

Correlation Between Duration of Illness and Quality of Life in Pediatric Patients with Nephrotic Syndrome at Dr. Soetomo General Hospital, Surabaya, Indonesia – A Cross-Sectional Study

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ABSTRACT

INTRODUCTION: Nephrotic syndrome (NS) is a chronic kidney disease where treatment involves using steroids. Steroids impact behavioral and emotional disorders and can negatively affect the quality of life (QoL).

This study's aim was to analyze the correlation between the duration of illness and the quality of life on physical, emotional, social and school aspects using PedsQL in NS pediatric patients.

METHODS: An observational study was conducted by evaluating medical records and interviews of nephrotic syndrome pediatric patients and their parents using PedsQL in the inpatient unit and outpatient clinic of the Child Health Department at Dr. Soetomo General Hospital from September to November 2018.

RESULTS: 31 nephrotic syndrome pediatric patients met our study's inclusion criteria. The subjects were dominated by males (90%) and 39% were 13-18-years of age. Most of the patients came from outside Surabaya (61.3%). The most frequent illness duration was more than 6 months (87.1%) and the majority of subjects were steroid-resistant nephrotic syndrome patients (58.1%). There was minimal difference between the quality of life regarding physical, emotional, social and school aspects. There was a negative correlation between the quality of life on physical, emotional, social, and school aspects ($R = -0.423, -.0371, -0.092, \text{ and } -0.290$, respectively).

CONCLUSION: According to the parents of NS pediatric patients with duration of illness, there was a negative correlation between the quality of life on physical, emotional, social, and school aspects.

Keywords: Nephrotic Syndrome, Quality of Life; Child

INTRODUCTION

Nephrotic syndrome (NS) is a kidney disorder. The main clinical signs are massive

proteinuria, hypoalbuminaemia, oedema and hypercholesterolaemia. NS often occurs in children; indeed, NS's incidence in children is 15 times greater than it is in adults [1,2]. In 2012, the

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prevalence of proteinuria in Rwanda was 10.5% [3]. The incidence of NS in children in developing countries is higher than in developed countries. Every year 6 out of 100,000 children under 14 years-of-age in Indonesia suffer from NS; the ratio of males to females is 2:1 [1]. Classification of NS is based on response to steroid treatment: steroid-sensitive nephrotic syndrome (SSNS) and steroid-resistant nephrotic syndrome (SRNS) [4]. SSNS is then further divided into infrequent relapse if relapse occurs \leq 3 times in a year, frequent relapse if relapse occurs \geq 4 times in a year and steroid-dependent nephrotic syndrome (SDNS) [1].

Pediatric NS patients, especially SRNS and NS relapse, are hospitalised more often, and consequentially this can affect their quality of life (QoL) [5]. According to the World Health Organization (WHO), QoL is an individual's perception of their position in society and is associated with physical and psychological desires and expectations [6]. Patients with chronic diseases such as NS will experience side effects of the medication that include behavioural disorders; there is a 2.5-fold increase in psychopathological risk compared to healthy children [7]. The psychological development of children with NS requires special consideration because the response to corticosteroids (that acts as the main treatment for NS) remains uncertain [8].

NS pediatric patients with PedsQL scores below normal have a decreased QoL [5]. This phenomenon is propagated by behavioural and emotional disorders frequently associated with relapse, prolonged corticosteroid treatment and socioeconomic conditions [9]. NS pediatric patients who are often hospitalised are impacted physically, psychologically and financially. Additionally, the impact of being absent from school can decrease quality of life.

The PedsQL questionnaire is one instrument for assessing the QoL in the pediatric population. It has good reliability in the 2-18-year-old age range; it is divided into age groups and consists of generic modules that have been used in 25,000 children and their parents regarding specific illnesses [10]. Another instrument for assessing QoL in the pediatric population is TACQOL, which is less reliable than PedsQL for 5-15-year-old individuals and there is no age grouping [11]. In this study, we chose to use the PedsQL because of the wider

age range and it's higher reliability. Furthermore, PedsQL is widely used in NS pediatric patients, including those from Bangladesh, Egypt and South India [12–14].

