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# THE CLINICAL STATUS OF CHRONIC KIDNEY DISEASE (CKD) PATIENTS

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## ABSTRACT

**Objective:** In this study our main goal is to evaluate the clinical status of chronic kidney disease (CKD) patients. **Method:** This cross-sectional study was carried out in the outpatient department of nephrology, Sir Salimullah Medical College and Mitford hospital; Bangabandhu Sheikh Mujib Medical University and National institute of nuclear medicine and allied sciences (NINMAS), BSMMU, Dhaka from June 2016 to May 2017. A total of 120 Chronic kidney disease patients attending outpatient departments in above institutions were included in the study. **Results**: during the study, HTN was found as highest (88.9%) and CVD as least (3.7%) co-morbid condition among the study subject. Majority were found in CKD stage 3 (n=63). CKD stage 4 was found (n=44). The least number was found CKD stage 5 (n=5).Best correlation and substantial agreement was found between m-GFR and e-GFR Hoek's method (Kappa=0.740, p<0.001). Fair agreement was found between m-GFR and MDRD method (Kappa=0.347, p<0.001). Moderate agreement was found between m-GFR, CKD-EPI and CG method. **Conclusion**: from our study we can conclude that, Patients with CKD present several complex management issues to health care providers. With early identification and quick staging policy is necessary for management of CKD.

**KEYWORDS:** glomerular filtration rate (GFR), cystatin C, chronic kidney disease.

## INTRODUCTION

Chronic kidney disease (CKD) is recognized as a major health problem affecting approximately 13% of the United States population.[1] Numbers of prevalent CKD patients will continue to rise, reflecting the growing elderly population and increasing numbers of patients with diabetes and hypertension. As numbers of CKD patients increase, primary care practitioners will be confronted with management of the complex medical problems unique to patients with chronic renal impairment. As well documented in the literature, the nephrologist rarely manages the medical needs of CKD patients until renal replacement therapy is required. In this chapter we will define CKD staging and discuss five complications associated with CKD: anemia, hyperlipidemia, nutrition, osteodystrophy, and cardiovascular risk.[2-3]

Several cardiovascular risk factors associated with CKD are unique to patients with this disease (non-traditional risk factors). Anemia, which has been discussed above, is a risk factor for adverse cardiovascular outcomes in CKD patients. Abnormal serum phosphate levels, calcium-phosphate ion product, and parathyroid hormone levels are independent cardiovascular risk factors in the setting of stage 5 CKD.[4-5] Higher calcium–phosphate products and the cumulative dose of oral calcium-based phosphate binders correlate with the extent and progression of arterial calcification in dialysis[6] and stage 3 or 4 CKD patients Interestingly, serum phosphate levels were associated with increased rates of death and myocardial infarction in patients with stage 3 or 4 CKD.[5]

In this study our main goal is to evaluate the clinical status of chronic kidney disease (CKD) patients.

### Objective

### General objective

- To evaluate the clinical status of chronic kidney disease (CKD) patients.

### Specific objective

- To evaluate co-morbid conditionin patients.
- To asses the stage of CKD in patients.

## METHODOLOGY

**Study type:** This was a cross sectional study.

**Place and period of the study:** This study was carried out in the outpatient department of nephrology, Sir Salimullah Medical College and Mitford hospital; Bangabandhu Sheikh Mujib Medical University and National institute of nuclear medicine and allied sciences (NINMAS), BSMMU, Dhaka from June 2016 to May 2017.

**Study population:** A total of 120 Chronic kidney disease patients attending outpatient departments in above institutions.

### Inclusion Criteria

- Age > 18 years
- Diagnosed cases ofchronic kidney disease.

### Exclusion Criteria

- Acute deterioration of kidney function.
- Patients suffering from Hypothyroidism or hyperthyroidism
- Drugs taken like steroid that altered serum cystatin C and serum creatinine level

### Study procedure

All study subjects were informed about the potential risk and benefit of the procedure and informed consent was taken from each patient before the procedure. Good hydration (300-500 ml water) and voiding prior to beginning of study was maintained.10 ml of blood was taken for serum creatinine and serum cystatin C prior isotope ($^{99m}$Tc-DTPA) injection. Two syringe counts (pre and post syringe) were taken. Blood was drawn after 1 hour and 3 hour for $^{99m}$Tc-DTPA plasma clearance.

### Statistical Analysis

Computer based statistical analysis was carried out with appropriate techniques and systems. All data were recorded systematically in preformed data collection form (questionnaire) and quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency distribution and percentage. Statistical analysis was performed by using window-based computer software devised with Statistical Packages for Social Sciences (SPSS-20) (SPSS Inc., Chicago, IL, USA). 95% confidence limit was taken. According to the result, the inferential analysis like ANOVA, paired t-test, chi- square test, Pearson's correlation test, linear regression, ROC curve analysis, kappa co-efficient test and data were presented as tables and graphs in result section.

