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ORIGINAL ARTICLE

# Study of Lipid Profile in Pediatric Nephrotic Syndrome Patients in Karbala

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## ABSTRACT

**Objective:** This study aims to study detect relationship between some biological and biochemical parameters in pediatric nephrotic syndrome with different ages.

**Methods:** The study was done between October 2021 and May 2022. In the Pediatric teaching hospital Center for Nephrology /Karbala Health Directorate. A 5 mL sample of venous blood was collected from 116 Nephrotic syndrome children patients and 42 healthy children. There are several analyses have been performed as a result, including biochemical parameters: Lipid profiles (TC, LDL, HDL, and TG), Albumin, Hematological parameters CBC, Physiological parameters (Glucose, ABO), General Parameters (Age, Weight, Gender).

**Results:** The results show that the value of TC, LDL, HDL, TG, Albumin, and Glucose were 330.62, 204.27, 58.51, 308.67, 30.54, and 115.27 mg/dL, respectively. In children with Nephrotic syndrome there were some correlation between some parameters, such as TC and LDL (0.808) ,and TG with both LDL and TC (0.526,0.539), respectively. The B blood group in children with nephrotic syndrome was more than in healthy.

## INTRODUCTION

Nephrotic syndrome remains a common chronic illness marked by changes in perm selectivity on the glomerular capillary wall, resulting in an incapacity to control protein loss in the urine. Proteinuria in the nephrotic range stays definite as more than 1000 mg/m$^2$ per daytime or a random urine protein-to-creatinine ratio of more than Two mg/mg. In children with pediatric nephrotic syndrome, proteinuria usually remains selective, consisting mostly of albumin.[1]

The global incidence of pediatric Nephrotic syndrome is reported to be 4.7 per 100,000 children (range 1.15–16.9), with sub-regional diversity due to the country background and geographic location.[2] NS is currently the most common chronic childhood glomerular disorder seen in Nigeria. Glucocorticoids have remained the mainstay of its treatment since their introduction in the 1950s, and steroid responsiveness is regarded as its most important prognostic indicator. Earlier studies on childhood NS were at Ibadan and Kaduna, both in Nigeria and other parts of tropical Africa.[3]



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It's mainly an illness of youthful 15 times further than an adult.[4] Problems in NS might arise from pharmacological treatment or from the disease itself. Because of altered cellular processes or as a direct consequence of altered plasma protein composition, the waste of plasma in the urine causes NS complications; thromboembolism, cardiac illness, hypovolemic shock, anemia, and acute renal disaster are some of the symptoms that can happen. Problems of prolonged therapy in Nephrotic kids are usually related to CS, alkylating drugs, calcineurin inhibitor also mycophenolate moiety (MMF).[5]

According to a study performed in Iraq, hyperlipidemia is among the common features of nephrotic syndrome. On the edge of therapy in NS patients, the cholesterol levels in the blood return to normal. Furthermore, maintaining a healthy lipid level in the body is vital for overall health. Somewhat irregularities in lipid amounts, such as those seen in relapse, cause athermanous cardiovascular disease (ACD), blood clot embolic (BCE) problems, atherosclerotic vascular disease (AVD), embolic thrombus issues, and lipid accumulation in glomeruli and renal tubule epithelial cells are all caused by fat accumulation inside nephrons and proximal tubular epithelium. As a result of these negative consequences, renal failure occurs.[6]

## MATERIALS AND METHODS

From November 2021 to April 2022, a case-control study for pediatric patients which have Nephrotic syndrome was done. In Karbala teaching hospital for children, Karbala pediatric hospital/Karbala Health Directorate, one hundred and sixteen pediatric patients were diagnosed with Nephrotic Syndrome and forty-two as healthy pediatric persons. All of the patients were children, age up to 15, of both sexes, with nephrotic syndrome.

Identification for Nephrotic Syndrome: Clinical symptoms, hypoalbuminemia, and glomerular biopsy are used to diagnose the nephrotic syndrome. A specialist doctor in the pediatric hospital identified children with Nephrotic syndrome based on clinical symptoms, hypoalbuminemia, and kidney biopsy.

