IOSR Journal Of Pharmacy And Biological Sciences (IOSR-JPBS)
e-ISSN:2278-3008, p-ISSN:2319-7676. Volume 16, Issue 1 Ser. III (Jan. – Feb. 2021), PP 26-36
www.Iosrjournals.Org

Clinical Profile and Treatment Evaluation of Nephrotic Syndrome in Paediatric Department GGH

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Abstract
Introduction: *This is the commonest clinical syndrome in the world. It is characterized by gross proteinuria (>1 g/m2 per 24 hr) and hypercholesterolemia are always present. Oedema resulting from build-up of salt and water is usually severe. Other abnormalities such as raised plasma aldosterone and anti-diuretic hormone levels are prominent in children with massive proteinuria and oedema. Hypertension, azotemia and hematuria either microscopic or frank rarely occur in childhood.*
Materials and Methods: *All the patients satisfying the inclusion criteria were selected from the paediatric department of Government General Hospital, Kurnool. All the data of the subjects are collected by using the proforma. The data collection includes demographics, chief complaints, past history, general examination of the patient including lab investigations, nephrology reference and treatment.*
Results: *This study was conducted on 90 children diagnosed with nephrotic syndrome in tertiary care hospital. In the present study the gender distribution was done in nephrotic syndrome patients. Out of 90 cases collected and analysed the majority of gender distribution was found to be on males with 68% followed by female 32%.The age distribution of patients from <1 to >9, we collected cases from 0.5yrs to 11 yrs. Similar observation were made by Sahana K.S et al.,1 (2014).*
Conclusion: *The present study of clinical profile and treatment evaluation of nephrotic syndrome in paediatrics concludes that, males are more prone to suffer than females from nephrotic syndrome. The mean age group of children affected is 4-6 years of age. Majority of the cases in our study are with minimal change disease (MCNS). In our study we commonly find symptoms in patients with nephrotic syndrome are mostly facial puffiness, oedema in both upper and lower limbs, abdominal distension, abdominal pain followed by proteinuria and oliguria and in few cases, we observed the fever and high serum cholesterol and other symptoms like weight gain, shortness of breath. The most of the cases are relapse and frequent relapse cases. The treatment given for nephrotic syndrome in our tertiary care hospital is with low dose prednisone. Finally, we conclude that the given treatment was rational in our hospital and patients are recovered as well. Levamisole is the new drug which can be used as a second option for nephrotic syndrome for frequent relapse and relapse cases in children.*

Key Words: *nephrotic syndrome, MCNS, facial puffiness, oedema*

Date of Submission: 28-01-2021 Date of Acceptance: 12-02-2021

I. Introduction

This is the commonest clinical syndrome in the world. It is characterized by gross proteinuria (>1 g/m2 per 24 hr) and hypercholesterolemia are always present.[1]

Oedema resulting from build-up of salt and water is usually severe. Other abnormalities such as raised plasma aldosterone and anti-diuretic hormone levels are prominent in children with massive proteinuria and oedema. Hypertension, azotemia and hematuria either microscopic or frank rarely occur in childhood.

The cause of idiopathic nephrotic syndrome remains unknown, but evidence suggests it may be a primary T-cell disorder-the most common form that leads to glomerular podocyte dysfunction.[2]

Idiopathic nephrotic syndrome has a reported incidence of 2-7 cases/100,000 children. However, in the Indian sub-continent the incidence is estimated at 90–100/million population.

There are two distinct histological variants of primary idiopathic nephrotic syndrome:

1. Minimal-change nephritic syndrome (MCNS)
2. Focal segmental glomerulosclerosis (FSGS)

Minimal change nephrotic syndrome and focal segmental glomerulosclerosis may represent opposite ends of one pathophysiological process or distinct disease entities. By contrast, membranous nephropathy is a distinct disease and is rare in children.

