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The Impact of Bundled Nursing Interventions Based on Empowerment Theory on Patients with Indwelling Urinary Catheters

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Abstract: *Objective:* To explore the value of bundled nursing interventions based on empowerment theory in the care of patients with indwelling urinary catheters. *Methods:* Forty-two patients with indwelling urinary catheters, admitted from June 2022 to June 2023, were sampled and randomly divided using a random number table. Group A received bundled nursing care based on empowerment theory, while Group B received standard care. The differences in catheterization duration, unplanned extubation rate, emotional scores, quality of life scores, and adverse events were compared. *Results:* Group A had a shorter catheterization duration and a lower rate of unplanned extubation than Group B, with $P < 0.05$. Anxiety (SAS) and depression (SDS) scores were lower in Group A than in Group B, with $P < 0.05$, and the quality of life (SF-36) scores were higher in Group A than in Group B, with $P < 0.05$. The adverse event rate for Group A was also lower than that for Group B, with $P < 0.05$. *Conclusion:* Patients with indwelling urinary catheters who received bundled nursing care based on empowerment theory experienced improved emotional stability, optimized quality of life, fewer unplanned extubation events, and the intervention was highly effective and feasible.

Keywords: Indwelling urinary catheter patients; Bundled nursing; Empowerment theory; Impact

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1. Introduction

Urinary tract infections are common complications among hospitalized patients, potentially prolonging recovery times, increasing medical costs, and even impacting treatment effectiveness. Additionally, prolonged catheterization can heighten physical and mental stress, adversely affecting patients' adherence to treatment. Therefore, it is necessary to implement nursing interventions for patients with indwelling catheters to reduce related adverse events. Conventional nursing, which primarily relies on passive service, cannot adequately meet the needs of modern patients with indwelling catheters [1]. Bundled nursing integrates contemporary nursing practices with evidence-based medicine, combining a series of nursing measures to provide scientifically sound

and targeted services for indwelling catheter care. Nursing adjustments based on empowerment theory can improve the operability of bundled care and reduce clinical nursing adverse events [2]. This study examines the value of applying bundled nursing interventions based on empowerment theory in 42 patients with indwelling urinary catheters treated from June 2022 to June 2023.

2. Materials and methods

2.1. General information

A total of 42 patients with indwelling urinary catheters, admitted from June 2022 to June 2023, were sampled and randomly divided using a random number table. Group A consisted of 12 males and 9 females, aged 35 to 77 years, with an average age of 54.19 ± 2.44 years. Group B included 13 males and 8 females, aged 34 to 78 years, with an average age of 54.21 ± 2.46 years. There was no statistically significant difference between Groups A and B in patient demographics ($P > 0.05$).

Inclusion criteria: (1) Patients indicated for indwelling urinary catheterization; (2) Informed consent provided; (3) Stable vital signs including heart rate, respiratory rate, pulse, and temperature.

Exclusion criteria: (1) Critically ill patients with a life expectancy of less than three months; (2) Patients with psychiatric disorders; (3) Patients with poor reading and comprehension abilities.

2.2. Methods

2.2.1. Group A: bundled nursing based on empowerment theory

(1) Establishing a bundled care team: The head nurse acted as team leader, with experienced nurses in catheter care as team members. Weekly training sessions were conducted, covering nursing theory and practical skills for various diseases. The team leader reviewed unique nursing cases, facilitating group discussions and analysis of nursing strategies. Based on the actual situation of the department, assessment strategies were improved, with rewards for high-quality service and penalties for poor service quality.

(2) Cognitive intervention: A comprehensive educational manual was prepared, detailing knowledge about disease triggers, symptoms, and precautions, and highlighting cases of successful recovery with long-term indwelling catheters to boost patient confidence. Hospitalized patients with catheters were invited to join a WeChat group where the responsible nurse shared catheter care knowledge through text, video, and images for easy reference. Patients' families were encouraged to attend expert lectures to improve their understanding of catheter care.

(3) Emotional intervention: Indwelling urinary catheters can reduce quality of life, increase anxiety and depression, and sometimes cause a loss of hope. Nurses were trained to identify and address the triggers of emotional fluctuations and to provide timely guidance to alleviate patients' negative emotions. Nurses also encouraged patients to express their thoughts and answered their questions patiently to boost their recovery confidence.