## RESULTS

In table-1 shows clinical parameter of study subjects in different stages. One-way ANOVA and chi square test were done to measure the significance level. The following table is given below in detail:

**Table 1: Clinical parameter of study subjects in different stages.**

| Variable | CKD 3 (n=63) | CKD 4 (n=44) | CKD 5 (n=5) | P value |
|---|---|---|---|---|
| Age | 52 ±.12 | 51 ±10 | 46 ±14 | 0.498 |
| Sex ratio (M:F) | 58 : 42 | 48 : 52 | 40 : 60 | 0.439 |
| B M I (kg/m$^2$) | 24.7±.4.1 | 23.7±3.7 | 23.0±3.7 | 0.372 |
| Systolic BP(mm Hg) | 139 ±11 | 138±12 | 136±16 | 0.787 |
| Diastolic BP (mm Hg) | 84±7 | 86±6 | 84 ±8 | 0.214 |

In table-2 shows distribution of co-morbid condition among the study subjects where HTN was found as highest (88.9%) and CVD as least (3.7%) co-morbid condition among the study subject. The following table is given below in detail:

**Table-2: Distribution of co-morbid condition among the study subjects.**

| Co-morbid condition | Frequency | Percent |
|---|---|---|
| HTN | 72 | 88.9 |
| IHD | 20 | 18.3 |
| CVD | 3 | 3.7 |
| *Multiple response exist | | |

In figure-1 shows distribution of CKD patients according to stages. majority were found in CKD stage 3 (n=63). CKD stage 4 was found (n=44). The least number was found CKD stage 5 (n=5). The following figure is given below in detail:

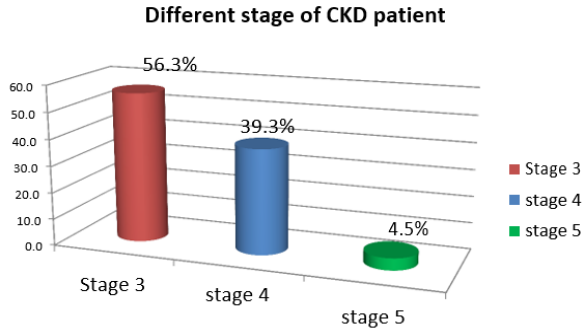


**Figure-1: Distribution of CKD patients according to stages.**

In table-3 shows differences in the serum creatinine estimation of colorimetric and enzymatic method. Significant differences were observed in the serum creatinine estimation of colorimetric and enzymatic method among CKD stage 4 ($p<0.001$) and CKD stage 5 ($p<0.001$) subjects. Significant differences were not

observed in the serum creatinine estimation of colorimetric and enzymatic method among CKD stage 3 (p=0.779) subjects. The following table is given below in detail:

**Table 3: Differences in the serum creatinine estimation of colorimetric and enzymatic method in relation to different stages of CKD.**

| CKD | Test Serum creatinine (Colorimetric method) | Serum creatinine (Enzymatic method) | Difference (%) | P value |
|---|---|---|---|---|
| Stage 3 | 1.7±0.51 | 1.6±0.43 | 10% | 0.779 |
| Stage 4 | 3.0±.96 | 2.8±0.79 | 20% | <0.001 |
| Stage 5 | 4.3±0.58 | 4.0±0.53 | 30% | <0.001 |

***Paired t test was done to measure the significance level.**

In table-4 shows comparison of between m-GFR with e-GFR (creatinine and cystatine C where best correlation and substantial agreement was found between m-GFR and e-GFR Hoek's method (Kappa=0.740, p<0.001). Fair agreement was found between m-GFR and MDRD method (Kappa=0.347, p<0.001). Moderate agreement was found between m-GFR, CKD-EPI and CG method. The following table is given below in detail:

**Table-4: Comparison of between m-GFR with e-GFR (creatinine and cystatine C.**

| Test) | | | m-GFR | | Kappa coefficient | P value |
|---|---|---|---|---|---|---|
| | | | (+) ve | (-) ve | | |
| CystatinC based | e-GFR Hoek's | (+) ve | 96 | 3 | 0.740 | <0.001 |
| | | (-) ve | 3 | 10 | | |
| Creatinine Based | MDRD | (+) ve | 99 | 10 | 0.347 | <0.001 |
| (enzymatic) | | (-) ve | 0 | 3 | | |
| | CKD-EPI | (+) ve | 98 | 9 | 0.407 | <0.001 |
| | | (-) ve | 1 | 4 | | |
| | CG | (+) ve | 98 | 9 | 0.407 | <0.001 |
| | | (-) ve | 1 | 4 | | |

**Kappa test was done to measure the significance level.**

## DISCUSSION

Among the study subjects, mean age was (51±11) with 55% male and 45% female. Majority of the patient were found with primary disease HTN next to that with DM and GN. Least was found with CKD. Majority were found in CKD stage 3 (n=63). CKD stage 4 was found (n=44). The least number was found CKD stage 5 (n=5).

All three groups were almost similarly matched. Comparison of 3 stages of CKD in relation to serum creatinine (mg/dl) and cystatin C (mg/L) were analyzed. Mean values of all three methods were increased with staging of CKD. Serum creatinine of colorimetric and enzymatic methods in stage 3, 4 and 5 were found different. Serum creatinine of colorimetric and enzymatic methods in stage 3, 4 and 5 were found different.

In patients with CKD 4 statistically higher accuracy was found for e-GFR Hoek's (74.2%) compared to accuracy for MDRD method (63.2%), CG (57.1%) and CKD-EPI method (50.2%). In patients with CKD 5 statistically higher accuracy was found for e-GFR Hoek's (64.2%) compared to accuracy for MDRD method (50.2%), CG (53.3%) and CKD-EPI method (51.1%).

To compare e-GFR (creatinine and cystatine C based method) with standard method m-GFR Kappa test was carried out. Best correlation and substantial agreement were found between m-GFR and e-GFR Hoek's method (Kappa=0.740, p<0.001). Fair agreement was found between m-GFR and MDRD method (Kappa=0.347, p<0.001). Moderate agreement was found between m-GFR, CKD-EPI and CG. These results were suggestive with previous study.[7]

## CONCLUSION

Patients with CKD present several complex management issues to health care providers. With early identification and quick staging policy is necessary for management of CKD.

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