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Original Article

Nursing management of oral rehydration therapy in pediatric patients with gastroenteritis and hypovolemia at a general hospital: A case study

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Abstract

Background: Gastroenteritis is an inflammation of the stomach and small intestine caused by bacterial or viral infection, characterized by symptoms such as defecation more than three times per day. This condition often leads to nursing problems including impaired skin integrity, discomfort or pain, hyperthermia, and, most commonly, fluid volume deficit (hypovolemia). Oral rehydration therapy (ORT) plays an essential role in preventing hypovolemic complications, particularly dehydration ranging from mild to severe. ORT not only restores the balance of sodium and potassium concentrations in the body but also accelerates the recovery process.
Objective: This study aimed to provide nursing care and to evaluate the effectiveness of oral rehydration therapy in children with gastroenteritis and hypovolemia in a general hospital.
Methods: A case study approach was applied to explore nursing care management for pediatric patients with gastroenteritis and hypovolemia receiving oral rehydration therapy. The study compared two pediatric clients aged 1–5 years, admitted in July 2024 with gastroenteritis and hypovolemia. Data were collected through informed consent forms, interviews, observations, physical examinations, pediatric nursing assessment formats, and documentation. The case study was conducted over three consecutive days in a general hospital setting.
Results: After three days of nursing interventions, with the primary diagnosis of hypovolemia related to active fluid loss, the administration of oral rehydration therapy demonstrated effective outcomes. Nursing care interventions— including observation, therapeutic actions, education, and collaboration—led to the resolution of the problem on the third day of care.
Conclusion: This case study highlights the comparison of nursing care in two pediatric clients with gastroenteritis and hypovolemia undergoing oral rehydration therapy, showing that the intervention effectively resolved the problem within three days. Continued parental education was provided as part of the follow-up care.

Background

Gastroenteritis, or diarrhea, is a common health problem among children, characterized by watery stools occurring three or more times per day. This condition is generally caused by bacterial, viral, or parasitic infections transmitted through contaminated food and water. Excessive loss of fluids and electrolytes such as sodium, potassium, bicarbonate, and chloride can lead to dehydration, which, if not managed promptly, may result in serious complications (Galuh, 2023).

Globally, gastroenteritis remains a major cause of morbidity and mortality in children. The World Health Organization (WHO, 2021) reported approximately 1.7 billion cases annually worldwide. It is the second leading cause of illness and death in children, primarily due to dehydration, which can actually be prevented through improved sanitation and timely rehydration therapy. The prevalence is also higher in children than in adults, with a slightly greater incidence among boys compared to girls (NCHS, 2021).

In Indonesia, the burden of gastroenteritis remains significant. Data from the Ministry of Health (2021–2023) recorded 1.3 million cases in 2021, increasing to 1.4 million in 2022, before slightly declining to 1.35 million in 2023. In South Sumatra Province, cases rose from 55,000 in 2021 to 62,000 in 2022, and then declined to 58,000 in 2023 (Dinkes Sumsel, 2023). Hospital-based records show a similar trend. At Siti Fatimah Az-Zahra Regional General Hospital in Palembang, cases increased markedly from 93 in 2021, to 201 in 2022, and sharply rose to 615 in 2023, with the majority of patients presenting with hypovolemia due to mild to moderate dehydration (Medical Record RSUD Siti Fatimah, 2024).

Clinically, patients with gastroenteritis present not only with recurrent diarrhea but also with abdominal pain, nausea, vomiting, fever, loss of appetite, dry lips, reduced urination, weakness, and in severe cases, altered consciousness. These conditions substantially increase the risk of serious complications if not addressed promptly (Putri, 2018). One of the most aggravating factors is dehydration resulting from significant fluid loss.

The primary management to prevent and treat mild to moderate dehydration in gastroenteritis is oral rehydration therapy (ORT). ORT has been proven effective in replacing lost fluids and electrolytes, preventing hypovolemia, restoring electrolyte balance, and improving tissue perfusion (Janna, 2020; Narza, 2022). Furthermore, oral rehydration therapy represents a nursing intervention that requires active involvement of nurses in educating families about proper administration, dosage, and frequency.

