J Biochem Technol (2022) 13(3): 63-66
https://doi.org/10.51847/ZF3KCjACdU
ISSN: 0974-2328

Evaluation of Drug Prescribing Trends and Drug-Drug Interactions among Chronic Kidney Disease Patients

Bilal Mustafa Memon, Saleem Ahmed Khoso, Abeer Ali El-Sherbiny Ateya, Lienda Bashier Eltayeb*

Received: 27 June 2022 / Received in revised form: 14 September 2022, Accepted: 17 September 2022, Published online: 20 September 2022

Abstract

Chronic kidney disease (CKD) is a challenging problem for medicine to overcome. The renal disorder is frequently misdiagnosed; nevertheless, attempts are being made to enhance the identification and treatment of patients with this comorbidity. The objective of the present study was to assess the prescribing patterns and drug/drug interactions among patients suffering from CKD and renal transplantation. About 300 patients were recruited after following the inclusion and exclusion criteria, and the prospective observational study was carried out for a period of six months at the tertiary care Hospital Larkana. The sample comprised 63% males and 37% females, and the primary age group was 65-75 years 31.66%. The major comorbidities were Diabetes Mellitus 22.33% and Hypertension 19.66%. Besides, 89% were CKD, and 11% were transplantation patients. The present study made detailed research on the drugs prescribed in CKD and Transplantation cases, and most of the drugs were prescribed with trade names and without following the WHO guidelines, which triggered the serious DDIs.

Keywords: CKD, Renal transplantation, DDIs, Prescription

Introduction

Drug utilizing study (DUR) is termed as the approved, systemic, organized, consistent surveying of prescribing, imparting, and using of prescription and contains very prime goal and parameter of ensuring the rational drug therapy (Kanani *et al*., 2019), which possesses significant importance for taking the wise decision for any tertiary care Hospital (National Kidney Foundation, 2002; World Health Organization: Burden of Disease Project, 2018; Kanani *et al*., 2019). The Kidney Disease outcome quality Initiative (KDOQI) of the national kidney foundation is explained as Kidney damage or the GFR < 55MI/min/1.73m2 for > three months (Castelino *et al*., 2020). As per the World Health Organization survey, chronic Kidney disease has a very profound mortality rate, and more than 850,000 deaths are reported per year (Castelino *et al*., 2020). In owning to the confined lifestyle, polypharmacy poses a serious threat of severe adverse effects to patients suffering from CKD. Having different comorbidities like hypertension, Diabetes Mellitus, Coronary artery disease, and infection, and the recommendation of different drugs for the comorbidities can severely worsen the existing CKD complication (Tesfaye *et al*., 2017; Doody *et al*., 2020; Alqurashi *et al*., 2021). In these conditions, rational drug therapy is extremely difficult because of the augmented risk of drug-associated problems that needs the proper attention for the complicated drug regimen with expert monitoring (Al-Ramahi, 2012; Oluyombo *et al*., 2017). Efficacy, economy, compliance, and adherence are taken into consideration in selecting the drug for curing patients suffering from CKD (Hill *et al*., 2016; Liu *et al*., 2020). Such patients are most of the time taking polypharmacy prescriptions and are more at risk of drug-drug interaction and adverse drug reactions. There is a dire need to make the proper and suitable selection of drugs to avoid unwanted effects and ensure optimum patient outcomes (Ahlawat *et al*., 2015; Pothen *et al*., 2019). Some of the complexities, such as CVS, Anemia, and High blood pressure, need sound management (Tamilselvan *et al*., 2014) and approach, which can trigger several other complications and worsen kidney functions, ultimately adversely altering the quality of life (Bajait *et al*., 2014; Santra *et al*., 2014). The objective of this observation was to dissect the present endorsing trends in the administration of CKD patients and to suggest approaches to support drug utilization, restrict prescription error and improve therapeutic outcomes.

Materials and Methods

Study Design

The Perspective observational study was carried out for six months. The study was taken at the tertiary care Hospital in Larkana, North of Sindh. All patients aged between 25-75years old and patients suffering from CKD and renal transplantation were included. Patients aged below 25 years, as well as mentally unsound patients, were completely excluded.

Bilal Mustafa Memon
College of Pharmacy, Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro, Pakistan.

Saleem Ahmed Khoso
Appna Institute of Public Health, Jinnah Sindh Medical University Karachi, Pakistan.

