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A Study of the Occurrence and Associated Factors of Nephrotic Syndrome among Children Attending Out-Patient Department (OPD) In Selected Hospitals, Kolkata, West Bengal.

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Abstract:
Introduction: *Nephrotic syndrome is the most common Glomerular diseases that affect children. Renal histology revels the presence of minimal change nephrotic syndrome in more than 80% of these patients. The occurrence and associated factors of Nephrotic Syndrome information would help to improve both preventive and curative health care services.*
Materials and Methods: *A descriptive retrospective study was conducted on children with newly diagnosed Nephrotic Syndrome presented to paediatric out-patient department (OPD) at R. G. Kar Medical College and Hospital, Kolkata, West Bengal. Data were collected from 61 children with Nephrotic Syndrome during the period between 1st December, 2019 to 25th January, 2020 through visit in each area of the Pediatric Out-Patient Department by interviewing and record analysis. Non probability purposive sampling technique was used to select the children suffering from Nephrotic Syndrome.*
Results: *The data were analyzed by using descriptive and inferential statistics. Children who are having Nephrotic Syndrome were between 7-12 years and Majority (50.81%) of children were female. Most of children having Nephrotic Syndrome associated due to idiopathic Nephrotic Syndrome, family history of NS, congenital NS, infectious mononucleousis, UTI, malaria, meningitis, corticosteroid, antibiotics, food allergens, juvenile diabetes and immune system disorder were also responsible factors.*
Conclusion: *After detailed statistical analysis, the generalization is drown, that very limited sample has found in a given period of time, and it is also revealed that there were only six new cases found at that period of time. So occurrence rate is less, it is leading towards improving.*
Key words: *Nephrotic Syndrome, Occurrence, Children, Associated factors.*

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I. Introduction

Nephrotic syndrome (NS) is a kidney disease with high incidence compared with other kidney disease. Nephrotic syndrome is characterized by massive proteinuria, hyperlipidemia, hypoalbuminemia and edema. It is 15 times more common in children than adults. It is a quite common clinical condition in our country affecting usually the young children under-five.(1) Minimal change nephritic syndrome is universally common in childhood. Its incidence is known to vary in different populations, being 2 to 3/10 children aged less than 15 years per year in Europe and America, but 11/10 per year in Arub children in Libya.(2) Nephrotic syndrome is an important chronic disease in children, characterized by minimal change disease in the majority. Nephrotic syndrome is a common chronic disorder, characterized by alterations of perm selectivity at the glomerular capillary wall, resulting in its inability to restrict the urinary loss of protein. (3) Most patient with steroid sensitive nephrotic syndrome (SSNS) have frequent relapses until disease resolve spontaneously towards the end of second decade of life and so the main problem in such disease is frequent relapses and their association with complications of disease or side effects of drug used in each relapse. (4) The majority of children (90%) with idiopathic NS (INS) usually have minimal change NS (MCNS) on histopathologic findings, and 95% or more respond well to therapy with steroid.(3) Children with Nephrotic Syndrome are prone to many complications. Complications of Nephrotic Syndrome are divided into two categories: disease- associated and drug- related complications. Disease- associated complications include infections peritonitis, sepsis and cellulitis, acute renal failure, anemia, hypocalcemia and bone disease. The incidences of infections in Nephrotic Syndrome are still a

major problem in developing countries. [5] Idiopathic Nephrotic Syndrome is the most common form of Nephrotic Syndrome in childhood. Foreign data have shown varied result in the histopathologic finding of idiopathic Nephrotic Syndrome. Majority of patients are steroid responsive with the initial therapy of corticosteroid and minimal change is still considered the most common histopathologic finding. [6]

II. Objectives of the Study

- To identify the occurrence of Nephrotic Syndrome among children attending out-patient department (OPD) in selected hospital.
- To determine the associated factors of Nephrotic Syndrome among children attending out-patient department (OPD) in selected hospital.
- To find out the association between the associated factors and demographic variables among children with Nephrotic Syndrome.