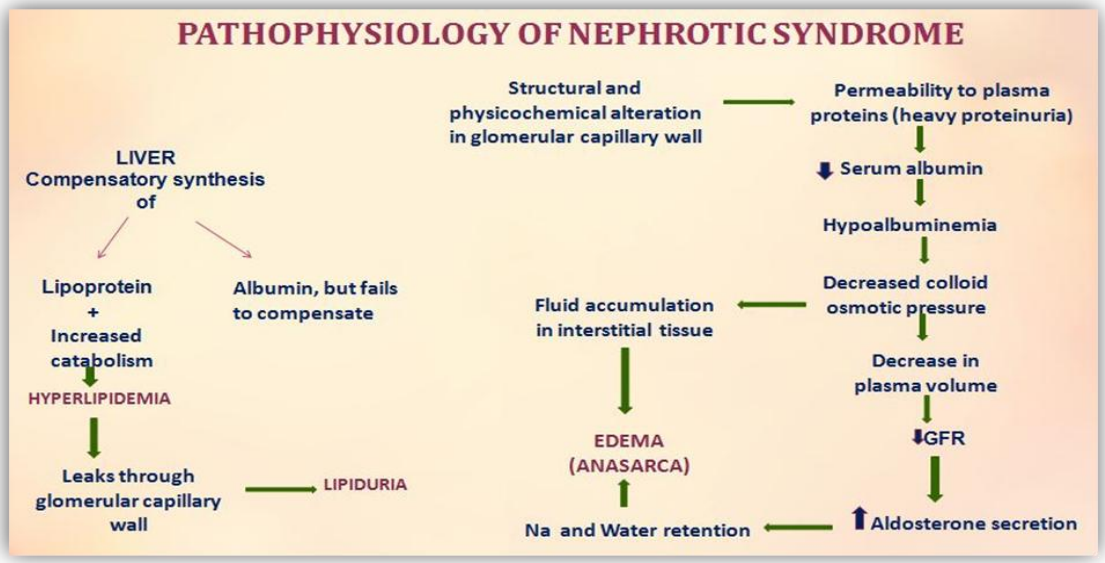
Etiopathogenesis
Two types are known:
A. Idiopathic In childhood, the vast majority (90%) belongs to this category. It is regarded by many authorities as a sort of autoimmune phenomenon, especially since it responds well to immunosuppressive therapy. Among idiopathic cases, minimal change disease, mesangial proliferation and focal sclerosis are found in 85%, 5% and 10%, respectively.
B. Secondary Unlike adults, children only occasionally suffer from this type. It is responsible for only 10% of overall nephrotic children. The disease in this case is usually mediated by some form of glomerulonephritis
About 80 to 85% of children with nephrotic syndrome are of "minimal lesion", or "corticosteroid responsive" type. The term, "minimal change nephrotic syndrome" (MCNS) is currently considered most appropriate for this condition. The rest of the 15 to 20% cases of nephrotic syndrome are due to chronic glomerulonephritis and other renal diseases, including those secondary to systemic disorders.[4]

Clinical Features

- Most patients are between 1 to 5 years at the onset of nephrotic syndrome. The peak incidence occurs at 2 to 4 years.
- Male to female ratio is around 2:1. The onset is usually gradual but may be acute in some cases.
- A previously well child begins to **gain weight** over a period of days to weeks. This may be accompanied by **periorbital puffiness**. All this may be regarded by theparents as a sign of "health" until obvious swelling of the body results.
- In a well-developed case, the clinical picture is fairly consistent: a preschooler having **massive anasarca** involving the **face, extremities, trunk, abdomen (ascites) and genitalia,** especially marked scrotal oedema almost resembling hydrocele.
- At times, hydrothorax may be present. This as well as massive ascites may cause respiratory embarrassment. Also, waterlogging may cause oedema of the gut and diarrhoea. Some enlargement of the liver is usual.
- Blood pressure may be slightly raised in an occasional case. Anaemia may be associated. ESR is usually high.
- Urine output is reduced. Superadded infections of respiratory tract, skin and peritoneum (peritonitis) occur due to reduction in immunoglobulins. Infection may sometimes act as a precipitating factor for the onset of nephrotic syndrome.

Pathology

The essential lesion is the thickening of the footplate of the basement membrane. As a result, there is increased permeability of glomerulus to plasma proteins. It is now convincingly demonstrated by immunodiffusion technique that proteins of low molecular weight are filtered by the glomeruli more easily than those of high molecular weight. Thus, in minimal lesion, only albumin is filtered. If, however, the damage to basement membrane is significant, it results in escape of large proteins such as globulins. This may be interpreted to mean that severity of nephrotic syndrome can be judged from the selective proteinuria which is expressed as selective permeability index.



Treatment

• Corticosteroids constitute the cornerstone of management. Various schedules have been employed. Generally, prednisolone, 2 mg/kg/day in divided doses, is most appropriate.

• Once edema has completely disappeared and the child has no albuminuria (this takes about 6 weeks), maintenance therapy can be given. For this purpose, prednisolone is given in a dose of 1.5 mg/kg/day as a single morning administration on every alternate day, for another 6 weeks. Then, it is tapered off, or abruptly stopped as per new trend.

• Occasionally, a subject who responds to daily prednisolone initially may suffer from a relapse shortly after he is shifted to or after stopping alternate day therapy. This is termed "steroid dependence". During steroid therapy, development of Cushingoid facies is frequent.

• A check on complications such as hypertension is essential. Remaining complications caused by prolonged steroid therapy include posterior subcapsular cataract, poor glucose tolerance, emotional problems and growth retardation

• A well balanced and healthy diet containing the recommended dietary reference value for protein is recommended with a "no added salt" regimen. If the child's appetite remains poor, a complete nutritional and energy supplement is necessary. Fluid restriction may also be helpful. These restrictions are lifted once the child goes into remission

Treatment of Initial Presentation of Idiopathic Nephrotic Syndrome

On the basis of randomized controlled trials involving children with a first episode of steroid-responsive nephrotic syndrome it is recommended that a 12 weeks initial course of prednisolone significantly decreases the risk of relapses. The dose of prednisolone is based on surface area and the recommended 12 weeks program is as follows:

• Prednisolone 60 mg/m2 daily for 4 weeks followed by
• Prednisolone 40 mg/m2 on alternate days for 4 weeks followed by
• Prednisolone 5–10 mg/m2 each week for another 4 weeks and then stop

Traditionally patients receive divided doses but once daily treatment also seems to be effective.

