



Prevalence of Chronic Renal Diseases in the area of Urban part of Jaipur, Rajasthan

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Abstract

Renal Diseases is common and horrible diseases now-a-days. Common in both in rural as well in the urban part of India. In modern time also nobody bother and care about the primary symptoms unless and until it will be changed into chronic renal diseases. Many other conditions such as Diabetes Mellitus, Hypertension etc. may cause CKD if not treated properly. A total of 100 patients had investigated suffered from CDK along with same no. Of normal individuals. Both the genders were included in the study. The parameters of Chronic Renal diseases such as Uric Acid, Creatinine and Urea had performed through kit methods. All the parameters regarding to detected the CKD were significantly raised in the patients having complained of CKD than that of control group. Hence, this study has been a step forward to find relation of multiple metabolic factors with chronic renal failure and raises a fundamental issue of need of further research in this direction which can help in better understanding of this disease and in developing new therapeutic strategies in treatment of chronic renal failure patients

Keywords: CDK, Uric Acid, Creatinine, Urea.

Introduction

The kidneys are paired retroperitoneal organs normally situated one on each side of the vertebral column. The kidney excretes the waste products of metabolism, precisely regulates the body's concentration of water and salt, maintains the appropriate acid balance of plasma, and serves as an endocrine organ, secreting such hormones as erythropoietin, renin, and prostaglandins. The term “**chronic renal failure**” applies to the process of continuing significant irreversible reduction in nephron number and typically corresponds to CKD stages 3–5. The great majority of individuals classified as having CKD

in the community over the age of 60 years is a reflection of physiologic age-related decrease in kidney function⁽¹⁾. Studies such as the National Health and Nutrition Examination Survey (NHANES), which provided data on an adult unselected population, estimated that 4.7% of US adults had CKD stage 3 or higher (defined as an estimated glomerular filtration rate (eGFR) of <60ml/min/1.73m²). Serum uric acid inversely correlates with decreasing renal function. Recent epidemiologic studies suggested that uric acid predicts the development of new-onset kidney disease and elevated levels of uric acid independently increase the risk for new-onset

kidney disease. CRF may be more likely a cause of hyperuricemia^(2,3). Serum creatinine concentration is widely used as an index of renal function so a higher serum creatinine and urea concentration is associated with a lower or reduced GFR⁽⁴⁾. Hence the study, investigated the prevalence of CKD patients.

Aim & Objective

To investigate the prevalence of Chronic Kidney Disease by comparison study of serum creatinine, serum urea and serum uric acid level.

Materials & Methods

A Hospital based cross-sectional study was planned, including 100 patients of chronic renal failure and 100 healthy persons having age between 30 to 70 years age coming to OPD/IPD Nephrology Department of SMS Hospital, Jaipur. The proposed study was conducted in the Department of Biochemistry of SMS Medical College and Hospital, Jaipur. A detailed history was taken with special emphasis on Age, Area, Socioeconomic status, Chief complaints, History of Present illness, Past History, Drug-History, Personal History, Family History from all study subjects.

Laboratory Procedure

1. About 10 ml of blood samples were collected by venipuncture into labelled dry test tubes.
2. After collection blood samples were allowed to coagulate after which they were centrifuged at 2500 rpm for 15 minutes to obtain sera and analyzed on fully automated chemistry analyzer AU680 (Beckman Coulter).
3. For biochemical investigations, patients were required to come empty stomach after an overnight fast of at least 14 hrs. 10 ml of venous blood was drawn for the following tests

Biochemical Parameters

1. Estimation of Urea⁽⁵⁾

Method:

Enzymatic (UV) method

Reagent composition:

Reagent 1: Buffer Reagent

Reagent 2: Enzyme Reagent

Urea Standard: 40 mg/dl

Assay procedure

Table 1: Assay Procedure of Urea

	Standard	Sample
Reagent	1ml	1ml
Standard	10µl	-
Sample	-	10 µl

Mix well and after 30 secs incubation read initial absorbance A1. Exactly after 60 seconds interval read absorbance A2 and measured at 320nm wavelength.

Determine the Δ Absorbance.

$$\Delta \text{Abs.} = A_2 - A_1$$

Calculation

Urea Conc. (mg/dl)

$$= \frac{\Delta \text{Abs. of Sample}}{\Delta \text{Abs. of Standard}} \times \text{Conc. of Standard}$$

2. Estimation of Serum creatinine:-⁽⁶⁻⁹⁾

Methodology

Modified Jaffe's reaction

Reagent composition:

Reagent 1: Picric acid Reagent

Picric acid 25.8mmol/L

Reagent 2: Sodium Hydroxide Reagent

Sodium Hydroxide 95mmol/L

Creatinine Standard

Creatinine Standard 2mg/dl(0.166mmol/L)

Assay procedure

Table 2: Assay Procedure of Creatinine

Pipette	Standard	Test
Working Reagent	1000µl	1000µl
Standard	100µl	-
Test	-	100 µl

Mix well and read initial absorbance (A_1)20 seconds after mixing and final absorbance (A_2)80 seconds after mixing and measured at 505nm.

