

## Original Research

# Comparative Evaluation And Correlation Of Various Clinical Parameters In Chronic Kidney Disease Patients With Or Without Hemodialysis: An Original Research Study

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### ABSTRACT

**Background & Aim:** Most of the early kidney diseases do not represent any clinical symptoms therefore left undetected. Chronic kidney disease is characteristically identified by usual testing of blood serum. Advanced cases of chronic kidney disease also manifest with some peculiar symptoms fatigue, loss of appetite, nausea, vomiting, metallic taste, inadvertent weight loss. This study was conducted to compare and correlate various clinical parameters in chronic kidney disease patients with or without hemodialysis.

**Materials and Methods:** The study was conducted over a year time on 80 chronic kidney disease patients. 45 male and 35 female patients in the age range of 30 to 50 years were studied in detail. Parameters and factors associated to chronic kidney disease were considered; Serum Cholesterol, Triglycerides, High Density Lipoproteins, Low Density Lipoproteins, Albumin (urine), Creatinine. Albumin is a type of proteins seen in blood normally. Group 1 patients consisted of 40 patients who underwent hemodialysis procedure. Group 2 patients consisted of 40 patients those have not undergone hemodialysis procedure. All data was forwarded for statistical analysis for further investigation and interpretations. P value less than 0.05 was taken as significant.

**Statistical Analysis & Results:** Statistical analysis was done by using software statistical package for the Social Sciences In group 1, mean Serum Cholesterol level was 179.41 (mg/dl) while mean Triglycerides level was 133.26 (mg/dl). P value was highly significant (0.01) for Serum Cholesterol level. In group 2, the mean Serum Cholesterol level was 201.41 (mg/dl) while mean Triglycerides level was 165.36 (mg/dl). P value was highly significant (0.02) for Serum Cholesterol level. Mean Albumin and mean Creatinine was 29.22 and 1.44 respectively. One-way ANOVA analysis of both study groups revealed highly significant p value.

**Conclusion:** Authors concluded that chronic kidney disease patients without hemodialysis exhibit deleterious discrepancies of tested lipid parameters (Dyslipidemia). Nevertheless, Albumin and Creatinine levels are also increased in chronic kidney disease patients (without hemodialysis). Accordingly chronic kidney disease patients without hemodialysis are at higher risk of possibility of blocked arteries and other related dilemmas.

**Keywords: Albumin, Chronic Kidney Disease, Creatinine, Hemodialysis, Lipoproteins**  
**INTRODUCTION**

By definition, chronic kidney disease is a longstanding disease of the kidneys leading to renal failure. Mostly, people do not have any potent symptom but frequently they feel fatigue, high blood pressure, loss of appetite, malaise, Swelling (Edema). Many of the researchers have shown that Diabetes and high blood pressure are the most common causes of chronic kidney disease.<sup>1,2</sup> Additionally, in United States, diabetes and high blood pressure are the leading causes of kidney failure, responsible for 3 out of 4 new cases. Literature has well evidenced that chronic kidney disease is more common in people who are black or of south Asian origin.<sup>3,4</sup> Renal functions are mostly assessed by renal function test which includes estimation of lipids apart from glomerular filtration rate. Nevertheless, glomerular filtration rate is the best overall indicator of kidney function. Dyslipidemia is a term used for abnormally high cholesterol or fats (lipids) in the blood. Pertinent Dyslipidemia typically increases the likelihood of atherosclerosis particularly in smokers. Interestingly, Dyslipidemia do not exhibit any prominent symptom therefore it is usually detected at its peak.<sup>5,6</sup> Dyslipidemia is a lipoprotein disorder which is predominantly diagnosed by estimating levels of serum lipids profile which include total cholesterol, TGs, HDL cholesterol and LDL.<sup>2,4,7</sup> Most of the clinicians are use to advice dialysis as the best way to clinically manage chronic kidney disease. So there is a need of hour to correlate the clinical parameters of chronic kidney disease and status of hemodialysis. Hence, this study was primarily conducted to compare and correlate various clinical parameters in chronic kidney disease patients with or without hemodialysis.

**MATERIALS AND METHODS**

This study was planned and executed in a territory hospital wherein chronic kidney disease patients were studied comprehensively for their clinical parameters. The study was completed over a year time in which total 80 chronic kidney disease patients were included. After explaining the study aim, written and signed consents were obtained from all 80 willing patients. Systematic sampling procedure was employed rationally to select all participating patients from routine opd. Both male and female patients were included in the study. 45 male and 35 female patients were studied in detail (Table 1 and Graph 1). Exclusion criteria included patients with any possibility of loss of follow up, patients on ongoing medication for kidney disease, patients with severe systemic complications. Inclusion criteria included patients with known chronic kidney disease, patients within age range of 30 to 50 years, patients reported to hospital within the postulated study tenure. Parameters and factors related to chronic kidney disease were studied in detail (Table 2-4). We have screened following serum and urine parameters; Serum Cholesterol, Triglycerides, High Density Lipoproteins, Low Density Lipoproteins, Albumin (urine), Creatinine. Albumin is a type of proteins seen in blood normally. Healthy kidney usually does not let Albumin to pass into urine. Hence, increasing Albumin level in blood is an alarming situation for underlying kidney disease. Creatinine is considered as a waste product derived from muscular metabolism. Diseased kidneys fail to clear off this Creatinine from blood via urine. Hence, increasing Creatinine level in blood usually indicate worsening of kidneys. All willing and selected patients were categorized into two study groups based on the status of their hemodialysis. Group 1 consisted of 40 patients who underwent hemodialysis procedure. Group 2 consisted of 40 patients those have not undergone hemodialysis procedure. All of the above discussed parameters have been checked and evaluated comprehensively in patients of both groups. For performing these tests, venous blood and urine samples have been taken from all participating patients. All data was sent for statistical analysis for further analysis and interpretations. P value less than 0.05 was taken as significant.

