

Original Article

Application of predictive nursing care in elderly patients with fractures that underwent total hip arthroplasty procedures

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Abstract: Objective: The aim of this study was to investigate the efficacy of predictive care in elderly patients that underwent total hip arthroplasty procedures. Methods: A total of 166 elderly patients that underwent total hip arthroplasty procedures were included. All included patients received hip replacement. They were divided into the intervention group (IG) (86 cases) and control group (CG) (80 cases). CG patients received conventional care for one month, while IG patients received predictive care for one month. SAS (Self-Rating Anxiety Scale) and SDS (Self-rating Depression Scale) scores, before and after surgery, VAS (Visual Analog Scale) scores, before surgery and 1 hour, 6 hours, and 12 hours after surgery, incidence of postoperative complications, and satisfaction levels of both groups after care were measured. Results: No significant differences were observed in SAS and SDS scores between CG and IG patients ($P>0.05$) before treatment. SAS and SDS scores of the IG significantly decreased after nursing care and were significantly different from those in the CG ($P<0.05$). VAS scores in the IG were significantly lower than those in the CG at 6 and 12 hours after surgery ($P<0.05$). Incidence of complications in CG patients was significantly higher than that in the IG ($P<0.001$) and patients in the IG were more satisfied with nursing care than patients in the CG ($P<0.05$). Conclusion: Predictive nursing helps to improve postoperative depression and anxiety, relieve pain, and reduce postoperative complications in elderly patients receiving total hip arthroplasty procedures.

Keywords: Predictive nursing care, elderly patients, total hip arthroplasty, VAS score

Introduction

With the aging of the population, more attention has been paid to improving the quality of life of the elderly [1]. Several studies have shown that older individuals are more likely to develop orthopedic disorders due to physiological changes, such as declines in bodily function and atrophy of the bones. These factors affect their daily activities and increase incidence of fractures [2, 3]. Fractures can be caused by trauma or bone disease. Fractures resulting from trauma are the most common type observed in clinical practice, as most patients fail to prevent accidents. In particular, incidence of fractures is significantly higher in elderly patients than in other age groups [4]. Generally, fractures rarely lead to death. However, once the elderly fall, hip fractures are prone to occur. Hip fractures are most likely to

cause death in the elderly. According to clinical statistics, worldwide, the one-year survival rate of elderly patients with hip fractures is about 50% [5].

Total hip arthroplasty (THR) is the primary treatment for hip joint disease. THR involves the replacement of damaged joint surfaces with prosthetic substitutes, enhancing joint stability, relieving pain, and improving quality of life [6]. Most patients that undergo THR are older. They often have insufficient knowledge and understanding about the disease and surgical treatment. This may increase incidence of multiple complications after surgery and unfavorable effects on postoperative recovery and treatment outcomes [7]. Although conventional care satisfies surgical needs, the specificity of conventional nursing is low [8]. Therefore, better nursing methods are necessary.

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Predictive care, also known as advanced nursing care, predicts the situation that will occur during nursing implementation, as well as the course of nursing. Predictive care also determines the key points of nursing and identifies effective preventive measures, aiming to reduce patient discomfort, improve the quality of care, and transform passive treatment into active treatment [9]. A previous study [10] has shown that predictive care can promote recovery and improve satisfaction rates of patients with fractures. However, whether predictive care is effective in elderly fractured patients after THR remains unclear.

Therefore, this study explored the roles of predictive care in elderly patients that underwent THR, aiming to provide a reference for clinical caregivers.

Methods and materials

A total of 166 elderly patients that underwent total hip arthroplasty procedures were prospectively analyzed. All patients received hip replacements due to fractures. According to different nursing care methods, the patients were divided into the intervention group (IG) (86 cases) and control group (CG) (80 cases). The IG included 46 male patients and 40 female patients, with an average age of 65.24 ± 6.24 years. The CG included 42 male patients and 38 female patients, with an average age of 64.62 ± 5.84 years. The current study was approved by the Medical Ethics Committee of Xiangyang Central Hospital Dongjin Branch (The Affiliated Hospital of Hubei University of Arts and Science). All patients provided informed consent.

