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Original Article

The effect of Orem's self-care model on the quality of life, complications, and mental health of elderly hip fracture patients

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Abstract: Objective: The objective of this study is to improve the self-care abilities of elderly patients, especially those with activity-restricting diseases, based on Orem's self-care model (OSCM). Methods: A randomized clinical trial was conducted using a cohort of 110 eligible elderly patients with hip fractures. These patients were selected using the simple sampling method and randomly divided into an experimental group (EG) and a control group (CG). The study data were collected using validated questionnaires, including the visual simulation scale (VAS), the Barthel index, the Pittsburgh sleep quality index (PSQI), and the mental health level (SCL-90). The EG underwent intervention based on OSCM, while the CG underwent treatment based on the traditional care model. In addition, the patients' complications were assessed. Results: The study results showed that there were marked differences in the mean values of the VAS and Barthel indexes between the EG and CG after one week ($P < 0.05$). The changes in the VAS and Barthel indexes in the two groups were statistically significant at 6 weeks after the surgeries ($P < 0.05$). Compared with the CG, the EG had significantly different complications and postoperative SCL-90 index values ($P < 0.05$). Therefore, the educational intervention based on OSCM is effective in promoting the self-care abilities of elderly patients. Conclusion: The self-care plan based on OSCM can significantly improve the quality of life, complications, and mental health of elderly HF patients. Therefore, it is highly recommended that the nursing plan be incorporated into conventional nursing intervention to improve the quality of life and prognoses of elderly HF patients.

Keywords: Hip fractures, Orem's self-care model, the elderly

Introduction

Hip fracture (HF) is a special public health concern among the elderly, and as the population ages, the incidence of HF is on the rise [1]. It is estimated that the number of HF patients will reach over 4.5 million patients worldwide by 2050 [2]. It is reported that there are marked gender differences in HFs, namely, women and men have a lifetime HF prevalence rate of 20% and 10%, respectively. HFs occur frequently in the elderly, seriously affecting their quality of life and self-care abilities and causing an increase in mortality. HF patients have a mortality of 12% to 17% in the first year, and they have a tripled risk of long-term mortality, directly resulting in increases in the social and medical care expenditures [3, 4]. In most cases, HF requires surgical treatment and bed rest. Long-term fixation elevates the risk of thromboembolism, pneumonia, and bedsore ulcers. Many elderly patients experience anxiety, depression, and other negative emotions due to the physical pain caused by hip fractures and long-term bed rest resulting from the loss of their ability to move independently, and they may even be plagued by cognitive issues [5, 6]. Meanwhile, physiological, psychological, and social factors may further aggravate the perioperative complications, exerting adverse effects on the patients' surgeries and prognoses [7]. Without an effective nursing intervention plan, the patients may experience serious complications and improper fracture healing, preventing their hip function from recovering normally, seriously affecting their quality of life [8]. Elderly identification and lessening the risk factors for postoperative complications of HF in the elder-

Table 1. General situation of the patients

	Variables	Exp	Con	P
Gender	M	21	25	0.843
	F	34	30	
Age		69.4±4.2	68.7±4.3	0.390
BMI		24.5±2.9	24.1±3.7	0.077

Note: M: Male, F: Female, Exp: Experimental Group, Con: Control Group.

ly, reducing the nursing risks, and improving the quality of nursing management underpin the patients' physical and mental health and quality of life and the improved safety of the overall nursing work [9]. Regarding Orem's self-care model (OSCM), the patients' self-care abilities are taken as the core, and targeted nursing measures are formulated based on the patients' needs and self-care abilities. To date, OSCM has been extensively adopted in treating multiple diseases [10-13]. Therefore, the objective of this study is to investigate the influences of OSCM-based educational intervention on elderly HF patients' quality of life.

Materials and methods

General data

Clinical data: A total of 110 elderly HF patients hospitalized from March 2017 to March 2019 were recruited as the study cohort and randomly divided into the control group (CG) (55 cases with a mean age of 69.4 years) and the experimental group (EG) (55 cases with a mean age of 68.7 years). This study was approved by the Medical Ethics Committee of The First People's Hospital of Wenling.