If the patient is very oedematous, oliguric, showing evidence of hypovolemia, intravenous 20% salt poor albumin, 1 g/kg given over 4–6 hours is very effective, particularly if supplemented by intravenous frusemide 2 mg/kg. A low serum albumin alone is not an indication for intravenous albumin.[5]

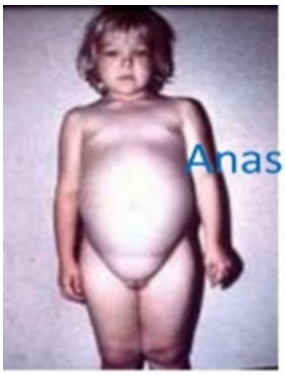
Steroid-Resistant Idiopathic Nephrotic Syndrome

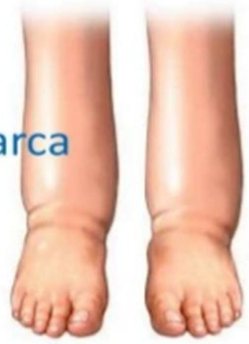
The management of children with steroid-resistant nephrotic syndrome is difficult, most children failing to achieve remission show progressive renal damage. A few children around 20–25% with idiopathic FSGS respond to an 8 weeks course of high dose corticosteroids. However, immunosuppressive drugs such as cyclophosphamide, levamisole, chlorambucil and ciclosporin have provided an alternative line of treatment for these children. Also, newer immunosuppressive agents, such as mycophenolate mofetil and sirolimus, have a place in the treatment of idiopathic primary FSGS.

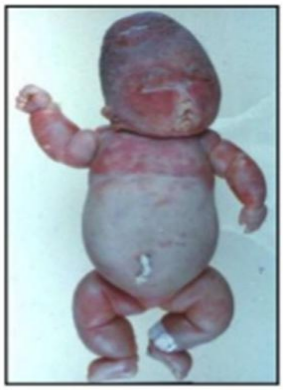
Frequently Relapsing and Steroid-Dependent Idiopathic Nephrotic Syndrome

Up to 60% of steroid responsive patients with nephrotic syndrome may have one or more relapses. Some of these children can be managed with low-dose prednisolone given daily or on alternate days, but many will still relapse, especially if they have intercurrent infections. Steroid-induced side-effects develop in a large number of these children. Frequent relapses are diagnosed if there is two or more relapses within 6 months of initial response, four or more relapses in any 12 months period and steroid dependent nephrotic syndrome if two consecutive relapses during steroid tapering or within 14 days of cessation of steroids. Treatment with cyclophosphamide, chlorambucil, ciclosporin and levamisole to reduce the risk of relapses is supported. Ciclosporin is an important steroid sparing agent in the treatment of steroid-responsive nephrotic syndrome.

PICTORIAL REPRESENTATION OF SYMPTOMS OF NS







Fetal Anasarca

II. Aim And Objectives

Aim: The main aim of the study is to evaluate the clinical profile and treatment for nephrotic syndrome in paediatric department from that to improve better patient care and patient quality of life in tertiary care hospital.
Objectives: To study and evaluate the clinical profile and treatment of nephritic syndrome in paediatric department. To identify and rectify the drug interactions in the given treatment. To analyse its benefits in optimizing quality and safety use of medicines.

III. Materials And Methods

Study design: -The present study is prospective observational study.
Study period: - The present study was carried out for a period of 6 months from June to November 2019.
Study site: -Paediatric department, inpatient unit of Government General Hospital, Kurnool.
Sample size: - During the study period of six months, the total of 90 cases was collected and studied for the evaluation of clinical profile and treatment among the 90 patients

METHOD OF STUDY

- All the patients satisfying the inclusion criteria were selected from the paediatric department of Government General Hospital, Kurnool.
- All the data of the subjects are collected by using the proforma.
- The data collection includes demographics, chief complaints, past history, general examination of the patient including lab investigations, nephrology reference and treatment