Inclusion and exclusion criteria

Inclusion criteria: Patients that underwent THR due to hip fractures; No history of cognitive dysfunction; Cooperated with treatment and expected to complete follow-up; Received complete clinical treatment.

Exclusion criteria: Patients with cardiopulmonary failure, accompanied by malignant tumors; Patients that failed to take care of themselves before sustaining a fracture; Patients with immune deficiencies and/or cognitive dysfunction; Patients that previously underwent hip arthroplasty procedures.

Methods and grouping

Patients in the CG and IG were provided the following conventional nursing care: 1. Daily nursing care: Patients were given comfortable and loose clothes. They were encouraged to participate in the process of dressing. They were served boneless and digestible foods. Bed guards were used when patients slept in their beds; 2. Drug treatment evaluation: Patients were assisted and monitored regarding medications. Routine inspections were performed to determine whether patients took all medications and adverse reactions experienced by the patients were identified; 3. Safety care: A guard was set up around the bed. Patients were accompanied or assisted when performing daily activities. Patients were not allowed to go out alone to avoid getting lost. Sharp items were kept away from the patients to prevent harm.

Patients in the IG received predictive care following the principles of conventional nursing, including preoperative, intraoperative, and postoperative care: 1). Preoperative care: Psychological support was provided to patients. Most patients that had TRK were older individuals. They were afraid to undergo surgery and were uncooperative. They were not confident with the results of the surgery, as they had insufficient knowledge and understanding about the procedure [11]. Hence, staff communicated with the patients, encouraged the patients to participate in group activities, accompanied them when they went out of their rooms, and ensured that they were treated with respect. Staff encouraged and guided the patients to boost their self-confidence, helped the patients to foster optimism, gained their active cooperation, and helped the patients maintain a pleasant mood; 2). Complications assessment and guidance: Prior to surgery, it was necessary to evaluate the physical condition of the patients and evaluate complications that may occur during treatment. The patients were repeatedly advised to consume foods with high calories, proteins, and vitamins and instructed to practice urinating and defecating in the bed, avoiding discomfort; 2) Intraoperative care: Since a large part of their bodies were exposed during surgery, preventive and warmth-retaining measures were performed to avoid hypothermia or colds. During surgery,

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more communication was used to see if the patients with local anesthesia felt any discomfort. Discomfort, if any, was relieved timely by taking appropriate measures. Patient vital signs were closely monitored. As soon as surgery was completed, the sutured wounds were inspected to check for bleeding. Caregivers assisted the doctors in installing an analgesic pump and prevented it from falling; 3) Postoperative care: 1. After surgery, patient pain was treated, as pain plays a major role in the initiation of postoperative stress response. Medications that can promote blood circulation, remove blood stasis, and relieve pain were administered. Fixation of the clamping plate was inspected and the cause of pain was explained. For patients with lower pain tolerance, an analgesic agent was provided; 2. Vital signs of the patients were closely monitored. Ice compression was applied to the incision site to reduce pain. Caregivers frequently communicated with the patients to divert their attention. Silence was observed in the hospital wards and unnecessary disturbances were avoided; 3. The third day after surgery, patients were properly rehabilitated and were informed about the content of the training to gain their cooperation. Moreover, the methods of exercise were designed and adjusted in a timely manner according to the degree of their physical recovery with a duration of 2 weeks. Adverse reactions occurring during treatment should be addressed in a timely manner. If patients died during treatment or could not be followed up, they were excluded from the study.

Outcome measures

Primary outcome measures: Nursing care was provided to patients for 1 month and SAS and SDS scores, before and after surgery, were obtained. The total SAS and SDA scores were 80. A higher score indicates more severe anxiety or depression. VAS scores, before surgery and 1 hour, 6 hours, and 12 hours after surgery, were obtained. The total VAS score was 10. A higher score indicates greater pain intensity.