III. Material And Methods

Study Design: Descriptive survey design
Study Setting: Paediatric Out Patient Department of R. G. Kar Medical College & Hospital, Kolkata, West Bengal
Study Duration: 1st December, 2019 to 25th January, 2020. (i.e., 8 weeks).
Sample size: 61 children with Nephrotic Syndrome attending in the selected hospital, R.G. Kar, Medical College & Hospital, Kolkata.
Sample selection method: In this study subjects were selected by Non probability purposive sampling technique.

Inclusion criteria:
1. Parents and children who can understand English/Bengali/Hindi.
2. Parents and children who were available during that period of time.
3. Children who were diagnosed with Nephrotic Syndrome.
4. Parents and children who were able to give answers willingly.

Exclusion criteria:
1. Critically ill children.

Description of data collection tools:

Data were collected by using a proforma assessing background information and Record analysis. Background information was obtained to collect data on demographic variables. There was ten items to collect information about children i.e. age, gender, birth order, religion, monthly income of family, residence, type of family, health care facilities, child go to school and onset of disease. Record analysis was developed to obtain the associated factors of children with Nephrotic Syndrome in three areas named Predisposing factors, Precipitating factors and co- morbid conditions. Predisposing factors consist with family history of kidney disease, congenital Nephrotic Syndrome and idiopathic Nephrotic Syndrome. Precipitating factors includes the record analysis related to history of poisoning/ toxin, history of infections, history of drug intake and immunological or allergic disorder. Co-morbid conditions consist of juvenile diabetes, immune system disorder, leukaemia, lymphoma, sickle cell disease, glycogen storage disorder and SLE.

Ethical Consideration:

Ethical clearance was taken from the institutional Ethics Committee of Apollo Gleneagles Hospitals, Kolkata and Ethics committee of R.G Kar Medical College & Hospital, Kolkata, West Bengal. Written informed consent was taken from guardian accompanied with children and assent consent was taken from children.

Data collection Procedure:

The data was collected through circulatory visit in each area of the Pediatric Out- Patient Department by interviewing and record analysis. Interviewing was done at first to know the background information of the patient and then record analysis was done to know the associated factors of Nephrotic Syndrome. The duration of interview was approximately 10 minutes. After data collection thanks was conveyed to all health providers. The heartfelt gratitude was conveyed to all participants for their active participation and cooperation as well as to all staff of Out Patient Department for their kind cooperation.

Statistical analysis:
The collected data were analyzed by using descriptive and inferential statistics according to the stated objectives.
Frequency and percentage were used for the analysis of demographic variables and associated factors of Nephrotic Syndrome, Yates Chi square test was done to find out the association between selected demographic variables and associated factors of Syndrome.

IV. Result

In the present study the obtained data was organized, tabulated, analyzed and interpreted under three sections.

Section - I Findings related to Occurrence of Nephrotic Syndrome in children and background information of children with Nephrotic Syndrome.

Calculation of Occurrence rate:

The study includes the occurrence of Nephrotic Syndrome during data collection period and the distribution of children according to their demographic characteristics by using descriptive statistics summarized in terms of frequency and percentage and presented in:
Data collection period was from 1st December, 2019 to 25th January, 2020. (i.e., 8 weeks).Total no. of children attending Paediatric OPD = 5667. Total no of newly diagnosed cases of Nephrotic Syndrome = 6

$$\text{Occurrence rate} = \frac{\text{No. of new cases with NS during a given time period}}{\text{Total no. children attended the OPD during given period of time}} \times 100$$

$$= 6/5667 \times 100$$
$$= 0.1058$$

This calculation indicated that the occurrence rate of children with Nephritic Syndrome was 0.1058 during 8weeks data collection period.

