



## EVALUATION OF LIPID PROFILE IN CHRONIC KIDNEY DISEASE

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\*Corresponding Author**ABSTRACT**

**Aim:** The aim of our study was to estimate the levels of Serum T.Cholesterol, HDL, LDL, TG, T.Cholesterol/HDL ratio and LDL/HDL ratio to establish a correlation of them in Chronic Kidney Disease patients.

**Study Design:** A hospital based Non-Experimental Observational Cross-sectional & Correlation Study was conducted on patients of both sex attending the Out Patient Department & In Patient Department of Nephrology & Medicine of SMI Hospital, P.Nagar Dehradun for a period of 4 months from January 2014 to April 2014. Study comprises 54 patients with evidence of Chronic kidney disease selected randomly of both sex & age above 15 years as Test Group & 50 healthy individuals sourced from hospital staff/ students & patients relatives as Control Group. Exclusion criteria was age  $\leq 15$  years & those not willing to participate.

**Methodology:** Consecutive sampling technique & Bio-physiological method of collection of Data was used .5ml blood was collected in sterile tubes from the fasting (8-12hrs) test group & control group and was analyzed for Serum T.Cholesterol, HDL,LDL, TG, T.Cholesterol/HDL ratio & LDL/HDL ratio by enzymatic method using VITROS ECIQ, an auto analyser at SMI Hospital, P.Nagar, Dehradun.

**Results:** Serum VLDL levels & T.Chol/HDL ratio levels were found to be Non significantly ( $P > 0.05$ ) elevated in Chronic kidney disease patients as compared to control group, while serum Cholesterol, HDL, LDL levels were non significantly lower ( $P > 0.05$ ) in Chronic kidney disease patients. Serum LDL/HDL ratio levels were significantly ( $P < 0.05$ ) lower. Serum TG levels were highly significantly ( $P < 0.01$ ) elevated in Chronic kidney disease patients when compared to control group.

Statistically there was non significant elevation ( $P > 0.05$ ) of Serum T.Cholesterol, LDL, HDL, VLDL, T.Cholesterol/HDL & LDL/HDL ratio levels in female Chronic kidney disease Group as compared to male Chronic kidney disease group. Serum TG levels were found to be non significantly lower ( $P > 0.05$ ) in female Chronic kidney disease Group as compared to male Chronic kidney disease Group.

**KEYWORDS :** Chronic kidney disease Lipid profile, Cholesterol**Introduction:**

Chronic kidney disease is a condition in which the kidneys fail to remove metabolic end products from the blood and regulate the fluid, electrolyte, and pH balance of extracellular fluids. Biochemically, it is typically detected by an elevated serum creatinine, physiologically it is described as a decrease in glomerular filtration rate.<sup>(1)</sup> Prevalence of Kidney Diseases ranges from 0.79% to 1.4%. The study involves all lipoprotein classes and shows considerable variations depending on the sex of the patient. Cardiovascular disease Chronic Kidney Disease (CKD) is the leading cause of death among patients with chronic and end-stage renal disease<sup>(2,3)</sup>. Chronic kidney disease leads to disturbances in the function of virtually every organ system of the body. However, it is well documented that CVDs are major cause of morbidity & mortality in patients with Chronic kidney disease, so the American Heart Association has recommended Chronic kidney disease ( specially on dialysis) to be classified in the highest risk group for developing cardiovascular events.

CVD mortality is 10 to 30 times higher in Chronic kidney disease<sup>(4)</sup>. Accelerated atherosclerosis leads to increase in cardiovascular complications in patients with Chronic kidney disease. Several factors contribute for atherogenesis, most notable among which is alterations in lipoprotein metabolism involving all lipoprotein classes and it shows variations depending on the degree of renal impairment, etiology, presence of nephritic syndrome & method of dialysis i.e Hemo Dialysis or peritoneal Dialysis.

Dyslipidemia seen in Chronic kidney disease is characterized by high TG & Low HDLc levels, accumulation of remnant particles, predominance of LDL particles and increased lipoprotein a (LP(a))<sup>(5)</sup>. Dyslipidemia has been hypothesized to cause Kidney damage & to play an important role in the progression of renal failure as well<sup>(6)</sup>. Dyslipidemia may damage glomerular capillary endothelial & mesangial cells as well as podocytes. Mesangial cells express receptors for LDLc & oxidized LDLc, which upon activation induce mesangial cell proliferation, increase mesangial matrix deposition & enhance the production of chemokines such as macrophage chemo-attractant protein-1 & cytokines such as interleukin-6. Macrophages infiltration release cytokines causing damage to the endothelial cells, mesangial cells & podocytes leading to progressive renal damage. There is growing evidence that cardiovascular damage begins as soon

as the kidney loses function and increases in severity during the progression of kidney disease<sup>(7,8)</sup>. Analyses and prevalence reports have estimated that about 45- 50% of haemodialysis and peritoneal dialysis patients have lipid abnormalities<sup>(9,10)</sup>. With the implication of plasma lipids in the pathogenesis of atherosclerosis and ischemic heart disease, it becomes worthwhile to study the behavior of various lipid fractions in Chronic kidney disease patients<sup>(11)</sup>. Common characteristics of the lipid profile include an elevation of serum TG, a decrease in the HDL cholesterol, and some elevation in the LDL cholesterol<sup>(12)</sup>.