Secondary outcome measures: Total incidence of postoperative complications in the two groups was obtained. Levels of patient satisfaction with nursing care were measured after surgery [satisfaction=(number of cases that were very satisfied with the nursing care + num-

ber of cases that were satisfied with the nursing care)/total number of cases × 100%].

Statistical methods

SPSS 20.0 software was used to perform all statistical analyses. Continuous data are expressed as mean ± standard deviation (mean ± SD). Independent t-test was used for comparisons between groups, while paired t-test was used for comparisons within the same group at multiple time points. $P < 0.05$ indicates statistical significance.

Results

Comparison of baseline characteristics

The current study compared baseline clinical data of the two groups, finding no statistical differences in gender, age, BMI, place of residence, smoking history, history of hypertension, history of diabetes, and education levels ($P > 0.05$) (**Table 1**).

Changes in SAS and SDS scores in both groups before and after provision of nursing care

This study statistically analyzed preoperative and postoperative SAS and SDS scores in the two groups, finding no statistical differences in SAS and SDS scores between the CG and IG before treatment ($P > 0.05$). After provision of nursing care, SAS and SDS scores of IG patients decreased and were found to be significantly different from those in the CG ($P < 0.05$) (**Table 2** and **Figure 1**).

Changes in VAS scores of both patient groups during nursing care

VAS scores of the two groups were evaluated before surgery and 1 hour, 6 hours, and 12 hours after surgery. It was found that preoperative VAS scores of the CG were not significantly different from those of the IG ($P > 0.05$). After provision of nursing care, using different models, VAS scores of the two groups at 1 hour, 6 hours, and 12 hours after surgery were evaluated. Results showed that VAS scores of the IG at 6 hours and 12 hours after surgery were significantly lower than those of the CG ($P < 0.05$). VAS scores of the IG at 1 hour after surgery were not statistically different from those of the CG ($P > 0.05$) (**Table 3** and **Figure 2**).

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Table 1. Patient clinical data [n (%)]

	CG groupn (n=80)	IG group (n=86)	t/X ²	P value
Gender				
Female	46 (53.49)	42 (52.50)	0.0163	0.897
Male	40 (46.51)	38 (47.50)		
Age (years)				
>65 years	66 (76.74)	62 (77.50)	0.013	0.908
≤65 years	20 (23.26)	18 (22.50)		
BMI (kg/m ²)	23.42 ± 1.84	23.05 ± 1.99	1.245	0.215
Domicile				
Rural area	12 (13.95)	10 (12.50)	0.076	0.783
City	74 (86.05)	70 (87.50)		
Smoking history				
Yes	48 (55.81)	40 (50.00)	0.562	0.453
No	38 (44.19)	40 (50.00)		
History of hypertension				
Yes	73 (84.88)	73 (91.25)	1.585	0.208
No	13 (15.12)	7 (8.75)		
Diabetes history				
Yes	55 (63.95)	49 (61.25)	0.130	0.719
No	31 (36.05)	31 (38.75)		
Degree of education				
≥Junior middle school	15 (17.44)	10 (12.50)	0.791	0.374
<Junior middle school	71 (82.56)	70 (87.50)		
Operation time (min)	75.62 ± 12.57	73.94 ± 15.22	0.772	0.441
Surgical bleeding volume (mL)	308.86 ± 37.22	313.21 ± 25.74	0.881	0.380
Bed rest time (d)	2.58 ± 0.75	2.49 ± 0.82	0.736	0.423
Fracture site				
Sub-head type	40 (50.00)	49 (56.98)	1.330	0.514
Via-neck type	25 (31.25)	26 (30.23)		
Basal-neck type	15 (18.75)	11 (12.79)		
Cause of fracture				
Walking injury or sprain	62 (77.50)	61 (70.93)	0.932	0.334
Car accidents	18 (22.50)	25 (29.07)		

Table 2. Changes in SAS and SDS scores between the two patient groups before and after nursing care

Group	CG group (n=80)	IG group (n=86)	t value	P value
SAS score				
Before nursing care	59.24 ± 5.15	58.89 ± 6.11	0.400	0.690
After nursing care	45.21 ± 6.35*	31.15 ± 5.84*	14.815	<0.001
SDS score				
Before nursing care	56.19 ± 5.10	55.89 ± 4.92	0.385	0.701
After nursing care	43.94 ± 4.82*	33.94 ± 5.02*	13.092	<0.001

Note: *There was a statistical difference in SAS and SDS scores between the two groups before and after nursing care (P<0.05).