Inclusion criteria

Inclusion criteria: (1) Patients at least 60 years old but less than 75 years old. (2) Patients undergoing their elected surgery, and without delirium or cognitive disorders before the surgery, and able to communicate normally. (3) Patients who voluntarily signed the informed consent forms. (4) Patients with the occurrence of unilateral HF (including femoral fractures and trochanter fractures). (5) Patients whose fractures occurred less than 14 days before the time they were enrolled in the study. (6) Patients with stable vital signs. (7) Patients free of pneumonia, deep vein thrombosis, and urinary tract infections (UTI) at admission.

Investigation tools

In this study, the intervention mode was based on OSCM, and the assessment was performed using the VAS and Barthel indexes. VAS, a simple and practical method, is extensively used to assess patients' pain treatment. The patients were assessed using a linear scale of 1-10.

The Barthel index was another tool used in this study. The patients' daily activities were assessed, including 10 dimensions: eating, bathing, personal hygiene, dressing, defecation, urination control, going to the toilet, using, transferring, moving on the ground, and going up and down stairs. The total possible score was 100 points in increments of 5 points. Over 60 points indicates a self-care ability, 40-60 points indicates mild disability, 20-40 points indicates severe disability, and less than 20 points suggests a loss of one's self-care abilities (**Table 2**). Sleep quality was assessed using Pittsburgh sleep scale, and the total score was negatively correlated with the sleep quality. The Pittsburgh sleep scale includes 7 dimensions and 19 items. The SCL-90 (symptom checklist 90), includes 10 dimensions and 90 items and was used to assess the patients' mental health from the perspectives of emotion, consciousness, and behavior.

Intervention methods

The patients were randomly assigned to the EG or the CG. The EG underwent educational intervention based on OSCM, while the CG underwent conventional orthopedic care. The self-care ability questionnaires were filled out completely. The educational contents were prepared based on the data provided by the participants and a literature review. The EG underwent educational intervention until six weeks after their surgeries. The educational contents included oral explanations, action modeling, and the distribution of educational materials. For different patients in different periods, corresponding nursing plans were formulated. The nursing plans primarily comprised a wholly compensatory nursing system, a partial compensatory nursing system, and a supportive-educative system. Specifically, the patients were educated regarding fracture indicators

Table 2. Barthel index rating scale

Item	Detail	Score
Feeding	Independent	10
	Needs help	5
	Unable	0
Transfers (bed to chair and back)	Independent	15
	Needs minor help (verbal or physical)	10
	Needs major help (1-2 people, physical), can sit	5
	Unable	0
Grooming	Independent	5
	Unable	0
Toilet use	Independent	10
	Needs help	5
	Unable	0
Bathing	Independent	5
	Unable	0
Mobility on level surfaces (45 m)	Independent (but may use any aid, e.g., stick), > 50 yards	15
	Walks with help of one person (verbal or physical), > 50 yards	10
	Wheelchair independent, including corners, > 50 yards	5
	Immobile or < 50 yards	0
Stairs	Independent	10
	Needs help (verbal, physical, carrying aid)	5
	Unable	0
Dressing	Independent	10
	Needs help	5
	Unable	0
Bowel control	Continent	10
	Occasional accident	5
	Incontinent (or needs to be given enemas)	0
Bladder control	Continent	10
	Occasional accident	5
	Incontinent (catheterized, unable to manage alone)	0

using the unified manual; the educational contents were adjusted and supplemented based on the actual situation of each patient, and regular education meetings were held. A perioperative pain management plan was established. The patients underwent psychological support so that they could self-manage their discomfort and negative emotions caused by the pain and other issues. After discharge, continuous education guidance was provided. After surgery, the patients' conditions were closely observed, and blood biochemistry and routine blood tests were conducted regularly. At weeks 1 and 6 after the surgery, the patients were asked to fill out the self-care ability questionnaires, so as to understand the conditions regarding the incidence of complications.

Statistical analysis

SPSS 23.0 was used for the statistical analysis, and the data were expressed as the mean ± standard deviation. The enumeration data were analyzed using Student's *t* tests. The categorical data were measured using chi-square tests. $P < 0.05$ indicates a statistically significant difference.

