

Evaluation of Prescribing Pattern of Drugs in Hemodialysis Patients

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Abstract

Background: Patients undergoing hemodialysis often exhibit a high level of dependency and frequently present with multiple co-morbid conditions. Chronic kidney disease (CKD) poses a significant global public health challenge, with its association with numerous complications. Prescribing medications appropriately for individuals with CKD presents a substantial challenge. **Objective:** The study aimed to assess the prescribing patterns of drugs in hemodialysis patients. **Results:** Out of the total 82 selected patients, 42 (51%) were male, and 40 (49%) were female. The prescribed drugs for dialysis patients included cardiovascular drugs (73.14%), gastrointestinal drugs (90.23%), antidiabetics (52.86%), hematopoietic agents (82.92%), vitamins and minerals (68.27%), and antibiotics (63.92%). **Conclusion:** The study's conclusion indicates that individuals undergoing dialysis predominantly consisted of elderly patients with concurrent co-morbid conditions. The prescribed medications for dialysis patients primarily included cardiovascular drugs, gastrointestinal drugs, antidiabetics, hematopoietic agents, vitamins and minerals, as well as antibiotics.

Keywords: Chronic Kidney Disease, ESRD, Hemodialysis, Prescription patterns, Co morbid conditions

INTRODUCTION

Chronic kidney disease (CKD) has emerged as a significant global health issue [1]. Individuals undergoing chronic hemodialysis often experience a myriad of complications, including fluid retention, elevated potassium levels, low hemoglobin levels, and weakened bones, necessitating pharmacological interventions. Managing these complications typically involves the use of multiple medications, particularly to address coexisting conditions such as hypertension, diabetes mellitus, and cardiovascular diseases. However, this polypharmacy approach not only escalates the cost of treatment but also presents a formidable challenge in the care of CKD patients. Non-adherence to prescribed medication regimens can significantly amplify the risk of severe complications, particularly in hemodialysis patients on multiple medications.

Several known predictors for the use of multiple medications include age, female gender, and low educational status [2]. In managing CKD patients on maintenance hemodialysis, the primary goals

revolve around addressing complications and preventing morbidity and mortality [3]. Notably, individuals with CKD bear one of the highest daily pill burdens [4]. Beyond the physical challenges, these patients contend with losses in professional, social, sexual, and psychological aspects, compounded by the emotional shocks experienced at the time of diagnosis and throughout the treatment journey [5].

To enhance their quality of life, CKD patients must be motivated to adhere to dietary and fluid

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intake guidelines, fostering adaptability to conditions that enable both social and physical activity within their natural potential [6]. Additionally, the survival of dialysis patients hinges on the delivery of an adequate dialysis dose, which should consider functional outcomes to accurately estimate dialysis adequacy [7]. This underscores the complex interplay between medical management, patient adherence, and overall well-being in the challenging landscape of CKD and hemodialysis [8, 9].

METHODOLOGY

Study Design

Prospective study.

Study Duration

Study was conducted for a period of six months from January 2021 to June 2021 among hemodialysis patients.

Study Site

Hemodialysis unit Navodaya Medical College Hospital and Research Centre, Raichur, Karnataka.

Data Collection

The necessary data was gathered using a specifically crafted data entry form. All the compiled information underwent thorough evaluation. The project team consisted of a Pharm D student, and visits to the dialysis unit were conducted daily as per the established schedule. The project team engaged in direct interactions with patients during these visits [10].

Sample size

The study was planned with a total number of 82 patients.

Eligibility Criteria

Inclusion Criteria

Inpatients and outpatients are attending dialysis unit of NMCH and RC and patients willing to participate in the study.

Exclusion Criteria

- Patients are not willing to participate in the study.
- Pediatric patients

Ethics Committee Approval

The study was approved by the committee by issuing ethical clearance certificate.

RESULT

A prospective observational study was designed to be conducted on hemodialysis patients visiting the dialysis unit of NMCH & RC. Among the 82 patients, 7 were in the age group of 26-35, 15 in the age group 36-45, 13 in the age group 46-55, 21 in the age group 56-65, and 26 were above 65, as presented in Table 1. The distribution of male and female patients in the hemodialysis process is also illustrated in Table 1.

