

## A Prospective Study to Evaluate Changes in the Lipid Profile Status of Chronic Kidney Disease Patients on Hemodialysis in Bundelkhand Medical College, Sagar, M.P.

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### Abstract:

**Introduction:** A reduction in glomerular filtration rate (GFR) to below 60 ml/min/1.73 m<sup>2</sup> for >3 consecutive months associated with multiple etiologies constitutes the definition of chronic kidney disease that can lead to significant lipid disorder which develop primarily from disturbed regulation of high density lipoproteins (HDL) & triglyceride-rich lipoprotein metabolism. Many patients of CKD live on hemodialysis on regular basis. This study was done to know the effect of hemodialysis on the lipid profile of the CKD patients.

**Background & Methods:** This is a prospective observational study conducted in Department of medicine Bundelkhand medical college India, between September 2022 to September 2024 after considering inclusion and exclusion criteria. The lipid profile of 100 eligible patients was analyzed using an autoanalyzer at the central pathology lab at Bundelkhand medical college Sagar . The aim of this research is to study Lipid Profile in CKD patients on Hemodialysis.

**Results:** Our study reported a statistically significant decrease in high-density lipoprotein (HDL) and an increase in triglycerides (TG) and very-low-density lipoprotein (VLDL) levels in CKD patients on hemodialysis. Similarly, total cholesterol and low-density lipoprotein (LDL) were also significantly increased in CKD patients on hemodialysis.

**Conclusion:** Dyslipidemia is an established accompaniment of CKD more so in patients on hemodialysis , so regular monitoring of lipid profile in CKD patients may help in decreasing the progression of the disease and, hence, mortality in CKD patients.

**Keywords:** Lipid, and Hemodialysis.

**Study Design:** Observational Study.

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### Introduction

CKD gradually progresses towards end-stage renal disease (ESRD), generally in association with high cardiovascular morbidity and mortality. In fact, CKD patients are more likely to die of cardiovascular complications than ESRD [1]. Many recently published studies indicate that dyslipidemia in CKD patients may actively participate in the progression of cardiovascular disease (CVD) and in the deterioration of kidney function [2]. CVD is the leading cause of mortality in CKD patients and its incidence is even higher in patients on hemodialysis [3]. In the general population, dyslipidemia is a known risk factor for CVD but the relationship of dyslipidemia as a risk factor in CKD progression should be explored and documented more.

Chronic kidney disease results when a disease process affects the structure or functional integrity

of the kidney. Cardiovascular disease (CVD) is one of the major cause of mortality in patients with chronic kidney disease (CKD) and end-stage renal disease (ESRD) Hypertriglyceridemia is the most common plasma lipid abnormality in patients with kidney disease failure, coexisting with cholesterol levels within the normal range. Lipid abnormalities are common in patients with renal disease, probably contributing to the high incidence of cardiovascular diseases in this population. [4]

Cardiovascular mortality is approximately 500 times higher in patients with age of 35 to 60-year-old ESRD patients than in individuals from the healthy population of the same age and race in Indian scenarios. Cardiovascular pathology in CKD patients can be explained by presence of many risk factor like hyperlipidemia , hypertension , DM , smoking and obesity in being hyperlipidemia is one

of the major risk factors for atherosclerosis. In previous done studies it was found that dislipidemia is associated with CKD disease and its prognosis and vice versa [5].

Lipid profile status was also different in CKD patients those on hemodialysis then those on conservative management. The purpose of the study is to find out lipid profile changes in CKD patients on hemodialysis. [6]

### Material and Methods

An observational study was carried out from September 2022 to September 2024. The study group consists of 100 patients diagnosed as ESRD

on maintenance hemodialysis of age group 18-70 years of both sex from dialysis unit of medicine department of Bundelkhand Medical College Sagar . Hundred cases were taken as a convenient sample size since the exact prevalence of the disease is unknown.

ESRD patients on maintenance hemodialysis for > 6months and HD minimum 2-3 times per week were analyzed pre and post dialysis. We excluded ESRD patients not receiving their prescribed dialysis dose, showed persistent non-compliance with their dialysis therapy and diagnosed cases with hepatic disease .