Complications occurring in both groups during nursing care

Complications of both groups during nursing care were statistically analyzed. Results showed that the complication rate in the CG was significantly higher than that in the IG (X²=23.787; P<0.001) (Table 4).

Evaluation of satisfaction levels of both groups after provision of nursing care

The satisfaction level of the CG was significantly higher than that of the IG (X²=15.574, P<0.001) (Table 5).

Discussion

Although conventional care/nursing is an effective tool in improving prognosis, it has certain disadvantages that are not beneficial to patient recovery in general. In contrast, predictive care, a new concept of care, can effectively improve therapeutic effects, as it involves the application of preventive measures before treatment [12, 13]. Furthermore, predictive care interventions will effectively improve patient moods, reduce incidence of complications and dangerous events during the period of hospitalization, and benefit patients that underwent rehabilitation. Previous studies [14, 15] have shown that predictive care effectively improves postopera-

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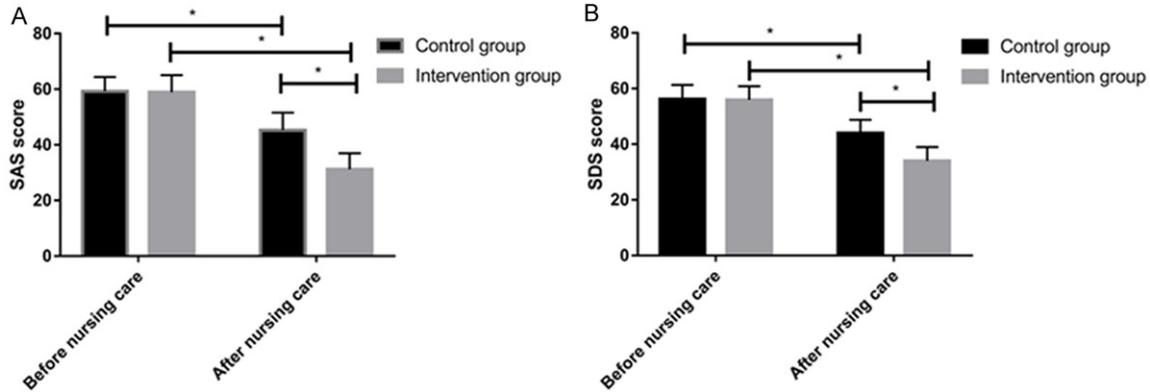


Figure 1. Changes in SAS and SDS scores in the two patient groups before and after treatment. There was no difference in SDS scores between the two groups before treatment ($P > 0.05$). After treatment, scores of the two groups were lower than those before treatment ($P < 0.05$) and there was a significant difference in SD after treatment in the IG ($P < 0.05$). S scores of the IG were significantly lower than those of the CG ($P < 0.05$).

Table 3. Changes in VAS scores in the two patient groups during nursing care

Group	Preoperative	1 hour after surgery	6 hours after surgery	12 hours after surgery
CG group (n=80)	6.42 ± 1.54	6.15 ± 1.22	5.97 ± 1.10	5.38 ± 0.67
IG group (n=86)	6.35 ± 1.69	5.87 ± 1.28	5.22 ± 0.59	4.19 ± 0.42
t value	0.279	1.443	5.416	13.593
P value	0.780	0.151	<0.001	<0.001