Calculation:

$$\Delta A = A_2 - A_1$$

Creatinine (mg/dl)

$$= \frac{\Delta A \text{ of Test}}{\Delta A \text{ of Standard}} \times \text{Conc. of Standard}$$

3. Estimation of Uricacid: (10-18)

Method:-

Phosphotungstate methods

Reagent and Composition

Uric acid reagent (concentrations refer to reconstituted reagent). 4-aminoantipyrine 0.3Mm, HDCBS 2Mm, Uricase 150U/L, Peroxidases 5,000 U/L ,buffer, PH 7.5±0.1. Non –reactive stabilizers and filters.

Measured at 510nm wavelength.

Calculations:-

A= Absorbance

Uric acid (mg/dl)

$$= \frac{A(\text{UnKnown})}{A(\text{Std})} \times \text{Conc. of Standard}$$

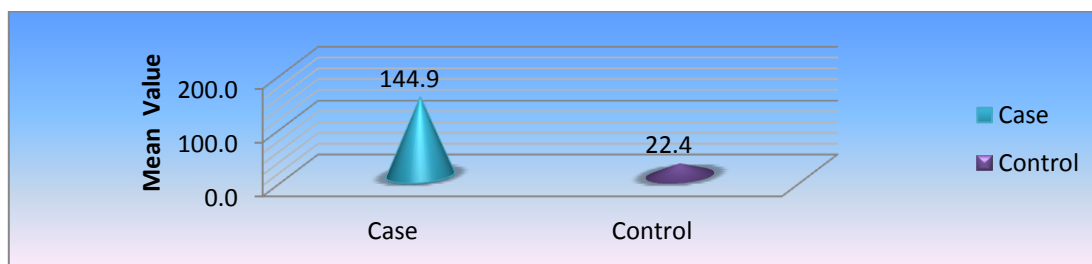
Observations & Results

Table 3: Level of Serum Urea

	Control (Group 1)	Case (Group 2)	P-Value
Min	15	92	0.0000
Max	38	195	
Mean	22.4	144.9	
SD	7.0	27.6	

P<0.05 = Highly Significant

Figure 1: Level of Serum Urea



In the above table & Figure, it's shown that the level of Serum Urea raised in the CKD patients

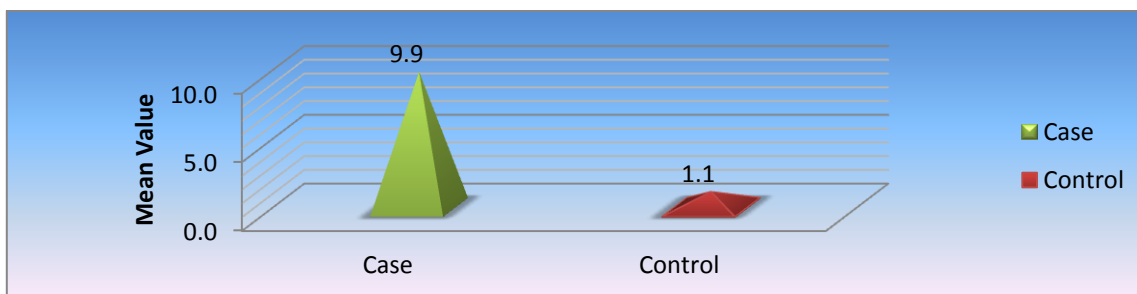
i.e., 144.9mg/dl whereas the level of Serum Urea in control group is 22.4mg/dl.

Table-4 : Level of Serum Creatinine

	Control (Group 1)	Case (Group 2)	P-Value
Min	0.4	2.49	0.0000
Max	1.6	18.6	
Mean	1.1	9.9	
SD	0.4	3.3	

P<0.001 = Highly Significant

Figure 2: Level of Serum Creatinine



In the above table & Figure, it's shown that the level of Creatinine raised in the CKD patients i.e.,

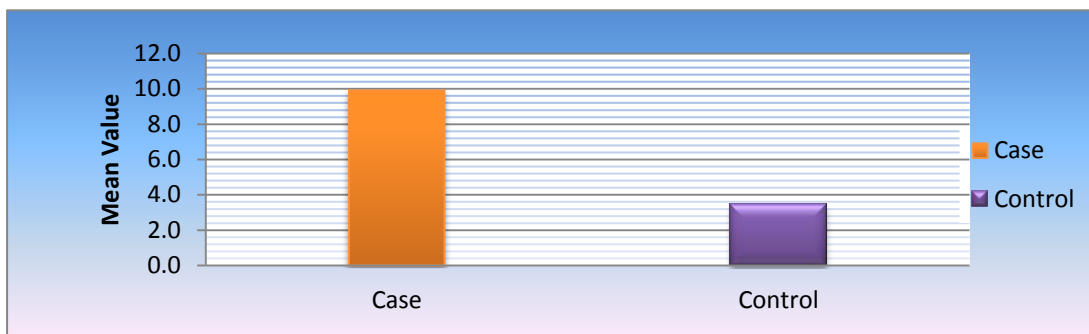
9.9mg/dl whereas the level of creatinine in control group is 1.1mg/dl.

