




# Profile of Pediatric Nephrotic Syndrome in Wahidin Sudirohusodo Hospital, Makassar, Indonesia

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ABSTRACT

**Introduction:** Nephrotic syndrome is a common and important pediatric chronic renal disease, characterized by massive proteinuria, hypoalbuminemia, edema, and hypercholesterolemia. This study was to assess the profile of pediatric nephrotic syndrome at Wahidin Sudirohusodo Hospital Makassar over a 7-year period. **Methods**: A retrospective study on hospitalized nephrotic syndrome patients at pediatric nephrology ward in Wahidin Sudirohusodo Hospital Makassar from January 2011 to December 2017. Demographic, clinical, and laboratory data were extract from medical records. **Results**: Total 142 children with nephrotic syndrome who fulfilled the inclusion criteria were analyze. Age at onset ranged from 1.4 to 17.5 years (mean 8.5 years), the majority (66.2%) was 5 year-old and above, predominantly boy (66.2%) with a boy to girl ratio of 1,95:1 and well-nourished (56.3%). Upper respiratory infections were observed in 36.6% cases. The predominant clinical signs and symptoms were edema (100%), hypertension (26.8%). Patients with relapse were 56.3%, and the mortality was 2.12%. The prevalent laboratory findings were microscopic hematuria (50.7%), massive proteinuria (100%), hypoalbuminemia (100%), hypercholesterolemia (100%), and elevated serum creatinine (9.9%). **Conclusion**: The profile of pediatric nephrotic syndrome at Wahidin Sudirohusodo Hospital Makassar was similar to typical children nephrotic syndrome and did not significantly differ from other studies.

**Keywords:** Children, Makassar, nephrotic syndrome

ABSTRAK

**Introduksi:** Sindrom nefrotik adalah penyakit kronis anak yang sering dan penting di seluruh dunia, ditandai oleh proteinuria masif, hipoalbuminemia, edema, dan hiperkolesterolemia. Studi ini untuk menentukan profil sindrom nefrotik anak di rumah sakit Wahidin Sudirohusodo Makassar selama 7 tahun. **Metode**: Penelitian retrospektif pada pasien sindrom nefrotik di bangsal nefrologi anak rumah sakit Wahidin Sudirohusodo Makassar dari bulan Januari 2011 sampai dengan Desember 2017. Data diambil dari rekam medik terdiri dari data demografi dan temuan klinis dan laboratorium. **Hasil**: Total 142 pasien sindrom nefrotik anak yang memenuhi kriteira inklusi dianalisis. Umur pasien saat *onset* mulai dari 1,4 sampai dengan 17,5 tahun dengan rerata umur 8,5 tahun. Kebanyakan berumur 5 tahun atau lebih (66.2%) didominasi pasien laki-laki (66,2%) dengan rasio jenis kelamin 1,95:1. Status gizi baik (56,3%). Infeksi saluran napas atas ditemukan pada 36,6% kasus. Gejala dan tanda klinis utama adalah edema (100%), hipertensi (26,8%), relaps pada 56,3% kasus, dan 2,12% pasien meninggal. Temuan laboratorium utama adalah hematuria mikroskopik (50,7%), proteinuria masif (100%), hipoalbuminemia (100%), hiperkolesterolemia (100%), dan peningkatan kreatinin serum (9,9%). **Simpulan**: Profil sindrom nefrotik anak di rumah sakit Wahidin Sudirohusodo Makassar pada umumnya serupa dan tidak berbeda bermakna dari penelitian lain. **Husein Albar, Fadel Bilondatu. Profil Penderita Sindrom Nefrotik Anak di RS Wahidin Sudirohusodo Makassar**

**Kata kunci:** Anak, Makassar, sindrom nefrotik

## INTRODUCTION

Nephrotic syndrome is a common renal disease and an important chronic renal disease in children. Its incidence is reported to be 2 -3/100000 children in Western countries,[1] slightly higher (2-7/100,000) in children of South Asian origin and its prevalence is 12-16/100,000 children.[2] In Indonesia, the incidence was reported 6 per 100,000 per year in children < 14 years with the sex ratio of boys and girls 2: 1.[3] Nephrotic syndrome (NS) is characterized according to criteria of the International Study of Kidney Disease in Children (ISKDC): massive proteinuria (>40 mg/m$^2$/h), hypoalbuminemia (<2.5 g/dL), edema, and hypercholesterolemia (>200 mg/dL).[2]

This study is to assess the profile of pediatric nephrotic syndrome at Wahidin Sudirohusodo Hospital Makassar.