Nurses play a crucial role in providing comprehensive nursing care for pediatric gastroenteritis patients, including assessment, nursing diagnosis, intervention, implementation, and evaluation. Education on oral rehydration therapy is an essential component of nursing interventions to prevent further hypovolemic complications in children with gastroenteritis. Based on this rationale, the present study was conducted to analyze the implementation of oral rehydration therapy in nursing care for children with gastroenteritis experiencing hypovolemia.

Methods

Study Design

This study employed a case study design, selected for its ability to provide a comprehensive, in-depth, and holistic description of the health problems experienced by patients. A case study emphasizes the exploration of real-life phenomena in their daily context by intensively observing the patient care process over a defined period. In this study, the case study was applied to describe the implementation of oral rehydration therapy as part of nursing care in children with gastroenteritis and hypovolemia. This approach was considered relevant as it allowed the researcher to understand the clinical condition, physiological responses, and family involvement in supporting successful treatment.

Sampling and Setting

The study involved two pediatric patients with a medical diagnosis of gastroenteritis accompanied by hypovolemia. The respondents were D, aged 1 year, and R, aged 4 years, both admitted to the pediatric ward of Cemara Pavilion, Siti Fatimah Az-Zahra Regional General Hospital, Palembang. Respondents were selected using purposive sampling based on predetermined inclusion and exclusion criteria.

Inclusion criteria were: (1) pediatric patients aged 0–18 years, (2) diagnosed with gastroenteritis, (3) presenting with mild to moderate dehydration (hypovolemia), (4) admitted to Siti Fatimah Az-Zahra Hospital, and (5) family consent to participate in the study. Exclusion criteria were: (1) patients or families refusing to participate, (2) gastroenteritis patients with complications such as hypovolemic shock or renal impairment, (3) patients aged ≥19 years, and (4) patients not treated in the study hospital.

The hospital was selected due to its high incidence of pediatric gastroenteritis and the availability of adequate pediatric care facilities. The study was conducted over three consecutive days, from July 4 to 6, 2024.

Instruments

Several instruments were used for data collection: (1) an interview guide to obtain information from patients' families regarding disease history, fluid intake, and family support; (2) an observation sheet to document patient conditions during the intervention, including diarrhea frequency, vital signs, skin turgor, and level of consciousness; (3) a standardized pediatric nursing physical examination format to assess the degree of dehydration; and (4) patient medical records as secondary data sources for medical diagnoses, laboratory results, and clinical progress notes. The use of multiple instruments aimed to enhance data validity through source triangulation.

Intervention

The primary intervention was oral rehydration therapy (ORT), the standard treatment for mild to moderate dehydration caused by gastroenteritis, as recommended by the WHO

and the Indonesian Ministry of Health. Administration of ORT was adjusted according to the patient's age and condition, following correct dosage, method, and frequency.

In addition to clinical management, the intervention included family education. Nurses provided explanations on how to prepare oral rehydration solution, proper administration techniques, and the importance of adherence to the recommended schedule. Nursing care followed the five steps of the nursing process: assessment, nursing diagnosis, planning, implementation, and evaluation. Continuous evaluation was conducted to assess patient responses, including improvement in vital signs, reduced frequency of diarrhea, and recovery from dehydration signs.

Data Collection

Data were collected using multiple methods: (1) direct observation of patient conditions during care, (2) interviews with family members regarding symptoms, compliance with ORT administration, and perceptions of the intervention, (3) physical examinations by nurses to assess dehydration signs, and (4) review of medical records as supporting data.

Data collection was conducted over three days, beginning at patient admission and continuing until the evaluation stage. All information was systematically documented using observation forms and field notes. The nursing process framework was applied to organize the data, facilitating a comprehensive case analysis.