### Estimation of Lipid Profile

The Auto-Chemistry Analyzer CS-T180 assessed Triglycerides (TG), Cholesterol (TC), Low-density lipoprotein (LDL), and High-density lipoprotein using an automatic technique.[7]

### Physiological Parameters Estimation

*Assessment of Complete Blood Counts The procedure was followed by[8].*

- The samples were all at room temperature in the first step. It was ten times spun by hand until it was suspended.
- If the samples are barcoded, it was run as if it were a normal patient (Caps lock was disabled).
- After placing the sample on the analyzer, the RUN button was pressed. After all of the samples had been examined, the results were printed. "To print the information, "Stored Data" was selected.
- The output button was pushed.
- Clear symbols by pushing "Mark," "All Clear," and "Cancel".[8]

**Table 1:** Lipid Profile Parameters of the study sample

| *The parameter* | *Control (N=42)* | *Patients (N = 116)* | *p-value* |
|---|---|---|---|
| Serum Albumin | 46.03 ± 3.87 | 30.54 ± 4.36 | 0.0001 ** |
| TG | 103.44 ± 70.89 | 308.67 ± 233.77 | 0.0001 ** |
| HDL | 46.48 ± 10.54 | 58.51 ± 70.49 | 0.2733 |
| LDL | 83.37 ± 23.64 | 204.27 ± 115.72 | 0.0001 ** |
| S. Cholesterol | 148.89 ± 29.97 | 330.62 ± 158.32 | 0.0001 ** |

*mean significance differences (P< 0.05),** mean high significance differences (P <0.001)

### Assessment of Glucose

In the Auto-Chemistry Analyzer CS-T180, glucose was measured automatically using the method from**7.**

### Assessment of Rh and ABO Blood Group.

In this method, A drop from donor or recipient blood is mixed separately with anti-A, anti-B, & anti-D antibodies for each part of the white porcelain support. The ABO & rhesus D (RhD) blood types may be determined by visually viewing the reaction or blood clump pattern. The test takes 5 to 10 minutes to complete and costs little if just a few blood type reagents are used.[9]

## RESULTS AND DISCUSSION

In lipid profile parameters in Table 1 resulted in high significances increase *($p < 0.001$)* in levels of all TG, LDL, and cholesterol between case and control children with mean as (308.67, 103.44) mg/dL,(204.27, 83.37) mg/dL and (330.62, 148.89) mg/dL for each of them respectively. As well as, HDL had no significant increase in a case than control children with mean respectively (58.51, 46.48) mg/dl.

Children with high triglyceride levels at the time of diagnosis of the nephrotic syndrome were 3.37 times more likely to relapse than those with borderline triglyceride levels.[10] The finding of this study was in agreement with the study done in India by Sarker *et al*., The podocyte biology explanation of proteinuria pathogenesis suggests that elevated triglyceride levels change the glomerular filtration barrier, which could explain this. Furthermore, the main infection's plasma protein loss will result in lipoprotein synthesis & low albumin levels. In response to the drop in serum albumin levels, the liver begins to produce more albumin. At the same time, the liver makes more cholesterol and triglycerides, which leads to the reappearance of nephrotic syndrome signs and symptoms. In a study by Gebrehiwot *et al*., 88 percent of children with a high triglyceride level and a blood albumin level of less than 1.5 g/dL had relapses.[11] HDL is a protective factor against atherosclerosis, according to the Framingham risk score, which has been widely used in predicting the risk of disease related to atherosclerosis. HDL particles are complex

**Table 2:** ABO Blood groups of the study sample.

| *Blood Group* | *Control* | *Patients* | *Total* | *P value* |
|---|---|---|---|---|
| A | 10 (23.81 %) | 25 (21.55 %) | 35 (22.15%) | 0.68028 |
| B | 6 (14.28 %) | 33 (28.45 %) | 39 (24.68%) | 0.02365* |
| AB | 6 (14.28 %) | 17 (14.66 %) | 23 (14.56%) | 1.0000 |
| O | 20 (47.62 %) | 41 (35.34 %) | 61 (38.61) | 0.15304 |
| Total | 42 (100%) | 116 (100 %) | 158 (100 %) | |
| *P value* | 0.00592 * | 0.01154 * | 0.00026** | |

