CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187
http://doi.org/10.5281/zenodo.4095891

Available online at: http://www.iajps.com *Research Article*

LIPID PROFILE PATTERN IN A PATIENT WITH CHRONIC KIDNEY FAILURE WITH GFR <60 ML / MIN / 1.73 M2 ON MAINTENANCE HEMODIALYSIS AND CONSERVATIVE TREATMENT

[1]Dr Haris Shakeel, [2]Dr Muhammad Wajid, [3]Dr Mazhar Ali
[1]Central Park Medical College, Lahore.

Article Received: August 2020 **Accepted:** September 2020 **Published:** October 2020

Abstract:

Background: *The incidence and prevalence of chronic kidney disease (CKD) is increasing worldwide and is associated with poor outcomes. The severity of CKD, along with the severity of CVD in any population, appears to be a disruptive combination for both patients and the healthcare system. Identifying CKD as a major risk factor for cardiovascular morbidity and mortality is attributed to dyslipidemia, and therefore the expectation of effective intervention to reduce premature cardiovascular mortality and progression of kidney disease to increase longevity is necessary, therefore this study may investigate the profile of lipid patient with chronic renal failure; on conservative treatment and maintenance treatment of hemodialysis.*

Place and Duration: *This cross-sectional study was conducted at the Department of Medicine and Nephrology in Jinnah Hospital Lahore for one-year duration from March 2019 to March 2020.*

Methods: *A cross-sectional comparative study was conducted to determine the pattern of the lipid profile in a chronic renal failure patient with GFR <60 ml / min treated conservatively compared to maintenance hemodialysis. A total of 128 study populations were selected according to the selection criteria, of which 62 patients were on maintenance dialysis (designated as group A) and 66 patients were treated conservatively with CKD (designated as group B). On average, the levels of cholesterol, LDL and triglycerides were higher in group B than in group A. On the other hand, the level of HDL was higher in group A than in group B and was statistically insignificant. At the same time, the mean LDL / HDL ratio was higher in group B than in group A. However, all these differences were statistically insignificant.*

Results: *Among patients in group A, mean levels of triglycerides, total cholesterol, and LDL were higher in patients with stage 4 CKD than in patients with stage 5 CKD. Mean HDL levels were higher in patients with stage 5 CKD than patients with stage 4 CKD. Among patients in group B, mean triglycerides and LDL levels were higher in patients with stage IV CKD. But neither of these two differences was statistically significant. On the other hand, mean total cholesterol level was higher in patients with stage III CKD and was statistically significant ($p < 0.05$). HDL levels were higher in stage 5 patients. But this difference was not statistically significant. In group A, the LDL / HDL ratio was higher in stage IV CKD patients and was statistically significant ($p < 0.05$). The mean LDL / HDL ratio was the highest in stage IV CKD patients in group B and was statistically significant ($p < 0.05$).*

Conclusion: *Our study showed that the mean lipid profile is better in chronic kidney disease patients undergoing dialysis than in conservative patients, but it is not statistically significant as the sample size is very small. In order to conclusively comment on possible factors associated with dyslipidemia in patients with CKD, a multicenter prospective study involving a larger number of populations and providing adequate statistical power is recommended.*

KeyWords: *chronic kidney disease, dyslipidemia, cardiovascular mortality and hemodialysis.*

Corresponding author:
Dr. Haris Shakeel,
Central Park Medical College, Lahore.
.

Please cite this article in press Haris Shakeel et al, ***Lipid Profile Pattern In A Patient With Chronic Kidney Failure With Gfr <60 Ml / Min / 1.73 M2 On Maintenance Hemodialysis And Conservative Treatment.,*** *Indo Am. J. P. Sci, 2020; 07(10).*

INTRODUCTION:

