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ORIGINAL

Comparison of dialysis practice and medication prescription pattern in chronic kidney disease patients undergoing hemodialysis at tertiary care and private hospital, Pune, India

Comparación de la práctica de diálisis y el patrón de prescripción de medicamentos en pacientes con enfermedad renal crónica sometidos a hemodiálisis en un hospital de atención terciaria y uno privado, Pune, India

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Abstract

Background: Chronic kidney disease (CKD) is a worldwide public health problem associated with various complications. CKD patients undergoing hemodialysis have associated comorbidities and prescribing drugs rationally in these patients is a difficult task.
Objective: To evaluate the prescription pattern of chronic kidney disease patients undergoing hemodialysis in both hospitals.
Methodology: the study was carried out in a tertiary care and a private hospital for a period of nine months. Chronic kidney disease patients on maintenance hemodialysis for at least one month were included. Details like sociodemographic and clinical characteristics, past medication history, comorbidities, and current medications were noted in self-pre-designed Patient Proforma. Mean ± standard deviation and percentages and relevant statistical tests likethe Chi-square test was used.
Result: The majority of the patients belongedthe to middle socio-economic class in private hospital and the lower-middle classa in tertiary hospital. Maximum were unemployed (50.60%, 36%), married (90.36%, 88,%) and had high school qualification (62.65%, 45.33%). About 78 (93.97%) patients were covered with insurance/health scheme in tertiary hospital and 39 (52%) in private hospital. Hypertension was found to be the leading cause in tertiary and private hospital. Calcium channel blockers (77.10%, 53.30%) were highly prescribed in both hospitals. Erythropoietin (69.80%), calcium acetate (21.70%) an,d anti-diabetics (Insulin 10.84%) in tera tiary hospital, whereas newer and costlier drugs like Darbepoetin, Iron preparations, and Lanthanum carbonate were prescribed ina private hospital.
Conclusion: Socioeconomic status led to variation in prescription patterns among both hospitals as newer and costlier drugs like Lanthanum carbonate, Sevelamer, and Darbepoetin were prescribed only in private hospital.

Keywords: Chronic kidney disease, Hemodialysis, Polypharmacy, Prescription pattern, Socioeconomic status.

Resumen

Antecedentes: La enfermedad renal crónica (ERC) es un problema de salud pública mundial asociado a diversas complicaciones. Los pacientes con ERC sometidos a hemodiálisis presentan comorbilidades asociadas y la prescripción racional de fármacos en estos pacientes es una tarea difícil.
Objetivo: Evaluar el patrón de prescripción de los pacientes con enfermedad renal crónica sometidos a hemodiálisis en varios hospitales.
Metodología: el estudio se llevó a cabo en un hospital de atención terciaria y otro privado durante un periodo de nueve meses. Se incluyeron pacientes con enfermedad renal crónica en hemodiálisis de mantenimiento durante al menos un mes. Se anotaron detalles como las características sociodemográficas y clínicas, los antecedentes de medicación, las comorbilidades y la medicación actual en un formulario de paciente de diseño propio. Se utilizaron la media ± desviación estándar y los porcentajes, así como pruebas estadísticas pertinentes como la prueba de Chi-cuadrado.
Resultados: La mayoría de los pacientes pertenecían a la clase socioeconómica media en el hospital privado y a la clase media-baja en el hospital terciario. La mayoría estaban desempleados (50,60%, 36%), casados (90,36%, 88,%) y tenían estudios secundarios (62,65%, 45,33%). Alrededor de 78 (93,97%) pacientes estaban cubiertos por un seguro o plan de salud en un hospital terciario y 39 (52%) en un hospital privado. Se observó que la hipertensión era la causa principal en los hospitales terciarios y privados. Los antagonistas del calcio (77,10%, 53,30%) se prescribieron con mayor frecuencia en ambos hospitales. La eritropoyetina (69,80%), el acetato cálcico (21,70%) y los antidiabéticos (insulina, 10,84%) se prescribieron en el hospital terciario, mientras que los fármacos más nuevos y costosos, como la darbepoetina, los preparados de hierro y el carbonato de lantano, se prescribieron en el hospital privado.
Conclusiones: El nivel socioeconómico provocó variaciones en los patrones de prescripción de ambos hospitales, ya que los fármacos más nuevos y costosos, como el carbonato de lantano, el sevelamer y la darbepoetina, sólo se prescribieron en el hospital privado.

