



## EVALUATING UREA AND CREATININE LEVELS IN CHRONIC RENAL FAILURE: A PROSPECTIVE STUDY

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### ABSTRACT

*Chronic kidney disease (CKD) is emerging to be an important chronic disease globally and India is likely to pose for this major problem. Chronic renal failure induces a slow and progressive decline of kidney function and results in serious medical condition. The survey shows that CKD is more common in male than in female with people ranging in between 41 to 50 years. The reason may be attributable to hypertension, diabetes or some other age related changes. Molecular basis of this relationship need to be evaluated to find out possible solution.*

**Keywords:** Chronic Kidney Disease, Glomerular Filtration Rate, Blood Serum, Haemoglobin, Creatinine and Urea Profiles.

### Introduction

Chronic kidney disease (CKD) is emerging to be an important chronic disease globally (Ruggenti et al. 2001). In India, given its population >1 billion, the rising incidence of CKD is likely to pose major problems for both healthcare and the economy in future years. Indeed, it has been recently estimated that the age-adjusted incidence rate of ESRD in India to be 229 per million population (pmp) (Modi and Jha, 2006). It is estimated that in the next years, the weight of CKD will increase, and over two million persons are expected to be receiving renal replacement therapy (dialysis or kidney transplant) by 2030 (Nisha et al. 2017).

Chronic renal failure induces a slow and progressive decline of kidney function. It is usually a result of complications from another serious medical condition. Unlike acute renal failure, which happens quickly and suddenly, chronic renal failure happens gradually - over a period of weeks, months, or years -as the kidneys slowly stop working, leading to end-stage renal disease (ESRD) (Eduardo et al. 2015).

In chronic renal failure there is a steady and continued decrease in renal clearance or glomerular filtration rate (GFR), which leads to the gathering of urea, creatinine and other chemicals in the blood. According to the Kidney Disease Improving Global Outcomes (KDIGO) declaration GFR of less than 60 mL/minute/1.73 m<sup>2</sup> is the indication of CKD (Eduardo et al. 2015). KDIGO additional classified the CKD in different stages which are: GFR 30 to 60 mL/minute as stage three; GFR 15 to 30 mL/minute as stage four; and GFR less than 15 mL/minute as stage five of CKD (Levey et al. 2005&

Nisha et al. 2017).

Creatinine is produced in the muscles by the non-enzymatic changes of creatine and phosphocreatinine. The liver has a momentous role in the assembly of creatinine through methylation of guanidine aminoacetic acid (Eduardo et al. 2015). The normal serum creatinine level is 0.5 to 1.0 mg/dL according to diurnal and menstrual variations, pursuit, and diet (Hamilton et al. 1972)

### Materials and Methods

Data was collected from the Department of Nephrology, Gauhati Medical College & Hospital, Guwahati between March 2017 and December 2017, 80 patients were included after providing informed consent. Creatinine was estimated by the Jaffe reaction, Urea was measured by diacetyl monoxime colorimetric method and Berthelot reaction.

### Results and Discussion

A total of 80 patients were analyzed (Fig. 1). These patients were randomly selected and their serum urea level, serum creatinine level and haemoglobin level were checked. Age and gender wise distribution was not to find the association between dialysis and gender and age although male between 41 – 50 age group are highly affected whereas in case of female the age group was found to be 31 – 40, may be due to physical status of patients (Eduardo et al. 2015).