This study aimed to analyse differences in QoL according to NS pediatric patients and their parents and the correlation between these QoL measures and illness duration.

METHODS

Study design: A cross-sectional study. Demographic and diagnostic information was gained from the medical records and QoL data was acquired from interviews with children and parents using the PedsQL questionnaire.

Setting: In the Pediatric Nephrology Division at Dr. Soetomo General Hospital Surabaya, Indonesia, inpatient unit and outpatient clinic. It is the largest referral hospital for the whole Eastern region of Indonesia with four pediatric nephrologists. The number of outpatients in pediatric nephrology cases is around 2500-3500 patients/year and the number of hospitalised pediatric nephrological patients is around 600-750 patients/year. NS cases are around 60-80 patients/year.

Participants: We conducted an observational study in NS pediatric patients in the inpatient unit and outpatient clinic of the Pediatric Nephrology Division at Dr. Soetomo General Hospital Surabaya, Indonesia, from September to November 2018. The sample included NS pediatric patients aged 5-18 years; the subjects and their parents consented to be research respondents. Children were excluded if their medical records were incomplete. There were no other inclusion and exclusion criteria.

Variables: The independent variable in this study is the duration of illness of NS pediatric patients (gained from the medical records). While the dependent variable is QoL (physical, emotional, social, and school aspects) (gained from interviews with children and parents using the PedsQL questionnaire).

Sampling: The sample in this study was generated using total sampling with the inclusion and exclusion criteria mentioned. Sample calculation was not undertaken because the total population is unknown. Employing a small number of participants without knowing the sample size can affect the interpretation of the findings, and to rectify this, the p-value was not used.

Definitions: NS diagnosis was made by a doctor

based on clinical manifestations, urinalysis, quantitative urine protein, blood tests or kidney biopsy. The illness duration was determined from the first time the patient was diagnosed with NS (obtained from the patient's medical records) until the interview was conducted. Quality of life is an assessment of the well-being of an NS pediatric patient over time.

PedsQL questionnaire: PedsQL has four sections: physical (eight questions), emotional (five questions), social (five questions) and school (five questions). The answers given are according to what the child experienced during the past month. Each question is responded using a five-point Likert scale, namely 0 for never, 1 for almost never, 2 for sometimes, 3 for often and 4 for almost always. Each score from each question is transformed to a scale of 0-100 (0 = 100; 1 = 75; 2 = 50; 3 = 25; 4 = 0). They completed questionnaire verbally administered and it was in the Indonesian language or Bahasa. The PedsQL questionnaire can be used for any chronic illness. Varni originally validated it in the English Language. It is relevant to this study as it has good reliability, wide age-range (2-18 years old), and had been used in the other studies of NS pediatric patients' QoL [10,12–14].

Interviews: Before interviews, the researcher collected the patient's medical record data which met inclusion criteria. The researcher then provided information for consent and asked the subjects/parents to sign the informed consent form. After that, the researcher interviewed the patients and their parents. The interviews took approximately 10-15 minutes. The interviews were conducted while the patients waiting for their medical check. The illness duration was divided into ≤ 6 months and >6 months based on previous studies by Rosita and Muryawan at Dr. Kariadi Hospital Semarang, Indonesia [5].

Statistical analysis: SPSS version 23 was used for statistical analysis. Data normality was analysed with the normal probability plot (NPP). According to children and their parents, the comparison of QoL was analysed with a paired-sample T-test for normally distributed data and the Wilcoxon test for non-normally distributed data. Pearson's correlation coefficient was used for the correlation tests for normally distributed data and Spearman's Rank test for non-normally distributed data. A $p < 0.05$ was considered to be statistically significant

Ethics: The research ethical certificate was issued by the Ethics Committee in Health Research Dr.

Soetomo General Hospital Surabaya, Indonesia, with IRB 0595/KEPK/lx/2018.

RESULTS

During the research period, 31 pediatric patients with nephrotic syndrome met the inclusion criteria (Table 1).