Palabras clave: Enfermedad renal crónica, Hemodiálisis, Polifarmacia, Patrón de prescripción, Nivel socioeconómico.

Introduction

Worldwide there has been an upward trend in the incidence and prevalence of chronic kidney disease (CKD) prompting increased cost of treatment with poor outcomes[1]. CKD patients going through maintenance hemodialysis have associated comorbidities like hypertension, diabetes mellitus, anemia, acid-base balance, and electrolyte disturbances etc[2]. The primary Objectives in CKD patients on maintenance hemodialysis are treatment of the complications and avoidance of morbidity and mortality[3]. The patients of CKD have one of the greatest daily pill burden[4]. Inappropriate utilization of medications can increment adverse drug effects and cause excessive length of emergency clinic stays, medical care use, and costs. Chronic Kidney Disease (CKD) is currently recognized as a significant medical problem worldwide[5].

The Global Burden of Disease (GBD) concentrate on 2015 positioned chronic kidney disease as seventeenth among the reason for passings globally (Age-standardized yearly demise pace of 19.2 passings per 100,000 population)[6]. Albeit the exact incidence and prevalence rates are not accessible, it is assessed that one out of 10,000 people suffer from CKD in India and around 100 thousand new patients foster End Stage Renal Disease (ESRD) in India annually[7]. Chronic hemodialysis patients have various complications, for example, liquid maintenance, expansion in potassium levels, low hemoglobin levels, frail bones requiring pharmacologic therapy. Multiple medications are basically expected to control comorbid conditions like hypertension, diabetes mellitus and cardiovascular diseases. It can build the cost of treatment and likewise represent a challenge for the treatment of patients with CKD. Rebelliousness with drug regimens might expand the gamble of extreme complications and addresses an expected problem in hemodialysis patients who are on multiple medications. There are a few known indicators for multiple medications, i.e., age, female gender, low educational status[8]. Lower socioeconomic status is connected to bring down health education[9]. The distinction in the socioeconomic status might prompt variability in the prescription pattern among CKD patients. Thus, the purpose of this study was to obtain information about the prescription pattern in CKD patients undergoing hemodialysis and observe the variations among both the hospitals.

Methods

It was a prospective, observational study conducted on patients admitted to tertiary hospital and a private hospital, who are on antihypertensive and antidiabetic drugs. for nine months from September 2017 to May 2018. Patients having CKD and on maintenance hemodialysis for a minimum of 1 month were included in our study. Exclusion criteria included pregnant women on dialysis, age less than 18 years, patients who are being dialyzed for Acute Kidney Injury and patients who are being evaluated for renal transplantation. Ethical approval was obtained for the study from the institutional ethics committee. The details like sociodemographic and clinical characteristics, past medication history, comorbidities and current medications (Number of medications, dose regimen and frequency) were noted in the self-pre-designed Patient Proforma. Mean ± standard deviation and percentages was used for summarizing the data. Other relevant statistical tests Chi-square test was used for quantitative data and comparison of proportions. The P value < 0.05 was considered as statistically significant.

Results

Ethical approval was obtained for the study from the ethics committee of Bharati Medical College. patients having CKD who were undergoing hemodialysis for greater than one month were enrolled in this study. Patients informed consent was taken for the study. Mean ± standard deviation and percentages was used for summarizing the data, other relevant statistical tests Chi-square test was used for quantitative data and comparison of proportions. The P value < 0.05 was considered as statistically significance.

