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# "Assessment of Serum Albumin level in active phase and in remission among Children with Nephrotic Syndrome: a tertiary care hospital study"

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***Abstract:****A prospective observational study was conducted in the department of Paediatric Nephrology & Kidney diseases, Dhaka Shishu (Children) Hospital, Sher - E - Bangla Nagar, Dhaka from January 2015 to December 2015 to assess Serum Albumin level in active phase and in remission in children with Nephrotic Syndrome. Nephrotic syndrome, or nephrosis, is defined by the presence of nephrotic-range proteinuria, edema, hyperlipidemia, and hypoalbuminemia. While nephrotic-range proteinuria in adults is characterized by protein excretion of 3.5 g or more per day but in children it is defined as protein excretion of more than 40 mg/m2/h or a first-morning urine protein/creatinine of 2-3 mg/mg creatinine or greater. Hypoalbuminaemia causes ascites, anasarca which in turn can cause comorbidity. Measurement of serum Albumin is very important to see outcome of Nephrotic Syndrome in children.The aim of this study was to Assess Serum Albumin level in active phase and in remission amongchildren withnephrotic syndrome.Serum Albumin was measured in the BiochemistryDepartment of Dhaka Shishu (Children) Hospital. Serum albumin was9.339318 gm/L in active phase of Nephrotic Syndrome and 20.4907 gm/L in remission which was significantly high in remission of NS.*

***Key words:****Assessment, Nephrotic syndrome, hypoalbuminemia,, Serum Albumin*

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## I. Introduction

A normal albumin range is 3.4 to 5.4 g/dL.Hypoalbuminaemia causes ascites, anasarca which in turn can cause comorbidity. Measurement of serum Albumin is very important to see outcome of Nephrotic Syndrome in children. A serum albumin test is a simple blood test that measures the amount of albumin in blood. Serum Albumin is the most abundant protein in human blood plasma; it constitutes about half of serum protein. It is produced in the liver[2]. It is soluble in water and monomeric. Proteins circulate throughout blood to help human body to maintain fluid balance. Albumin is a type of protein the liver makes. It's one of the most abundant proteins in our blood.We need a proper balance of albumin to keep fluid from leaking out of blood vessels. Albumin gives your body the proteins it needs to keep growing and repairing tissue. It also carries vital nutrients and hormones. Nephrotic Syndrome is a disease primarily of Pediatric age group. The syndrome is characterized by heavy proteinuria > 40mg/ m²/ h, hypoalbuminaemia< 2.5 gm /dl, edema and hyperlipidemia.

Hypoalbuminaemia in children with the nephrotic syndrome is due to an increase in turnover of total body albumin, may be result of a combination of two factors: 1) an increase in the fractional rate of catabolism of albumin and 2) albuminuria.

In children with ascites &anasarca, the fractional rate of albumin catabolism and the renal loss of albumin both are greatly increased. The deficiencies of albumin seen in the Plasma of children with nephrotic syndrome are due to an increased fractional rate of catabolism in association with renal losses. In nephrotic syndrome with hypoalbuminaemia, patient may present with severe edema/anasarca, severe respiratory distress and with complications as immunocompromised.Sometimes hospital stay of patients with nephritic syndrome become prolonged due to complications like huge ascites, anasarca, deep vein thrombosis, respiratory distress etc. Most of the Nephrotic syndrome patients are steroid responsive. Some response earlier, some take long duration and a few do not respond., Hypoalbuminaemia one of the cardinal feature of NS, causes edema, ascites, anasarca, severe respiratory distress and some co-morbidities. Sometimes albumin transfusion becomes eminent. Bioavailability of serum prednisolone will be low, when serum albumin is low, as serum prednisolone bound with protein in serum which causes delayed recovery of patient with nephritic syndrome. So Serum

albumin needs to be measured during active phase and in remission to see relationship and their clinical outcome. Moreover, very limited study was done in our country by measuring serum albumin level in nephrotic syndrome. So, this study was done to measure serum albumin level in nephrotic syndrome during active phase and in remission and to observe their relationship with clinical outcome. In a retrospective study of all children in Nelson R Mandela School of Medicine, the commonest cause of chronic kidney disease (stage 2-5) was Nephrotic Syndrome comprising 30.9% in children < 5 years old & 40.8% in > 5 years old.4. InNephrotic syndrome, renal failure may develop in some percentage. 30-40 % steroid resistant minimal change disease develops end stage renal disease by 5 years[3]

## II. Objectives

**General Objective:**

1. Assessment of Serum Albumin level in active phase and in remission in children with NephroticSyndrome.

**Specific Objectives:**

**1.** To estimate the serum albumin in children with Nephrotic Syndrome in active phase.
**2.** To estimate the serum albumin in children with Nephrotic Syndrome in remission.