### Result

**Table 1: Age Distribution**

S. No.	Age	Male	Female	Total	P Value
1	18-40	12	10	22	0.03667
2	41-60	34	24	58	
3	More than 60	10	08	20	
	<b>Total</b>	<b>48</b>	<b>42</b>	<b>100</b>	

The chi-square statistic is 0.1308. The *p*-value is 0.03667. The result is significant at  $p < 0.05$ .

**Table 2: Causes of end stage renal disease**

S. No.	Causes	No.	Percentage	P Value
1	DM	14	14	0.000097
2	HTN	43	43	
3	Both DM & HTN	13	13	
4	Cardiac Disease	09	09	
5	DM, HTN & Others	10	10	
6	Glomerulonephritis	07	07	
7	Any other disease	04	04	

The chi-square statistic is 18.4747. The *p*-value is 0.000097. The result is significant at  $p < 0.05$ .

**Table 3: Descriptive statistics study subjects**

S. No.	Parameters (mg/dl)	Pre dialysis	Post dialysis	P Value
1	Urea	109.62±3.61	42.43±8.77	0.00481
2	Creatinine	9.51±4.58	4.72±4.56	
3	Total Cholesterol	130.39±2.22	129.26±7.08	
4	Triglyceride	106.35±7.63	109.51±9.48	
5	HDL-C	27.51±1.69	28.51±2.83	
6	LDL-C	81.51±5.91	78.51±12.35	

The chi-square statistic is 106.0141. The *p*-value is 0.00481. The result is significant at  $p < 0.05$ .

**Table No. 4: Distribution of serum lipid levels among ESRD patients**

S. No.	Parameters (mg/dl)	Pre dialysis N=100	Post dialysis N=100	P Value
1	Total cholesterol < 200	89	93	< 0.00001
2	> 200	06	04	
3	Triacylglyceride <150	81	85	
4	>150	19	15	
5	<35	78	78	
6	HDL-C 35 - 60	17	20	
7	>60	03	00	
8	< 100	69	74	
9	LDL-C 100-129	16	13	
10	≥130	15	09	

The chi-square statistic is 40.3511. The *p*-value is < 0.00001. The result is significant at *p* < .05.

### Discussion

Approximately 50% of hemodialysis (HD) patients die from cardiovascular events. One of the main risk factors for cardiovascular events is hyperlipidemia. Progressive kidney disease is associated with lipoprotein abnormalities and dyslipidemia. Common lipid abnormality in HD patients is hypertriglyceridemia. Other lipid abnormalities seen in HD patients are high serum lipoprotein levels and a decrease in HDL levels. End Stage Renal Disease (ESRD) patients receiving hemodialysis are at a higher risk of developing dyslipidemia which is undoubtedly a predisposing factor of cardiac related disease in these patients [7-9]. Different phenomenon such as loss or accumulation of various substances and dysregulation or alteration in number of metabolic pathways are responsible for aetiology and pathogenesis of chronic changes in chronic kidney disease (CKD)

Morena et al., in their study, stated that hemodialysis patients are exposed to several atherogenic factors resulting from qualitative and functional lipid abnormalities, including triglyceride-rich particles, increased susceptibility to LDL oxidation and impairment of HDL protective effects [10]. However, this study is in contrast to the study by Lokesh who found low levels of total cholesterol, TG, HDL, VLDL, and LDL among patients undergoing hemodialysis when compared to controls [11].

The present study investigated lipid profile changes in patients with chronic kidney disease (CKD) undergoing hemodialysis. The results revealed significant alterations in lipid profiles, including decreased HDL and increased triglycerides, VLDL, and LDL level. Dyslipidemia is a prevalent comorbidity in CKD patients, contributing to increased cardiovascular risk [12]. The pathogenesis of dyslipidemia in CKD is multifactorial, involving insulin resistance, inflammation, and impaired apolipoprotein metabolism [13].

Regular monitoring and management of lipid profiles are crucial to mitigate cardiovascular risk in CKD patients on hemodialysis. The National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI) guidelines recommend lipid profile assessment every 6-12 months in CKD patients. Our findings are consistent with previous studies demonstrating dyslipidemia in CKD patients on hemodialysis [14-16]. However, the magnitude of lipid profile changes varies across studies, highlighting the need for standardized lipid assessment and management protocols.

### Conclusion

Dyslipidemia is an established accompaniment of CKD more so in patients on hemodialysis, so regular monitoring of lipid profile in CKD patients may help in decreasing the progression of the disease and, hence, mortality in CKD patients.

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