A total of 158 patients were included, from two hospitals in Pune of which 83 and 75 were from a tertiary and private hospital respectively, which satisfied the inclusion criteria. Majority of the patients in the private hospital were front the middle socio-economic class (80%) whereas, in the tertiary hospital subjects belong to lower-middle socio-economic class (100%) which was found to be statistically significant (/>-< 0,001). Highest number of patients were unemployed (50.60%, 36%). Married (90.36%, 88%). Higher school education qualification (62.65%, 45.33%), was found to be statistically significant (P = <0.001). About 78 (93.97%) patients were covered with insurance / health scheme in the tertiary hospital and only 39 (52%) were insured in the private hospital (P = < 0.001) (**Table I**).

Tabla I: Socio-demographic characteristics of CKD patient undergoing hemodialysis.

Characteristics	Number of patients (%)		Total (n=158)
	Tertiary Hospital (n=83)	Private Hospital (n=75)	
Gender			
Male	61 (73.49)	45 (60)	106 (67.09)
Female	22 (26.51)	30 (40)	52 (32.91)
Age (year)			
18-31	11 (13.25)	7(9.33)	18(11.39)
32-45	22 (26.51)	18(24)	40 (25.32)
46-59	25 (30.12)	24 (32)	49 (31.01)
≥60	25(30.12)	26 (34.67)	51(32.28)

The highest number of patients undergoing hemodialysis in the both the hospitals were found to be males (73.49%, 60%). The mean age in the patients undergoing hemodialysis in both the hospitals was 49.53 ± 15.09 years and 51.52 ± 14.53 years. Majority of the patients in the private hospital were from the middle socio-economic class (80%) whereas, in tertiary hospital subjects belonged to lower-middle socioeconomic class (100%) which was found to be statistically significant (P= < 0.001). The mean duration of dialysis was 2.71 ± 2.36 in tertiary and 3.21 ± 2.85 in private hospital. The frequency of twice weekly dialysis was highest in tertiary hospital whereas thrice weekly in private hospital (**Table I**). Hypertension (100%, 89.06%) was the commonest comorbidity followed by diabetes plus hypertension (35%, 31.25%) in both the hospitals (**Table II**). The total number of medications prescribed in 158 patients was 1262 out of which 623 were from tertiary hospital and 639 from private hospital. The average numbers of drugs per prescription from tertiary and private hospital were 7.51± 2.09 and 8.52 ± 1.35 respectively. Polypharmacy (use of ≥5 medications) was observed in 86.75% patients in tertiary hospital and 97.33% patients in private hospital. Anti-coagulants were given to all patients during hemodialysis.

Table III showed that in tertiary hospital 78.31% of the patients were undergoing twice weekly hemodialysis, whereas in the private hospital there were equal number of patients undergoing twice (48.00%) and thrice (50.67%) weekly hemodialysis. The average duration of hemodialysis in both the centers was 4 hours. About 51.81% of patients in the tertiary and 58.67% in the private hospital were undergoing hemodialysis for 1-5 years. Nearly all the Patients were vaccinated for Hepatitis B virus (HBV). Out of the anti-hypertensive drugs, calcium channel blockers were highly prescribed for the treatment of hypertension in both the hospitals (77.10%, 53.30%) (**Figure 1**).

Tabla II: Comorbidities of CKD Patients Undergoing Hemodialysis.

Characteristics	Number of patients		Total (n=144)	
	Tertiary hospital (n=83)	Private hospital (n=75)		
Co-morbid condition			**Chi-square value**	**P-value**
Present	80	64	0	0.34
Absent	3	6		
Hypertension	46(57.5)	35 (54.69)	81(56.25)	
Diabetes + Hypertension	28(35)	20(31.25)	4S (33.33)	
Diabetes Mellitus	0(0)	5(7.81)	5 (3.47)	
Hypothyroidism/ Hyperthyroidism m	0(0)	2(3.13)	2(1.39)	
Hypertension + Hypothyroidism	3 (3,75)	0(0)	3 (2,08)	
Hypertension + Diabetes+ coronary artery disease+ Hypothyroidism	1(1.25)	0(0>	1 (0.69)	
Hypotension + Diabetes+ coronary artery disease	I (1.25)	0(0)	1 (0.69)	
Hypertension + coronary artery disease	1(105)	I (1.56)	2(1.39)	
Hypertension + Diabetes + COPD	0(0)	1 (1.56)	1 (0.69)	

Chi-square test. * P < 0.05 is considered to be statistically significant.