## III. Mathod& Materials

This prospective observational study was done in the department ofPaediatricNephrology &Kidney diseases, DhakaShishu(Children) Hospital, Sher - E - Bangla Nagar, Dhaka from January 2015 to December 2015. Fortyfour (44) diagnosed nephrotic syndrome patients admitted in Dhaka Shishu Hospital were purposively included in this study whose age, 1-8 years, steroid responder & Idiopathic nephrotic syndrome were included. NS patients, age < 1 years and > 8 years. Steroid dependent & resistant nephrotic syndromes wereexcluded. Prior to commencement of the study ethical clearance was taken from the ethical clearance committee of BICH. Informed written consent from legal guardian was taken after proper counseling. Reassurance was given to the guardian regarding investigations. First of all thorough history & elaborate clinical examination were noted on a questionnaire. Biochemical & other necessary investigations like CBC, Urine R/E, S. cholesterol, spot urine protein creatinine ratio, HBsAg, S. creatinine MT, USG of KUB, CXR, etc. were done. Two ml Blood was collected from the patient & centrifuged. Then Serum was collected & stored in refrigerator. Serum Albumin level was measured in the department of Biochemistry, Dhaka Shishu Hospital. Data were collected by using prescribed questionnaire, compiled and analyzed by using STRATA 12. Chi-square test and Paired't' test were used as the test for significance. P value of < 0.05 was considered statistically significant.

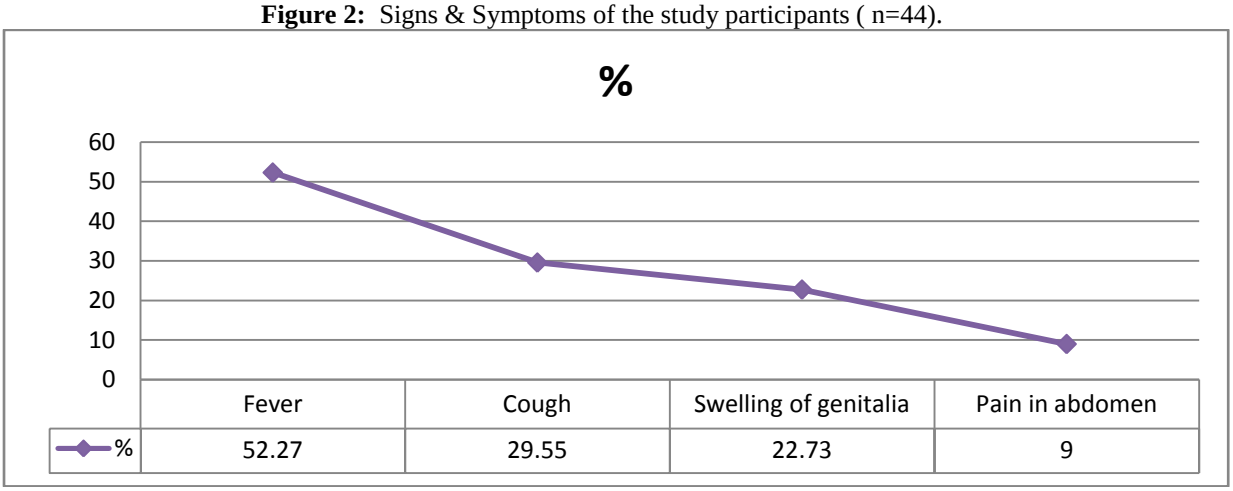
## IV. Result

This study was a prospective observational study. Serum Albumin levels were measured in nephrotic syndrome patients during active phase and in remission & clinical outcome were seen. The results in this study are given below.