Table-5: Level of Serum Uric acid

	Control (Group 1)	Case (Group 2)	P-Value
Min	2.27	8.1	0.0000
Max	4.9	11.9	
Mean	3.4	9.9	
SD	0.8	1.2	

P<0.001 = Highly Significant

Figure-3: Level of Serum Uric Acid



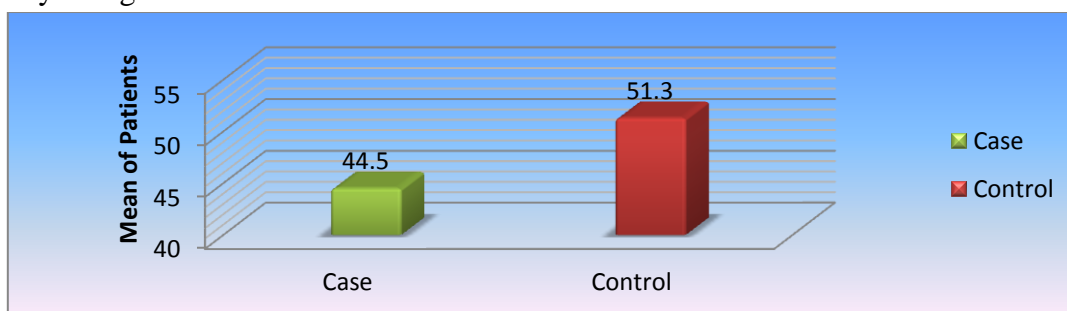
In the above table and figure, it's cleared shown that the level of Serum Uric Acid is higher in

CDK patients i.e., 9.9mg/dl than the control group i.e., 3.4mg/dl and p value is 0.

Table - 6 Study of Age Distribution of Cases

	Control (Group 1)	Case (Group 2)	P-Value
Min	36	30	0.0174
Max	68	65	
MEAN	51.3	44.5	
SD	9.9	11.6	

Figure 4: Study of Age Distribution of Cases

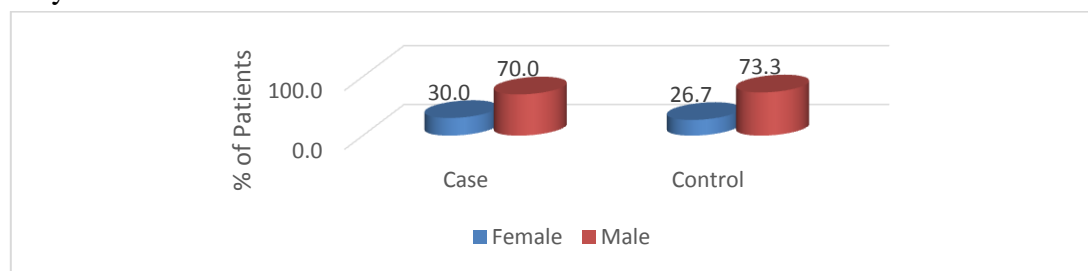


In the above table and figure, it's detected that mean aged group for CKD patients and control

group are 44.5 years and 51.3 years respectively and p value is 0.017.

Table – 7 Study of Gender distribution

Sex	Control (Group 1)	Case (Group 2)	Control(%)	Case(%)
Female	8	9	26.7	30.0
Male	22	21	73.3	70.0
Total	30	30	100.0	100.0

Figure 5: Study of Gender distribution

In the table as well in the figure it's shown that males are more prominent as far as CDK is concerned. 70% males are suffered from CKD but the percentage of females are low i.e., 30%.

Discussion & Conclusion

The mean level and standard deviation of creatinine was found to be higher in group 2(case group) (9.9 ± 3.3) as compared to group 1(control group) (1.1 ± 0.4) and it is highly significant (P value-0.0000). The mean level and standard deviation of serum uric acid was found to be higher in group 2(9.9 ± 1.2) as compared to group 1(3.4 ± 0.4) and it is highly significant (P value-0.0000). The mean level and standard deviation of TG was found to be higher in case group 2 (194.5 ± 32.8) as compared to control group 1(101.6 ± 39.6) And it is highly significant (P value-0.0000). 70% patients were males and 30% were females suffered from CKD. Hence, the present study suggested that the males patients are more than that of the females patients and Life style should be changed for all individuals so that percentage of CKD patients would decrease by taking healthy and balance food, avoid smoking, avoid alcohol intake, etc. Also, Government must take appropriate step to control the Chronic Kidney Diseases.

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