

Analysis of the Nursing Effect of Hierarchical Extended Nursing Based on The Guidance of Orem's Theory in Patients with PICC Catheterization

Haixia Zhu*, Shuqiao Chen, Hui Chi

Yancheng No. 1 People's Hospital, Yancheng 224000, Jiangsu Province, China

*Corresponding author: Haixia Zhu, zhuhaixia8288@sina.com

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Abstract: *Objective:* To analyze the nursing effect of hierarchical extended nursing based on the guidance of Orem's theory in patients with peripherally inserted central (PICC) catheterization. *Methods:* Ninety-one patients with PICC catheterization admitted to the hospital from May 2021 to May 2023 were selected and divided into a control group and an observation group, with 45 and 46 cases, respectively. The control group received routine nursing care, while the observation group received routine nursing care combined with hierarchical extended nursing based on the guidance of Orem's theory for 3 months. Relevant indicators between the two groups were compared. *Results:* The improvement degree of various indicators in the observation group after nursing was better than that of the control group ($P < 0.05$). *Conclusion:* Graded extended nursing based on the guidance of Orem's theory improved the knowledge, belief, behavior, and self-efficacy of patients with PICC catheterization, and relieved their anxiety, depression, and other negative emotions. The nursing effect was deemed to be significant.

Keywords: Intravenous catheter; Orem theory; Graded extended care; Self-efficacy

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1. Introduction

Chemotherapy is a common procedure to treat malignant tumors and can effectively control the progression of the disease. However, due to the relatively high toxicity of chemotherapy drugs, traditional administration methods can produce varying degrees of stimulating effects on the patient's blood vessels, causing a risk of drug extravasation. Peripherally inserted central catheter (PICC) is a catheter-assisted arm venipuncture that avoids the direct contact of chemotherapy drugs with the veins and reduces irritation to peripheral blood vessels^[1]. However, because PICC catheterization often requires patients to keep the catheter in place, effective clinical nursing measures should be provided during treatment^[2]. The hierarchical extended nursing based on the guidance of Orem's theory can integrate the patient's condition, external resources, and other information

to meet their needs and improve the nursing outcomes. This study explores the nursing effect of hierarchical extended nursing based on the guidance of Orem's theory in patients with PICC catheterization to provide insights into nursing care.

2. Materials and methods

2.1. Basic information

This study was approved by the hospital's Medical Ethics Committee. All research subjects and their families voluntarily consented to participate. This study included 91 patients with PICC catheterization admitted to the hospital from May 2021 to May 2023 who were randomly divided into the control group and the observation group, at 45 and 46 examples, respectively. The control group consisted of 25 males and 20 females aged 35–70 years old, with an average age of 46.38 ± 3.04 years. There was 1 case of puncture site at the right basilic vein, 18 cases at the left basilic vein, and 8 cases at the right brachial vein. The observation group consisted of 27 males and 19 females aged 36–70 years old, with an average age of 46.41 ± 3.06 years. There were 17 cases of puncture sites at the right basilic vein, 21 cases at the left basilic vein, and 8 cases at the right brachial vein. Data between the two groups were comparable ($P > 0.05$).

Inclusion criteria: (1) Patients diagnosed with malignant tumors and receiving PICC catheter chemotherapy; (2) those who have yet to receive similar treatment before admission; (3) 20 years old and above. Exclusion criteria: (1) Patients with a history of PICC catheter treatment; (2) abnormal mental status; (3) those with two or more types of malignant tumors.

2.2. Method

The control group received routine nursing intervention. After admission, patients received routine health education, where relevant manuals were issued to inform them on how to prevent and handle PICC complications, and the patient's condition was closely observed.

The observation group received hierarchical extended care based on the guidance of Orem's theory. The patient's condition and PICC catheter-related knowledge were explained by the nurse to the patients and their families in detail and a hierarchical management was conducted according to the patient's risk of complications. Patients were regularly educated and relevant videos on PICC insertion precautions were recorded, which were then played on a loop in the ward. On-site demonstrations were conducted by relevant medical staff in the ward to enable them to master essential home care skills. Patients were encouraged to participate in exercise activities, where nurses paid close attention to the duration and intensity of exercise, and provided timely encouragement to improve the patient's treatment compliance. A public account for PICC catheter extended care was created. The comments section was closely monitored, along with the status of patients with tubes at home. Patients were instructed to return to the hospital regularly for follow-up visits. This intervention was carried out for 3 months for both groups.

2.3. Observation indicators

The evaluation of the knowledge, belief, and practice level of the two groups before and after nursing care was assessed using a self-developed survey scale. The scores ranged from 0–100 points (proportional to the knowledge, belief, and practice level). The self-efficacy of the two groups before and after nursing care was evaluated based on the General Self-Efficacy Scale (GSES) score ^[3]. The scale included disease and symptoms, diet and exercise, and cognition and behavior. The scores ranged from 0–40 points and were directly proportional to self-efficacy. The psychological distress management scale (DM) (0–10 points), Self-rating

Anxiety Scale (SAS) (0–100 points), and Self-rating Depression Scale (SDS) (0–100 points) of the two groups of patients before and after care were used to evaluate the degree of psychological distress of the patients [4,5]. The degree of anxiety and depression was directly proportional to the score.