Data Analysis

Data were analyzed using descriptive qualitative methods based on the Miles and Huberman framework: (1) data collection through observation, interviews, physical examinations, and documentation; (2) data reduction by selecting information relevant to the research focus; (3) data display in narrative case descriptions illustrating patient conditions, interventions, and responses to oral rehydration therapy; and (4) conclusion drawing based on the analyzed findings. This analysis provided an in-depth understanding of the effectiveness of oral rehydration therapy in the context of pediatric nursing care for gastroenteritis with hypovolemia.

Ethical Consideration

Ethical principles in nursing research were strictly observed. The principle of autonomy was upheld by respecting patients' and families' rights to decide participation through informed consent. Beneficence and non-maleficence were ensured by providing safe, evidence-based interventions beneficial to patients' conditions. Justice was applied by delivering equal care without discrimination. Veracity (truthfulness) and fidelity (keeping commitments) were maintained in communication with patients' families. Confidentiality was guaranteed by protecting respondent identity and using only initials in reports. Thus, the study complied with ethical standards required for case studies in health research.

Results

This study was conducted on two pediatric patients diagnosed with gastroenteritis accompanied by hypovolemia, admitted to the pediatric inpatient ward of Cemara Pavilion, Siti Fatimah Az-Zahra Regional General Hospital, Palembang, from July 4–6, 2024. The subjects were D, aged 1 year, and R, aged 4 years, both of whom received inpatient care for three days.

Nursing Assessment

In the first patient (D), the mother (Mrs. L) reported vomiting 4–6 times per day for two days prior to hospital admission, accompanied by watery stools 8–10 times per day. Objectively, the patient was conscious (compos mentis) with vital signs: temperature 36.7°C, pulse 135 beats/min, respiratory rate 26 breaths/min, and SpO_2 100%. The patient appeared irritable, with dry and cracked lips, delayed skin turgor (>2 seconds), yellow watery stools without mucus, generalized weakness but without weight loss. Fluid balance records showed intake of approximately 1,100 cc in 24 hours, with output (urine, vomiting, diarrhea) reaching 1,300 cc, resulting in a negative fluid balance of –200 cc/day.

In the second patient (R), the mother (Mrs. S) reported that the child had consumed chocolate and milk two days before admission, followed by fever at night, then vomiting 3–5 times and watery stools 6–10 times per day. Objectively, the patient appeared lethargic with sunken

eyes, dry and cracked lips, and a weight loss of about 3 kg. The general condition was compos mentis, with vital signs: temperature 38.9°C, pulse 120 beats/min, respiratory rate 22 breaths/min, and SpO_2 100%. Skin turgor was markedly delayed (>4 seconds), stools were yellow and watery with mucus, and the body appeared thin. Fluid balance showed intake of 1,200 cc with an output of 1,500 cc, resulting in a negative fluid balance of –300 cc/day.

Nursing Diagnosis

Based on the assessments, the nursing diagnosis established for both patients was hypovolemia related to fluid and electrolyte loss due to gastroenteritis. This diagnosis was supported by findings of vomiting, recurrent diarrhea, dehydration signs (delayed skin turgor, dry mucous membranes, weight loss), and fluid imbalance.

Nursing Interventions

The planned interventions included: (1) identifying causes and dietary history, (2) monitoring signs and symptoms of hypovolemia, (3) monitoring stool frequency and consistency, (4) monitoring fluid intake and output, (5) providing perianal skin care, (6) administering oral rehydration solution (ORS), (7) educating families on gastroenteritis, hypovolemia, and ORS administration, and (8) recommending small, gradual meals.

Nursing Implementation

In patient D, stool frequency decreased from 8–10 times/day to 4 times on the second day and 2 times on the third day after ORS administration. In patient R, stool frequency decreased from 6–10 times/day to 5 times on the second day and 3 times on the third day. Both patients showed improvement in general condition, and their families were able to administer ORS independently according to the instructions provided.