Tabla III: Dialysis related characteristics of CKD patient undergoing hemodialysis.

	Number of patients		Total (n=158)	Chi-square value	P-value
Characteristics	**Tertiary hospital (n=83)**	**Private hospital (n=75)**			
Duration of dialysis per session (hrs.)	4 (hrs.)	4 (hrs.)			
Frequency of dialysis session per week					
Once	6 (7.23)	1 (1.33)	7 (4.43)	25.07	<0.001*
Twice	65 (78.31)	36 (48)	101 (63.92)		
Thrice	12(14.46)	38 (50.67)	50(31.65)		
Duration on Dialysis					
Less than 1 year	30(36.14)	19 (25.33)	49 (31.01)	2.89	0.408
1 -5 years	43 (51.81)	44 (58.67)	87 (55.06)		
6-10 years	8 (9.64)	11 (14.67)	19(12.03)		
More than 10 years	2(2.41)	1 (1.33)	3(1.90)		
Interdialytic Weight Gain					
Less than 1kg	12(14.46)	8(10.67)	20(12.66)	1.1	0.894
1-2 kg	18(21.69)	19(25.33)	37 (23.42)		
2-3 kg	25 (30.12)	25 (33.33)	50(31.65)		
3-4 kg	15(18.07)	18(24)	33 (20.89)		
>4 kg	5 (6.02)	5 (6.67)	10(6.33)		
Nil	8 (9.64)	0(0)	8 (5.06)		
Mean Ultrafiltration volume (ml)	2405.31 ± 1268.85	2964.48 ± 982.85			

Chi-square test. * P < 0.05 is considered to be statistically significant.

Figure 1: Anti-hypertensive Drugs Prescribed in CKD Patients Undergoing Hemodialysis.

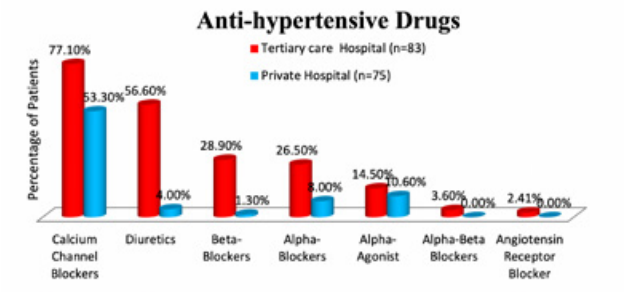


Figure 2: Anti-Diabetic Drugs Prescribed in CKD Patients Undergoing Hemodialysis.

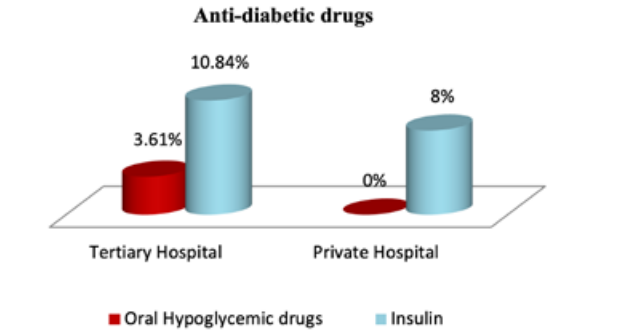
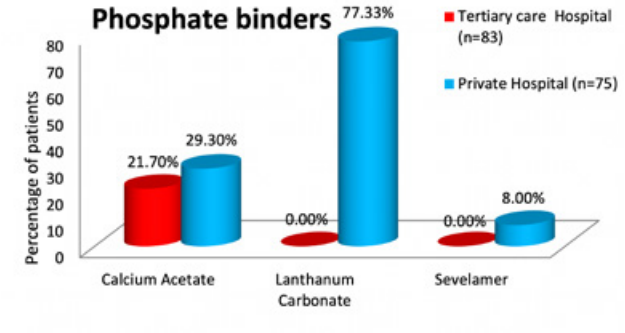


Figure 3: Phosphate Binders Prescribed in CKD Patients Undergoing Hemodialysis.