2.4. Statistical method

Statistical analysis was carried out using the SPSS 26.0 software. Measurement data was expressed as mean ± standard deviation and compared using a *t*-test. Count data were expressed as % and analyzed using the chi-squared (χ^2) test. Results were considered statistically significant at $P < 0.05$.

3. Results

3.1. Level of knowledge, belief, and practice between the two groups

As shown in Table 1, the knowledge, belief, and practice level in the observation group after nursing was higher than in the control group ($P < 0.05$).

Table 1. Comparison of knowledge, belief, and behavior levels between the two groups (mean ± standard deviation, points)

Group	Cases, <i>n</i>	Knowledge		Belief		Behavior	
		Before care	After care	Before care	After care	Before care	After care
Control group	45	33.76 ± 3.83	61.56 ± 5.59*	34.94 ± 4.66	66.57 ± 7.51*	36.79 ± 5.68	65.55 ± 8.53*
Observation group	46	33.74 ± 3.80	84.58 ± 6.69*	34.90 ± 4.68	87.51 ± 7.66*	36.81 ± 5.71	87.59 ± 9.19*
<i>t</i>		0.018	17.843	0.028	22.819	0.020	7.286
<i>P</i>		0.985	< 0.001	0.978	< 0.001	0.984	< 0.001

Note: Compared with before care, * $P < 0.05$.

3.2. Comparison of self-efficacy between the two groups

As shown in Table 2, the self-efficacy score of the observation group after nursing care was higher than that of the control group ($P < 0.05$).

Table 2. Comparison of self-efficacy between the two groups (mean ± standard deviation, points)

Group	Cases, <i>n</i>	Diseases and symptoms		Diet and exercise		Cognition and behavior	
		Before care	After care	Before care	After care	Before care	After care
Control group	45	15.20 ± 2.77	25.18 ± 3.20*	16.11 ± 2.14	24.13 ± 3.22*	15.24 ± 2.54	26.60 ± 3.17*
Observation group	46	15.18 ± 2.81	33.28 ± 5.12*	16.08 ± 2.16	32.30 ± 5.18*	15.21 ± 2.51	32.48 ± 5.16*
<i>t</i>		0.034	9.027	0.067	9.013	0.057	6.532
<i>P</i>		0.973	< 0.001	0.947	< 0.001	0.955	< 0.001

Note: Compared with before care, * $P < 0.05$.

3.3. Comparison of psychological states between the two groups

As shown in Table 3, the DM, SAS, and SDS scores of the observation group after nursing care were lower than those of the control group ($P < 0.05$).

Table 3. Comparison of psychological states between the two groups (mean ± standard deviation, points)

Group	Cases, <i>n</i>	DM		SAS		SDS	
		Before care	After care	Before care	After care	Before care	After care
Control group	45	6.18 ± 1.05	4.02 ± 0.88*	51.75 ± 9.11	21.82 ± 3.21*	50.22 ± 4.33	18.35 ± 2.74*
Observation group	46	6.15 ± 1.03	2.05 ± 0.53*	51.77 ± 9.14	10.20 ± 1.02*	50.20 ± 4.30	7.27 ± 1.30*
<i>t</i>		0.138	12.969	0.010	23.377	0.022	24.730
<i>P</i>		0.891	< 0.001	0.992	< 0.001	0.982	< 0.001

Note: Compared with before care, **P* < 0.05.

4. Discussion

PICC catheterization is a safer way to administer intravenous chemotherapy. It can reduce the patient's anxiety, worry, and other negative emotions caused by repeated punctures and avoid damage to their blood vessels. In clinical practice, patients with PICC catheters are often given relevant nursing care to ensure effective chemotherapy, but the nursing effect has certain limitations [6].

This study showed that after nursing care, the knowledge, belief, behavior, and self-efficacy scores of the observation group were higher than those of the control group, and the DM score, SAS score, and SDS score were lower than those of the control group. This indicated that graded extended care based on the guidance of Orem's theory improved the nursing outcomes of patients with PICC. The level of knowledge, belief, behavior, and self-efficacy of patients with PICC can reduce their psychological distress and effectively alleviate their anxiety, depression, and other negative emotions. This finding was similar to the research results of Zhou *et al.* [7]. The hierarchical extended care based on the guidance of Orem's theory assisted patients in gradually transitioning from the acute phase to the sub-acute phase and in transferring from hospital to home through systematic nursing measures to receive continuous nursing intervention [8]. The hierarchical extended nursing based on the guidance of Orem's theory also utilizes the patient's self-care ability as the basis of care so that the patient can actively learn about nursing knowledge and practice self-care behaviors. With this, the patient's knowledge, belief, behavior, and self-efficacy can be improved, and their dissatisfaction with treatment methods can be alleviated [9,10].

5. Conclusion

Graded extended nursing care based on the guidance of Orem's theory improved the knowledge, behavior, and self-efficacy of PICC patients, and relieved their anxiety, depression, and other negative emotions. This procedure exhibited significant value and is worthy of popularization.

Disclosure statement

The authors declare no conflict of interest.

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