Chronic kidney disease or chronic kidney failure are increasingly recognized as a global health problem. The incidence and prevalence of chronic kidney disease is increasing worldwide [1-2]. According to the National Health and Nutritional Survey (NHANBS) 1998-2004, the incidence of CKD in the US population is 15.2%. CKD patients are classified as having the greatest risk of developing coronary artery disease CHD2. The incidence of cardiovascular CVD is high in patients undergoing hemodialysis3. CKD is defined as an abnormality in the structure or function of the kidneys that has been present for 3 months and has health implications [3-4]. It is most often diagnosed on the basis of microalbuminuria. The level of albumin excretion in urine above 30 mg / day in at least 2 measurements is consistent with CKD regardless of the GFR level. We will focus primarily on dyslipidemia in patients with chronic kidney disease stage [3, 4, 5] in the conservative treatment and maintenance hemodialysis stages. Dyslipidemia, common in CKD patients with a lipid profile, varies widely with the level of renal function and the degree of proteinuria. In CKD, the etiology of dyslipidemia can be more accurately reflected in the apolipoprotein profile [5-6]. The levels of apo A-I and apo A-II are often lowered, leading to a reduction in HDL-C production. In addition, elevated levels of apo CIII, integral to the metabolism of both LDL-C cholesterol and very low-density lipoprotein (VLDL-C). The accumulation of apo B containing VLDL particles is also important in the development and maintenance of dyslipidemia in CKD. Factors that may contribute to the decreased catabolism and clearance of apo B-rich triglyceride-containing lipoproteins include 1) decreased activity of lipolytic enzymes; 2) abnormalities in the composition of lipoproteins that prevent binding to appropriate receptors, and 3) reduced lipoprotein uptake from the bloodstream [7-8]. Binding and uptake of lipoproteins can be influenced by the increased amount of oxidative stress observed in CKD such that oxidative modification of lipoproteins leads to decreased uptake by the relevant receptors and subsequent atherosclerosis. In summary, many factors influence the hepatic and peripheral uptake of triglyceride-rich lipoproteins containing apo B, resulting in increased circulation of these potentially atherogenic lipoproteins. Prior to the development of CKD, patients often have elevated total and LDL-C levels[9-10]. However, as CKD progresses to renal failure, the incidence of elevated total and LDL-C levels decreases. In dialysis patients, LDL-C levels are generally lower than in the general population. The classic lipid profile of post-stage CKD includes hypertriglyceridemia, low HDL-C, and low or normal LDL-C. Bearing in mind the mortality of patients with CKD, we are investigating the level of serum lipids in patients with CKD undergoing conservative treatment and maintenance hemodialysis[11]. Identifying CKD as a major risk factor for cardiovascular morbidity and mortality is attributed to dyslipidemia, and therefore the expectation of effective intervention to reduce premature cardiovascular mortality and progression of kidney disease to increase longevity is imperative, so this study looks at the lipid profile in a patient with renal insufficiency; on conservative treatment and maintenance treatment of hemodialysis.

MATERIALS AND METHODS:

A cross-sectional study was conducted at the Department of Medicine and Nephrology in Jinnah Hospital Lahore for one-year duration from March 2019 to March 2020.128 samples were deliberately collected from CKD patients admitted to hospital for CKD stge-3, grade IV, and stage-5. The respondents were divided into two groups. Hemodialysis patients were included in group A, and conservative patients in group B. Patients under 18 years of age, with hypothyroidism and chronic liver disease, pregnant women, and patients taking lipid-lowering drugs were excluded from the study. Data was collected from all participants through face-to-face interviews and structured questionnaires. Informed consent was obtained from all participants. Age, sex, occupation and marital status were recorded according to the participants' statements during the interview. A story about smoking, high blood pressure, and diabetes. A history of any cardiovascular events (myocardial

infarction, stroke, heart failure) was collected. A history of antihypertensive, anti-diabetic, lipid-lowering and anti-ischemic agents has been reported. The participants were then tested for height, weight, blood pressure, anemia, and swelling. The collected laboratory data included FBG, serum creatinine, fasting lipid profiles, serum calcium, and serum phosphate. The data was processed and analyzed using the SPSS (Statistical Package for Social Science) computer software version 16. The test statistics used for the data analysis were descriptive statistics, chi-square test, Student's t-test. Descriptive statistics include frequency, mean, and standard deviation. Continuous data are presented as the mean and standard deviation of the mean and compared using the student's test. Categorical data was expressed as a percentage and assessed using the chi-square test. A p value of <0.05 was considered significant.