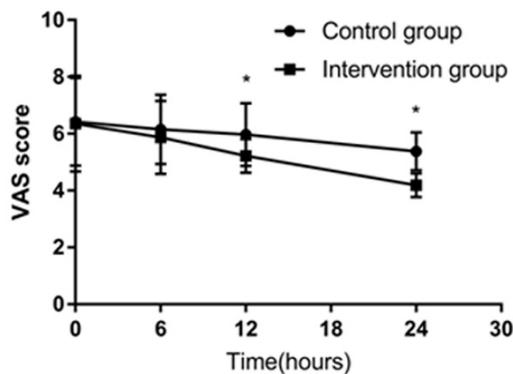


Figure 2. Changes in VAS scores in the two groups. VAS scores in the IG at 12 hours after surgery were significantly lower than those in the CG ($P < 0.05$). VAS scores in the IG were significantly lower than in the CG ($P < 0.05$).

tive depression in patients with coronary heart disease and reduces postoperative complications. Whether predictive care is effective in hip replacement of elderly patients with fractures, however, remains unclear. Therefore, the current study explored the roles of predictive care in elderly patients that underwent

THR, aiming to provide a reference for the choice of clinical care.

SAS is a commonly used tool in clinical practice and reflects the subjective feelings of the patients. SDS directly reflects depression changes of patients during treatment and,

to some extent, requires the identification of patient education levels [16]. The VAS score was measured by patients themselves using a 10-cm ruler. Results are more objective. The current study evaluated SAS, SDS, and VAS scores of both groups, finding no significant differences in preoperative scores between the two groups. Furthermore, SAS and SDS scores after provision of nursing care were significantly decreased and improved, compared with those before nursing care. The degree of reduction of SAS and SDS scores in the IG was more significant than in the CG group. There were no differences in VAS scores between the CG and IG at 1 hour after surgery. However, differences between the groups were observed at 6 hours and 12 hours after surgery, as the effects of anesthesia completely disappeared and patient pain intensified. After provision of predictive nursing care, VAS scores decreased significantly in the following period. According to Liang's study [17], predictive nursing care provided to patients with fractures, accompanied by anxiety and depression, effectively improved the mood of patients and relieved pain symptoms. Results indicated that predictive care will

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Table 4. Complications observed in both groups during nursing care [n (%)]

Group	Pressure sore	Infect	Ankylosis	Deep venous thrombosis of lower extremity	Astriction
CG group (n=80)	3 (3.49)	4 (4.65)	5 (5.81)	2 (2.33)	2 (2.33)
IG group (n=86)	10 (12.50)	7 (8.75)	12 (15.00)	10 (12.50)	5 (6.25)

Table 5. Evaluation of post-nursing satisfaction of patients in the two groups [n (%)]

Group	Very satisfied	Satisfied	Same as
CG group (n=80)	29 (33.72)	40 (46.51)	17 (19.77)
IG group (n=86)	15 (18.75)	26 (32.50)	39 (48.75)

significantly improve the level of anxiety and depression in elderly patients with fractures after THR, promoting postoperative recovery. In addition, the current study statistically analyzed incidence of postoperative complications in the two groups. It was found that incidence of complications in the CG was significantly higher than that in the IG. In the study of Dai, the prevalence of complications after predictive care in elderly patients with fractures was also significantly reduced, suggesting that prospective care prevented the occurrence of complications in elderly patients with fractures [18]. The current study also statistically analyzed satisfaction levels of the two groups. Results showed that the level of satisfaction of the CG was significantly lower than that of the IG group, suggesting that predictive nursing was effective in improving patient satisfaction with the nursing care provided and promoted the relationship between doctors and patients.

However, this study had several limitations. Most of the patients in this study had low levels of education. The SDS rating scale requires a certain level of education. Whether it had an impact on the results of this study remains unclear. Moreover, the number of study samples was rather small. It is not known whether the limited sample size caused a bias in the accuracy of results. Therefore, a larger sample size should be used in future studies. Patients with higher educational levels should also be included to verify present results.

In summary, predictive care will significantly improve postoperative depression and anxiety in elderly patients with THR, as well as relieve pain, reduce incidence of postoperative complications, and improve the relationship between

doctors and patients. Moreover, it is worthy of extensive promotion in clinical practice.

Disclosure of conflict of interest

None.