Table 1: Frequency & Percentage distribution of background information of children with Nephrotic Syndrome **n=61**

Demographic Variables	Frequency (f)	Percentage (%)
Age		
a) 1month- 6years	23	37.70
b) 7years -12 years	38	62.29
Gender		
a) Male	30	49.18
b) Female	31	50.81
Birth order		
a) 1st child	27	44.26
b) 2nd child	25	40.98
c) > 3 child	9	14.75
Religion		
a) Hindu	26	42.62
b) Muslim	34	55.73
c) Christian	1	1.63
d) Other	0	0
Family monthly income		
a) <3907/-	17	27.86
b) 3908-11,707/-	41	67.21
c) 11,707- 19,505/-	3	4.91
d) >19,515/-	0	0
Residence		
a) Rural	31	50.81
b) Urban	30	49.18
c) Urban slum	0	0
Type of family		
a) Nuclear	26	42.62
b) Joint	35	57.37
Nearest health facility		
a) Less than 5km	27	44.26
b) More than 5km	34	55.73
Child go to school		

a)	Yes	36	59.01
b)	No	25	40.98
Onset of disease			
a)	0-5 yrs	50	81.96
b)	6-10 yrs	11	18.03

Data presented in table 1. indicates the frequency and percentage distribution of background information of children in terms of age, gender and birth order of child. There were 62.29% of children belong the age group between 7 to 12yrs, 50.81% were female children and 44.26% were the first child in birth order, maximum children 55.73% were Muslim, 67.21% had family monthly income 3908/- to 11,707/- , 50.81% were live in urban area, 57.37% children were from joint family, 55.73% children stayed more than 5km far from health care facility, and 81.96% children affected within 5ys of age.

Section- II Findings related to identify associated factors of Nephrotic Syndrome in terms of frequency and distribution.

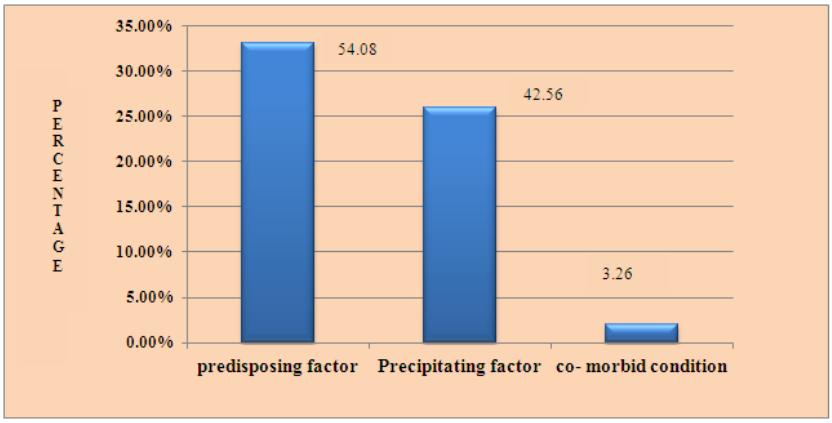
Table 2: Frequency and percentage distribution of associated factors in children with Nephrotic Syndrome.

n=61

Associated Factors	Frequency (f)	Percentage (%)
Predisposing factors		
• Family history of kidney disease	8	13.11
• Congenital Nephrotic Syndrome	5	8.19
• Idiopathic Nephrotic Syndrome	20	32.78
Precipitating factors		
• **History of Poisoning /Toxin;**		
a. Snake bite	1	1.63
• **History of infections like;**		
a. UTI	4	6.55
b. Infectious mononucleosis	6	9.83
c. Malaria	1	1.63
d. Meningitis	1	1.63
• **History of drugs intake like;**		
a. Corticosteroid	6	9.83
b. Antibiotics	3	4.91
• **Immunological or allergic disorder**		
a. Food allergy	4	6.55
Co- morbid conditions		
• Juvenile Diabetes	1	1.63
• Immune system disorder	1	1.63

Data presented in table 2 reveals that, 32.78% children had idiopathic cause, 13.11% children had family history of Nephrotic Syndrome, 8.19% children had congenital Nephrotic syndrome of predisposing factor. In precipitating factor 9.83% children had history of infectious mononucleosis and 9.83 % children had history of corticosteroid drug intake and Within Co-morbid condition 1.63% children suffered from Juvenile diabetes and 1.63% children suffered from immune system disorder.

n=61



Associated factors of Nephrotic Syndrome

Fig 1: Bar diagram showing the percentage of associated factors of Nephrotic Syndrome in children.