RESULTS:

The socio-demographic characteristics of the respondents are presented in Table I. Most of the respondents belonged to the age group from 41 to 60, both in group A (58.1%) and group B (47.0%). There are various risk factors among the respondents to our survey. group A and group B 54 (87.1%) and 21 (31.8%) patients had hypertension in group A and group B, respectively. The percentage of smokers was greater in group A - 46.8% than in group B - 30%, and was not statistically significant. In groups A and B 31 50% and 37 56.1%) were diabetic, and 31 (50%) and 29 (43.9%) were non-diabetic. More than half of the patients had anemia in both groups (67.7% in group A and 65.2% in group B). But it wasn't statistically significant. Mean age, BMI, systolic and diastolic blood pressure were higher in group A than in group B. However, these differences were not statistically significant.

Table I *Sociodemographic details of the respondents*

Table I *Socio-demographic details of the respondents*

Characteristics		No of the study subjects	
		Group A(n = 62)	Group B(n= 66)
Age (in years)	21-40	7 (11.3 %)	15 (22.7 %)
	41-60	36 (58.1 %)	31 (47.0%)
	Ø 60	19 (30.6 %)	20 (30.3 %)
Sex	Male	37 (59.7 %)	40 (60.6)
	Female	25 (40.3 %)	26 (39.4 %)
Educational status	Illiterate	8 (12.9 %)	9 (13.6 %)
	Primary	27 (43.5 %)	14 (21.2 %)
	Secondary	16 (25.8 %)	30 (45.5 %)
	Higher secondary and above	11 (17.7 %)	13 (19.7 %)
Occupation	Housewife	23 (37.1 %)	18 (27.3)
	Business	17 (27.4 %)	13 (19.7 %)
	Service holder	10 (16.1 %)	24 (36.4 %)
	Farmer	6 (9.7 %)	3 (4.5 %)
	Others	6 (9.7 %)	8 (12.1 %)

The mean level of hemoglobin was greater in group B (9.19 ± 2.11 (SD), but the difference was also statistically insignificant. On the other hand, the mean level of calcium in group A was 8.50 ± 1.28 (SD), and in in group B 8.05 ± 1.21 (SD) and this difference was statistically significant Similarly, the mean level of phosphate was higher in group A, i.e. 5.21 ± 1.97 (SD) than in group B, i.e. 1.22 (SD) and statistically this difference was also significant. Mean cholesterol, LDL and triglyceride levels were higher in group B than in group A. However, these differences were not statistically significant. On the other hand, HDL levels were higher in group A At the same time, the mean LDL / HDL index was

higher in group B (3.86 ± 1.93) than in group A (3.43 ± 1.85), but it was not significant statistically, Table III shows that among patients from group A the mean triglyceride level (182.22 ± 74.81), total cholesterol (207.57 ± 42.46) and LDL level (137.87 207.57 ± 4 2, 46) were higher in patients with stage 4 CKD than in patients with stage 5 CKD. The mean HDL level was higher in patients with stage 5 CKD (36.97 ± 8.77) than in patients with stage 4 CKD (36.48 ± 11.72).

Serum LDL is significantly lower in CKD stage 4 patients than in stage 5 patients (p = 0.000). Among patients from group B, mean triglyceride levels (231.63 ± 124.67) and LDL (127.37 ± 38.35) were higher in patients with stage IV CKD. But neither of these two differences was statistically significant. On the other hand, the mean total cholesterol level (244.48 ± 57.62) was higher in patients with CKD stage III and was statistically significant (p <0.005). On average, HDL levels (35.56 ± 10.49) were higher in stage 5 patients. But this difference was not statistically significant. Table V showed that the average level of triglycerides and total cholesterol was higher in group B (TG = 231.63 ± 124, T. Choles = 211.21 ± 62.97) than in group A (TG = 182.22 ± 74.81, T. Choles = 207.57 ± 42.46) among patients with stage 4 CKD. On the other hand, mean values of HDL and LDL were higher in group A (HDL = 36.48 ± 11.72, LDL = 137.87 ± 33.71) than in group B. All differences, however, were statistically insignificant.