## STATISTICAL ANALYSIS AND RESULTS

All the related data were set methodically and subjected to basic statistical analysis using SPSS statistical package for the Social Sciences version 22 for Windows. Table 1 & Graph 1 express about age & gender wise distribution of patients. Total 80 patients were included in the study including 45 male and 35 females in the age range of 30 to 50 years. In the first age range of 30-35 years, total 19 patients were found. P value was highly significant for this group (0.01). In the age range of 36-40 years, total 22 patients were noticed. P value was highly significant for this group (0.02). Likewise in the age range of 46-50 years, total 15 patients were noticed with significant p value (0.01). Table 2 depicts about basic statistical analysis and related interpretations for intended clinical parameters for Group 1 having n=40 (with hemodialysis procedure). Here, mean Serum Cholesterol level was found to be 179.41 (mg/dl) while mean Triglycerides level was 133.26 (mg/dl). P value was highly significant (0.01) for Serum Cholesterol level. Mean High Density Lipoproteins was found to be 51.64 (mg/dl) while mean Low Density Lipoproteins was 101.83 (mg/dl). Mean Albumin (urine, mg/g) and mean Creatinine (mg/dl) was found to be 28.52 and 1.38 respectively. Table 3 represents about basic statistical analysis and related interpretations for intended clinical parameters for Group 2 having n=40 (without hemodialysis procedure). Here, mean Serum Cholesterol level was found to be 201.41 (mg/dl) while mean Triglycerides level was 165.36 (mg/dl). P value was highly significant (0.02) for Serum Cholesterol level. Mean High Density Lipoproteins was found to be 73.02 (mg/dl) while mean Low Density Lipoproteins was 71.23 (mg/dl). Mean Albumin (urine, mg/g) and mean Creatinine (mg/dl) was found to be 29.22 and 1.44 respectively. Table 4 shows the statistical comparison among the 2 study groups using one-way ANOVA [for group I, II]. P value was found to be extremely significant here (0.005).

**Table 1: Age & gender wise allocation of patients**

Age Group (Yrs)	Male	Female	Total	P value
30-35	12	7	19	0.01*
36-40	16	6	22	0.02*
41-45	11	13	24	0.18
46-50	6	9	15	0.01*
Total	45	35	80	*Significant
*p<0.05 significant				

**Table 2: Basic statistical analysis and related interpretations for intended clinical parameters (n=40, Group 1: with hemodialysis procedure)**

Parameters	Statistic al Mean	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
Serum Cholesterol (mg/dl)	179.41	0.186	0.145	1.96	1.383	1.0	0.01*
Triglycerides (mg/dl)	133.26	0.322	0.509	1.19	1.546	2.0	0.08
High Density Lipoproteins (mg/dl)	51.64	0.699	0.632	1.28	1.190	1.0	0.09
Low Density Lipoproteins (mg/dl)	101.83	0.247	0.739	1.43	1.383	1.0	0.30

Albumin (urine, mg/g)	28.52	0.393	0.602	1.64	1.833	2.0	0.80
Creatinine (mg/dl)	1.38	0.435	0.854	1.23	1.663	1.0	0.06