(4) Dietary intervention: Different patients have different primary diseases, so dietary adjustments were made according to their physiological state to ensure a balanced intake of nutrients. Patients were advised to avoid cold and fried foods.

(5) Exercise intervention: Exercise plans were tailored according to each patient's recovery status. If a

patient could not get out of bed, family members were instructed to massage the patient's limbs and help them turn over. For patients able to move independently, they were encouraged to engage in regular physical activity.

(6) Catheter care interventions:

(a) Pre-catheterization: Patient history was reviewed, including any previous urinary tract injury or infection history. Patients were guided to complete laboratory tests to assess the risk factors for urinary tract infections, and evaluations were conducted on their mobility and emotional stability, as well as the risk of unplanned extubation. Specific care measures were developed for patients with high-risk factors.

(b) During catheterization: The procedure was conducted under sterile protocol, with precautions taken to prevent contamination of the urethral meatus. The urethral and surrounding skin were disinfected with 0.5% povidone-iodine; the catheterization depth was 4.6 cm for female patients and 20–22 cm for male patients. Nurses were instructed to operate gently to avoid damaging the urethral mucosa. Once catheterized, 10–15 mL of normal saline was slowly injected into the catheter balloon. If contamination occurred during the procedure, the catheter was immediately replaced to prevent reuse of contaminated catheters.

(c) Post-catheterization: The frequency of rounds was increased, the catheter was secured to prevent kinking or bending, and the urine bag was placed above the patient's bladder to prevent backflow and reverse infection. The drainage bag's integrity and seal were monitored; the bag was clamped during patient activity to prevent backflow. Urine samples were collected for microbial pathogenic examination, and abnormalities were addressed immediately. The urethral meatus and adjacent skin were washed with 0.5% povidone-iodine to maintain cleanliness. For patients with fecal incontinence, additional local disinfection was conducted. Catheters were removed when removal criteria were met.

2.2.2. Group B: standard care

Hand hygiene was maintained according to aseptic principles, and the area was cleansed and disinfected before slowly inserting the catheter. After catheter insertion, patients were instructed to use warm water to clean the perineum to keep the area dry and clean.

2.3. Statistical analysis

Data were processed using SPSS 21.0. Count data were recorded as percentages and analyzed using the χ^2 test, while measurement data were recorded as mean ± standard deviation (SD) and analyzed with the *t*-test. Statistical significance was set at $P < 0.05$.

3. Results

3.1. Urinary catheter retention time and unplanned extubation rates

The urinary catheter retention time in Group A was shorter than that in Group B, and the unplanned extubation rate in Group A was lower than in Group B ($P < 0.05$), as shown in **Table 1**.

Table 1. Analysis of urinary catheter retention time and unplanned extubation rate

Group	Catheter retention time (days)	Unplanned extubation rate [*n* (%)]
Group A (*n* = 21)	4.01 ± 1.06	0 (0.00)
Group B (*n* = 21)	6.58 ± 1.42	4 (19.05)
χ^2 / *t*	6.6463	4.4211
P	0.0000	0.0355

3.2. Emotional scores

After the nursing intervention, patients in Group A had lower Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS) scores than those in Group B ($P < 0.05$). There was no significant difference in SAS and SDS scores between the two groups before nursing intervention ($P > 0.05$), as shown in **Table 2**.

Table 2. Comparison of emotional scores in patients with indwelling catheters before and after intervention (mean ± SD, points)

Group	SAS		SDS	
	Before	After	Before	After
Group A (*n* = 21)	54.19 ± 2.33	36.15 ± 1.06	55.26 ± 2.87	35.44 ± 1.55
Group B (*n* = 21)	54.21 ± 2.36	43.44 ± 1.42	55.29 ± 2.89	42.19 ± 1.48
t	0.0276	18.8526	0.0338	16.5037
P	0.9781	0.0000	0.9732	0.0000

3.3. Quality-of-life scores

After the nursing intervention, the SF-36 scores of patients in Group A were higher than those in Group B ($P < 0.05$). Before the nursing intervention, there was no difference in SF-36 scores between the two groups ($P > 0.05$), as shown in **Table 3**.