Results

Comparison of the demographic characteristics between the two groups

When the EG and the CG were established, it was confirmed that there were no significant

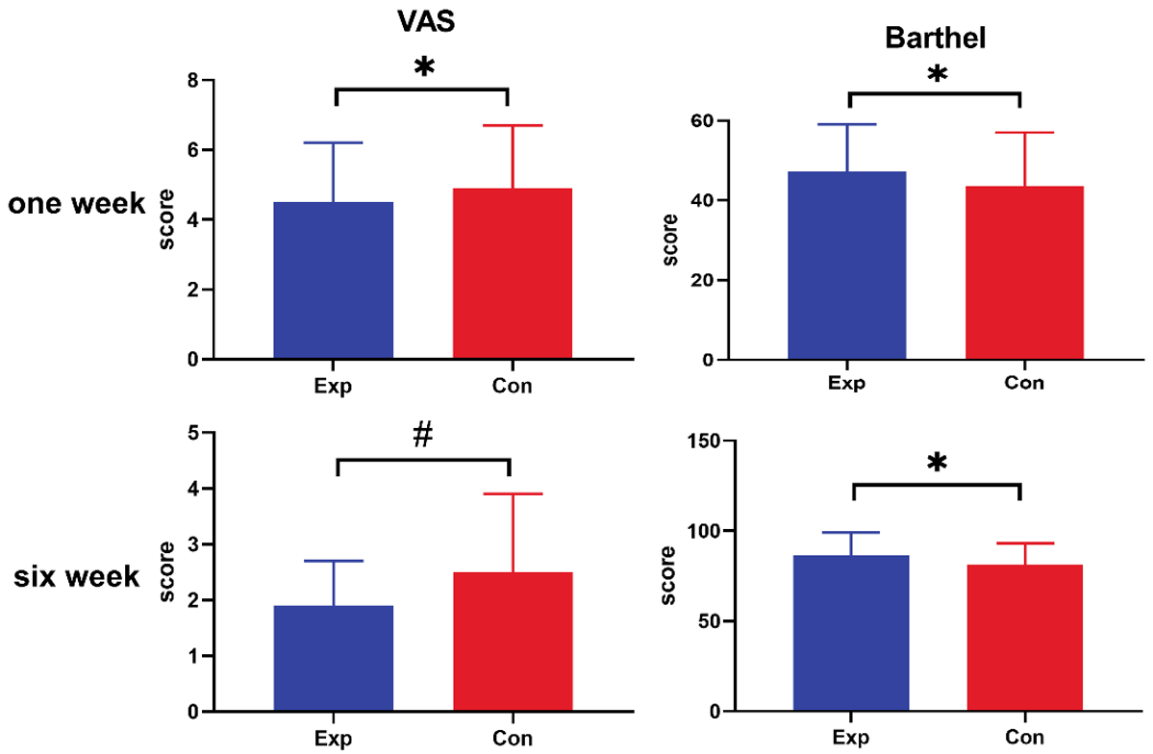

Figure 1. Comparison of the VAS and Barthel indexes in the two groups at weeks 1 and 6 after surgery. Note: Exp: Experimental Group, Con: Control Group, there are statistically significant differences in the VAS and Barthel indexes between experimental group and control group at week 1 after surgery ($P < 0.05$). The results in the experimental group and the control group are significantly different at week 6 after surgery ($P < 0.05$). * indicates that the difference is significant ($P < 0.05$); # means that the difference is significant ($P < 0.01$).

Table 3. Hospital stays and postoperative sleep indexes in the two groups

	hospital days	PSQI
Exp	18.61±3.73	11.25±4.32
Con	16.70±2.70	9.20±2.10
P	< 0.01	< 0.01

Note: Exp: Experimental Group, Con: Control Group, PSQI is the measurement result after 1 week.

differences in the demographic characteristics between the two groups (**Table 1**).

Comparison of the VAS and Barthel indexes between the two groups before and after the treatment

Our comparison of the two groups' general patient data showed that there were no significant differences in gender (P=0.843), age (P=0.390), or BMI (P=0.077) before the intervention (**Figure 1**). At week 1 after the surgeries, the VAS results and Barthel indexes in the EG and CG were 4.5±1.7 and 4.9±1.8 and 47.4±11.7 and 43.6±13.4, respectively, and the differences were statistically significant ($P < 0.05$). After 6 weeks, the VAS results and Barthel indexes in the EG and CG were 1.9±0.8 and 2.5±1.4 and 86.3±12.9 and 81.4±11.8, and the differences were significant ($P < 0.05$) (**Figure 1**). Regarding the sleep index, the PSQI results in the EG and CG were 11.25±4.32 and 9.20±2.10 after one week, and the differences were significant ($P < 0.05$) (**Table 3**).

