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Prevalence of lipid abnormalities among chronic kidney disease (CKD) patients attending in rural teaching hospital: An Observational study

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Abstract
Background: A chronic kidney disease (CKD) is a kind of renal disease in which there is a gradual loss of renal function. Initially, CKD is described as renal insufficiency or reduced renal reserve, which may progress to renal failure.
Objectives: The present study aimed to assess the lipid profile among CKD patients attending a rural teaching hospital.
Materials and Methods: This prospective observational study was conducted at Tertiary care Hospital Sangareddy. A total of 100 study subjects were selected from MNR hospital during the period from June 2021 to December 2021. The sample size was calculated by open Epi software.
Results: Significantly higher levels of triglycerides, total cholesterol, low-density lipoprotein, and VLDL were estimated in CKD patients in comparison with controls ($p<0.001$). Significant lower mean HDL was seen in CKD patients.
Conclusion: Dyslipidaemia is found common among patients with CKD. Proper medication and lifestyle changes can reduce mortality in CKD patients. Finally, regular assessment of lipid profiles among CKD patients can prevent further complications.

Keywords: Dyslipidemia, chronic kidney disease (CKD), dyslipidaemia, HDL

Introduction
In Chronic kidney disease (CKD) person demonstrate a gradual loss of renal function with loss or non-functioning nephron. Initially, CKD is described as renal insufficiency or reduced renal reserve, which may progress to renal failure. Globally 753 million people are suffering from CKD [1]. In accordance to a research reported by the Indian Council of Medical Research (ICMR), the prevalence of diabetes mellitus (DM) and hypertension are increasing day by day among the urban and rural population. With rising the incidence of these diseases, the prevalence of CKD is expected to rise [2-8]. CKD is characterized by various abnormalities of lipid metabolism, which leads to dyslipidemia. One of the major risk factors for cardiovascular diseases is Dyslipidemia. Globally dyslipidemia is common but not universal among the population with CKD. The incidence of hyperlipidemia increases as renal function declines, with elevated levels of triglycerides and Low-density lipoprotein (LDL). Wanner *et al*. (2008) state that hyperlipidemia can induce renal damage and contribute to the advancement of renal disease [9-12]. So the present study aimed to assess the lipid profile among the CKD patients attending a rural teaching hospital.

Material and Methods
This prospective observational study was conducted at MNR Medical College & Hospital which is a rural tertiary care hospital at Sangareddy, Telangana. Participants belonging to age group of 20 to 75ys, both genders were selected from the participants attending to medicine OPD and wards during the period from June 2021 to December 2021 with CKD were included. The sample size was calculated by open Epi software. Pregnant women, alcoholics, patients already on treatment for dyslipidaemia, drugs causing dyslipidaemia, cardiac disease, malignancy were excluded from the study.

Blood Sample Collection
Venous blood samples were taken from the aforesaid research individuals following a 12-hour fast. After describing the technique to the research volunteers, 5 ml of blood from the

cubital vein was collected in a vacutainer. Serum has been separated from blood samples in the central laboratory using a centrifuge set to 3000 rpm for 10 minutes. Blood samples were estimated using standard kit techniques, and analyses were performed on an ERBA Chem 7 semi-autoanalyzer.

Parameters measured

Triglycerides, HDL-cholesterol, LDL, VLDL.

CHOD-PAP method [3] was used for measurement of total cholesterol, Serum triglycerides using GPO-Trinder method,[14] HDL-cholesterol by the Phosphotungstic acid method,[15] and the VLDL and LDL estimated using the formula given by Friedewald's equation [16] as below:

- VLDL-C = Triglycerides/5.
- LDL-Cholesterol = total cholesterol-(HDL-cholesterol + triglycerides/5).

Statistical Analysis

The data were collected in proforma and analysed using SPSS v23 operating on windows 10. All results were presented as frequency, percentage, mean ± standard deviation (SD). Mean difference between continuous data was analysed using unpaired t-test. For all statistical purpose, a p-value of less than 0.001 was considered significant.

Results

A total of 100 participants were divided into two groups, 50 cases and 50 participants as controls between the age of 20–75 years. Among controls, 32 males and 18 were females and among cases, 28 males and 22 were females. (Table 1.)

Table 1: Showing distribution gender and age between groups

Age group	Controls (n= 50)		Cases (n=50)	
	Males	Females	Males	Females
20-30	07	02	06	02
31-40	03	03	07	04
41-50	06	02	03	05
51-60	08	03	02	07
61-70	05	06	03	03
71-75	03	02	07	01
Total	32	18	28	22

Table 2: Comparison of lipid profile parameters between the groups

Parameters	Controls (n= 50)	Cases (n= 50)	t- value	P-value
	Mean ± SD	Mean ± SD		
Total cholesterol	160.8 ±12.99	256.4 ± 21.57	26.84	<0.001 S*
Triglycerides	124.68 ±11.77	187.70 ± 25.64	15.79	<0.001 S*
HDL	45.42 ± 4.42	39.66 ± 2.95	7.66	<0.001 S*
LDL	88.52 ± 15.72	179.25 ± 19.73	25.42	<0.001 S*
VLDL	24.93 ± 2.35	37.56 ± 5.12	15.83	<0.001 S*

S* = Significant

As shown in the results, cases showed a significant higher mean level of triglycerides, total cholesterol, LDL and VLDL compared to controls. Similarly, there was significant lower mean level of HDL among the cases compared to the controls. (Table 2)

Discussion

We found that TG, TC, LDL, and VLDL were elevated in CKD patients as compared with controls. Serum HDL levels were decreased in CKD patients when compared to controls. Tsumura *et al*. reported similar findings in their research of CKD patients with hypercholesterolemia [17] Kimal *et al*.,[18] and Preeti Kumari *et al*. [19]. One of the most common anomalies in CKD patients is hypercholesterolemia, which is caused by excessive proteinuria and includes altered gene expression of enzymes such as 7 alpha-hydroxylase, HMG-CoA reductase, and hepatic LDL receptor [17]. Present study, there is significant increase in levels of triglycerides were seen when compared with controls. Similar findings were reported by Kimak *et al*., [20] Shah *et al*., [21] and Bhagwat *et al*. [22]. Among CKD patient's accumulation of triglycerides leads to triglyceridemia, due to low catabolism and high production of triglycerides [23]. In our study LDL and VLDL levels are increased when compared to controls. LDL levels are elevated in nephrotic syndrome, which is not a typical feature of patients with CKD [24]. VLDL levels rise owing to increased CEPT activity, which accelerates the transfer of cholesterol esters to VLDL and encourages greater VLDL production, and apo C-III protein levels rise, which is an LPL inhibitor that prevents VLDL breakdown [25]. We found that there was significant decrease in levels of HDL among the patients with CKD. Similar results were documented by Bhagwat *et al*. [22] and Yadav A *et al*. [26].

The lipid profile of CKD patients was examined in this study. Some research has been done on the association between CKD and altered lipid profiles. The current study, however, had a limited sample size because it was done over a short period of time, and the results may not be indicative of the greater population.

Conclusion

Dyslipidemia is found among CKD patients. Proper medication and lifestyle changes can reduce mortality in CKD patients. Finally, regular assessment of lipid profiles among CKD patients can prevent further complications.

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Conflicts of Interest
None

Reference

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