

A Cross-sectional Study on Association of Dyslipidaemia with Chronic Kidney Disease in a Tertiary Care Hospital in Kolkata

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Abstract: Chronic Kidney Disease (CKD) is a significant public health concern in recent years due to its increased prevalence among the population and its increased morbidity and mortality. It was estimated that the prevalence of chronic kidney disease in India ranges from 0.79% to 1.4%. This study aimed to find out the proportion of CKD among the patients admitted in General Medicine wards of a tertiary care hospital in Kolkata and to find out any association between CKD and dyslipidaemia. This study is descriptive, observational and cross-sectional in design. It was a hospital-based study, conducted in General Medicine ward in a tertiary care teaching hospital in Kolkata. All adult patients (age ≥ 18 years) admitted in the General Medicine ward in the hospital from September 2015 to February 2016 were included in the study. Out of 1375 study subjects, 135 (9.92%) persons were diagnosed as having Chronic Kidney Disease, and 1240 (90.08%) persons were suffering from ailments other than CKD. CKD patients mostly belonged to the age group of 41-60 years and, it is same for the non-CKD patients as well. 65.19% of the CKD patients were males. The relationship of age group, gender and religion with CKD status is not statistically significant. The presence of hypertriglyceridemia, presence of decreased HDL and presence overall presence of dyslipidaemia in CKD patients are statistically significant at 95% confidence limits. As, the emergence of diabetic nephropathy is the pre-eminent cause of CKD, more attention must be paid for early diagnosis and adequate treatment of diabetes, hypertension and dyslipidaemia, to prevent unwanted complications, especially Chronic Kidney Disease.

Keywords - Chronic Kidney Disease (CKD), Cholesterol, Triglyceride, Dyslipidaemia

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I. Introduction

Chronic Kidney Disease (CKD) is a significant public health concern in recent years due to its increased prevalence among the population and its increased morbidity and mortality. It was estimated that the prevalence of chronic kidney disease in India ranges from 0.79% to 1.4%.¹ The incidence of End Stage Renal Disease was estimated to be 181 per million population in 2005 in central India.¹ The exact prevalence of CKD in India is not clear due to lack of proper and adequate data recording systems.¹ The prevalence of CKD varied in different countries. In United States the chronic kidney disease prevalence was 13%.²

Abnormalities in lipid metabolism may occur in patients with all stages of chronic kidney disease.³⁻⁹ CKD is associated with premature atherosclerosis and increased incidence of cardiovascular morbidity and mortality.¹⁰⁻¹² Among human studies relating dyslipidaemia to renal outcome, it was found that higher total cholesterol, higher non-HDL cholesterol and lower HDL cholesterol were significantly associated with an increased risk of developing renal dysfunction in healthy people.¹³ There is very limited data regarding prevalence of CKD among hospitalized patients and its association with dyslipidaemia, particularly in India. In this background, the present study aimed to find out the proportion of CKD among the patients admitted in General Medicine wards of a tertiary care hospital in Kolkata and to find out any association between CKD and dyslipidaemia.

II. Materials And Methods

This study was descriptive, observational and cross-sectional in design. It was a hospital-based study, conducted in General Medicine ward in a tertiary care teaching hospital in Kolkata. All adult patients (age ≥ 18 years) admitted in the General Medicine ward in this hospital from September 2015 to February 2016 (6 months) were included in the study. Those who are not willing to participate in the study and very sick patient who were unable to give proper history were excluded.

The study was conducted with the help of a predesigned, pretested schedule and a checklist. Detailed history was taken from all the patients. History consisted of socio-demographic data as well as of data relating to CKD. The age of the patient at the time of diagnosis of Chronic Kidney Disease, treatment and drug history, family history of similar illness, history relating to any co-morbid conditions like, Diabetes, Hypertension, Coronary Artery disease, family history of kidney disease was noted. Meticulous clinical examination was done. All the relevant investigation reports were thoroughly examined and done, if required. Blood tests comprised of Fasting Sugar or 2-hour PP Sugar, Complete Blood Counts, Urea, Creatinine, Uric Acid, Lipid Profile comprising of estimation of Total Cholesterol, Triglyceride, HDL Cholesterol, LDL Cholesterol, VLDL Cholesterol. The data were entered in MS Excel spreadsheet and then analysed using software R version 3.4.3.

Permission from Institutional Ethics Committee of IPGME&R, Kolkata was sought prior to the conduction of the study.

III. Results

1617 patients were admitted in General Medicine wards of IPGME&R, Kolkata between September 2015 and February 2016. Out of these patients, 1375 patients were eligible as study subjects for this institution based cross-sectional study.

Out of these 1375 study subjects, 135 (9.92%) persons were diagnosed as having Chronic Kidney Disease, and 1240 (90.08%) persons were suffering from ailments other than CKD.

Table 1: Distribution of study subjects according to the CKD status and socio-demographic factors

Socio-demographic factors	CKD Present (N ₁ =135)		CKD Absent (N ₂ =1240)		Total (N=1375)	
	No.	(%)	No.	(%)	No.	(%)
Age groups						
≤ 40 years	4	(2.96)	40	(3.22)	44	(3.20)
41-60 years	79	(58.52)	731	(58.95)	810	(58.91)
61-80 years	51	(37.78)	459	(37.02)	510	(37.09)
≥ 81 years	1	(0.74)	10	(0.81)	11	(0.80)
Gender						
Male	88	(65.19)	830	(66.94)	918	(66.76)
Female	47	(34.81)	410	(33.06)	457	(33.24)
Religion						
Hinduism	116	(85.93)	1043	(84.11)	1159	(84.29)
Islam	18	(13.33)	188	(15.16)	206	(14.98)
Others	1	(0.74)	9	(0.73)	10	(0.73)

Table 1 shows that out of 1375 study subjects most of them belonged to the age group of 41-60 years. CKD patients mostly belonged to the age group of 41-60 years and, it is same for the non-CKD patients as well. 65.19% of the CKD patients were males. Out of the study subjects, 1159 (84.29%) belonged to Hindu religion. 116 Hindus and 18 Muslims were suffering from CKD.