Table 1: Baseline characteristics of the subjects in this study

Characteristic	n = 31
Age (Years; Mean 10.7 \pm 3.9)	
5-7	8 (25.8)
8-12	11 (35.5)
13-18	12 (38.7)
Sex	
Boy	28 (90.3)
Girl	3 (9.7)
Origin	
Surabaya	12 (38.7)
Outside Surabaya	19 (61.3)
Illness duration (Months; Mean 45.5 \pm 34.9)	
≤ 6	4 (12.9)
> 6	27 (87.1)
NS Type	
SRNS	18 (58.1)
SSNS	13 (41.9)

Data are presented as n (%). For the age and duration of illness, the overall mean \pm standard deviation is also reported. SD = standard deviation, NS = nephrotic syndrome, SRNS = steroid-resistant nephrotic syndrome, SSNS = steroid-sensitive nephrotic syndrome

Normality (NPP) analysis revealed that children and their parents' physical, emotional and school aspect data were normally distributed. However, the social aspect data, according to children and their parents, was not normally distributed. The lower score shows that the patients have worse QoL (Table 2).

Correlation between duration of symptoms and QoL: There was a negative correlation between QoL on physical (moderate), emotional (weak),

Table 2: Quality of life according to children compared to QoL according to parents

Domain	Child reported	Parent-reported
Physical	68	65.81
Emotional	61.13	57.23
Social	73.71	84.35
School	50.81	53.55

social (very weak), and school (weak) aspects according to the NS pediatric patient with the duration of illness ($R = -0.423, -.0371, -0.092,$ and $-0.290,$ respectively; Table 3). There was a negative correlation between QoL on physical (very weak), emotional (weak), social (very weak), and school (weak) aspects according to the parents of NS pediatric patients with duration of illness ($R = -0.149, -0.380, -0.007,$ and $-0.333,$ respectively; Table 3). A negative correlation means that the longer duration of illness, the worse quality of life.

Table 3: Correlation between QoL with the duration of illness

QoL	Patients	Parents
	R-value	R-value
Physical	-0.423	-0.149
Emotional	-0.371	-0.380
Social	-0.092	-0.007
School	-0.290	

R values for Pearson and Spearman are defined as r, 0-0.19 is regarded as very weak, 0.2-0.39 as weak, 0.40-0.59 as moderate, 0.6-0.79 as strong and 0.8-1 as very strong correlation [15,16].

DISCUSSION

Most of the subjects were in the 13-18-year-old age group (Table 1). Additionally, the majority were male. In all over the world, NS's incidence is more in boys and the cause is unknown. Not only in Indonesia and not because girls are not taken for treatment. Based on the distribution from the region, NS pediatric patients were mostly from outside Surabaya. The mean duration of illness was 45 months and was therefore dominated by illness longer than 6 months. SRNS was more prevalent than SSNS.

NS severity and chronicity are predisposing factors for a lower HRQoL score; the cut-off score for the

PedsQL assessment is 65.4 [17, 18]. In this study, PedsQL scores for the patients and their parents were below 65.4 in emotional and school aspects, indicating that the QoL for NS pediatric patients regarding these aspects was poor. The PedsQL scores regarding physical and social aspects were both above 65.4. Thus, the patients' QoL in both aspects was normal and only slightly decreased compared to healthy children. Poor QoL within the emotional aspect is caused by long-term steroid treatment that causes a dysfunction in the stimulation and activation of neurons in the hypothalamus, hippocampus, amygdala and prefrontal cortex.