We come across many cases of chronic kidney disease in SMI Hospital attached to S.G.R.R.I.M.&H.S. Facilities for dialysis are also available here. This study mainly focuses on the influence, chronic kidney disease has over Lipid profile & focuses on the Correlation of these profiles with Sex of the patient.

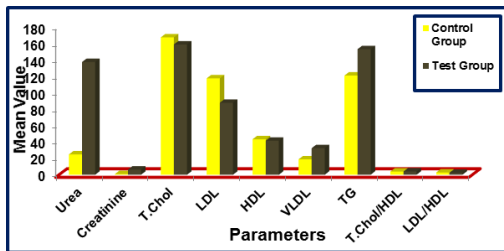
**Material & Methodology:** A hospital based Non-Experimental Observational Cross-sectional & Correlation Study was conducted on patients of both sex attending the Out Patient Department & In Patient Department of Nephrology & Medicine of SMI Hospital, P.Nagar Dehradun for a period of 4 months from January 2014 to April 2014. Study comprises 54 patients with evidence of Chronic kidney disease selected randomly of both sex & age above 15 years as Test Group & 50 healthy individuals sourced from hospital staff/ students & patients relatives as Control Group. Consecutive sampling technique & Bio-physiological method of collection of Data was used .5ml blood was collected in sterile tubes from the fasting ( 8-12hrs) test group & control group and was analyzed for Serum T.Cholesterol, HDL,LDL, TG, T.Cholesterol/HDL ratio & LDL/HDL ratio by enzymatic method using VITROS ECIQ, an auto analyser at SMI Hospital, P.Nagar, Dehradun. Chronic kidney disease was diagnosed by clinical examination & biochemical analysis of the patient. Exclusion criteria for the study was age less than 15 years & those not willing to participate.

Data was analysed using Microsoft office Excel 2007. Test used were unpaired t- test with unequal variance & paired t- test, through that only p value was determined. Other tests applied were correlation analysis, standard deviation and mean values. Value  $< 0.05$  was considered significant &  $< 0.01$  was considered highly significant.

**Result:**

Serum VLDL levels & T.Chol/HDL ratio levels were found to be Non significantly (P>0.05) elevated in Chronic kidney disease patients as compared to control group, while serum Cholesterol, HDL, LDL levels were non significantly lower (P>0.05) in Chronic kidney disease patients. Serum LDL/HDL ratio levels were significantly (P<0.05) lower. Serum TG levels were highly significantly (P<0.01) elevated in Chronic kidney disease patients when compared to control group as shown in Table 1 & depicted graphically in Figure 1.

**Figure 1: Mean Values of Lipid profile , Serum Urea & Serum Creatinine in both groups.**



**Table 1: Mean Values of Lipid profile , Serum Urea & Serum Creatinine in both groups.**

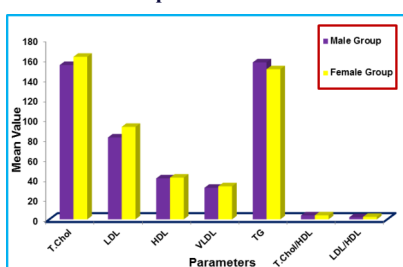
Parameter	Control Group (n=50)	Test Group (n=54)	t-Value	P-Value	Level of significance
	Mean ± SD	Mean ± SD			
T.Chol.	167.44±17.95	158 ±53.14	1.99	<0.17	NS
LDL	117.52± 7.67	87.7 ±36.7	2.00	<1.09	NS
HDL	43.24 ±3.15	41.37 ±14.60	2.00	<0.35	NS
VLDL	18.74 ±3	32.37 ±15.98	2.00	1.97	NS
TG	120.9± 24.01	153 ±71.31	1.99	<0.004	HS
T.Chol/HDL	3.89 ±0.33	3.99 ±1.41	2.00	<0.74	NS
LDL/HDL	2.72± 0.17	2.29 ±1.20	2.00	<0.012	S
Urea	24.84±5.39	137.5±50.52	15.68	<0.0001	HS
Creatinine	0.825±0.13	6.3±2.74	14.12	<0.0001	HS

Statistically there was non significant elevation(P>0.05) of Serum T.Cholesterol, LDL,HDL, VLDL, T.Cholesterol/HDL & LDL/HDL ratio levels in female Chronic kidney disease Group as compared to male Chronic kidney disease group. Serum TG levels were Chronic kidney disease found to be non significantly lower (P>0.05) in female Chronic kidney disease Group as compared to male Group as depicted in Table 2 & Figure 2.

