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A Study on the Efficacy of Targeted Nursing in CRRT Treatment for Renal Disease Patients

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Abstract: *Objective:* To evaluate the efficacy of targeted nursing care in renal patients undergoing continuous renal replacement therapy (CRRT). *Methods:* Sixty renal patients admitted to our hospital between February 2022 and June 2025, all undergoing CRRT, were randomly assigned using a random number table to either a conventional care group or a targeted care group, comprising 30 patients each. The conventional group received standard care, while the targeted group received tailored nursing interventions. The efficacy of care was compared between groups. *Results:* The targeted group exhibited fewer complications, lower pain scores post-intervention, and higher treatment compliance compared to the conventional group ($p < 0.05$). *Conclusion:* Implementing tailored nursing care for renal patients undergoing CRRT reduces complications, alleviates pain, and enhances treatment compliance, warranting its adoption.
Keywords: Targeted nursing; CRRT therapy; Nephropathy; Application efficacy

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1. Introduction

Nephropathy encompasses multiple types, with common forms including glomerular diseases such as acute glomerulonephritis, chronic glomerulonephritis, and nephrotic syndrome. These conditions primarily impair glomerular filtration function. Different nephropathies vary in etiology, clinical presentation, and treatment approaches. Continuous renal replacement therapy (CRRT) represents a significant contemporary approach to managing renal disease. It enables the sustained, gradual removal of excess fluid and metabolic waste from the body, particularly excelling in eliminating inflammatory mediators. This therapy regulates water, electrolyte, and acid-base balance, thereby mitigating systemic inflammatory responses and affording time for organ function recovery [1]. However, CRRT treatment is complex. It requires establishing vascular access, involves prolonged treatment duration, and, given patients' severe condition and poor physical state, is prone to complications such as infection, hypotension, and catheter occlusion. These complications can disrupt treatment progress, potentially worsen the condition, prolong hospital stays, and increase treatment costs. Concurrently, the complex and painful treatment process frequently induces fear, anxiety, and other negative emotions in patients. This can erode confidence in the therapy, leading to poor compliance and diminished treatment efficacy. Conventional nursing, adhering to fixed protocols with limited attention to individual patient differences, struggles to

meet the needs of such patients [2]. Consequently, identifying more effective nursing models to reduce CRRT-related complications, enhance patient compliance, and alleviate suffering represents a critical challenge for contemporary clinical nursing. Targeted nursing tailors individualized plans based on patients' specific conditions, treatment characteristics, and personal needs, delivering more appropriate and comprehensive care across multiple dimensions. This study therefore investigates the efficacy of targeted nursing in renal patients undergoing CRRT treatment.

2. Data and methods

2.1. General data

Sixty patients with renal disease admitted to our hospital between February 2022 and June 2025, all undergoing CRRT treatment, were randomly assigned using a random number table to either the conventional group or the targeted group, comprising 30 patients each. The conventional group included 18 males and 12 females; ages ranged from 32 to 65 years, with a mean age of (45.62 ± 5.31) years. The targeted group comprised 17 males and 13 females; with ages ranging from 33 to 64 years, mean (46.15 ± 4.98) years. General characteristics were comparable between groups ($p > 0.05$).

2.1.1. Inclusion criteria

(1) Meeting renal disease diagnostic criteria;
(2) Undergoing CRRT;
(3) Informed consent from patient and family.

2.1.2. Exclusion criteria

(1) Severe hepatic dysfunction;
(2) Psychiatric disorders;
(3) Intolerance to treatment.

2.2. Methodology

The conventional group received standard nursing care, specifically: nursing staff measured patients' vital signs, including temperature, pulse, respiration, and blood pressure, every two hours, recording details meticulously in nursing logs; they closely monitored changes in consciousness, skin color, and urine output, immediately notifying doctors of any abnormalities and assisting with management. Prior to CRRT treatment, conduct a comprehensive inspection of all relevant equipment, including the hemofiltration machine's functionality, the integrity of tubing, and the readiness of replacement fluids and anticoagulants, to ensure operational readiness. During treatment, periodically check tubing connections for tightness and monitor for blood leakage or fluid seepage to guarantee uninterrupted therapy. Provide patients with basic dietary guidance, explaining that they must abstain from food and drink during treatment. Once their condition stabilizes, gradually reintroduce a light, easily digestible diet. Simultaneously, offer reassurance by explaining the fundamental treatment process and precautions, such as avoiding excessive movement to prevent catheter dislodgement.