These dysfunctions affect cognition, adaptive behavior and neuroendocrine release [19]. Relapse causes patients to go to a doctor for treatment or even be hospitalised, so they are often absent from school. Some NS pediatric patients also have difficulty concentrating in school, doing homework and have a decline in memory - all of which are side effects of steroid therapy. Research in South India and Egypt state that the QoL in the physical, emotional and social aspects of NS pediatric patients is better than in pediatric patients with other chronic diseases [13, 14]. However, there is no difference in the school aspect between NS pediatric patients and pediatric patients with other chronic diseases [13,14]. Previous studies have reported a difference in QoL perception between children and parents; parents of children with poor health conditions tend to underestimate their children's disorders [20,21]. In this study, there were minimal differences in QoL's perception, according to NS pediatric patients and their parents. The difference in results between this study and the study that reported a difference in QoL perception between children and parents might occur because of the small number of samples in this study. One previous study stated that children report their QoL to be better [22]. Other studies showed no significant difference between reports of children and parents related to QoL [23,24]. According to children and parents, differences in the QoL may be the result of differences in the utilised statistical methods and are also influenced by the age of the child, the domain used, and the QoL of the parents themselves [25].

Initially, there is a difference between the perception of QoL according to children and parents. Still, over time, the difference is reduced

because parents adapt to care for children with chronic health conditions [26]. In this study, there were minimal differences in QoL scores between children and their parents. Most of the NS pediatric patients in this study had a greater illness duration than 6 months did not influence the results. Thus, parents and children had the same perception of QoL.

There was a negative correlation between the physical (moderate strength correlation), emotional (weak strength correlation), social (very weak strength correlation), and school (weak strength correlation) QoL aspects and duration of illness for the NS pediatric patients. According to the parents, only the emotional aspect was weakly negatively correlated with the duration of illness. These negative correlations mean that the longer the duration of the illness, the lower the QoL. In a previous study, children with a duration of illness less than one year have worse scores in QoL's physical aspect and those with an illness duration greater than one year have a worse emotional score [17]. One of the factors that influences emotional and behavioural disorders is steroid treatment. High steroid doses over long time periods will increase the risk of toxicity, including severe behavioural changes such as steroid psychosis [7,27]. Long-term steroid treatment can also affect NS's course and lead patients to relapse or develop SRNS that further impacts their QoL [28].

Furthermore, NS pediatric patients with a longer duration of illness are often faced with the challenge of achieving and maintaining remission that subsequently become emotional challenges [17]. Fear of relapse in the near future can also be a possible cause for worse scores in emotional aspects [29]. The presence of a correlation according to children and the absence of a correlation according to parents regarding QoL in the physical aspect may be because parents believe that their children can still do anything that healthy children can do. In contrast, the children feel that many activities must be avoided to decrease relapse and risk of infection. These restrictions can eventually cause physical disorders in the child such as difficulty running or playing with friends [30]. QoL in social aspect for NS pediatric patients decreased and there was a very weak strength correlation between the social QoL aspect and duration of illness. The NS pediatric patients and

their parents also stated there was no difficulty interacting with peers because their friends already knew of the disease and could understand it, but the children's activities were restricted due to fear of relapse. Research in New Delhi explained that parents restrict social interaction of NS pediatric patients because it is considered to increase the risk of infection, but it does not necessarily need to be limited [31].

NS pediatric patients often did not go to school at least once per month to receive treatment from a doctor for the school aspect. Some of them admitted that they did not attend school because they felt unwell. Therefore, there was a weak strength correlation between the school QoL aspect and duration of illness. Regardless of the length of time, a child suffers from NS; they remain equally absent from school at least once a month to receive treatment from a doctor. These findings indicate that the NS pediatric patients and their parents adhere to treatment. This adherence may be related to the free NS treatment modalities provided by the BPJS system in Indonesia.

This study used hospital medical record data that had limitations related to demographic data such as the type of NS and diagnostic information, such as when a patient was first diagnosed with NS. Furthermore, the sample was too small because there were quite many NS pediatric patients under the age of 5. This contributed to the exclusion criteria. In addition, this study was also conducted by interviewing children; hence the results were also influenced by the children's mood. However, this study's sample can still be utilized and can be developed into further research using other variables such as socioeconomic status and parenting style.

CONCLUSION

Given the pediatric patients perspective based on illness duration, there were negative correlations to the QoL aspects, mainly physical (moderate) aspect. On the other hand, their parents' perspective showed a negative correlation between QoL and illness duration, mainly emotional (weak) and school (week) aspects.

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