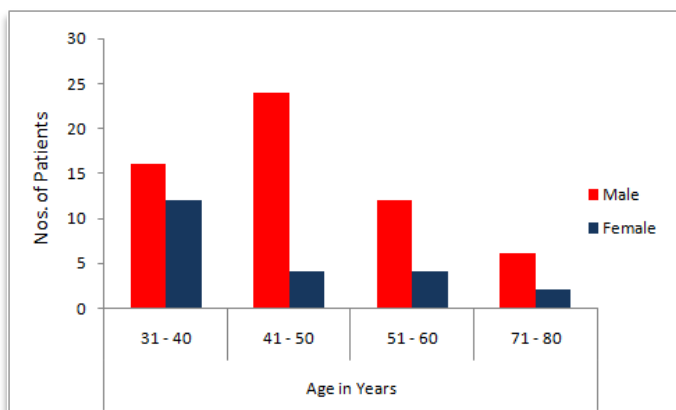


Fig. 1: Age and gender wise distribution of CKD patients

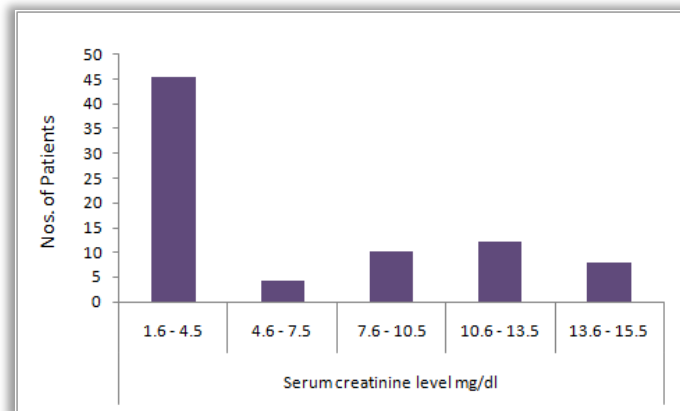


Fig. 4: Post-dialysis serum creatinine level in CKD patients.

**Effect of Dialysis on Serum Urea Level**

In CKD patients, pre-dialysis serum urea level was significantly higher than normal range (20-40 mg/dl). Most of the patients (60 %) had serum urea level between 101-200 mg/dl (Fig. 2) may be due to dietary intake of high protein.

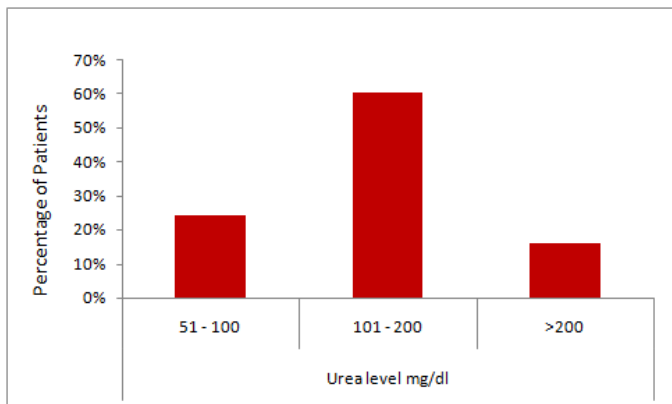


Fig. 2: Pre-dialysis serum urea level in CKD patients

**Effect of Dialysis on Serum Creatinine Level**

Serum creatinine level was higher than normal range (up to 1.4 mg/dl) in CKD patients undergoing dialysis. Most of the patients have serum creatinine level between 1.6 – 4.5 mg/dl (36.84 %) and 10.6 – 13.5 mg/dl (5.26 %) before dialysis (Fig. 4) which justified the statement made by Nisha *et al.* 2017. Glomerular filtration rate (GFR) or creatinine clearance is the based method for the estimation of kidney functioning. Factors like age, sex and physical status of person also effect serum creatinine level (Lascano *et al.* 2010).

**Hemoglobin Level in CKD patients**

Hemoglobin (Hb) level was found low in CKD patients due to removal of blood during dialysis. In the current study 80 patients (78.57%) had Hb between 3.1 – 8.5 g/dl, other 21.42% between 8.6 – 9.5 g/dl. This low Hb level most of the time led to the development of anemia.

**Conclusion**

During a survey, it was reported that CKD lead to anemia in most of the patients (Astor *et al.* 2002 & Eduardo *et al.* 2015), consistent with our results. During the study it was also observed that CKD is more common in male then in female. People between 41 to 50 years are more affected with CKD (Hida *et al.* 1995). The reason may be attributable to hypertension, diabetes or some other age related changes (Nisha *et al.* 2017). It was also observed that middle age males are more affected to CKD disease. Molecular basis of is relationship need to be evaluated to find out possible solution (Schieppati *et al.* 2005).

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