The data presented in figure 1 shows that percentage distribution of associated factors of Nephrotic Syndrome in which 58.08% children had predisposing factors, 45.56% had precipitating factors and 3.26% had Co- morbid conditions.

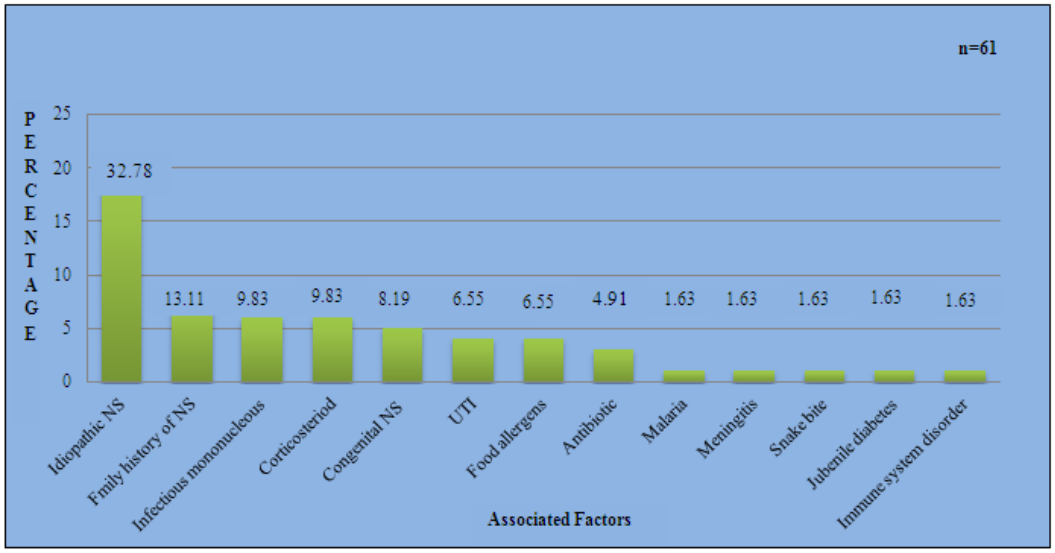


Fig. 2: Bar diagram showing the ranking order of Percentage of associated factors of Nephrotic Syndrome.

Data depicted in figure 2 shows that the percentage of associated factors of Nephrotic Syndrome in ranking order, in which the maximum children 32.78% had idiopathic Nephrotic Syndrome and minimum children 1.63% had Malaria, Meningitis, Snake bite, juvenile diabetes and immune system disorder.

Section-III Findings related to association between associated factors and demographic variables among children with Nephrotic Syndrome.

Table 3: Chi square showing the association between age of children with associated factors of Nephrotic Syndrome in children **n=61**

	Factors of Nephrotic Syndrome	Variable Age		Yates Chi square value
		<Median (5yrs)	>Median (5yrs)	
1.	**Congenital Factor**			
	Present	3	2	
	Absent	32	**24**	0.121
2.	**History of Antibiotic use**			
	Present	1	2	0.070
	Absent	34	24	
3.	**History of UTI**			
	Present	1	3	0.691
	Absent	34	23	
4.	**History of Corticosteroid use**			
	Present	1	2	0.070
	Absent	34	24	
5.	**History of Food Allergens**			
	Present	1	3	0.691
	Absent	34	23	

$\chi 2df(1)= 3.84, p>0.05$

Data presented in table 3 reveals that the calculated chi values of Congenital factor ($\chi 2(1)=0.121$), History of Antibiotic use ($\chi 2(1)=0.070$), History of UTI ($\chi 2(1)=0.691$) and History of Corticosteroid use ($\chi 2(1)= 0.070$) and History of food Allergy ($\chi 2(1)=0.691$) is less than tabulated chi values i.e. 3.84 (df=1) so it is not significant at 0.05 level of significance and there is no significant association between Age of children and Associated factors of Nephrotic Syndrome.