*mean significance differences *($p < 0.05$)* , ** mean high significance differences *($p < 0.001$)*

molecules that carry lipid from the artery to the liver, which is excreted by the bile duct. HDL particles also contain various amounts of oxidants and antioxidants that help control systemic inflammation.[12] Except for HDL, the values above are still above normal, according to the National Cholesterol Education Program (NCEP), namely total cholesterol200 mg/dL, LDL> 130 mg/dL, triglycerides 100 mg/dL, and HDL≤ 40 mg/dL. Abnormalities These findings suggest that NS patients are likely to have atherosclerotic lesions, though this is debatable. While some clinical studies have found an increased risk of heart disease in older NS patients, others do not.[13]

One study also similar to this showed that TC, LDL and TG were significantly high in patients of nephrotic syndrome compared to control children. Further, HDL was significantly lower in the nephrotic syndrome group compared to the control group.[14] Corticosteroids may have an impact on lipid metabolism. According to the NS consensus, the first line of treatment for children in Indonesia should be corticosteroids. Because corticosteroid usage in subjects varies in length and number of doses depending on the kind of NS being treated, lipid levels were significantly affected by how often kid has a relapse.[12]

## Blood Groups of Study Sample

The results of Table 2 showed there were significant differences *($p < 0.05$)* in the ABO group in controls and patients, which a higher O group in both, and in total, showed high significance differences (*$p < 0.001$*). While in comparison with cases and controls in the ABO group, there were no significant differences in all groups except the B group, which had significant differences (*$P < 0.05$)* among case and control children. B groups in patients' children are more than in healthy.

Blood group antigens are genetically encoded proteins that can increase the risk of some diseases whilst lowering the risk of others. Several diseases have been linked to the ABO blood group in studies, such as coronary artery disease, depression, type 2 diabetes mellitus (T2DM), chronic kidney failure, gastroduodenal ulcers, Cohn's disease, hepatitis B infection, Covid-19, thyroiditis, several cancer types, including brain, breast, skin, pancreatic, and small cell lung cancers, as well as rheumatologic diseases like systemic lupus erythematous.[15] Many ideas (inflammation, infection) have been proposed to explain the propensity or protection associated with blood

**Table 3:** The correlation between some lipid profile parameters

| | *Serum Albumin* | *ALT* | *ALP* | *TG* | *LDL* | *S. Chol.* |
|---|---|---|---|---|---|---|
| S. Albumin | 1 | 0.061 | 0.034 | -0.221 | -0.311 | -0.360 |
| TG | - | - | - | 1 | 0.526* | 0.539* |
| LDL | - | - | - | - | 1 | 0.808** |
| S. Chol. | - | - | - | - | - | 1 |

* The correlation is significant at 0.05 level (2-tailed) ** The correlation is significant at 0.01 level (2-tailed)

types, and while no clear mechanism has been found, they are still considered possible causes. However, other studies have not shown a link between blood group and illness. The findings of this study confirm those of Abbas *et al.,* who found no link between ABO blood type antigens as well as kidney function tests.[16]

In another study by Oruc *et al*., no link between NS and blood group was found. The results of this study support their results.

## The correlation between parameters (that have significance effects) in nephrotic patients.

Table 3 shows the significant correlation at 0.01 level (2-tailed) in Nephrotic patients between LDL and S.Chol. There is also a positive correlation (0.808). Also found considerable correlation at 0.05 level (2-tailed) in Nephrotic patients between, TG and LDL , TG and S.Chol. which all was positive correlation at (0.526, 0.539) respectively.

The nephrotic state is associated with markedly increased total cholesterol and LDL cholesterol levels due to both impaired clearance and increased production.[17]

Positive correlation between TG and serum cholesterol and between TG and LDL, and also a correlation between LDL and serum cholesterol, all of them were in agreement with previous studies such as Ningsih *et al*. It was shown that in individuals with NS, an atherogenic lipid profile is linked to an increased risk of cardiac disease like myocardial infarction.

Several reports of myocardial infarction have also been documented in children. However, with persistent lipid abnormalities in patients with NS, even in remission, the risk of long-term cardiovascular events for children with NS remains unclear.[13]

The lipid metabolism disorders in NS can improve with treatment but can persist during periods of remission.[18]

# CONCLUSIONS

Reversible correlation between TG with serum cholesterol, TG with LDL and LDL with serum cholesterol.

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