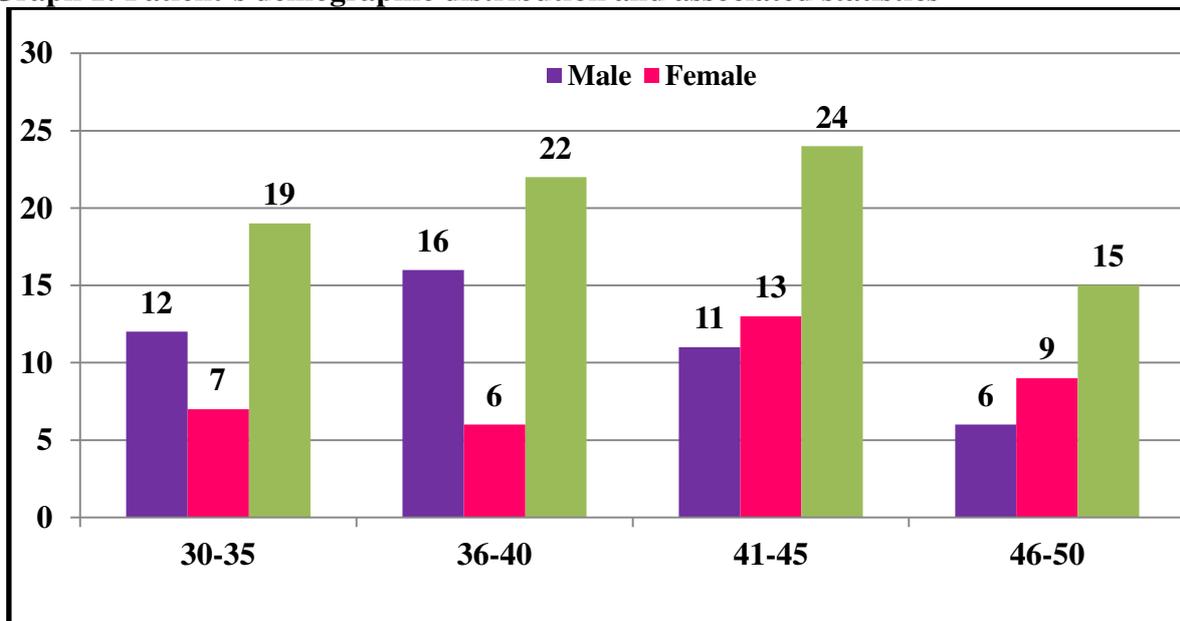
**Table 3: Basic statistical analysis and related interpretations for intended clinical parameters (n=40, Group 2: without hemodialysis procedure)**

Parameters	Statistic al Mean	Std. Deviation	Std. Error	95% CI	Pearson Chi-Square Value	df	Level of Significance (p value)
Serum Cholesterol (mg/dl)	201.41	0.486	0.945	1.96	1.983	1.0	0.02*
Triglycerides (mg/dl)	165.36	0.622	0.609	1.89	1.546	2.0	0.09
High Density Lipoproteins (mg/dl)	73.02	0.499	0.832	1.98	1.690	1.0	0.06
Low Density Lipoproteins (mg/dl)	71.23	0.847	0.839	1.43	1.983	1.0	0.30
Albumin (urine, mg/g)	29.22	0.693	0.602	1.34	1.433	2.0	0.08
Creatinine (mg/dl)	1.44	0.435	0.854	1.23	1.563	1.0	0.06

**Table 4: Comparison among the 2 study groups using one-way ANOVA [for group I, II]**

Variables	Degree of Freedom	Sum of Squares $\Sigma$	Mean Sum of Squares $m\Sigma$	F	Level of Significance (p)
Between Groups	3	2.930	1.738	2.4	0.005*
Within Groups	21	6.837	0.038		-
Cumulative	132.13	12.033	<b>*p&lt;0.05 significant</b>		

**Graph 1: Patient’s demographic distribution and associated statistics**



## DISCUSSION

Chronic kidney disease is the sixteenth major cause of death every year worldwide. Chronic kidney disease usually involves up to 16% of the population all over the world and is frequently unnoticed by patients and practitioners. Most of the researchers have demonstrated that chronic kidney disease is more common in low and middle income grade than in high income grade countries.<sup>8,9</sup> Apart from the two most common etiologies (diabetes and hypertension), glomerulonephritis and renal infections are also equally responsible for the development of chronic kidney disease. This is particularly true for Asian and African countries. Most of the researchers and academicians recommend early detection and treatment of chronic kidney disease since progressive chronic kidney disease is usually ending with life threatening situations. Diagnosis of chronic kidney disease is characteristically done by regular screening with serum biochemistry and urine profiles.<sup>10,11</sup> Only advanced cases and worsened conditions come up with clear symptoms like fatigue, nausea, vomiting, metallic taste, weight loss, peripheral edema. Many researchers showed quantitative references to diagnose chronic kidney disease like inefficient kidney function persisting for more than 3 months, GFR less than 60 mL/min/1.73m<sup>2</sup>, abuminuria, disturbed renal histology, renal tubular diseases, renal transplantation. Many pioneer studies have confirmed that the occurrence of cardiovascular disease is noticeably elevated among patients with chronic kidney disease compared with those without chronic kidney disease.<sup>3,6,8</sup> Therefore most of the clinicians recommend significant control of cardiovascular risk factors along with managing chronic kidney disease. Many studies recommend that patients aged fifty years or older with chronic kidney disease be treated special care and attention. Dietary management of chronic kidney disease is one of the extensively researched areas however we do not have any concrete guidelines about it till date. Different researchers have different opinions in this regards. However, as a preventive measure we must advice for protein restriction for aggressive progression of chronic kidney disease.<sup>12,13</sup>

## CONCLUSION

Within the limitations of the study, authors concluded that chronic kidney disease patients without hemodialysis showed clear imbalance of tested lipid parameters (Dyslipidemia). However, Albumin and Creatinine levels are slightly increased in chronic kidney disease patients (without hemodialysis) when compared with chronic kidney disease patients with hemodialysis. Therefore, patients without hemodialysis are at higher risk of possibility of blocked arteries (atherosclerosis) and heart attacks, stroke or other hematological issues. Explications and findings of the present study must be correlated analytically before applying. Authors also expect other long term studies with larger sample size in these regards.

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