Abeer Ali El-Sherbiny Ateya, Lienda Bashier Eltayeb*
Department of Medical Laboratory Sciences, College of Applied Medical Sciences, Prince Sattam Bin Abdul Aziz University- Al-Kharj, 11942 Riyadh, KSA.

***E-mail:** Lindarose009@hotmail.com

© 2022 The Author(s). This is an **Open Access** article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC-BY 4.0).
https://creativecommons.org/licenses/by/4.0/deed.en

In the current study, 300 patients were recruited for the study using a purposive sample technique. The six-month data of patients, including demographic (age and sex) signs, symptoms, indication with the grade, comorbidities, the number of drugs prescribed per prescription, utilization of the generic and trade name, drugs suggested with group /class, dosage forms, drug/drug interactions with severity level were taken into account. Data was analyzed and compared with drug prescribing from the WHO model list of essential medicine (Shamsuddin *et al*., 2018). The Medscape medicine reference information base was employed to evaluate patients' medicine routines for anticipated DDIs. The objectivity of the solution was split by contrasting dissimilar factors like medicine recommended by generic and trade name, % age of dosage forms, a drug prescribed by WHO, and the severity of drug-drug interaction found in each prescription. Data was gathered and statistically analyzed using the SPSS software version 26.

Results and Discussion

In the current study, 300 patients were recruited for the study using a purposive sample technique. The six-month data of patients, including demographic (age and sex) signs, symptoms, indication with the grade, comorbidities, the number of drugs prescribed per prescription, utilization of the generic and trade name, drugs suggested with group /class, dosage forms, drug/drug interactions with severity level were taken into account. The sample comprised 63% males and 37% females, and the primary age group was 65-75 years 31.66%. The major comorbidities were Diabetes Mellitus 22.33% and Hypertension 19.66%. Besides, 89% were CKD, and 11% were transplantation patients. All demographic and clinical data was summarized in **Table 1**.

Table 2 illustrates the analysis of drug utilization based on WHO-drug core indicators where the number of drugs from the WHO essential drug lists out of the total number of medicines is about 33.98%. The classes of medicine recommended to the patients are summarized in **Table 3**. **Figure 1** displays Drug/Drug interactions with Severity Levels among study participants. Among the 300 prescriptions, 270 DDIs were reported; 17% were severe in nature, 63% were moderate, and 20% were mild-natured.

Table 1. Demographic and baseline data of study subjects

Parameters	Number	Percentage
Demographic data of Patients		
Gender		
Male		63%
Female		37%
Clinical status of patients		
CKD		89%
Renal transplantation		11%
Age group		
25-34	23	7.6
35-44	52	17.33
45-54	61	20.33
55-64	69	23
65-75	95	31.66
Comorbidities of patients		
CLD	45	15
Anemia	13	4.33
Coronary Artery Disease	17	5.66
Hypertension	59	19.66
Diabetes Mellitus	67	22.33
Urinary tract infection	33	11
Thyroid	27	9
Others	39	13
Dosage forms prescribed Total prescribed drugs (2054)		
Powder	31	1.5
Injections	188	9.15
Capsule	207	10.07
Tablets	1534	74.68
Syrup	67	3.26
Others	27	1.31
Mode of prescription		
Generic	67	3.2
Trade	1987	96.7

Table 2. Analysis of drug utilization based on WHO-drug core indicators

Prescribing Indicators	Frequency
Prescription assessed	300
Total Number of medicine	2054
Avg Number of drugs/ prescription	6.8
Drugs recommended by generic	3.2
Number of drugs from the WHO essential drug list out of the total number of medicines	698 (33.98%)

Table 3. Class of medicine recommended to the Patients

Drug Class	Number	Percentage
Thyroid Drugs	53	2.5
Antihypertensive	277	13.4
Antidiabetic	87	4.23
Antipsychotic	209	10.1
Antifungal	21	1.022
Anti-gastric	57	2.77
Supplements	209	10.17
Analgesics	71	3.4
Antihistamine	27	1.31
Antimuscarininc	17	0.82
Statins	61	2.9
Antiviral	43	2.09
Antibiotics	208	10.12
Steriods	153	7.44
Mucolytic Agents	61	2.96
Multivitamins	254	12.3
Immuno-suppressants	61	2.9
Others	183	8.90