Table 4: Chi square showing the association between gender of children with some factors of Nephrotic Syndrome in children n=61

Factors of Nephrotic Syndrome	Variable Gender		Yates Chi square value
	Boys	Girls	
1. Family history of NS			
Present	3	5	0.108
Absent	27	26	
2. History of Infectious mononucleosis			
Present	4	2	0.223
Absent	26	29	
3. History of UTI			
Present	2	2	0.233
Absent	28	29	
4. History of Corticosteroid use			
Present	2	4	0.150
Absent	28	27	

χ^2 df(1)= 3.84, p>0.05

Data presented in table 4 reveals that the calculated chi values of Family history of Nephrotic Syndrome ($\chi^2_{(1)}$=0.108), History of Infectious Mononucleosis ($\chi^2_{(1)}$=0.223), History of UTI ($\chi^2_{(1)}$=0.233) and History of Corticosteroid use ($\chi^2_{(1)}$= 0.150) is less than tabulated chi values i.e. 3.84 (df=1) so it is not significant at 0.05 level of significance and there is no significant association between Gender of children and Associated factors of Nephrotic Syndrome.

V. Discussion

In this study the Occurrence of Nephrotic Syndrome in children during given period of time was 0.1058%.

These study findings were related with the findings of Rhuma NR, EI Boeshi AS, Sabei LT, Kara AM who conducted a Study on children with newly diagnosed Nephrotic Syndrome. Their result showed that there were (1.03%) newly diagnosed Nephrotic Syndrome.[7]

In this study it was showed that maximum 62.29% children belonged to age group of 6-12 years and 37.70% children belonged in 1month- 6 years.

These study findings were consistent with the findings of Patil R, Bendale A conducted a study in children admitted to paediatric department of a tertiary health care centre. This study result found that the majority of the children 34.38% were in the age group of 9-12 and 28.13%, children belonged in the age group of 6-9 yrs, 21.88%, in 3-6yrs and 15.63% children in 0-3yrs.[1]

In the present study showed that maximum children had Nephrotic Syndrome due to predisposing factors among those factors the idiopathic factor (32.7%) was more and others were family history of Nephrotic Syndrome (13.11%) and congenital factor (8.19%).

These findings were almost similar with the findings of the study conducted by Anochie I, Eke F, Okpere A on childhood Nephrotic Syndrome among 28 children with Nephrotic Syndrome. This study result showed that 20 (71.4%) children had Idiopathic Nephrotic Syndrome.[8]

In present study Precipitation factors were associated with Nephrotic Syndrome these were infectious mononucleousis (9.83%), UTI (6.55%), malaria (1.63%), meningitis (1.63%), snake bite (1.63%), corticosteroid (9.83%), antibiotics (4.91%) and food allergens (6.55%).

These findings were supported by the findings of the study conducted by Ajayan P, Krishnamurty S, Biswal N, Mandal J on the incidence of major infections in Nephrotic Syndrome and evaluate the risk factors for major infections and their etiological spectrum among 86 children with Nephrotic Syndrome. This study result revealed that incidence of major infections was 36.6%, peritonitis and pneumonia together accounted for 72.9%, while UTI accounted for 16.2%.[9]

The present study showed that Co-morbid conditions of the children these were juvenile diabetes (1.63%) and immune system disorder (1.63%).

These study findings were not similar to other study conducted by Anochie I, Eke F, Okpere A on childhood Nephrotic Syndrome among 28 children with Nephrotic Syndrome. There were 28 patients included out of these 14 girls and 14 boys with Nephrotic Syndrome. The peak age was 1-4 years and 20 (71.4%)

children had idiopathic Nephrotic Syndrome, four had chronic renal failure, one had sickle cell disease, two were positive to human immunodeficiency virus (HIV) and one had pulmonary tuberculosis.[8]

VI. Conclusion

The study reveals that the most of children who are having Nephrotic Syndrome were between 7-12 years. Majority (50.81%) of children were female and Majority of children having Nephrotic Syndrome associated due to idiopathic Nephrotic Syndrome, family history of Nephrotic Syndrome, congenital Nephrotic Syndrome, infectious mononucleousis, UTI, malaria, meningitis, corticosteroid, antibiotics, food allergens, juvenile diabetes and immune system disorder were also responsible factors.

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