**Table 1:** Age and sex distribution of the study participants in year (n-44)

| | **Mean age** | **S.E** | **CI** | |
|---|---|---|---|---|
| **Age** | 4.287356 | 0.180519 | 3.928497 | 4.646216 |
| Gender | Frequency | | Percentage | |
| **Male** | 28 | | 63.22 | |
| **Female** | 16 | | 36.88 | |

**Figure 2:** Signs & Symptoms of the study participants ( n=44).




All patients presented with oedema, puffy face & ascites. Fever- 52.27%, cough - 29.55% , swelling of genitalia -22.73% and pain in abdomen - 9% among study participants.

**Table 2:** Distribution of signs & symptoms in remission among the study participants (n=44)

| | Odema | Fever | swelling of genitalia | swelling of abdomen | pain in abdomen | cough | Puffy face |
|---|---|---|---|---|---|---|---|
| Present | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Absent | 43 | 43 | 43 | 43 | 43 | 43 | 43 |

All the patients in remission having no symptom like oedema, fever, swelling of genitalia, ascites, pain in abdomen, cough, puffy face etc.

**Table 3:** Serum Albumin level during active phase of NS and in remission (n=44)

| Group | Obs | Mean | Std. Err. | Std. Dev. | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| Active phase | 44 | 9.339318 | 0.671417 | 4.453675 | 7.985277 | 10.69336 |
| In remission | 43 | 20.4907 | 1.177342 | 7.720348 | 18.11473 | 22.86667 |
| combined | 87 | 14.85092 | 0.900013 | 8.394765 | 13.06175 | 16.64009 |
| difference | | -11.1514 | 1.347467 | | -13.8305 | -8.47225 |

| | |
|---|---|
| Ho: diff = 0 | t = -8.2758 |
| Ha: diff != 0 | P < 0.0000 |

Serum albumin is significantly high in remission (P value < 0.0000).

**Table 4:** Distribution of patients by relapse among study participants (n=44)

| | no of patient | percentage | m.albumin in AP(gm/L) | m.albumin in Rem(gm/L) |
|---|---|---|---|---|
| NS 1st attack | 16 | 36.36 | 9.43 | 22.49 |
| NS 1st relapse | 12 | 27.27 | 9.33 | 20.40 |
| NS 2nd relapse | 10 | 22.73 | 9.33 | 20.40 |
| FRNS | 6 | 13.64 | 9.28 | 16.48 |

Above table shows that 16 were 1st attack NS, 12 were 1st relapse NS, 10 were 2nd relapse NS and 6 were FRNS among 44 study participants.

## V. Discussion

This study was done in the in the department of PaediatricNephrology &Kidney diseases, Dhaka Shishu (Children) Hospital, Sher - E - Bangla Nagar, Dhaka from January 2015 to December 2015 . Serum Albumin was measured in this study. Average serum Albumin level inactive phase of nephrotic syndrome was 9.339318 gm/L and in remission was 20.4907 gm/L which was significantly high in remission of NS. Another study done by Jorge J et al 1997 showed that serum albumin was 19.04 gm/L.In this study, 1st attack nephrotic

syndrome was 36.36 %, 1st relapse nephrotic syndrome was 27.27 %, 2nd relapse nephrotic syndrome was 22.73 % and frequent relapse nephrotic syndrome was 13.64 %. Serum albumin levels were higher in 1st attack nephrotic syndrome than frequent relapse nephrotic syndrome. In age distribution, mean age of patient was 4 years 3 months and in sex distribution, male is predominant 63.22 %. Clinical presentation of cases: oedema, puffy face & ascites were present in all patients of nephrotic syndrome. Fever, cough, swelling of genitalia and pain in abdomen were present in 52.27 %, 29.55 %, 22.73 % and 9 % of cases respectively.

## VI. Limitations

The study was done to Assess Serum Albumin level in activephase and in remission in children with Nephrotic Syndrome patients. Lower number of sample size, only forty four (44)and single study place (a hospital) shown its limitations.

## VII. Conclusion

Serum albumin was significantly increased in remission of children with Nephrotic Syndrome than active phase which ensures better clinical outcome of NS.

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