Nursing Evaluation

After three days of interventions, both patients showed clinical improvement. Patient D demonstrated increased fluid intake, improved skin turgor, weight gain of 1 kg, normalized stools, and appeared cheerful. Patient R showed reduced diarrhea frequency, improved skin turgor, weight gain of 0.5 kg, and reduced signs of dehydration. Thus, the nursing diagnosis of hypovolemia was considered resolved in both cases.

Discussion

The findings of this study demonstrate that the administration of oral rehydration therapy (ORT) in children with gastroenteritis effectively reduced the frequency of diarrhea, improved skin turgor, increased fluid intake, and restored fluid balance. In both patients, symptoms of hypovolemia—including recurrent diarrhea, vomiting, weight loss, and signs of dehydration—gradually improved following three days of intervention. These results highlight the critical role of ORT in preventing further complications associated with fluid loss in pediatric patients.

This finding is consistent with the World Health Organization (WHO, 2021) guidelines, which emphasize oral rehydration therapy as the first-line management for mild to moderate dehydration caused by diarrhea. ORT is considered safer, more affordable, and more effective than intravenous fluids in cases without complications. The outcomes observed in patients D and R were aligned with WHO indicators, including improved consciousness, decreased stool frequency, and normalization of vital signs.

This study also supports previous evidence. Janna (2020) reported that ORT reduced stool frequency and improved hydration status in children within 48–72 hours. Similarly, Narza (2022) highlighted that ORT not only replaces fluids but also restores electrolyte balance, accelerating recovery. These studies reinforce the findings of this case study, where ORT successfully reduced diarrhea frequency in both patients within three days of care.

The role of nurses in this study extended beyond fluid administration to include education, monitoring, and family engagement. According to Potter and Perry (2015), nursing diagnoses are established based on subjective and objective data collected directly from patients.

In this study, nurses performed comprehensive assessments, identified hypovolemia as the primary diagnosis, developed appropriate interventions, and conducted continuous evaluations. The success of the intervention was strongly influenced by consistent monitoring of fluid intake, output, and clinical status (Meiranti et al., 2025).

The results also emphasize the importance of family involvement in the successful administration of ORT. Families played a key role in ensuring adherence to the prescribed dosage and frequency. Education provided by nurses on the preparation and administration of ORT improved family knowledge and skills, which enhanced adherence. Thus, family involvement emerged as an essential aspect of continuity of care, both during hospitalization and after discharge (Ferdinand et al., 2025).

Although intravenous fluids are frequently used in severe dehydration, the present findings show that ORT alone is sufficient for mild to moderate dehydration. This aligns with the recommendations of the Indonesian Ministry of Health (2021), which places ORT as the first-line therapy for pediatric diarrhea. The advantages of ORT include ease of administration, low cost, and its proven effectiveness in reducing hospitalizations and mortality in children under five years old. With significant clinical improvement achieved in a short period, this study further confirms the effectiveness of ORT as the primary intervention (Ramayani & Amelia, 2025).

Clinically, this study provides important implications for nursing practice. ORT should be implemented as a standard component of nursing care for pediatric gastroenteritis in healthcare facilities. Nurses bear responsibility not only for the technical aspects of therapy but also for ensuring family adherence to treatment. Nursing care delivered through a systematic process—assessment, diagnosis, intervention, and evaluation—proved effective in improving patient outcomes in this case study.

Conclusion and Recommendation

This case study of two pediatric patients with gastroenteritis and hypovolemia demonstrated that oral rehydration therapy (ORT) is effective in restoring fluid balance, reducing the frequency of diarrhea, and improving clinical signs of dehydration. Nursing interventions—including assessment, diagnosis, administration of ORT, family education, and evaluation—were proven to successfully resolve hypovolemia within three days. The success of the intervention was strongly influenced by the active involvement of nurses in patient monitoring and the provision of appropriate education to families. Therefore, ORT can be considered a primary nursing intervention for children with gastroenteritis presenting with mild to moderate dehydration.

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Declaration of conflict of interest

The authors declare no competing interests.

Declaration on the Use of AI

No AI tools were used in the preparation of this manuscript.

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