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Review Paper

Effect of Nursing Interventions on Controlling Complications of Nephrotic Syndrome in Children: A Narrative Review

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ABSTRACT

Background and Aim: Nephrotic syndrome ranks as a prevalent chronic renal disorder among children, leading to various challenges, including low blood albumin levels, swelling, heightened infection risks, and dietary issues. The pivotal role of nursing interventions in mitigating and managing these complications is undeniable. This research evaluated the impact of nursing practices on managing nephrotic syndrome-related complications in pediatric patients.

Methods: For this narrative review, studies from 2013 to 2025 were examined, utilizing databases, such as Web of Science, PubMed, Scopus, SID, Magiran, and Google Scholar with appropriate search terms.

Results: The findings indicated that critical nursing measures, such as educating parents, consistent monitoring of fluid and electrolyte balance, skin care, dietary modifications, and ongoing psychosocial support significantly contribute to lessening complication severity and enhancing life quality for affected children.

Conclusion: The study underscores the critical importance of nurses in the holistic management of nephrotic syndrome in children.

Keywords: Nephrotic syndrome, Nursing, Intervention, Children, Complications

Introduction

Nephrotic syndrome is one of the most common kidney disorders in children, characterized by severe protein loss in the urine, low levels of albumin in the blood, swelling, and high cholesterol levels. This condition is associated with significant complications, including frequent infections, nutritional problems, kidney failure, and psychosocial challenges, all of which greatly impact the recovery and quality of life of affected children [1]. Approximately 70% of children diagnosed with minimal change disease experience a relapse within two years, which can lead to acute kidney injury, serious infections, and blood clots [2]. While many children with minimal change nephrotic syndrome have positive long-term outcomes, some may develop focal segmental glomerulosclerosis, a more se-

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vere condition that can result in kidney failure and may require dialysis or a transplant. The annual incidence of nephrotic syndrome in children is estimated to be between 2 and 7 cases per 100,000 children [3].

Nephrotic syndrome in children is classified into secondary, congenital, and idiopathic forms, with the idiopathic type being the most common. Histological examinations usually show either minimal change nephropathy or focal and segmental glomerulosclerosis. Although most patients respond to corticosteroid treatment, over 70% experience relapses, leading to conditions, like recurrent nephrotic syndrome or steroid-dependent nephrotic syndrome. However, many children achieve long-term remission without progressing to end-stage renal failure [4].

Treatment strategies for nephrotic syndrome include medications, such as corticosteroids, albumin, and diuretics, as well as dietary measures, like restricting fluid and sodium intake to manage complications and improve care. Early detection of relapses in steroid-responsive patients allows for outpatient management, which can reduce healthcare costs and enhance patient safety by minimizing the need for hospital admissions. Given the unique physiological and psychological needs of children, specialized and targeted nursing care is essential. Attendance at school, academic performance, and interactions with peers are crucial for assessing a child's health and quality of life [5]. Children struggling in these areas often face issues due to inadequate growth and functional development, which can lead to lower self-esteem. Additionally, frequent absences caused by extended hospital stays and restrictions on participating in group activities due to infection risks further exacerbate these challenges [6].

Nursing interventions play a vital role in treatment by assisting with family education, monitoring vital signs, managing medications, providing nutritional support, preventing infections, and offering psychological support. Research shows that evidence-based nursing care programs can reduce complication rates, improve treatment adherence, and enhance the quality of life for patients [7]. The growing importance of nursing care within the healthcare system highlights the need to evaluate the effectiveness of these interventions in managing the complications of nephrotic syndrome in children [8]. This study aimed to investigate how nursing interventions affect the control of complications in pediatric nephrotic syndrome, providing solid scientific evidence to improve care quality and develop effective strategies for nursing children affected by this disease.

Materials and Methods

This study was conducted as a narrative review.

Research question

The main question of this study was "What are the most important effects of nursing interventions on controlling complications of nephrotic syndrome in children?"

Search for resources

Search for scientific resources was conducted in international and Iranian databases, including Web of Science, PubMed, Scopus, ScienceDirect, Google Scholar, SID, and Magiran. To increase the comprehensiveness of the search, articles published from January 2013 to December 2025 were reviewed. The keywords used in the search were "nephrotic syndrome", "nursing intervention", "children", "complications" and Persian equivalents.

After initial screening, 27 relevant articles were selected and analyzed. Logical operators AND and OR were used to combine keywords. Manual searches were also used in the reference lists of the original articles to identify gray articles and unofficial sources.

Inclusion and exclusion criteria

Inclusion criteria were articles published in peer-reviewed journals, qualitative, quantitative, or review studies related to clinical education in pediatrics, studies on undergraduate nursing students, studies Published in Persian or English language, and being published between 2013 and 2025. Exclusion criteria were studies that only addressed education in graduate schools or other medical disciplines, articles with no full text available, short reports, letters to the editor, and non-standard reviews.

