# SCREENING FOR LIVER AFFECTION IN CHILDHOOD NEPHROTIC SYNDROME

*Thesis*

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# مسح لتأثر الكبد فى حالات متلازمة النفروز لدى الأطفال

رسالة

توطئة للحصول على درجة الماجستير فى طب الأطفال


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# SUMMARY

The study was aiming to investigate children with nephrotic syndrome for the presence of liver affection clinically and/or biochemically.

It was conducted on a group of 100 patients with various types of childhood nephrotic syndrome clinically and laboratory diagnosed following up in the Pediatric Nephrology Clinic Children's Hospital, Ain Shams University.

They were 67(67%) males and 33 (33%) females with ages (42%) above 11 years.

Detailed history was taken from all patients including age, sex, duration of the disease, activity of the disease (relapse/remission), duration, dose, and response to steroid therapy, presence of symptoms of liver affection as screen patients with childhood nephrotic syndrome for liver affection and to investigate for its cause if present.

Careful examination of patients was done with special emphasis on manifestations of nephrotic syndrome (lower limb edema, puffy eye lids, ascites), complications of steroid therapy (cushinoid appearance, hypertension,….), and symptoms suggestive of liver affection (presence of jaundice, liver examination, signs of portal hypertension and splenomegly…..).


*First thanks to* **ALLAH** *to whom I relate any success in achieving any work in my life.*

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*Reham Reda Ywakim*

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# LIST OF ABBREVIATIONS

| Abbrev. | Meaning |
|---|---|
| **BCS** | Budd-Chiari syndrome |
| **BUN** | Blood urea nitrogen |
| **CKD** | Chronic kidney disease |
| **CNS** | Centeral nervous system |
| **CNS** | Congenital nephrotic syndrome |
| **DBP** | Diastolic blood pressure |
| **ECAD** | Extracorporal albumin dialysis |
| **ESR** | Erytherocyte sedimentation rate |
| **FSGS** | Focal segmental glomerulosclerosis |
| **GFR** | Glomerular filteration rate |
| **GI** | Gastro intestinal |
| **HBcAg** | Hepatitis B core antigen |
| **HBsAg** | Hepatitis B surface antigen |
| **HBV** | Hepatitis B virus |
| **HBV-MN** | Hepatitis B virus-associated membranous nephropathy |
| **HCV** | Hepatitis C virus |
| **HDL** | High density lipoprotein |
| **HIV** | Human immunodeficiency virus |
| **HRS** | Hepatorenal syndrome |
| **IGF-I** | Insulin like growth factor-I |
| **IGF-II** | Insulin like growth factor-II |
| **INS** | Idiopathic nephrotic syndrome |
| **IV** | Interavenous |
| **IVC** | Inferior vena cava |
| **LDL** | Low density lipoprotein |

# LIST OF ABBREVIATIONS (Cont....)

| Abbrev. | Meaning |
|---|---|
| **LMW** | Low molecular weight |
| **MARS** | Molecular absorbent recycling system |
| **MCNS** | Minimal change nephrotic syndrome |
| **MPGN** | Mesengial proliferative nephrotic syndrome |
| **MRI** | Magnetic resonance imaging |
| **NAFLD** | Non alcoholic fatty liver disease |
| **NASH** | Non alcoholic steatohepatitis |
| **PH** | Portal hypertension |
| **PNS** | Primary nephrotic syndrome |
| **PTH** | Parathyroid hormone |
| **PVT** | Portal vein thrombosis |
| **RI** | Resistive index |
| **SBP** | Systolic blood pressure |
| **SCG10** | Superior cervical ganglion 10 |
| **SLE** | Systemic lupus erythermatous |
| **SNS** | Secondary nephrotic syndrome |
| **SRNS** | Steroid resistant nephrotic syndrome |
| **SSNS** | Steroid sensitive nephrotic syndrome |
| **TG** | Triglycerides |
| **TIPS** | Transjugular intrahepatic portacaval shunt |
| **VOD** | Veno-occlusive disease |

# INTRODUCTION

Nephrotic syndrome is defined as a glomerular disease with massive protineuria and hypoalbuminemia and its complications are numerous.

Among these complications, salt & water retention, infections, hyperlipidemia and thromboembolism ***(Mitari, 2004).***

Hepatic affection may be found in-patients with nephritic syndrome in the form of Budd-Chiari syndrome or inferior vena cava thrombosis, which is confirmed by Doppler showing incomplete outflow obstruction of hepatic veins and inferior vena cava ***(Livola et al., 2000).***

The liver is also susceptible to the toxic effects of many cytotoxic or immunosuppressive treatments. However, in carriers of hepatitis B virus and, less frequently, of hepatitis C virus, liver damage due to reactivation of viral replication can occur after withdrawal of immunosuppressive drugs ***(Vento et al., 2002).***

Patients with nephrotic syndrome have one of the most pronounced secondary changes in lipoprotein metabolism known and the magnitude of the changes correlates with the severity of the disease. These changes are of a quantitative as well as qualitative nature ***(Kronenberg, 2005).***

Fatty liver can occur in nephrotic patients due to accumulation of neutral fats (triglycerides) in the hepatocytes, causing mild to moderate enlargement of the liver ***(Toblli et al., 2002).***

# AIM OF THE WORK

To screen patients with childhood nephrotic syndrome for liver affection and to investigate for its cause if present.

*Chapter 1*

# NEPHROTIC SYNDROME

Nephrotic syndrome is a common type of kidney disease seen in children ***(Gbadegesin and Smoyer, 2008).*** It is primarily a pediatric disorder and is 15 times more common in children than adults. The incidence is 2-3/100,000 children per year; and the majority of affected children will have steroid-sensitive minimal change disease. The characteristic features of nephrotic syndrome are heavy proteinuria (>3.5g/24hr in adults or 40mg/$m^2$/hr in children.Because 24-hour urine collections are potentially unreliable and burdensome, especially in young children), hypoalbuminemia (<2.5g/dl), edema, and hyperlipidemia ***(Vogt & Avner, 2008).***

**Some important definitions related to nephrotic syndrome:**

***Remission***: Urinary protein excretion < 4mg/$m^2$/hr, nil or trace by dipstick on spot sample for 3 consecutive days.

***Relapse***: Urinary protein excretion >40mg/$m^2$/hr, or ≥ 3+ by dipstick for 3 consecutive days

***Frequent relapses***: Two or more relapses within 6 months of initial response; 4 or more relapses within any 12-months period.

***Steroid dependence***: Two consecutive relapses occurring during corticosteroid withdrawal or within 14 days of its discontinuation.

***Steroid resistance***: Failure to achieve response in spite of 4 weeks of daily oral prednisolone 2mg/kg/day.

***(Bagga et al., 2008)***

**Epidemiology:**

***Incidence:***

The annual incidence of nephrotic syndrome in most countries in the western hemisphere is estimated to range from 2-7 new cases per 100,000 children, and the prevalence from 12-16 per 100,000 children ***(Gbadegesin and Smoyer, 2008).***

There is epidemiological evidence of a higher incidence of nephrotic syndrome in children from south Asia ***(McKinney et al., 2001).***

***Age:***

The etiology of nephrotic syndrome is age dependent. Most cases appearing in the first three months of life are referred to as congenital nephrotic syndrome (CNS) and are due to genetic diseases ***(Gbadegesin and Smoyer, 2008).***

The Finnish variety of congenital nephrotic syndrome an autosomal recessive condition, presents commonly at this age ***(Niaudet, 2004).***