### Methods

A retrospective study was conducted among nephrotic syndrome patients in Pediatric Nephrology Ward, Wahidin Sudirohusodo Hospital, Makassar, Indonesia from January 2011 to December 2017. Data was obtained from medical records, from patients aged 1-18 years diagnosed with nephrotic

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syndrome (NS) on the basis of edema, massive proteinuria (>40 mg/m²/h), hypoalbuminemia (<2.5 g/dL), and hypercholesterolemia (>200 mg/dL).[2]

Data recorded were the initial name and registration numbers, age, gender, nutritional status, presenting signs and symptoms, presence of hypertension and hematuria, urinalysis, serum albumin, cholesterol, and creatinine, relapse and mortality. The response to treatment was classified according to ISKDC: a) steroid sensitive – complete resolution of proteinuria within eight weeks of prednisone therapy; b) infrequent relapses – less than two episodes of relapsing nephrotic syndrome within 6 months of the initial response to prednisone; c) frequent relapses – two or more episodes within six months of the initial response or four or more episodes within a 12-month period.[4]

Hypertension was defined as blood pressure higher than 95th percentile for sex and height.[5] Hematuria was defined as > 5 red blood cells/mL in centrifuged urine.[6] Elevated serum creatinine is defined as the serum creatinine level > 1.2 mg/dL in children aged 1-18 years.[7] Assessment of nutritional status is based on body weight to height ratio according to CDC-NCHS 2000 and WHO' criteria as over, good, under, and poor nutritional status.[8] Infection is proved by clinical and laboratory findings including upper respiratory tract infection, diarrhea, urinary tract infection, or skin infection. The initial treatment for nephrotic syndrome comprises of prednisone 2 mg/kg/day for 4 weeks followed by alternate days for 4 weeks.[6] Patients with complete medical records were further analyzed. Standard descriptive statistics were chi-square test and p value analyzed with the Statistical Package for the Social Sciences (SPSS) version 16. This study was approved by the institutional ethical committee of Wahidin Sudirohusodo Hospital, Makassar. The author declared no competing interests.

## RESULTS

There were a total of 188 patients with the diagnosis of nephrotic syndrome hospitalized in the pediatric nephrology ward Wahidin Sudirohusodo Hospital Makassar from January 2011 to December 2017. Out of the total 188 patients, 142 patients (75.53%) were with complete medical records for further analysis. Age at onset of nephrotic syndrome ranged from 1.4 to 17.5 years with mean age of 8.5 years. The majority (66.2%) of cases was ≥ 5 years predominantly boy (66.2%) with a boy to girl ratio of 1,95:1. Upper respiratory infections (URTI) were present in 36.6% cases. The clinical features included edema (100%), hypertension (26.8%). The nutritional

**Table 1.** The profile of pediatric nephrotic syndrome at Wahidin Sudirohusodo Hospital Makassar

| Patients profile ( n=142) | n | % |
|---|---|---|
| **Age** | | |
| Range | 1.4 – 17.5 | |
| Means | 8.5 | |
| < 5 years | 94 | 66.2 |
| ≥ 5 years | 48 | 33.8 |
| **Sex** | | |
| boys | 94 | 66.2 |
| girls | 48 | 33.8 |
| **Nutritional status** | | |
| Good | 80 | 56.3 |
| Under | 52 | 36.6 |
| Poor | 10 | 7.0 |
| **Edema** | 142 | 100 |
| **Hypertension** | 38 | 26.8 |
| **Hematuria** | 72 | 50.7 |
| **Massive proteinuria** | 142 | 100 |
| **Hypoalbuminemia** | 142 | 100 |
| **Hypercholesterolemia** | 142 | 100 |
| **Elevated serum creatinine** | 14 | 9.9 |
| **URTI** | 52 | 36.6 |
| **Relapsing NS** | 80 | 56.3 |
| **Outcome** | | |
| Recovery | 139 | 97.88 |
| Death | 3 | 2.12 |

**Tabel 2.** Outcome of pediatric nephrotic syndrome in Wahidin Sudirohusodo Hospital Makassar

| Variable | Outcomes (%) | | | X2 tests ( df 2) | P |
|---|---|---|---|---|---|
| | Recovery | Death | Total | | |
| **Age** | | | | | |
| < 5 years | 93 | 1 | 94 | 0.152 | 0.697 |
| ≥ 5 years | 46 | 2 | 48 | | |
| **Sex** | | | | | |
| boys | 93 | 1 | 94 | 1.152 | 0.277 |
| girls | 46 | 2 | 48 | | |
| **Nutritional status** | | | | | |
| good | 80 | 1 | 80 | 0.151 | 0.821 |
| under | 51 | 1 | 52 | | |
| poor | 10 | 1 | 10 | | |
| **Hypertension** | | | | | |
| Yes | 35 | 2 | 38 | 1.428 | 0.611 |
| No | 104 | 1 | 104 | | |
| **Hematuria** | | | | | |
| Yes | 69 | 2 | 72 | 1.142 | 0.621 |
| No | 70 | 1 | 70 | | |
| **Elevated serum creatinine** | | | | | |
| Yes | 9 | 1 | 14 | 1.132 | 0.517 |
| No | 128 | 2 | 128 | | |
| **Relapsing NS** | | | | | |
| Yes | 77 | 2 | 80 | 1.152 | 0.612 |
| No | 62 | 1 | 62 | | |
| **URTI** | | | | | |
| Yes | 49 | 1 | 52 | 1.512 | 0.676 |
| No | 90 | 2 | 90 | | |




status was good (56.3%), under (36.7%), and poor (7.0%). Relapsing nephrotic syndrome observed in 56.3% and mortality in 2.12%. The prevalent laboratory findings were microscopic hematuria in 50.7% and elevated serum creatinine in 9.9%. The profile and the outcome have shown in table 1 and 2.

