

CKD stage	No. of patients (n = 125)	Percentage (%)
Stage-1	5	4%
Stage-2	9	7.2%
Stage-3a	13	10.4%
Stage-3b	7	5.6%
Stage-4	44	35.2%
Stage-5	43	34.4%
None	4	3.2%

Table 3: Stages of CKD in study population.

Stage 1: Kidney damage with normal or increased GFR (>90 mL/min/1.73 m²)

Stage 2: Mild reduction in GFR (60-89 mL/min/1.73 m²)

Stage 3a: Moderate reduction in GFR (45-59 mL/min/1.73 m²)

Stage 3b: Moderate reduction in GFR (30-44 mL/min/1.73 m²)

Stage 4: Severe reduction in GFR (15-29 mL/min/1.73 m²)

Stage 5: Kidney failure (GFR <15 mL/min/1.73 m² or dialysis)

None: Patients who are not undergone serum creatinine test.

Drugs	Total	Adjusted	Non adjusted
Anti hypertensives			
Enalapril	13	3	10
Atenolol	4	1	3
Clonidine	3	2	1
Spironolactone	18	9	9
Cardiac glycosides			
Digoxin	8	1	7
Antiplatelets			
Aspirin	33	12	21
Antifungals			
Fluconazole	3	3	0
Antibiotics			
Cefixime	1	0	1
Cefoperazone and Sulbactam	1	0	1
Cefotaxime	1	0	1
Amoxicillin/Clavulanate	15	2	13
Meropenem	1	1	0
Piperacillin/tazobactam	6	0	6
Norfloxacin	2	1	1
Azithromycin	4	0	4
Ciprofloxacin	7	0	7
Sulfamethoxazole+ Trimethoprim	3	2	1
Antacids			

Ranitidine	7	2	5
Anagesics			
Tramadol	6	4	2
Antidiabetics			
Metformin	8	1	7
Glimepiride	5	3	2
Total (Percentage)	149	47 (31.54%)	102 (68.45%)

Table 4: Drug dosage adjustments in CKD patients.

Discussion

In this study only drugs need to be dose adjusted in renal failure was considered. Out of 1163 drugs 141 drugs need dose adjustment. Among the 149 drugs 102 (68.45%) were nonadjusted and 47 (31.54%) were adjusted. Were as in Abdulrahman M Alahdal, Ahmed A: Elberry study [5] 53.1% drugs are nonadjusted. In Ahsan Saleem, Imran Masood study [6] 58.2% are unadjusted and 41.8% are adjusted. The present study shows most drugs requiring dose adjustments was antibiotics especially Amoxicillin/Clavulanate. But in Abdulrahman M Alahdal, Ahmed A: Elberry study [5] most dose adjustment needed drug is Vancomycin among antibiotics. The dose adjustment can done by reducing the dose of drug or by increasing the dosing interval. Followed by Amoxicillin/Clavulanate, Ciprofloxacin and Piperacillin/tazobactam are antibiotics need dose adjustment.

After antibiotics antihypertensives are drugs needed dose adjustment, especially Spironolactone 9, Enalapril 10 and Atenolol 3. Digoxin is a cardiac glycoside which has narrow therapeutic range (0.8 - 2 mcg per liter), above this level can cause serious toxicity. Higher or lower potassium levels may also lead to toxicity. Digoxin is mostly excreted in unchanged form by kidneys, in normal patients the half life of digoxin is 36 hours, in renal failure patients the elimination is much longer depending on stage of renal dysfunction. Hence in CKD dose adjustment of digoxin is important. In this study digoxin was given to 8 patients among them adjusted are one and unadjusted are seven, so most of patients needed dose adjustments. Even though Oral hypoglycemics are less prescribed due to their complications in CKD. Among prescribed drugs some needed dose adjustments.

Metformin was given to 8 patients in that one is adjusted and seven unadjusted. According to FDA metformin should not be used with decreased creatinine clearance or ≥ 1.4 mg/dl in women and serum creatinine ≥ 1.5 mg/dl in men. Because Metformin is renally cleared and may cause lactic acidosis in renal impairment. Glimepiride was prescribed to five patients among them only 2 patients need dose adjustment. Glimepiride and their metabolites are

renally eliminated, leading to increased risk of hypoglycemia as GFR declines. Hence dose adjustments practice in the hospital has to be improved [7-10].

Conclusion

It is concluded that more than half of drugs was not dose adjusted, there is need of dose adjustment in hospitalized chronic kidney disease patients. Continuous medical education of physicians and collaboration with clinical pharmacist is an important issue for quality improvement regarding renally impaired patients.

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