**Table 2: Mean Values of Lipid Profile in male & Female Groups.**

Parameter	Sex (mean ± SD)		Test values		Level of Significance
	Male (24)	Female(30)	t-values	P-value	
T.Chol.	154.16 ± 45.53	162.43 ± 59.04	2.006	0.56	NS
LDL	81.79 ± 32.27	92.43 ± 39.81	2.006	0.28	NS
HDL	40.95 ± 13.33	41.7 ± 15.76	2.006	0.85	NS
VLDL	31.54 ± 14.58	33.03 ± 17.24	2.006	0.73	NS
TG	156.83 ± 73.47	149.96 ± 70.64	2.009	0.73	NS
T.Chol/HDL	3.94 ± 1.34	4.02 ± 1.48	2.007	0.85	NS
LDL/HDL	2.08 ± 0.82	2.46 ± 1.43	2.01	0.22	NS

**Figure 2: Mean Values of Lipid Profile in male & Female Groups.**



**Discussion:** Of late globally increasing trends of Chronic kidney disease has put the health care facilities around the world under tremendous strain. Increase CVD morbidity & mortality in Chronic kidney disease is caused by dyslipidemia. The impact of lipid abnormalities on renal function has been evaluated in various studies (13,14,15,16). In these studies, unfavorable lipoprotein profiles interacted as risk factors for progressive renal decline. Abnormal lipid profiles start to appear soon after renal function begins to deteriorate (16). The most accepted theory postulates that lipoprotein present in the bloodstream are taken by macrophages in the sub endothelial spaces leading to the formation of cholesterol engulfed cells namely foam cells which trigger a series of events leading to the formation of atherosclerotic plaques. The arterial narrowing that follows impairs the blood supply of several organs like heart, brain, kidney etc.

In our study we found Low Total cholesterol, LDLc, HDLc & LDL/HDL ratio & raised VLDL,Tg & T.Cholesterol/HDL ratio compared to control group. In Female group T.Cholesterol, LDLc, HDLc, VLDL, T.Cholesterol/HDL & LDL/HDL ratio was found to be raised & TG level was found to be low as compared to Male group. These Findings are in accordance with our study -

A study was conducted by Virchow in 1860 (17) showed an association between lipids & Kidney Disease.

A study was conducted by Bagdade et al in 2003 (18) observed serum VLDL-C to be raised in Chronic kidney disease patients both in non dialysis and hemodialysis group when compared with control group.

A study was conducted by Mordasini et al in 2006 (18), In their study, serum HDL-C was found to be decreased in Chronic kidney disease patients both in non dialysis and hemodialysis groups when compared with control.

A Study was conducted by Vasilis Tsimihodimos, Zoi Mitrogianni and Moses Elisaf in 2011 (19) proving "Dyslipidemia Associated with Chronic Kidney Disease".

A study conduct Chronic kidney disease ed by Basha et al in 2013 (18) stated that the accumulation of triglycerides leading to triglyceridemia in is the consequence of both a high production and a low catabolism of triglycerides.

**Conclusion:** Chronic kidney disease is is the ninth leading cause of death in United States as well as most industrialized nation throughout the world (18,20). Cardiovascular disease is the leading cause of death among patients with chronic and end-stage renal disease (2,3). There is growing evidence that cardiovascular damage begins as soon as the kidney loses function and increases in severity during the progression of kidney disease (7,8). Analyses and prevalence reports have estimated that about 45- 50% of haemodialysis and peritoneal dialysis patients have lipid abnormalities (9,10). With the implication of plasma lipids in the pathogenesis of atherosclerosis and ischemic heart disease, it becomes worthwhile to study the behavior of various lipid fractions in Chronic kidney disease patients (11).

Review of literature reveals that despite extensive study of dyslipidemia in Chronic kidney disease patients the results are still inconclusive. Most of the studies infer that biochemical dyslipidemia occurs in a high percentage of cases but overt clinical manifestation does not occur. Total cholesterol, LDLc, HDLc & LDL/HDL ratio were found to be low & raised VLDL,Tg & T.Cholesterol/HDL ratio levels were found as compared to control group in our study. In Female group T.Cholesterol, LDLc, HDLc, VLDL, T.Cholesterol/HDL & LDL/HDL ratio was found to be raised & TG level was found to be low as compared to Male group in our study. So we recommend early detection and appropriate intervention for any such alterations in the lipid profile of these patients will possibly help prevent cardiovascular complications and thereby improve the survival rates.

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