IV. Results

GENDER DISTRIBUTION

Male-68%
Female-32%

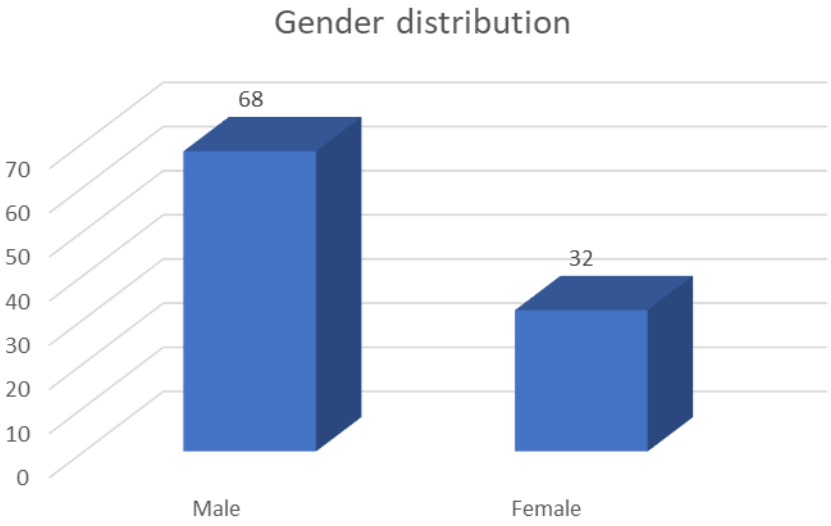


Figure 1: Gender distribution for nephrotic syndrome patient

AGE DISTRIBUTION

4-6yrs of age-50%
7-9yrs of age-21%
1-3yrs of age-16%
More than 9yrs of age-12%
Less than 1yrs of age-1%

