), torsemide 90 (85.71%), vitamin D_3 105 (75%), insulin 35 (70%), and calcium carbonate 80 (56.33%).Hydrocortisone was very useful in treating conditions of unwanted inflammation and immune response [19]. Torsemide is three times more potent than furosemide and hence used in edema and HTN [20].Vitamin D_3 is used to prevent secondary hyperparathyroidism [21]. Insulin has intensive

glycemic control that reduces the rate and progression of microalbuminuria in diabetic control [22].Calcium carbonate was used for the treatment of hyperphosphatemia, normalizing phosphate concentration in CKD patients [23]

The commonly occurring complications in dialysis were chills & rigor 15 (10%), backache 12 (8%), nausea & vomiting 10 (6.66%), hypotension 9 (6%), and muscle cramp 5 (3.33%).Chill & rigor were due to blood transfusion, backache was due to immobility during dialysis [13], and nausea & vomiting was due to hypotension [24]. Hypotension was due to antihypertensive drugs before dialysis and muscle cramps due to the removal of excessive fluid [13].

It is a single hospital-based study. There is a small sample size, so it may not reflect the general population of Nepal. We don't have local guidelines on the prescription pattern of drugs for CKD patients maintained on hemodialysis. Prescription patterns and selection of drugs differ among physicians of different medical specialties.

Conclusion

It could be concluded that hypertension was the frequent related co-morbidity. Hydrocortisone, torsemide and Vit.D_3 were prescribed medications in CKD patients maintained on hemodialysis. Hydrocortisone was commonly used at this tertiary care center in our setup. Chills & rigor, backache and nausea & vomiting were complications occurred during dialysis.

Recommendation

Chronic kidney disease is a non-communicable disease increasing day by day. When a kidney is not functioning accurately, dialysis is one of the options; a twice-a-week hemodialysis is a good option for CKD patients. Physical activity, a controlled diet, and regular medicines are steps to slow down the progression of the disease.

Acknowledgement: None.

Conflicts of interests: None.