For patients undergoing CRRT, targeted nursing care is provided in addition to routine care, specifically:

(1) Condition monitoring and complication prevention

A dedicated, experienced nurse is assigned to monitor vital signs, recording the patient's temperature, blood pressure, heart rate, respiration, and oxygen saturation every 30 minutes. Simultaneously, all CRRT treatment parameters, such as blood flow rate, transmembrane pressure, and ultrafiltration volume, are closely observed. Any abnormal readings must be immediately investigated and addressed. For CRRT lines, hourly checks were conducted to verify patency, assess for bleeding or swelling at puncture sites, and inspect for kinking, compression, or clotting. Bleeding sites require prompt dressing changes with pressure applied to arrest hemorrhage. Should clotting tendencies arise, anticoagulant doses are adjusted per medical orders. To prevent

infection, strict aseptic technique must be maintained. The puncture site should be disinfected twice daily with povidone-iodine, with sterile dressings changed to ensure cleanliness and dryness. Thorough handwashing must be performed before and after patient contact, and sterile gloves worn during procedures. The treatment environment should be regularly disinfected and kept well-ventilated. To prevent hypotension, assess the patient's blood volume prior to treatment and replenish as medically indicated. During treatment, gradually adjust blood flow rate and ultrafiltration rate to avoid excessive blood volume depletion. Should blood pressure decrease, immediately reduce ultrafiltration rate and administer vasoactive medications as prescribed, closely monitoring blood pressure fluctuations.

(2) Pain management

Upon admission and before/after CRRT sessions, assess pain intensity using the Visual Analogue Scale (VAS). Tailor interventions based on scores: For pain scores ≤ 3, position the patient comfortably (e.g., semi-recumbent or lateral decubitus) to reduce abdominal tension and alleviate discomfort. Distract the patient with preferred soothing music, comedy sketches, or storytelling to divert attention from pain. - Instruct the patient to practice slow breathing (inhale for 4 seconds, exhale for 6 seconds) to promote relaxation and pain relief. Instruct patients to practice slow, deep breathing: inhale for 4 seconds, exhale for 6 seconds, repeating to aid bodily relaxation and pain relief. For scores 3–7, supplement the above measures with non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen as medically prescribed, monitoring for pain relief and adverse reactions. Patients scoring 7 or above should be promptly referred to the doctor. Administer opioid analgesics such as morphine as prescribed, closely monitoring respiration, consciousness, and other vital signs to prevent adverse drug reactions.

(3) Psychological care

Nursing staff should proactively engage with patients and their families upon admission to understand the patient's personality, family background, knowledge of their condition, and psychological state. Allocate at least 30 minutes daily for private conversations, patiently listening to concerns, fears, and requests while offering full understanding and reassurance. Explain the causes of kidney disease, the rationale, process, potential outcomes, and possible adverse effects of CRRT treatment in simple, accessible terms. Highlight the hospital's medical expertise and share examples of successful recoveries to bolster the patient's confidence in treatment. Encourage family members to provide frequent companionship and emotional support, fostering a sense of familial warmth. For patients experiencing significant emotional fluctuations, employ psychological guidance techniques such as cognitive behavioral therapy to correct misconceptions and guide them towards a positive outlook on their condition and treatment.

(4) Nutritional support

During CRRT treatment, collaborate with dietitians to develop personalized nutritional plans based on the patient's clinical condition, body weight, and nutritional status. In the initial treatment phase, when patients are severely ill and have poor digestion, administer short-chain peptide enteral nutrition via nasogastric tube. Begin with 500 mL/day, gradually increasing to 1000–1500 mL/day based on tolerance, maintaining an infusion rate of 20–30 mL/hour to prevent abdominal distension or diarrhea. Once the patient's condition stabilizes and gastrointestinal function improves, gradually transition to liquid diets such as rice water, vegetable broth, and fruit juice, progressing to semi-liquid options like congee, soft noodles, and egg custard. Ensure the diet provides adequate calories, protein, vitamins, and minerals. Avoid spicy, greasy, raw, cold foods, and those that stimulate increased pancreatic secretion, such as meat broth, chicken soup, and fried foods. Regularly monitor nutritional indicators like serum albumin and hemoglobin levels, adjusting the nutritional plan accordingly.

2.3. Observation indicators

Compare the incidence of complications (infection, hypotension, catheter occlusion) between the two groups; Compare pain scores before and after nursing intervention in both groups (using VAS scores, 0–10, where higher scores indicate

greater pain); Compare treatment adherence between the two groups.

2.4. Statistical methods

Data were analyzed using SPSS 24.0. Continuous data were assessed using t-tests; categorical data were evaluated using χ^2 tests. A p-value < 0.05 indicated a significant difference.

3. Results

3.1. Comparison of complication incidence between the two groups

The incidence of group-specific complications was lower than that in the conventional group ($p < 0.05$), as shown in **Table 1**.

Table 1. Comparison of complication incidence between the two groups

Group	Infection	Hypotension	Pipeline blockage	Occur frequently
Standard group	4 (13.33)	3 (10.00)	3 (10.00)	10 (33.33)
Targeted at the group	1 (3.33)	0 (0.00)	0 (0.00)	1 (3.33)
χ^2				9.017
p				0.003

3.2. Comparison of pain scores before and after treatment between the two groups

Following nursing intervention, the pain scores in the targeted group were lower than those in the conventional group ($p < 0.05$), as shown in **Table 2**.