Study selection

After eliminating duplicates, titles and abstracts were independently reviewed by two researchers. In cases of disagreement, a third reviewer was used. Finally, from the initial 57 articles, 27 articles that were most consistent with the study objectives were selected for the final analysis (Figure 1).

Data extraction and analysis

Data were extracted from articles using an information extraction form, including general information, study

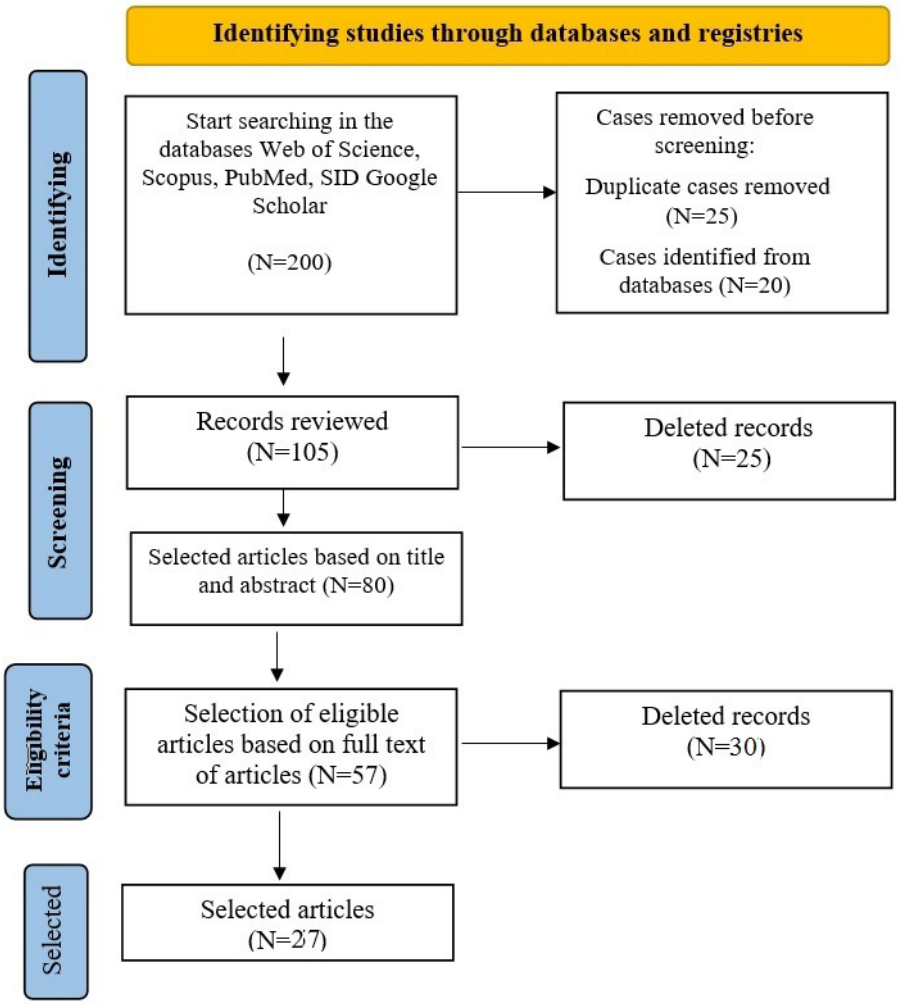

Figure 1. Flowchart of study selection

objective, participants, data collection method, and the most important findings. Data analysis was performed as a qualitative content analysis, and challenges were categorized into main themes and subthemes.

Study validation

To increase the validity and reliability of the review, the following methods were used: Independent review of articles by two individuals, transparency of the article selection process, using standard data extraction tools, and full reporting of the search and analysis stages.

Results

Parental education

Teaching parents to recognize symptoms, such as fever, reduced urine production, and rapid weight increase is crucial for the early detection of potential health issues and the prevention of severe complications. Additionally, instructing them on proper home care and medication administration is an essential aspect of nursing [9].

Skin care and wound prevention

The susceptibility of a child's skin to injuries and infections increases with edema from nephrotic syndrome. Implementing regular skin care routines, altering the child's position frequently, and utilizing suitable bedding are critical nursing practices [10].

Fluid and weight management

Meticulous monitoring of fluid consumption and output, along with daily weighing, is crucial in managing risks associated with excessive swelling or dehydration [11].

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Nutrition and growth

Providing dietary advice to parents focused on lowering salt consumption, enhancing protein intake, and averting developmental delays forms a significant part of the nursing role within the treatment team [12].

Infection prevention

Children receiving corticosteroid treatments are at heightened risk for infections. It is vital to educate on cleanliness, observe for infection symptoms, and ensure vaccinations are administered promptly [13].

Psychological support

Chronic illnesses during childhood may contribute to anxiety, depression, and challenges in social interactions. Offering emotional and psychological support to both the child and their family is integral to improving their overall quality of life [14].