References

[1] Levey AS, Coresh J, Chronic kidney disease, Lancet. 379:9811(2012) 165-80. PMID: 21840587.
[2] Nathan RH, Fatoba ST, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS, et al., Global prevalence of chronic kidney disease: a systematic review and meta-analysis, PloS One. 11:7(2016) e0158765. PMID: 27383068.
[3] Couser WG, Remuzzi G, Mendis S, Tonelli M, The contribution of chronic kidney disease to the global burden of major noncommunicable diseases, Kidney Int.80:12 (2011) 1258-70. PMID: 21993585.
[4] Perico N, Remuzzi G, Chronic kidney disease: a research and public health priority, Nephrol Dial Transplant. 27:3 (2012) iii19-26. PMID: 22764188.
[5] Ghimire M, Pahari B, Das G, Sharma SK, Das GC, Prevalence of Peripheral Arterial Disease in End Stage Renal Disease Patients on Hemodialysis: a study from central Nepal, KUMJ. 12:47 (2014) 181-4. DOI: 10.3126 kumj.v12i3.13714.
[6] Goddard J, Turner AN, Stewart LH, Davidson's principle and practice of medicine. 21st edition. Edinburg: Churchill Livingstone Elsevier.(2010) p. 415-17.
[7] Anding K, Gross P, Rost JM, Allgaier D, Jacobs E, The influence of uraemia and haemodialysis on neutrophil, phagocytosis and antimicrobial killing, Nephrol Dial Transplant. 18:10 (2003) 2067-73. PMID: 13679482.
[8] Chaudhry A, Stone WJ, Breyer JA, Occurrence of pyuria and bacteriuria in asymptomatic hemodialysis patients, Am J Kidney Dis. 21:2 (1993) 180-3. PMID: 8430679.
[9] Himmelfarb J, Hemodialysis complications, Am J Kidney Dis. 45:6 (2005) 1122-31. PMID:15957144.
[10] Oommen JM, Nerurkar DP, Sajith M, Jawale S, Ambike S, Prescription pattern of chronic kidney disease patients undergoing hemodialysis in tertiary and private hospital, J Young Pharm. 11:2 (2019) 202-6. DOI: 10.5530/jyp.2019.11.42.
[11] Pothen C, Baby B, Ashokan A, Chacko C, Shenoy P, UP NK, Drug usage pattern in chronic kidney disease patients undergoing maintenance hemodialysis, Research J. Pharm. and Tech. 12:10 (2019) 5024-28. DOI: 10.5958/0974-360X.2019.00872.2.
[12] Pokhrel A, Pokhrel BR, Gyawali P, Regmi D, Khanal M, Bhattarai A, et al., Cardiovascular risk assessment in hemodialysis patients, Nepal Med Coll J. 23:3 (2021) 252-8. DOI: https://doi.org/10.3126/nmcj.v23i3.40385.
[13] Bartaula B, Subedi M, Kumar MM, Shrestha M, Bichha N, Mudbhari B, Spectrum of complications in chronic kidney disease patients undergoing maintenance hemodialysis: an experience of a tertiary care center in Nepal, Saudi J Kidney Dis Transpl. 30:1 (2019) 208-14. PMID: 30804283.
[14] Chaudhary SK, Manadhar N, Adhikari L, Polypharmacy and potential drug-drug interactions among medications prescribed to chronic kidney disease patients, Janaki Medical College Journal of Medical Sciences.9:1 (2021) 25-32. DOI: https://doi.org/10.3126/jmcjms.v9i1.38047.
[15] Bajait CS, Pimpalkhute SA, Sontakke SD, Jaiswal KM, Dawri AV, Prescribing pattern of medicines in chronic kidney disease with emphasis on phosphate binders. Indian J Pharmacol. 46:1 (2014) 35-9. PMID: 24550582.
[16] Sgnaolin V, Sgnaolin V, Engroff P, Carli GA, Elizabeth A, Figueiredo PL, Assessment of used medications and drug-drug interactions among chronic renal failure patients, Dialnet.24:4 (2014) 329-35. DOI: 10.15448/1980-6108.2014.4.17637.
[17] Al-Ramahi R, Raddad AR, Rashed AO, Bsharat A, Ghazeleh DA, Yasin E, et al., Evaluation of potential drug-drug interactions among Palestinian hemodialysis patients, BMC Nephrology. 17 (2016) 96. DOI: 10.1186/s 12882-016-0317-0.
[18] Fasipe OJ, Olayemi SO, Akinyede AA, Osho PO, Ibiyemi-Fasipe OB, Osho ES, How do we prevent the burden of extremely harmful and clinically nonbeneficial drug-drug interactions among chronic

kidney disease patients? Toxicology Research and Application. 2 (2018)1-14. DOI: 10.1177/2397847318 79486.
[19] Sharma HL, Sharma KK, Principles of Pharmacology. 2nd edition. Paras Medical Publisher; (2013) p 565-67.
[20] Tripathi KD. Essentials of Medical Pharmacology. 7th edition. Jaypee Brothers Medical Publishers (P) Ltd. (2013) p579-81.
[21] Jean G, Souberbielle JC, Chazot C, Vitamin D in chronic kidney disease and dialysis patients, Nutrients. 9:328 (2017) 1-15. PMID: 28346348.
[22] Devi DP, George J, Diabetic Nephropathy: Prescription Trends in Tertiary Care, Indian Journal of Pharmaceutical Sciences. 70:3 (2008) 374-78. PMID: 20046751.
[23] Chan S, Au K, Francis RS, Mudge DW, Johnson DW, Pillans PI, Phosphate binders in patients with chronic kidney disease, Aust Prescr. 40:1 (2017) 9-14. PMID: 28246429.
[24] Prabhakar, Singh RG, Singh S, Rathore SS, Choudhary TA, Spectum of Intradialytic Complications during Hemodialysis and its Management: A Single Center Experience, Saudi J Kidney Dis Transpl. 26:1 (2015) 168-72. PMID: 25579743.