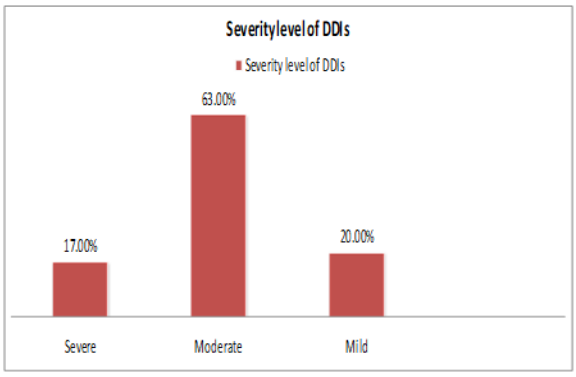


Figure 1. Drug/Drug interactions with Severity Level among study participants

The lack of awareness, the poor lifestyle, and the contaminated drinking water have increased kidney patients over the last few years. It has not only augmented the Renal Patients, but at the same time, the comorbidities have also been triggered, and the work burden has increased immensely on the SUIT hospital. SUIT is one of the best service providers among renal patients. Several Deaths are reported per year because of renal complications in Pakistan. In the current study, the prospective observational study was conducted at the Chandka Medical College Hospital Larkana for six months, where the CKD and transplantation patients were considered. The sample comprised 63% males and 37% females, which is consistent with the study made by Pothen *et al*. The dominance of male patients has further worsened the economic status of people because most males are the only breadwinners for their families. The most number of patients were found in the age group of 65 to 75, which is inconsistent with the study of Pothen *et al*., where the maximum number of patients were aged 51. The current study is in line with the study conducted by Ahlawat *et al*., where the number of patients with CKD is relatively high, 89%, compared to the patients of the transplantation, which was 11%. The present study is inconsistent with the study conducted by Santra *et al*., which showed Hypertension as the major comorbidity among the patients. In the present study Diabetes Mellitus comes first with 22.33%, followed by Hypertension at 19.6%. The WHO guidelines were followed less; hence there is a dire need to give away proper significance to the essential medicine guidelines of the WHO. In the current study, a total of 2054 drugs were prescribed, and the most recommended drugs were in the class of antihypertensive 13.4%, which is further related to the study conducted by Ahlawat *et al*., and antimuscarinic were less prescribed about 0.8%. Out of the total drugs prescribed, the tablets were the most prescribed and 74.68 %, while 10.07% were capsules, and 9.15% were injections. Of the drugs prescribed, 96.7% in trade names and 3.2% with generic names were recommended. The drug/drug interactions included 17% severe, 63% moderate, and 20% mild, which is consistent with the study conducted by Rama *et al*. (2012), which showed a high number of moderate followed by mild and severe cases.

Conclusion

The present study made detailed research on the drugs prescribed in CKD and Transplantation cases. Most of the drugs were prescribed with trade names and without following the WHO guidelines, which triggered the serious DDIs. This study can be very much helpful in identifying the educational and quality enhancement opportunities to curb prescription-related complications in the community.

Acknowledgments: This publication was supported by the Deanship of scientific research at Prince Sattam bin Abdul-Aziz University.

Conflict of interest: None

Financial support: None

Ethics statement: The ethical approval was sought from the ethical committee constituted by Liaquat University of medical and health science Jamshoro.

References

Ahlawat, R., D'Cruz, S., & Tiwari, P. (2015). Drug utilization pattern in chronic kidney disease patients at a tertiary care public teaching hospital: Evidence from a cross-sectional study. *Journal of Pharmaceutical Care & Health Systems*, *3*, 2376-2419.

Alqurashi, M. Y., Alharthi, K. F., Abdulrahman, A., Alshehri, Y. K. A., Sanousi, M. A., Abdullah, A., Almazyed, K. S. A., Alrashidi, S. M., Abdullah, W., Qaeed, A. A. A., et al. (2021). The Role of Dpp-4 Inhibitors In Type-2 Diabetes Patients With Chronic Kidney Disease. *Pharmacophore, 12*(3), 91-94.

Al-Ramahi R. (2012). Medication prescribing patterns among chronic kidney disease patients in a hospital in Malaysia. *Saudi journal of kidney diseases and transplantation: an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia*, *23*(2), 403-408.