Education levels of the 82 participants were detailed in Table 2, with 42 (51.21%) having completed primary school, 24 (29.26%) with a high school education, and 16 (19.51%) being graduates; no participants held a postgraduate degree. Employment status of the participants is depicted in Table 3, with 12 (14.63%) unemployed, 16 (19.51%) employed in the private sector, 32 (39.02%) working as homemakers, and 22 (26.82%) engaged in other occupations.

Table 4 outlines the financial status of the participants, with monthly incomes distributed as follows: less than 12,000 INR for 8 participants, 12,000-24,000 INR for 48 participants, 24,000-48,000 INR for

16 participants, and 48,000-1,10,000 INR for 5 participants; 5 participants had incomes between 1,10,000-1,75,000 INR.

The duration of dialysis for participants is summarized in Table 5, with 12 (17.07%) spending 2 hours/day, 26 (31.70%) spending 3 hours/day, and 42 (51.21%) spending 4 hours/day. The adherence of patients to the recommended diet and treatment is presented in Tables 6 and 7, respectively.

Table 8 illustrates the frequency of dialysis sessions, with 24 (29.26%) patients undergoing hemodialysis twice a week, 40 (48.78%) three times a week, and 18 (21.95%) four times a week.

In Table 9, co-morbid conditions among the participants are detailed, with 32 having hypertension, 12 suffering from CAD, 16 having COPD/TB, 20 diagnosed with diabetes mellitus, and 2 experiencing GI bleeding.

Finally, Table 10 outlines the various classes of drugs prescribed for dialysis patients, including cardiovascular drugs, GI drugs, antidiabetics, hematopoietic agents, vitamins and minerals, and antibiotics.

Table 1. Age and sex distribution of study participants (N=82).

Age	No. of patients	Male	Female
26-35	7 (8.53%)	4	3
36-45	15 (18.29%)	11	4
46-55	13 (15.85%)	6	7
56-65	21 (25.60%)	9	12
>65	26 (31.70%)	12	14
	Total no. of patients = 82	42	40
	%	51%	49%

Table 2. Education level of study participants (N=82).

Education level	No. of patients	%
Primary school	42	51.21
High school	24	29.26
Graduate	16	19.51
Post graduate	0	0

Table 3. Occupational status of study participants (N=82).

Occupational status	No. of patients	%
Unemployed	12	14.63
Private employee	16	19.51
Household	32	39.02
Others	22	26.82

Table 4. Financial status of participants (N=82).

Financial status (income in INR per month)	No. of participants	%
< 12,000	8	9.75
12,000-24,000	48	58.53
24,000-48,000	16	19.51
48,000-1,10,000	5	6.09
1,10,000-1,75,000	5	6.09
> 1,75,000	0	0

Table 5. Duration of dialysis in participants (N=82).

Duration of dialysis	No. of participants	%
2 hr/day	14	17.07
3 hr/day	26	31.70
4 hr/day	42	51.21

Table 6. Adherence to recommended diet by study participants (N=8).

Adherence to recommended diet	No. of patients	%
Very much	48	58.53
Quite	26	31.705
Little	8	9.756
Not at all	0	0

Table 7. Adherence to recommended treatment by study participants (N=82).

Adherence to recommended treatment	No. of patients	%
Very much	38	46.34
Quite	28	34.143
Little	16	19.51
Not at all	0	0

Table 8. Frequency of dialysis session in study participants (N=82).

Frequency of dialysis session	No. of patients	%
2x/week	24	29.265
3x/week	40	48.785
4x/week	18	21.950

Table 9. Co morbid conditions of study participants (N=82).

Co morbid conditions	No. of patients	%
Hypertension	32	39.02
CAD	12	14.63
COPD/TB	16	19.51
Cancer	0	0
Diabetes mellitus	20	24.39
Psychiatric disorder	0	0
GI bleeding	2	2.431

Please note that while I have rephrased the text to the best of my ability, specific details related to the study are preserved, and it's important to provide proper citation if this information is used in a formal setting.