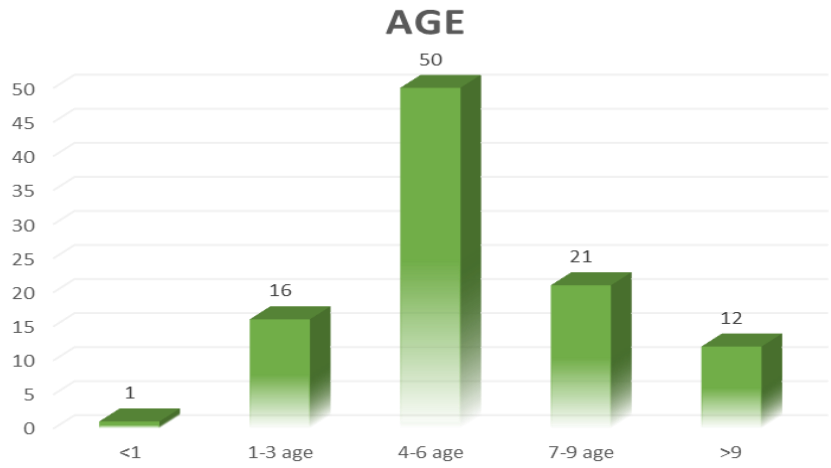


Figure 2: - Age distribution in nephrotic syndrome patients

MINIMAL CHANGE DISEASE

Biopsy confirmed -56%
Biopsy not done-44%

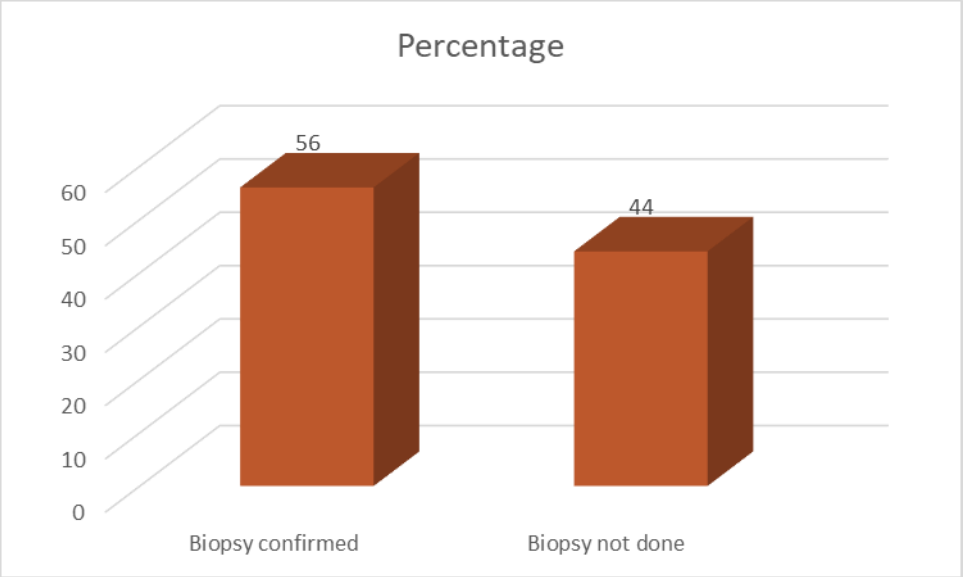


Figure 3: - Minimal change disease observed in nephrotic syndrome patients

RELAPSE IN GENDER

Male-67%
Female-33%

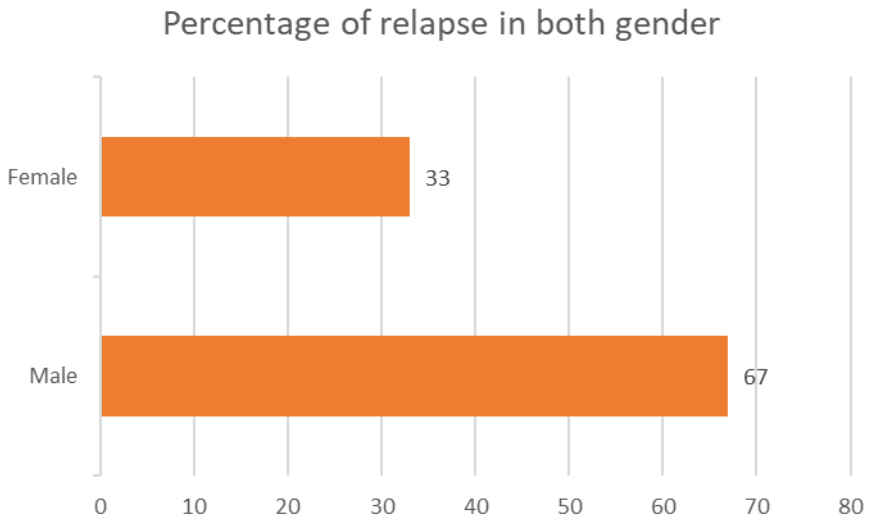


Figure 4: Relapse cases in male and female

RELAPSE AND FREQUENT-RELAPSE

Frequent Relapse-48%
Relapse-33%
Newly Diagnised-19%

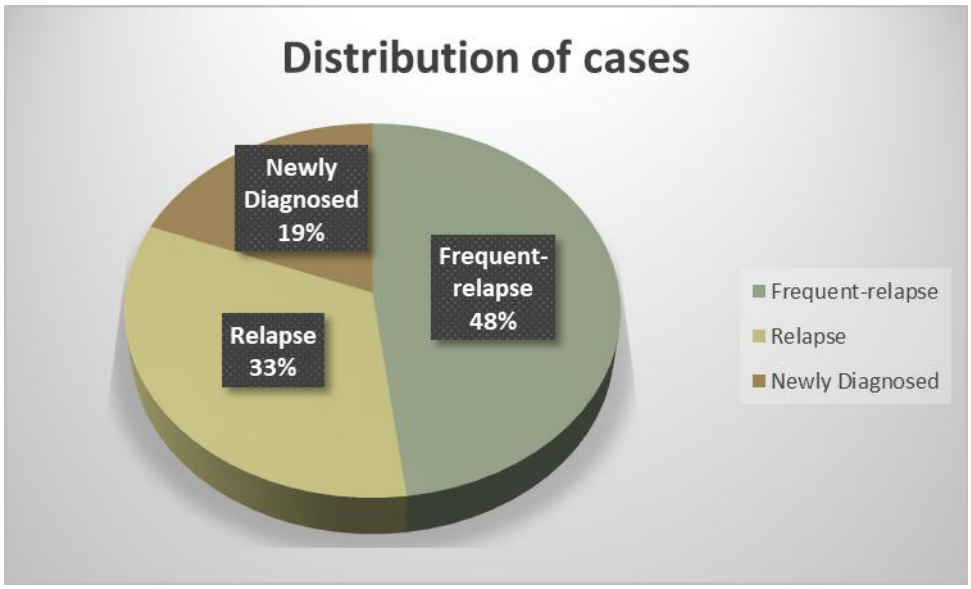


Figure 5: - Distribution of cases in nephrotic syndrome patients.

RELAPSE-MALE

Relapse male-77%

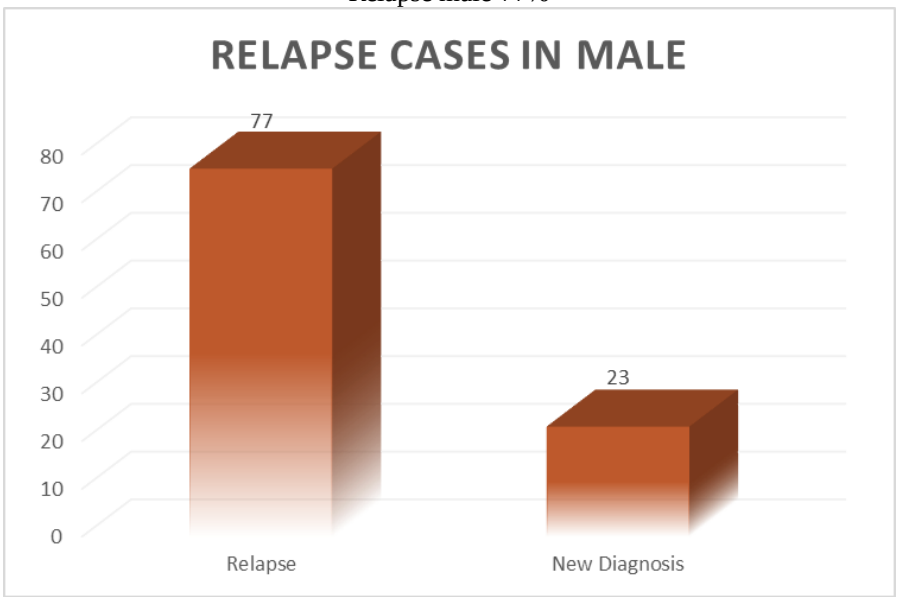


Figure 6: Relapse and Newly diagnosed cases of Male in nephrotic syndrome patients.