Table 2. Comparison of pain scores before and after nursing interventions in two groups ($\bar{x} \pm s$, points)

Group	Before nursing	After care
Standard group	7.52 ± 1.36	4.25 ± 1.08
Targeted at the group	7.48 ± 1.29	2.13 ± 0.85
t	0.117	8.449
p	0.907	0.000

3.3. Comparison of treatment adherence between the two groups

The group receiving combination therapy demonstrated higher treatment adherence than the conventional group ($p < 0.05$), as shown in **Table 3**.

Table 3. Comparison of treatment adherence between the two groups

Group	Full compliance	Partial compliance	Non-compliance	Compliance rate
Standard group	12 (40.00)	10 (33.33)	8 (26.67)	22 (73.33)
Targeted at the group	20 (66.67)	9 (30.00)	1 (3.33)	29 (96.67)
χ^2				4.706
p				0.030

4. Discussion

The pathophysiological process of kidney disease encompasses multiple aspects, including systemic inflammatory responses and oxidative stress, which can cause varying degrees of damage to multiple organ systems in patients. Continuous renal replacement therapy (CRRT) serves as a vital supportive modality, aiding patients in improving their condition and restoring organ function by continuously removing inflammatory mediators and stabilizing the internal environment. However, the risks and challenges patients face during treatment should not be underestimated. Such patients often present with compromised physical condition and impaired immune function, potentially encountering issues like coagulation abnormalities and hemodynamic instability during treatment. Prolonged CRRT may further induce electrolyte imbalances and heightened infection risks. These necessitate close monitoring and prompt intervention by healthcare professionals to ensure therapeutic efficacy and patient safety. Nursing care plays a critical role in CRRT, directly influencing treatment progression and patient recovery. Conventional nursing care lacks specificity, addressing only basic patient needs without effectively preventing or managing complex situations arising during CRRT. Targeted nursing, however, tailors' interventions to the patient's actual condition, disease characteristics, treatment requirements, and individual differences, offering distinct advantages in multiple aspects. In this study, the targeted group exhibited significantly fewer complications than the conventional group, demonstrating the efficacy of targeted nursing in preventing complications. Within targeted nursing, healthcare professionals conduct more frequent and thorough monitoring of clinical conditions. This enables earlier and more accurate detection of abnormalities in vital signs and treatment parameters, facilitating timely intervention. For instance: - Close observation of CRRT lines and prompt management prevented occlusions; - Rigorous aseptic techniques and meticulous care of puncture sites substantially reduced infection risks; - Rigorous blood pressure monitoring and judicious fluid volume adjustments successfully prevented hypotension [3]. Collectively, these measures form a comprehensive complication prevention system, effectively ensuring patient treatment safety.

Regarding pain management, pain scores in the targeted care group were significantly lower than in the conventional group, attributable to the diverse pain intervention strategies employed. Pain is a common symptom in renal patients, causing physical distress while also impairing immune function and treatment tolerance via neuroendocrine pathways [4,5]. Targeted nursing employs a stepwise pain management protocol tailored to the patient's pain level, ranging from non-pharmacological therapies such as positional adjustments, music therapy, and breathing exercises to pharmacological interventions involving appropriate analgesic use [6]. This personalized approach not only effectively alleviates pain but also reduces analgesic dosage and adverse reactions, enhancing patient comfort and quality of life. Treatment adherence significantly impacts therapeutic outcomes, with higher compliance observed in the targeted care group compared to the conventional group. This advantage stems from the comprehensive psychological support and nutritional assistance embedded within targeted nursing. Renal patients, confronting severe illness and complex treatments, are prone to negative emotions that may compromise treatment cooperation. Through proactive communication, nursing staff within targeted care identify patients' psychological needs, providing timely counselling and support to build confidence and alleviate treatment-related fears and resistance [7,8].

Concurrently, personalized nutritional support not only met patients' nutritional requirements and facilitated recovery but also conveyed a sense of care and consideration, further enhancing adherence. Moreover, this targeted approach embodied a patient-centered philosophy. By delivering more attentive and considerate services, it fostered greater trust and reliance in nursing staff, thereby strengthening the nurse-patient relationship. A positive nurse-patient relationship not only improves patient adherence but also facilitates smoother nursing practice, creating a virtuous cycle [9,10].

Overall, targeted nursing care proves highly effective for renal patients undergoing continuous renal replacement therapy (CRRT), reducing complications, alleviating pain, and enhancing treatment adherence. This approach significantly improves patient prognosis and facilitates recovery. Consequently, this nursing model warrants further implementation in clinical practice to better serve the treatment and rehabilitation of renal patients.

Disclosure statement

The author declares no conflict of interest.

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