The most prescribed drugs in tertiary hospital were anti-hypertensive drugs (93.97%), hematopoietic agents (72.28%), Vitamins and mineral supplements (65.06%) and the least prescribed were anti-arrhythmic drugs (1.21%) and anti-thyroid drugs (1.21%). In private hospital, hematopoietic agents (97.33%), Vitamins and mineral supplements (94.66%) and phosphate binders (93.33%) were highly prescribed and least prescribed drugs were statins (2.66%).

Out of the anti-hypertensive drugs, calcium channel blockers were highly prescribed for the treatment of hypertension in both the hospitals (77.10%, 53.30%) (**Figure 2**). Among the Calcium Channel Blockers (CCBs), Amlodipine was most commonly prescribed both in tertiary (65.60%) and in private (92.50%) hospital. Other CCBs prescribed were Nifedipine, Cilnidipine and Barnidipine. Metoprolol was the commonest beta blocker prescribed for hypertension in tertiary and private hospital (91.6% and 100% respectively). Hematopoietic agents used in tertiary and private hospital were Erythropoietin/Epoetin alfa (69.87% and 68.00%) and iron preparations (49.40% and 92.00%) respectively in parenteral forms. Iron preparations in tertiary hospital included iron sucrose 48.19% (Parenteral), ferrous sulphate 1.20% (Parenteral) and ferric citrate 1.20% (Oral) whereas in private hospital iron preparations include iron sucrose 92.00% (Parenteral) and ferric carboxylates 2.66% (Parenteral). The oral hypoglycemic drugs prescribed were 3.61% and 8% patients in tertiary and private hospital respectively (**Figure 2**). Insulin was slightly prescribed more in tertiary hospital 10.84% (n=9) than private hospital 8.00% (n=6). Among anti-secretory drugs, Proton Pump Inhibitors (PPIs) were more widely used than H2 blockers and antiemetics in both hospitals. The most commonly used PPIs were pantoprazole 84.60% (n=11) in tertiary and 95.20% (n=20) in private hospital. Phosphate binders were prescribed in the form of calcium and calcium free agents. Calcium Acetate was maximally prescribed in private hospital 22 (29.33%) than in a tertiary setting 18 (21.68%) (**Figure 3**). Lanthanum carbonate 58 (77.33%) and Sevelamer 6 (8.00%) was only prescribed in private hospital.

Discussion

The majority of the patients undergoing hemodialysis were males which showed a consistent pattern when contrasted with Sanjay K. Agarwal et al.[10] Manfred Hecking et al.[11] and Lakshminarayan et al.[12] who detailed similar results. Males showed higher risk factors like overweightness, having greater waist circumference and a raised circulatory strain which makes them more helpless against foster chronic kidney disease over a time of time[13]. On the contrary Lori L. Pounds et al. and Idan Goldberg et al. in their report expressed that the prevalence of CKD will in general be higher in women, while the movement of disease is more severe in men[13,14]. The mean age detailed in tertiary care hospital and confidential hospital were viewed as similar. Bernard Canaud et al. in his review expressed that elderly patients account for an increased fraction of patients on renal replacement treatment worldwide because of aging and underlying comorbidities (25%-30%)[14] hence justifying the higher number of our review subject belonging to the age group of 60 years and above (30.12%, 34.67%). In India hemodialysis is more preferred and is largely influenced by socioeconomic status and restricted insurance schemes[15]. In this review patients in confidential hospital were on threefold weekly hemodialysis, while in the tertiary care hospital they were on twice weekly hemodialysis significantly considering that a greater number of them had a place with the lower-center socioeconomic class, were jobless and economically depended on their family or insurance coverage for dialysis and medication use.

Length of dialysis was similar in both the hospitals. Similar results were published by Brian Bieber et al. which manifested higher number of patients reliant upon twice weekly hemodialysis[16].