Table 2 shows no statistically significant difference between recovery and death according to the demographic, clinical, and laboratory features (P>0.05).

## DISCUSSION

In this study, the age ranged from 1.4 to 17.5 years with a mean of 8.5 years, and the majority (66.2%) of cases was ≥ 5 years old. Almost similar observations were found by Sahana with age distribution from 2 to 15 years and the mean age at 7.4 years,[9] as well as observations by Chahar OP, et al,[10] and Shastri NG, et al,[11], whereas Nilawati[12] and Safaei A, et al,[13] observed the different age ranged from 6 months to 11 years with the mean age of 5.1 years. In India and Nigeria, the mean age of patients was 7.9 ± 5.1 years,[14,15] while Kamal FA, et al,[16] reported age ranged from 6 months to 17 years with the mean age of 55 ± 3.4 months.

Nephrotic syndrome was more common in boys than in girls (2:1 - 3:2).[17,18] Report from Indonesia shows nephrotic syndrome occurs in 6 per 100.000 pediatric population per year with boys to girls is 2:1.[3,6] In this study, boys was more common than girls with sex ratio of 1.95:1 (66.2%/33.8%). Sahana[9] and Siegal NJ, et al,[19] also noted the sex ratio of 3.27:1; Nilawati[12] found the sex ratio of 2,7:1(73,5% boys/26,5% girls) and Safaei A, et al,[13] with the sex ratio of 1.9 :1 (66% boys/girls 34%). In contrast, no gender predominance observed by Paola M, et al. [20] In other studies, the sex ratio was from 1.6 to 2.76/1.[21,22] Ahmadzadeh, et al,[23] reported the similar sex ratio (2:1).

In this study, well-nourished patients were observing in 56.3 % cases, under-nourished in 36.7%, and poor- nourished in 7.0%. In contrast, Sudihardjo W, et al,[24] in Surabaya found well-nourished patients was 74,2%, under-nourished 1.5%, severe malnourished 11.5%, and obesity in 2.8%. Additional social factors including early access to care, early diet intervention, lower socioeconomic status, and ignorance may influence nutritional status of these patients.

In a review of ISKDC,[25] hypertension was present in 20.7% patients with minimal changes nephrotic syndrome. Hypertension was observed in 26.8% patients in this study; which is higher than that observed by Sahana[9] (12%) and Safaei A, et al,[13] (11.2%) but less than data from Paola M, et al,[18] (69.5%) and Sudihardjo W, et al,[24] (51.5%). The different findings in hypertension may be due to difference in methodology either in sample size and technical procedures or in epidemiological variations in each geographical location.

Upper respiratory tract infection was the most common complication in this study (36.6%). Other studies reported pneumonia and upper respiratory tract infection in 18% of patients[13] and 30.64%.[16] In contrast, urinary tract infection was the commonest complication (25%) observed by Sahana.[9]

Our study demonstrated the prevalent laboratory finding was microscopic hematuria (50.7%) which is almost similar to Paola M, et al,[20] (65.2%) but higher than that reported by Sahana[9] (10.6 %), Safaei A, et al,[13] (23%), Sudihardjo W, et al,[24] (14.3%), and Nilawati[12](14,7%). Some studies may perform renal biopsy for diagnosis, but diagnosis in the present study only based on clinical criteria; these differences may also because of different methodologies and size of the sample populations. Persistent hematuria even microscopic may be an indication for a renal biopsy in children with clinical diagnosis of NS.

In a review of ISKDC, elevated serum creatinine was present in 33.33 -150% of patients with nephrotic syndrome.[25] Other reports documented the almost similar findings (32.5%.[26,27] and 23.5%[12]) whereas in the present study, the elevated serum creatinine was only in 9.9% of the patients and normal serum creatinine was observed in all patients by Sahana.[9] These variations may be due to different designs of studies and especially different geographical patterns of patients populations. Since we did not perform renal biopsy, elevated creatinine serum was not differentiated by histologic features; we didn't know which type of nephrotic syndrome is with elevating creatinine level.

Relapse was observed in 56.3% patients in the present study which is similar to that observed by Safaei A, et al,[12] (68.2%), Paola M, et al,[20] (56.5%), and Sahana[9] (63%); respectively. In the present study, death was observed in 2.12% of patients. Ethnical differences may play a role in these different findings and different designs of studies should be considered.[14,15,22]

The limitation of our study is due to retrospective design of this study, based only on medical records data with incomplete data.

The profile of pediatric nephrotic syndrome in our study was in concordance with typical nephrotic syndrome in children and did not differ significantly from other studies.

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