The relationship of age group and CKD status is not statistically significant. (chi-square statistic = 0.0558, p-value = 0.996555, degree of freedom = 3). Also, the relationship of gender and CKD status is not statistically significant. (chi-square statistic = 0.1681, p-value = 0.681821, degree of freedom = 1). Similarly, the relationship of religion and CKD status is also not statistically significant. (chi-square statistic = 0.3194, p-value = 0.852407, degree of freedom = 2).

Table 2: Association of CKD status and lipid profile parameters among the study subjects

Types of Dyslipidaemia	Respective Lab values	CKD Present (N ₁ =135)		CKD Absent (N ₂ =1240)		Total (N=1375)		Chi-square value	p-value
		No.	(%)	No.	(%)	No.	(%)		
Hypercholesterlaemia	≥ 200 mg/dl	42	(31.11)	318	(25.65)	360	(26.18)	1.88	0.17
Hypertriglyceridaemia	≥ 150 mg/dl	91	(67.41)	227	(18.31)	318	(23.13)	165.10	0.00
Raised LDL	≥ 100 mg/dl	39	(28.89)	281	(22.66)	320	(23.27)	2.64	0.10
Decreased HDL	≤ 40 mg/dl	47	(34.81)	238	(19.19)	285	(20.73)	18.08	0.00
Dyslipidaemia	Anyone of the above	107	(79.26)	418	(33.71)	525	(38.18)	81.40	0.00

Dyslipidaemia as defined for this study, means presence of any one or more of: i) Serum Cholesterol level ≥ 200 mg/dl ii) Serum Triglyceride level ≥ 150 mg/dl iii) LDL level ≥ 100 mg/dl iv) HDL level ≤ 40 mg/dl. As in Table 2, overall, the proportion of dyslipidaemic patients among 1375 study subjects is 525 (38.18%). Among 135 CKD patients, 107 (79.26%) had dyslipidaemia, whereas, among the 1240 non-CKD patients, 418 (33.71%) had dyslipidaemia.

Among the CKD patients, 42 (31.11%) had increased serum cholesterol levels, 91 (67.41%) had increased triglyceride levels, 39 (28.89%) had increased LDL levels and 47 (34.81%) had decreased HDL levels. The presence of hypertriglyceridemia, presence of decreased HDL and presence overall presence of dyslipidaemia in CKD patients are statistically significant at 95% confidence limits.

Table 3: Lipid Profile Parameters in patients with CKD (N₁ = 135)

Lipid Profile Parameters	Respective Lab values	Patients with CKD (N ₁ =135)	
		No.	(%)
Total Cholesterol	< 200 mg/dl	93	(68.89)
	200 - 249 mg/dl	24	(17.78)
	≥ 250 mg/dl	18	(13.33)
Triglyceride	< 150 mg/dl	44	(32.59)
	150 - 249 mg/dl	61	(45.19)
	≥ 250 mg/dl	30	(22.22)
LDL	< 100 mg/dl	96	(71.11)
	100 - 149 mg/dl	28	(20.74)
	≥ 100 mg/dl	11	(8.15)
HDL	> 40 mg/dl	88	(65.19)
	31 - 40 mg/dl	37	(27.41)
	≤ 30 mg/dl	10	(7.41)

As seen from Table 3, Cholesterol level ≥ 250 mg/dl was seen in 13.33% of CKD patients, triglyceride level ≥ 250 mg/dl was seen in 22.22% of CKD patients.

5 (3.7%) CKD patients had positive family history of the disease and 12 (8.89%) patients were taking medications for dyslipidaemia in the form of statins and / or fibrates.

IV. Discussion

This study was conducted among 1375 patients in the General Medicine Wards of IPGME&R, Kolkata, India, between September 2015 and February 2016. Among the total patients, 135 patients were found to have diagnosed with CKD and the rest 1240 patients were included in non-CKD group. In this study the proportion of CKD was calculated as 9.92%, The value found is in consistence with the reported proportion in international studies (0.6 to 43.3%)^{14,15} and in two studies conducted in Brazil (7.3%-12.7%).^{16,17} Among the

CKD patients, 88 (65.2%) were males and 47 were (34.8%) females and the male preponderance was shown in most of the available studies.^{18,19}

Only 3.7% had positive family history of the disease and 8.9% patients were taking hypolipidemic medications in the form of statins and / or fibrates. This suggests that only few CKD patients had taken hypolipidemic drugs. Several randomized controlled trials have shown that effective treatment of dyslipidaemia reduces the rate of morbidity and mortality²⁰ by reduced the rate of renal function decline.²¹⁻²³ This study evaluated CKD patients with stages 3–5 including diabetic and non-diabetic patients and verified that higher total cholesterol, higher LDL cholesterol, lower HDL cholesterol and higher serum triglyceride level as compared to non-CKD patients, out of which decreased HDL and higher triglyceride levels being statistically significant. Most of the studies both in national^{24,25} and international²⁶⁻³⁰ level showed that CKD patients had having dyslipidaemia.

V. Conclusion

CKD was found to be significantly associated with hypertriglyceridemia and low HDL level. Overall presence of dyslipidaemia is also statistically significant in CKD patients. As, the emergence of diabetic nephropathy is the pre-eminent cause of CKD, more attention must be paid for early diagnosis and adequate treatment of diabetes, hypertension and dyslipidaemia, to prevent unwanted complications, especially Chronic Kidney Disease.

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