Hypertension can be a reason or a consequence of chronic kidney disease and has been accounted for to occur in 85% to 95% of patients with chronic kidney disease (Stages 3-5) in the Unified States[17]. In present study, the medications were prescribed in light of the comorbid conditions and complications involved during the patient treatment. Numerous medications are an unavoidable predicament looked during the management of CKD patients because of the prevalence of co-existing illnesses. In present study, polypharmacy (utilization of ≥5 medications) was seen in 86.74% patients in tertiary hospital and 97.33% patients in confidential hospital. In a study by Chiu Y et al. the daily pill burden in the patients were extremely high and almost one-half of the patients were prescribed to take more than 20 pills daily[18]. The average number of medications prescribed in the present study was almost similar in both the hospitals. Enemies of coagulants were given during hemodialysis to all patients to prevent coagulation of blood during hemodialysis.

Hypertension is the most common comorbidity associated with chronic kidney disease (CKD) followed by diabetes. In this study, the counter hypertensive medications were significantly prescribed in tertiary hospital though hematopoietic agents were maximally prescribed in confidential hospital. The most commonly involved drugs for the treatment of hypertension were calcium channel blockers, followed by diuretics, beta blockers and alpha blockers in tertiary hospital while calcium channel blockers followed by alpha agonist, alpha blocker and diuretics were utilized in confidential hospital. All the antihypertensive medications were prescribed in oral dosage structure. Similar results were found in examinations conducted by Al Ramahi et al. Devi DP et al. and Bailie GR et al.[19-21] Among the Calcium Channel Blockers (CCBs), Amlodipine was most commonly prescribed to diminish blood tension for dialysis patients. Other CCBs prescribed were Nifedipine, Cilnidipine and Barnidipine in tertiary hospital though just Cilnidipine and Nifedipine were given in confidential hospital. Metoprolol was the commonest beta blocker prescribed for hypertension in both tertiary and confidential hospital in this study. Different medications utilized from this class included Nebivolol.

Diuretics were utilized commonly in about over half of the patients especially loop diuretics like Furosemide (74.5%) in tertiary hospital which is consistent with the examinations conducted by Al Ramahi et al. Ahlawat R et al.[19-22] Different classes of cardiovascular drugs prescribed were cardiac glycosides, anti-anginals, cholesterol lowering agents, antiarrhythmics. Cholesterol lowering agents like statins namely atorvastatin was prescribed more in tertiary than private hospital. In a study by AlRamahi et al.[19] around 47% of the patients were using serum lipid reducing agents mostly Lovastatin.

Anemia is the most common complication due to decreased erythropoietin secretion. In this study, hematopoietic agents utilized in tertiary and private hospital were Erythropoietin/epoetin alfa (EPO) and iron preparations separately which were viewed as higher than a study conducted by Ahlawat R et al.[22] and in a study by Al Ramahi et al.[19] where erythropoietin was under prescribed and higher frequency of blood transfusion were compounded. Iron preparations were exceptionally prescribed in private hospital than in tertiary hospital. Darbepoetin (DPO) was mostly prescribed in private hospital than tertiary hospital. As the maximum number of patients in tertiary hospital belonged to either lower/middle socioeconomic class, Erythropoietin was maximally given in both the hospitals. Notwithstanding, Santra S et al. and others, in their study revealed that hematopoietic agents like Erythropoietin and Darbepoetin were underused due to low patient compliance and high cost[23]. The prescription of water-soluble vitamin supplements is a regular practice in many dialysis units. Vitamins and minerals were prescribed maximally in private hospital. Folic acid was just utilized in private hospital (54.7%). Vitamin B complex was prescribed in both the hospitals. A new meta-analysis by Wang L et al. included observational and randomized investigations of vitamin D supplementation and concluded that on the basis of restricted proof, vitamin D supplements when given at moderate to high portions may lessen cardiovascular risk[24]. Vitamin D analogs namely calcitriol and alfacalcidol were maximally prescribed in private hospital and minimally prescribed in tertiary hospital. Combination of calcium carbonate with vitamin D 3 and vitamin B complex with iron was given exclusively in tertiary hospital. It was found that very few could afford the higher cost of vitamin D analogs, so a combination therapy with calcium was given to patients in tertiary hospital.