Bajait, C. S., Pimpalkhute, S. A., Sontakke, S. D., Jaiswal, K. M., & Dawri, A. V. (2014). Prescribing pattern of medicines in chronic kidney disease with emphasis on phosphate binders. *Indian Journal of Pharmacology*, *46*(1), 35-39. doi:10.4103/0253-7613.125163

Castelino, R. L., Saunder, T., Kitsos, A., Peterson, G. M., Jose, M., Wimmer, B., Khanam, M., Bezabhe, W., Stankovich, J., & Radford, J. (2020). Quality use of medicines in patients with chronic kidney disease. *BMC Nephrology*, *21*(1), 216. doi:10.1186/s12882-020-01862-1

Doody, H. K., Peterson, G. M., Watson, D., & Castelino, R. L. (2015). Retrospective evaluation of potentially inappropriate prescribing in hospitalized patients with renal impairment. *Current Medical Research and Opinion*, *31*(3), 525-535. doi:10.1185/03007995.2015.1010036

Hill, N. R., Fatoba, S. T., Oke, J. L., Hirst, J. A., O'Callaghan, C. A., Lasserson, D. S., & Hobbs, F. D. (2016). Global Prevalence of Chronic Kidney Disease - A Systematic Review and Meta-Analysis. *PloS One*, *11*(7), e0158765. doi:10.1371/journal.pone.0158765

Kanani, N. J., Mistry, V. R., & Sandeep, J. R. (2019). Drug utilization pattern in chronic kidney disease patients at a

tertiary care teaching hospital. *Innovations in Pharmaceuticals and Pharmacotherapy, 7*(2), 31-36.

Liu, B., Wang, Q., Wang, Y., Wang, J., Zhang, L., Zhao, M., & C-STRIDE study group (2020). Utilization of antihypertensive drugs among chronic kidney disease patients: Results from the Chinese cohort study of chronic kidney disease (C-STRIDE). *Journal of Clinical Hypertension (Greenwich, Conn.)*, *22*(1), 57-64. doi:10.1111/jch.13761

Mittal, N., Mittal, R., Singh, I., Shafiq, N., & Malhotra, S. (2014). Drug utilisation study in a tertiary care center: recommendations for improving hospital drug dispensing policies. *Indian Journal of Pharmaceutical Sciences*, *76*(4), 308-314.

National Kidney Foundation (2002). K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *American journal of kidney diseases: the official journal of the National Kidney Foundation*, *39*(2 Suppl 1), S1-S266.

Oluyombo, R., Ayodele, O. E., Akinwusi, P. O., Okunola, O. O., Akinsola, A., Arogundade, F. A., Sanusi, A. A., & Onayade, A. (2013). A community study of the prevalence, risk factors and pattern of chronic kidney disease in Osun State, South West Nigeria. *West African Journal of Medicine*, *32*(2), 85-92.

Pothen, C., Baby, B., Ashokan, A., Chacko, C., Shenoy, P., & Nandakumar, U. P. (2019). Drug usage pattern in chronic kidney disease patients undergoing maintenance hemodialysis. *Research Journal of Pharmacy and Technology*, *12*(10), 5024-5028. doi:10.5958/0974-360X.2019.00872.2

Rama, M., Viswanathan, G., Acharya, L. D., Attur, R. P., Reddy, P. N., & Raghavan, S. V. (2012). Assessment of Drug-Drug Interactions among Renal Failure Patients of Nephrology Ward in a South Indian Tertiary Care Hospital. *Indian Journal of Pharmaceutical Sciences*, *74*(1), 63-68. doi:10.4103/0250-474X.102545

Santra, S., Agrawal, D., Kumar, S., & Mishra, S. S. (2015). A study on the drug utilization pattern in patients with chronic kidney disease with emphasis on antibiotics. *Journal of Integrative Nephrology and Andrology*, *2*(3), 85.

Shamsuddin, N., Gnanasan, S., Karuppannan, M., & Farooqui, M. (2018). A Call for an Educational Intervention Tool to Guide Selection of Complementary and Alternative Medicine (CAM) in Chronic Kidney Disease (CKD) Patients. *Archives of Pharmacy Practice*, *9*(2), 1-3.

Tamilselvan, T., Veerapandiyan, A. K., & Karthik, N. (2014). Study on drug utilization pattern of chronic renal failure patients in a tertiary care hospital. *Hypertension*, *70*(42), 112.

Tesfaye, W. H., Castelino, R. L., Wimmer, B. C., & Zaidi, S. T. R. (2017). Inappropriate prescribing in chronic kidney disease: A systematic review of prevalence, associated clinical outcomes and impact of interventions. *International Journal of Clinical Practice*, *71*(7), 10.1111/ijcp.12960. doi:10.1111/ijcp.12960

World Health Organization: Burden of Disease Project. (2018). Available from: http://www3.who.int/whosis/menu.cfm. Accessed 22.