RELAPSE- FEMALE

Relapse Female-79%

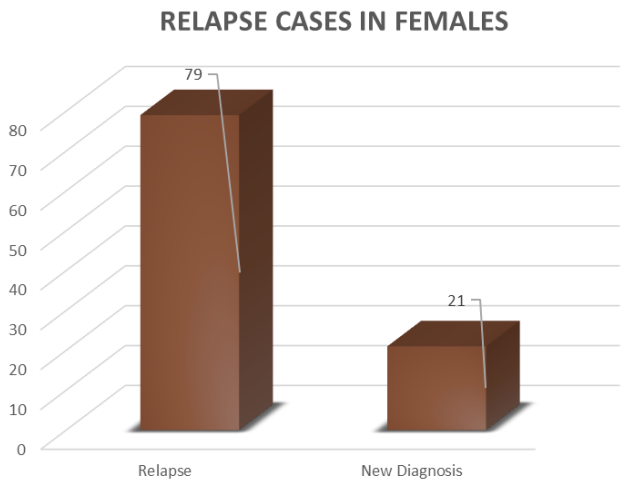
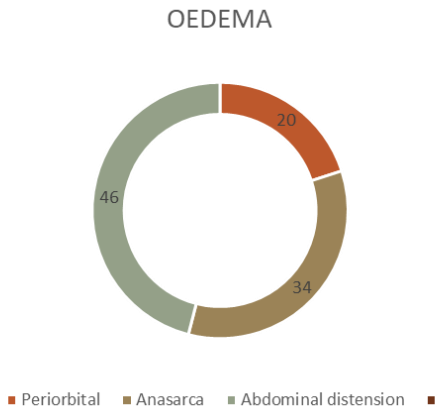


Figure 7: Relapse and newly diagnosed cases of Female in nephrotic syndrome patients.

OEDEMA

Periorbital oedema-46%
Abdominal distension-34%
Anasarca-34%



ABDOMINAL PAIN

Male-24%
Female-13%
Absent-63%

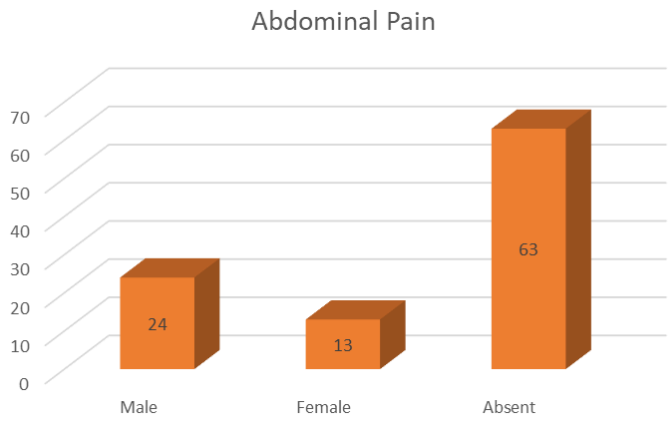
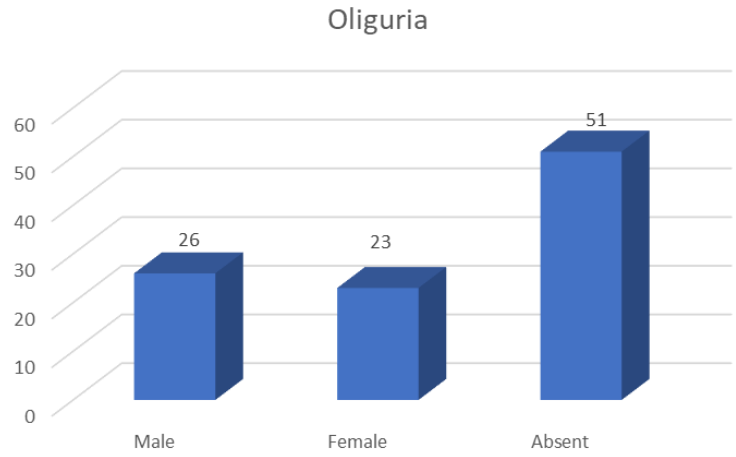