Discussion

Nursing interventions, focusing on fluid management, comprehensive care, and family involvement, play an important role in the management of complications of nephrotic syndrome in children. These interventions aim to reduce symptoms, prevent relapse, and improve the quality of life of affected children [15]. The effectiveness of these interventions is supported by various studies, highlighting their importance in the care of pediatric nephrotic syndrome. Effective fluid management is essential in controlling edema and hypervolemia in children with nephrotic syndrome. Nursing interventions include monitoring fluid intake, maintaining 24-hour fluid balance, and collaborating with medical teams to prescribe diuretics [16]. The family-centered nursing model significantly improves quality of life and reduces hospital stay for children with nephrotic syndrome. It also increases family satisfaction with care. Their participation is crucial in preventing relapse and managing complications, such as hypertension and proteinuria [17].

Nurses play a preventive and therapeutic role during relapses by closely monitoring symptoms and collaborating with parents to effectively manage care. Nursing care of children with nephrotic syndrome and fluid volume overload problems can be effectively addressed through fluid management, which includes monitoring fluid intake, maintaining 24-hour fluid balance, and co-administration of diuretics [18]. Research has shown that fluid management effectively reduces edema and corrects hypervolemia in children with nephrotic syndrome, highlighting the importance of close monitoring of signs and symptoms, such as edema, weight loss, blood pressure, and urine output for the early detection of status changes [19].

This study concludes that the nurses' role in the management of children with nephrotic syndrome is crucial during the relapse period, and emphasizes the importance of appropriate medical care and the need to collaborate with the child's parents to effectively address caregiving problems. This highlights the need for close monitoring of the child's condition, blood pressure assessment, appropriate timing of fluid interventions, and collaboration with the child's parents [20]. Wang et al. showed that the observation group who received continuous home care showed significantly higher compliance rates in various dimensions, including diet, fluid intake, medication, dialysis regimen, daily living, and exercise compared to the control group, with statistically significant differences, with significant increases in behavioral ability, physical function, psychological function, and social function compared to the control group [21]. Li et al. showed the management of pediatric nephrotic syndrome and highlighted the importance of pharmacological and nutritional interventions to address complications, such as edema, metabolic bone disease, micronutrient deficiencies, and hyperlipidemia associated with this disease [22].

El-Shahat et al. showed that treatment for patients with frequent relapses or steroid-resistant disease included fluid and sodium restriction, corticosteroids, anti-albumin drugs, and anti-inflammatory drugs. After nursing intervention, treatment compliance in the experimental group, who received whole-process health education in addition to conventional nursing, was significantly higher than in the control group, who received only conventional nursing [23]. Lee et al. showed that the relevant knowledge score about nephrotic syndrome was higher in the experimental group than in the control group, indicating that active nursing intervention improved health knowledge and treatment compliance among patients]24]. Hassan et al. showed that children with steroid-resistant nephrotic syndrome experienced longer hospitalization and more complications, including bacterial infections, urinary tract infections, and acute renal failure, compared with children with steroid-sensitive nephrotic syndrome [25].

Nursing interventions include education for parents and children, careful monitoring of vital signs and fluid intake and output, encouragement of a specific diet (low

salt, low fat, and high protein in certain cases), prevention of infections through adherence to hygiene principles and appropriate vaccination, and monitoring of drug side effects (especially corticosteroids). Emotional and psychological support for the child and family also plays an important role in increasing their quality of life [26]. Hilmanto et al. showed that regular nursing education and follow-up can decrease the frequency of disease recurrence, improve adherence to treatment, and reduce repeated hospitalizations. In addition, educating parents about warning signs and how to respond to them leads to the early identification of complications and timely intervention. As a result, targeted nursing interventions focused on comprehensive care are not only effective in controlling the complications of nephrotic syndrome but also improve clinical outcomes, reduce the economic burden of the disease, and promote the mental health of the child and family [27].

Conclusion

Nursing interventions play a significant role in improving the control of complications of nephrotic syndrome in children. Educating parents and children about warning signs, adherence to medication regimens, proper nutrition, and regular follow-up are effective measures that can reduce the frequency of disease recurrence, improve nutritional status, prevent infections, and increase the quality of life of affected children. Also, family-centered nursing care and raising awareness among families pave the way for more active participation in the treatment process and increased adherence to medical recommendations. Therefore, strengthening the role of nurses in the treatment team and planning for the implementation of targeted interventions can have a significant impact on the effective management of this chronic disease.

Ethical Considerations

Compliance with ethical guidelines

Written informed consent was obtained from the individuals for the publication of any potentially identifiable data included in this article.

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Authors' contributions

Conceptualization, investigation, resources, supervision, validation, review, and editing: Fereshteh Ghaljaei; Methodology, Data curation, formal analysis, project administration, software, and visualization: Jalal Nourmohammadi; Writing the original draft: Jalal Nourmohammadiand Fereshteh Ghaljaei.

Conflict of interest

The authors declared no conflict of interest.

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