Hyperphosphatemia is a habitually seen complication in patients with End Stage Renal Disease (ESRD). Phosphate binders are prescribed to CKD patients in the type of calcium and calcium free agents. In the present study, calcium acetate was maximally prescribed as a phosphate binder in both the hospitals. One research also stated that calcium acetate ought to be considered the calcium-based binder of decision in the management of uremic hyperphosphatemia. A study by Galani V et al. proposed that calcium acetate can be utilized for patients of lower socioeconomic status with hyperphosphatemia and hypocalcemia similar to present study[25]. The significant expense of treatment of Sevelamer hydrochloride and Lanthanum carbonate makes it more expensive for a decent extent of the Indian population. Calcium supplements are more affordable because of

minimal expense when compared to Sevelamer. In the present study, Lanthanum carbonate and Sevelamer were just prescribed in private hospital. The significant expense of Sevelamer hydrochloride can restrict its utilization for the poor socioeconomic population in this manner just prescribed in private hospital. Hyperglycemia is a fundamental cause of vascular target organ complications, including Diabetic Kidney Disease (DKD) and there is a greater requirement for stricter glycemic control in diabetic patients undergoing dialysis to prevent hypoglycemic episodes. Insulin was prescribed more in the two hospitals as compared to oral hypoglycemic drugs which was consistent with a study carried out by Zaman Huri H. et al. where in excess of a half of diabetic patients with CKD were prescribed with insulin for their glycemic control[26]. In this study, Meglitinides and DDP-4 inhibitors were the class of drugs preferred in tertiary hospital rather than a study where no monotherapy involving DPP-4 inhibitors were seen in the study population by which they were prescribed other anti-diabetic combinations. Regular insulin and Isophane insulin were equally prescribed in both the hospitals whereas combinations of Insulin Neutral Protamine Hagedorn (NPH) (half) + Insulin Regular (half) and Human Insulin (30%) + Human Isophane Insulin (70%) were preferred in tertiary hospital.

Among anti-secretory drugs, Proton Pump Inhibitors (PPIs) were more widely used than H2 blockers and antiemetics in both hospitals. The most commonly used PPIs were Pantoprazole 84.6% (*n*=11) in tertiary and 95.2% (*n*=20) in private hospital. Apart from Pantoprazole, Rabeprazole was prescribed in tertiary hospital whereas Esomeprazole was prescribed in private hospital. In the tertiary hospital, majority of the patients belonged to lower middle socioeconomic class and were covered under insurance/ health scheme. Hypertension was the most common cause of CKD and also the highest co-morbidity reported. Presence of multiple comorbidities led to polypharmacy in both the hospitals. Newer and costlier drugs like Lanthanum carbonate, Sevelamer and Darbepoetin were more prescribed in private hospital than tertiary hospital where Calcium acetate and Erythropoietin was prescribed. Hematopoietic agents, vitamin and mineral supplements were majorly prescribed in both the hospitals, which were followed by prescription of anti-hypertensives in tertiary hospital and phosphate binders in the private hospital. Prescribing pattern of private hospital, where newer and costlier drugs were prescribed, varied from tertiary hospital based on the socioeconomic status of the patients.

Conclusion

In the tertiary hospital, majority of the patients belonged to lower middle socioeconomic class and were covered under insurance/ health scheme. Hypertension was the most common cause of CKD and also the highest co-morbidity reported. Presence of multiple comorbidities led to polypharmacy in both the hospitals. Newer and costlier drugs like Lanthanum carbonate, Sevelamer and Darbepoetin were more prescribed in private hospital than tertiary hospital where Calcium acetate and Erythropoietin was prescribed. Hematopoietic agents, vitamin and mineral supplements were majorly prescribed in both the hospitals, which were followed by prescription of anti-hypertensives in tertiary hospital and phosphate binders in the private hospital. Prescribing pattern of private hospital, where newer and costlier drugs were prescribed, varied from tertiary hospital based on the socioeconomic status of the patients.

Consent for publication
Not applicable.

Availability of data and materials
The data that support the findings of this study are available within the article.

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Conflict of interest
The authors declare no conflict of interest, financial or otherwise.

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