Figure 9: - Abdominal Pain in nephrotic syndrome patients

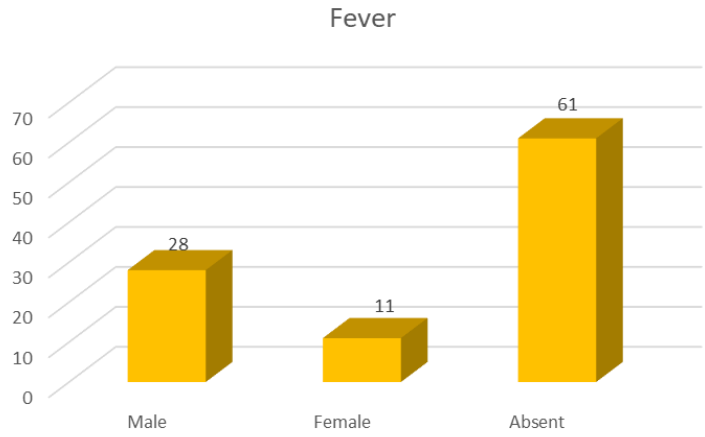
OLIGURIA

Male-26%
Female-23%
Absent-51%



FEVER

Male-28%
Female-11%
Absent-61%



PREDNISOLONE USAGE

H/O of prednisolone-82%
No H/O of prednisolone-18%

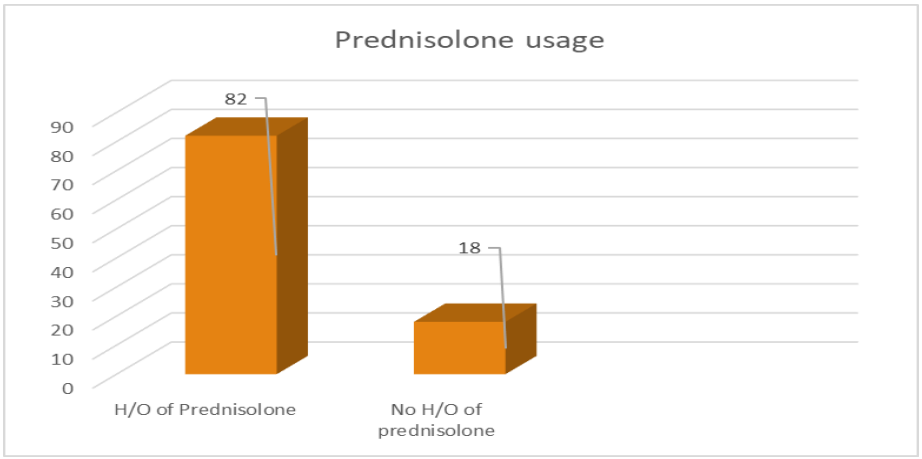


Figure 12: - Prednisolone usage in nephrotic syndrome patients

Unpaired t- test

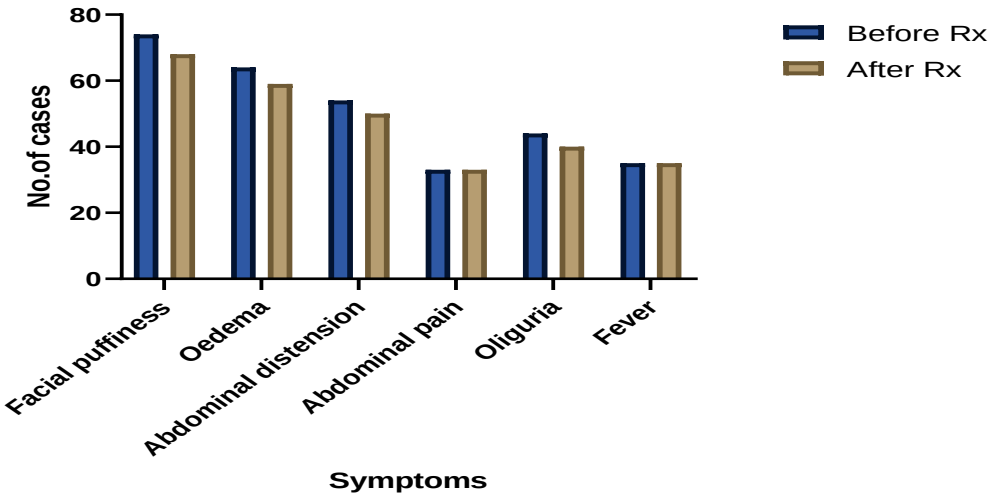


Figure: -13 Recovery rate of symptoms with treatment.