DISCUSSION

There are 82 participants in the study, with the majority being geriatric patients, constituting around 50-60%. Geriatric patients are more prone to co-morbid conditions like hypertension, diabetes mellitus (DM), and coronary artery disease (CAD), making them at a higher risk of developing chronic kidney disease (CKD) and subsequently undergoing dialysis. The distribution between male and female participants is roughly equal.

The primary aim of dialysis therapy, especially in geriatric patients, is to reduce morbidity and mortality [7]. The overall education level of the study participants is predominantly up to primary

school. Dialysis duration varies, with patients spending 2, 3, or 4 hours per day, and those in the advanced stage of CKD (stage 4) typically undergoing the maximum duration of 4 hours. Prolonged dialysis may have implications for the physical health of individuals.

Table 10. Different class of drugs prescribed in dialysis patients (N=82).

Drugs	No. of patients	%
Cardiovascular drugs		
CCB	16	19.51
Diuretics	20	24.39
Alpha-blocker	2	2.43
ACE inhibitor	10	12.19
ARB	4	4.87
Beta -blocker	8	9.75
GI drugs		
PPIs	46	56.09
H2 blockers	28	34.14
Anti-diabetics		
Insulin	22	26.82
Oral hypoglycemic agents	23	26.04
Hematopoietic		
Iron	36	43.90
Folate	12	14.63

The study indicates that CKD lasting for more than a year often leads to dialysis, with hypertension and DM identified as the main contributing factors. The severity of the disease progresses, and CKD stage 4 is a common reason for initiating dialysis.

Patients undergoing hemodialysis due to CKD are required to adhere strictly to a physician-recommended diet. Certain food items, such as processed meat, chili, and high-sodium and high-phosphorous foods, should be avoided. The study reveals that 60% of participants were highly adherent to the prescribed diet.

Individuals undergoing dialysis often have multiple co-morbidities, necessitating numerous medications. Adherence to prescribed treatments is crucial for preventing deterioration in health. The study participants demonstrate high adherence to the recommended treatment regimen.

Regarding the frequency of dialysis sessions, the study shows that 70% of participants undergo dialysis 3-4 times per week, potentially influenced by the severity of CKD. Patients with advanced CKD, particularly in the last stage, may require more frequent dialysis sessions.

Co-morbid conditions among the participants include 32 with hypertension, 12 with CAD, 16 with COPD/TB, 20 with diabetes mellitus, and 2 with GI bleeding. Hypertension and diabetes mellitus are the most prevalent co-morbid conditions among the participants.

Participants undergoing dialysis receive a variety of prescribed medications. Cardiovascular drugs, such as calcium channel blockers (CCB), diuretics, alpha-blockers, ACE inhibitors, angiotensin receptor blockers (ARBs), and beta-blockers, are commonly prescribed for hypertension. GI drugs like proton pump inhibitors (PPIs) and H2 receptor blockers are prescribed for GI bleeding. Antidiabetics such as insulin and oral hypoglycemic agents are administered for diabetes. Hematopoietic agents are given every 15 days to address the loss of erythropoietin hormone production by the kidneys. Hematinics, including folic acid supplements and iron preparations, are often prescribed for anemic

patients. Vitamins and minerals, including vitamin D, calcitriol, and multivitamins/multiminerals, are prescribed for deficiencies. Various antibiotics, including cephalosporins like ceftriaxone, cefotaxime, and ciprofloxacin, are also commonly prescribed.

Please note that I've paraphrased the text to the best of my ability while retaining the key information. If used in a formal setting, proper citation is essential.

CONCLUSION

The study primarily involves a higher proportion of elderly participants who exhibit coexisting health conditions. These individuals are currently undergoing treatment with various medications, including anti-hypertensives, anti-diabetic agents, hematopoietics, as well as vitamins, minerals, and antibiotics.

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Conflicts of Interest

There are no conflicts of interest.

Abbreviations

ARB: angiotensin receptor blockers
CKD: chronic kidney disease
CAD: coronary artery disease
CCB: calcium channel blockers
COPD: chronic obstructive pulmonary disease
E.g.: example
Et,al: all others
HD: hemodialysis
Hr: hour
PPI: proton pump inhibitors
TB: tuberculosis

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