Table II *Comparison of lipid profiles between two groups*

Characteristics	Group- A (on hemodialysis) n =62 Mean ± SD	Group –B (on conservative) n=66 Mean ± SD	P value
Cholesterol mg/dl	196.85±46.57	212.30±66.46	0.133
HDL mg/dl	36.79±9.88	33.39±10.11	0.057
LDL mg/dl	114.66±40.85	119.18±46.71	0.562
Triglyceride mg/dl	181.94±121.59	218.98±108.63	0.071
LDL/HDL	3.43±1.85	3.86±1.93	0.203

In patients with stage 5 CKD, total cholesterol and HDL were higher in group A (T-cholesterol = 190.54 ± 48.25, HDL = 36.97 ± 8.77) than in group B (T-cholesterol = 174.74 ± 63.34, HDL = 35.56 ± 10.49). In turn, the mean level of triglycerides and LDL was higher in group B (TG = 189.05 ± 86.62, LDL = 107.68 ± 45.82) than in group A (TG = 181.77 ± 143.15, LDL = 100.97 ± 38.76). But these differences were statistically insignificant.

Table III: Lipid profile in different stages of CKD in Group A

CKD stage	Triglyceride mg/dl Mean ± SD	Total Cholesterol mg/dl Mean ± SD	HDL mg/dl Mean ± SD	LDL mg /dl Mean ± SD
Stage 4	182.22±74.81	207.57±42.46	36.48±11.72	137.87±33.71
Stage 5	181.77±143.15	190.54±48.25	36.97±8.77	100.97±38.76
P value	0.989	0.166	0.85	0.000

Different stages CKD in group B

CKD stage	Triglyceride Mean±SD	Total Cholesterol Mean±SD	HDL Mean±SD	LDL Mean±SD
Stage 3	230.52±106.72	244.48±57.62	35.05±8.66	120.13±54.80
Stage 4	231.63±124.67	211.21±62.97	30.08±10.64	127.37±38.35

Stage 5	189.05±86.62	174.74±63.34	35.56±10.49	107.68±45.82
P value	0.369	0.002	0.132	0.393

Lipid Profile of two group

Group	Triglyceride Mean SD(±)	Total Cholesterol Mean SD(±)	HDL Mean SD(±)	LDL Mean SD(±)
Group A	182.22±74.81	207.57±42.46	36.48±11.72	137.87±3.71
Group B	231.63±124.67	211.21±62.97	30.08±10.64	127.38±8.35
P value	0.108	0.818	0.056	0.325

DISCUSSION:

Chronic kidney disease (CKD) is a public health problem worldwide due to the increasing incidence of type 2 diabetes and atherosclerotic-related kidney disease. This creates a serious health problem as a high percentage of these patients will require renal replacement therapy. The effects of chronic kidney disease include not only kidney failure, but complications from renal dysfunction and cardiovascular disease. The global increase in the number of patients with chronic kidney disease and the resulting end-stage renal disease requiring renal replacement therapy is set to reach large sizes over the next decade, and only a small number of countries have strong economies that are able to meet the challenges [12]. It is therefore necessary to change the global approach to CKD from ESRD treatment to a much more aggressive primary and secondary prevention. In order to avoid a major catastrophe, a global and coordinated approach to CKD in both more and less developed countries should be adopted [13]. Dyslipidemia is often observed in patients with CKD, leading to abnormal levels and composition of plasma lipoproteins. The main features of uremic dyslipidemia are an increase in the concentration of triglycerides and cholesterol in almost all plasma lipoproteins and a decrease in HDL cholesterol. Indeed, the mechanisms underlying hypertriglyceridemia may be multifactorial. Hypertriglyceridemia does contribute to the progression of atherosclerosis and cardiovascular disease [14-15].

CONCLUSION:

Dyslipidemia is an integral component of CKD, but its level depends on the morality of treatment. Our study showed that the mean lipid profile is better in patients with chronic kidney disease undergoing dialysis than in those receiving conservative treatment, but it is not statistically significant as the sample size is very small. When planning a therapeutic approach in patients with CKD, lipid profile should always be taken into account, and its identification and treatment should be an integral part of the management protocol for patients with CKD.