Chi-Square Test

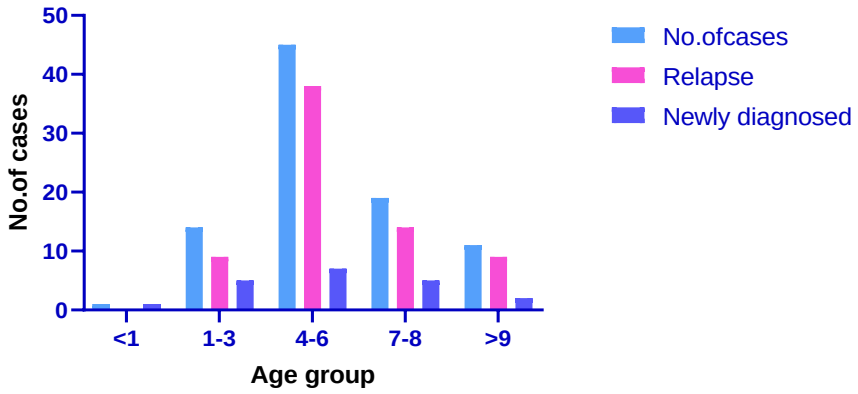


Figure: -14 Relapse and non-relapse cases between age group

V. Discussion

- This study was conducted on 90 children diagnosed with nephrotic syndrome in tertiary care hospital.
- In the present study the gender distribution was done in nephrotic syndrome patients. Out of 90 cases collected and analysed the majority of gender distribution was found to be on males with 68% followed by female 32%.The age distribution of patients from <1 to >9, we collected cases from 0.5yrs to 11 yrs. Similar observation were made by Sahana K.S et al.,1 (2014).
- Out of 90 collected and analysed the age distribution were done.50% of the cases was found be in between 4-6 years of age, followed by 21% of the cases belong to 7-9yrs of age,16% of them belong to 1-3 years of age group, 12% of cases belong to the age group >9 and 1% of cases belong to less than 1year of age group which is similar to the study done by Suleyman Kalman et al.,5 (2015).
- General risk factors include gender, minimal change disease, NSAID abuse, family history. The most common risk factor of nephrotic syndrome is minimal change disease. 90 cases were collected in which 56% were presented with MCD which was. confirmed biopsy. The remaining 44% may or may not be with MCD but biopsy was not done.
- Oliguria is one main feature of nephrotic syndrome. Out of 90 cases collected and analysed the oliguria was found to be 26% in male, followed 23% in female and remaining 51% of cases were found to be absent.
- In nephrotic syndrome majority of the patients are presented with oedema in peri orbital region, anasarca, abdominal distension, other symptoms abdominal pain and fever.
- Oedema is the hallmark feature of nephrotic syndrome. Out of 90 cases collected and analysed the periorbital oedema was found to be 20%, followed by anasarca 34%, remaining was found to be with abdominal distension.

- Out of 90 cases collected and analysed the abdominal pain was found to be 24% in males followed 13% in females and remaining 63% of cases presented with no complaint of abdominal pain.
- Fever is one common feature of nephrotic syndrome. Out of 90 cases collected and analysed the fever was found to be 28% in male, followed 11% in female and remaining 61% of cases were found to be absent.[6]
- Most of the nephrotic syndrome are related to relapse ones. In the present study, 67% of the patients were found to be male and rest 33% of the patients are females. We had separated the relapse and newly diagnosed cases in male and female, 77% of which are relapse cases in male patients and remaining 23% are newly diagnosed ones, 79% of which are relapse cases in female patients and remaining 23% are newly diagnosed ones. In nephrotic syndrome patients will have the frequent relapse and relapse cases and few are newly admitted ones. 90 cases were collected and we analysed and distributed among them.48% of the cases were frequent relapse, followed 33% of them belong to relapse, and 19% of the cases were newly diagnosed one.
- We have done comparison study between before treatment and after treatment by using graph pad prism software. Since T calculated value 0.7261 is not less than the T table value 0.05, there is no significant difference between before treatment and after treatment. Chi-square test was also done between relapse and newly diagnosed case in age group. Since, T calculated value 0.6003 is not less than T table value 0.05, there is no significant difference between the relapse and non-relapse cases in age group.[7]
- Prednisolone is the common drug which is used to treat nephrotic syndrome in paediatric patients. History of prednisone usage was found to be 82%, followed by 18% of patients with no history of prednisone usage.[8]

VI. Summary And Conclusion

- ✓ The present study of clinical profile and treatment evaluation of nephrotic syndrome in paediatrics concludes that, males are more prone to suffer than females from nephrotic syndrome.
- ✓ The mean age group of children affected is 4-6 years of age. Majority of the cases in our study are with minimal change disease (MCNS).
- ✓ In our study we commonly find symptoms in patients with nephrotic syndrome are mostly facial puffiness, oedema in both upper and lower limbs, abdominal distension, abdominal pain followed by proteinuria and oliguria and in few cases, we observed the fever and high serum cholesterol and other symptoms like weight gain, shortness of breath.
- ✓ The most of the cases are relapse and frequent relapse cases.
- ✓ The treatment given for nephrotic syndrome in our tertiary care hospital is with low dose prednisone.
- ✓ Finally, we conclude that the given treatment was rational in our hospital and patients are recovered as well.
- ✓ Levamisole is the new drug which can be used as a second option for nephrotic syndrome for frequent relapse and relapse cases in children.

RECOMMENDATIONS

- ❖ Nephrotic syndrome associated with upper respiratory tract infection, is advised to prescribe prednisolone aimed to reduce risk of relapse.
- ❖ Prompt search and treatment for UTI associated with NS should be overlooked about managing children.
- ❖ Diuretic, management of NS.
- ❖ Role of hyperalbuminemia in NS.
- ❖ Evaluating the indices in various phases of clinical course (remission, relapse) in same patient.
- ❖ Treatment evaluation of NS over corticosteroids with other drugs (Immunosuppressants)

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