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References

- [1] Almeida OP, Khan KM, Hankey GJ, Yeap BB, Golledge J and Flicker L. 150 minutes of vigorous physical activity per week predicts survival and successful ageing: a population-based 11-year longitudinal study of 12 201 older Australian men. *Br J Sports Med* 2014; 48: 220-225.
- [2] McKee KJ, Orbell S, Austin C, Bettridge R, Liddle B, Morgan K and Radley K. Fear of falling, falls efficacy, and health outcomes in older people following hip fracture. *Disabil Rehabil* 2002; 24: 327-33.
- [3] Härlein J, Dassen T, Halfens RJ and Heinze C. Fall risk factors in older people with dementia or cognitive impairment: a systematic review. *J Adv Nurs* 2009; 65: 922-33.
- [4] Banaszkiwicz PA. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty: an end-result study using a new method of result evaluation. In: editors. *Classic Papers in Orthopaedics* 2014: 13-17.
- [5] Metsemakers WJ, Smeets B, Nijs S and Hoekstra H. Infection after fracture fixation of the tibia: analysis of healthcare utilization and related costs. *Injury* 2017; 48: 1204-1210.
- [6] Newman ET, Hug KT, Wellman SS, Bolognesi MP and Kelley SS. Custom intramedullary intercalating device for treatment of supracondylar fracture between constrained total knee arthroplasty and well-fixed total hip arthroplasty. *The Knee* 2014; 21: 594-596.
- [7] Belmont Jr PJ, Goodman GP, Waterman BR, Bader JO and Schoenfeld AJ. Thirty-day post-

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- operative complications and mortality following total knee arthroplasty: incidence and risk factors among a national sample of 15,321 patients. *JBJS* 2014; 96: 20-26.
- [8] Jia N, Zhou X, Wang F, Wang Y, Zhao Y and Wang J. The study on the nursing intervention of the pedicle flap transposition repairing traumatic tissue defect in the hands. 2015.
- [9] Sheer B and Wong FK. The development of advanced nursing practice globally. *J Nurs Scholarsh* 2008; 40: 204-211.
- [10] Huaying HE, Jun DU and Xueshuang LI. Clinical effect of waterlow score in pressure ulcer risk assessment and predictive care. *Journal of Nursing Science* 2005; 19: 005.
- [11] Alexiou KI, Roushias A, Varitimidis SE and Malizos KN. Quality of life and psychological consequences in elderly patients after a hip fracture: a review. *Clin Interv Aging* 2018; 13: 143-150.
- [12] Amish Burn Study Group, Kolacz NM, Jaroch MT, Bear ML, Hess RF. The effect of Burns & Wounds (B&W)/burdock leaf therapy on burn-injured Amish patients: a pilot study measuring pain levels, infection rates, and healing times. *J Holist Nurs* 2014; 32: 327-340.
- [13] Al-Mailam FF. The effect of nursing care on overall patient satisfaction and its predictive value on return-to-provider behavior: a survey study. *Qual Manag Health Care* 2005; 14: 116-120.
- [14] Che S. To explore the effect of predictive nursing in the prevention of postoperative depression in patients with coronary heart disease. *Journal of Nursing* 2017; 6: 4-8.
- [15] Fearon K, Ljungqvist O, Von Meyenfeldt M, Revhaug A, Dejong C, Lassen K, Nygren J, Hausel J, Soop M and Andersen J. Enhanced recovery after surgery: a consensus review of clinical care for patients undergoing colonic resection. *Clinical nutrition* 2005; 24: 466-477.
- [16] Nan J, Liu J, Mu J, Dun W, Zhang M, Gong Q, Qin W, Tian J, Liang F and Zeng F. Brain-based correlations between psychological factors and functional dyspepsia. *J Neurogastroenterol Motil* 2015; 21: 103-10.
- [17] Liang L. Effect of psychological nursing intervention for fracture patients with depression and anxiety. *China Medicine & Pharmacy*, 2014; 4: 153-154.
- [18] Dai H and Wu Y. Complications in elderly patients with femoral fracture care effect analysis of the application of predictive nursing. *Harbin Medical Journal* 2016; 94-96.