REFERENCES:

1. Vaidya, Satyanarayana R., and Narothama R. Aeddula. "Chronic Renal Failure." In *StatPearls [Internet]*. StatPearls Publishing, 2019.
2. Pathak, A. K., Neelakanth U. Parappanavar, and Pratap Singh Chauhan. "Hypertriglyceridemia in Reference to Chronic Kidney Disease."
3. Murmu, Asso Prof Dr Malati, Pravas Sahu, Manoranjan Naik, Om Prakash Nayak, and Soumya Ranjan Patra. "Study of Lipid Profile in Non Diabetic CKD Patients."
4. Matyjek, Anna, Slawomir Literacki, Stanislaw Niemczyk, and Aleksandra Rymarz. "Protein energy-wasting associated with nephrotic syndrome–the comparison of metabolic pattern in severe nephrosis to different stages of chronic kidney disease." *BMC nephrology* 21, no. 1 (2020): 1-11.
5. Schütz, Jasper da Silva, Carolina Barrera De Azambuja, Giuliano Reolon Cunha, Juliano Cavagni, Cassiano Kuchenbecker Rösing, Alex Nogueira Haas, Fernando Saldanha Thomé, and Tiago Fiorini. "Association between severe periodontitis and chronic kidney disease severity in predialytic patients: A cross-sectional study." *Oral Diseases* 26, no. 2 (2020): 447-456.
6. Van den Bulck, Steve A., Patrik Vankrunkelsven, Geert Goderis, Gijs Van

Pottelbergh, Jonathan Swerts, Karolien Panis, and Rosella Hermens. "Developing quality indicators for Chronic Kidney Disease in primary care, extractable from the Electronic Medical Record. A Rand-modified Delphi method." *BMC nephrology* 21 (2020): 1-10.

7. Kannan, R. "The Impact of Thyroid Hormone Therapy on the Changes in Estimated Glomerular Filtration Rate in Chronic Kidney Disease Patients with Subclinical Hypothyroidism." PhD diss., Madurai Medical College, Madurai, 2019.
8. Bulck, Steve Alfons Van den, Patrik Vankrunkelsven, Geert Goderis, Gijs Van Pottelbergh, Jonathan Swerts, Karolien Panis, and R. P. Hermens. "Developing quality indicators for Chronic Kidney Disease in primary care, extractable from the Electronic Medical Record. A Rand-modified Delphi method." (2020).
9. Burlacu, Alexandru, Simonetta Genovesi, Carlo Basile, Alberto Ortiz, Sandip Mitra, Dimitrios Kirmizis, Mehmet Kanbay, Andrew Davenport, F. Sande, and A. Covic. "Coronary artery disease in dialysis patients: evidence synthesis, controversies and proposed management strategies." *J Nephrol* (2020).
10. Brake, Lars. "ASSESSMENT OF NUTRITIONAL STATUS AND NUTRITIONAL HABITS IN PATIENTS ON HEMODIALYSIS." PhD diss., University of Split. School of Medicine. Pathophysiology., 2020.
11. Stengel, Bénédicte, Marie Metzger, Christian Combe, Christian Jacquelinet, Serge Briançon, Carole Ayav, Denis Fouque et al. "Risk profile, quality of life and care of patients with moderate and advanced CKD: The French CKD-REIN Cohort Study." *Nephrology Dialysis Transplantation* 34, no. 2 (2019): 277-286.
12. Capotondo, Maria Mercedes, and Carlos Guido Musso. "Nephroprevention in the Elderly." In *Clinical Nephrogeriatrics*, pp. 133-145. Springer, Cham, 2019.
13. Yueh-Lung, Peng, Tain You-Lin, Chien-Te Lee, Yang Yi-Hsn, Huang Yaw-Bin, Wen Yen-Hsia, and Hsu Chien-Ning. "Comparison of uric acid reduction and renal outcomes of febuxostat vs allopurinol in patients with chronic kidney disease." *Scientific Reports (Nature Publisher Group)* 10, no. 1 (2020).
14. Simeoni, Mariadelina, Silvio Borrelli, Carlo Garofalo, Giorgio Fuiano, Ciro Esposito, Alessandro Comi, and Michele Provenzano. "Atherosclerotic-nephropathy: an updated narrative review." *Journal of Nephrology* (2020): 1-12.
15. Garibotto, Giacomo, Daniela Picciotto, and Daniela Verzola. "18 Wasting and Cachexia in Chronic Kidney Disease." *Sarcopenia: Molecular, Cellular, and Nutritional Aspects* (2019): 349.