Table 3. Comparison of quality-of-life scores in patients with indwelling catheters before and after intervention (mean ± SD, points)

Group	Physical health		Mental health		Physical function		Mental function	
	Before	After	Before	After	Before	After	Before	After
Group A (*n* = 21)	64.19 ± 2.41	84.36 ± 3.68	65.18 ± 2.37	84.47 ± 3.72	64.74 ± 2.36	85.49 ± 3.68	65.72 ± 2.37	86.14 ± 3.71
Group B (*n* = 21)	64.22 ± 2.38	75.11 ± 3.11	65.21 ± 2.39	75.36 ± 3.06	64.72 ± 2.39	76.15 ± 3.11	65.69 ± 2.39	75.44 ± 3.06
t	0.0406	8.7978	0.0408	8.669	0.0273	8.8834	0.0408	10.1959
P	0.9678	0.0000	0.9676	0.000	0.9784	0.0000	0.9676	0.0000

3.4. Adverse events

The adverse event rate in Group A was lower than that in Group B ($P < 0.05$), as shown in **Table 4**.

Table 4. Comparison of adverse events in patients with indwelling catheters [*n* (%)]

Group	Catheter deformation	Catheter blockage	Leakage	Incidence rate
Group A (*n* = 21)	0 (0.00)	0 (0.00)	1 (4.76)	1 (4.76)
Group B (*n* = 21)	2 (9.52)	1 (4.76)	3 (14.29)	6 (28.57)
χ^2				5.2323
P				< 0.05

4. Discussion

Some hospitalized patients, due to the impact of their illness, are unable to urinate normally and require an indwelling catheter to assist with urination. However, long-term catheterization carries a risk of urinary tract infection, which can exacerbate patient discomfort and may even affect the treatment outcomes of the primary disease, prolonging hospital stays [3]. Additionally, older patients with indwelling catheters are prone to incidents such as leakage and unplanned catheter removal due to various adverse effects. Therefore, it is essential to emphasize nursing interventions for patients with indwelling catheters to reduce physiological and psychological stress responses, improve patient comfort, and promote disease recovery [4]. Conventional care practices primarily focus on sterile techniques and lack comprehensive and standardized care measures tailored to meet patients' actual needs, which can lead to a high incidence of catheter-related adverse events and insufficient overall nursing quality [5]. The bundled care model, as a modern nursing strategy, adjusts the care plan based on specific patient issues and consists of a series of evidence-based measures that meet clinical nursing requirements and can improve patient prognosis. In this study, the bundled care approach was integrated with an empowerment education concept to provide multi-dimensional services covering cognition, emotion, diet, exercise, and catheter care, demonstrating comprehensive and scientific characteristics that can enhance nursing skills and improve care quality [6,7].

Data analysis from this study shows that Group A had a shorter catheter retention time and a lower rate of unplanned extubations compared to Group B ($P < 0.05$). This can be attributed to the empowerment-based bundled care model, where a specialized care team led by a head nurse conducted regular training and assessments, enhancing the overall service quality of the nursing department. Regular case discussions and analysis of intervention strategies for unexpected incidents reduced the rate of unplanned extubations and shortened catheter retention time [8,9]. Another set of data indicated that Group A had lower SAS and SDS scores and higher SF-36 scores than Group B ($P < 0.05$). This can be explained by the model's emphasis on patient education, delivered through educational booklets, WeChat support groups for catheterized patients, and expert-led lectures, which enhanced patients' understanding and confidence in recovery. The model also delved into the causes of patients' emotional fluctuations, addressed concerns about catheterization, alleviated anxiety, guided patients on healthy diets and scientific exercise, and provided nutritional support, thereby improving patients' physical condition and quality of life [10].

Lastly, data showed that Group A had a lower rate of catheter-related adverse events than Group B ($P < 0.05$). The empowerment-based bundled care model emphasizes catheter care, with a thorough assessment of risk factors for different patients before catheterization and tailored adjustments to care strategies, which can meet the specific nursing needs of catheterized patients. Strict aseptic procedures during catheter insertion,

proactive prevention of contamination, and reverse infection events ensure patient safety. Post-catheterization, attention to catheter fixation, and drainage bag integrity can reduce adverse events such as leakage [3]. For patients with fecal incontinence, appropriate disinfection is performed, and for those meeting removal criteria, the catheter is removed to further reduce infection incidents, thus enhancing patient comfort.

5. Conclusion

In conclusion, the application of empowerment-based bundled care for patients with indwelling catheters can reduce unplanned extubation rates, shorten catheter retention time, stabilize patients' emotions, improve quality of life, and reduce catheter-related adverse events, demonstrating value for broader implementation.

Disclosure statement

The author declares no conflict of interest.

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