Incidence of complications

Regarding the incidences of complications in the two groups, the results showed that there were 9 incidences of complications, including 4 cases of pneumonia, 2 cases of deep vein thrombosis, 1 case of urinary tract infection, 2 cases of wound infection, and 1 case of bedsores in the EG, and 19 incidences of complications, including 8 cases of pneumonia, 5 cases of deep vein thrombosis, 2 cases of urinary tract infections, 2 cases of wound infections, and 2 cases of bedsores in the CG ($P < 0.05$).

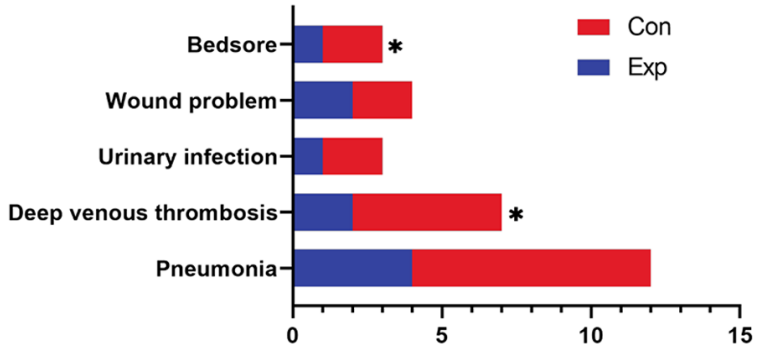

Figure 2. Postoperative complications in the two groups. Note: Exp: Experimental Group, Con: Control Group. * indicates a significant difference ($P < 0.05$). There are significant differences in the overall incidences of complications, and in the incidences of pneumonia and deep vein thrombosis in the two groups ($P < 0.05$).

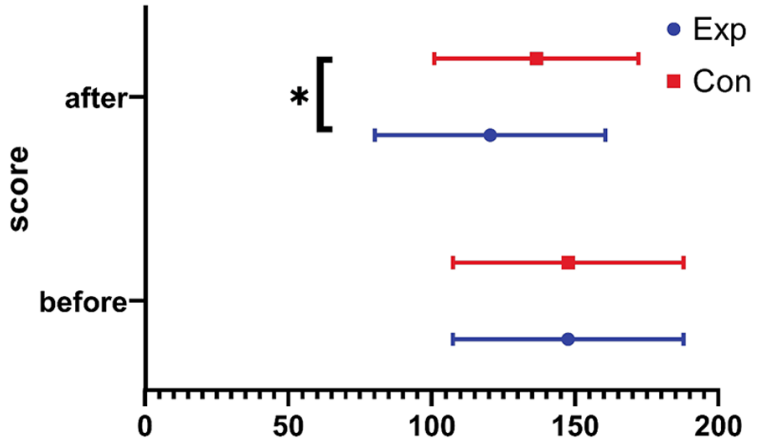

Figure 3. The SCL-90 scores in the two groups. Note: Exp: Experimental Group, Con: Control Group. The postoperative measurement score is the measurement result at week 1 after surgery. * indicates a significant difference ($P < 0.05$). The mental health of the patients was assessed using SCL-90, and there were significant differences between the two groups after the intervention.

There were significant differences in the overall incidences of complications, pneumonia, and deep vein thrombosis between the two groups ($P < 0.05$) (**Figure 2**).

Mental health assessment

The patients' mental health was assessed using SCL-90. Before the surgery, the EG and CG scores were 147.56±40.22 and 147.60±40.20, respectively. After the surgery, the EG and CG scores were 120.40±38.70 and 136±35.60, respectively, and there was no significant difference between the two groups ($P < 0.05$) (**Figure 3**).

Discussion

HFs in elderly exerts multiple adverse effects on the quality of life of the elderly. HF is related to age-related osteoporosis, and it affects patients' physical and psychological abilities and their mobility, resulting in a decline in their quality of life and an increase in their mortality [14]. Meanwhile, expensive medical care and lengthy rehabilitation procedures hinder patients from returning to their previous living conditions and achieving a complete functional recovery. Quality of life is an important indicator of patients' satisfaction with their own health and medical services. Therefore, it is necessary to intervene to improve their postoperative quality of life [15]. Orem's self-care theory can help health care providers identify and meet patients' self-care needs because it has been confirmed that self-care has an immeasurable potential and practicality in theory and practice [16]. With an increasingly extensive understanding of nursing service in society, patients' self-care has become a development trend. Patients require long-term self-care abilities. Therefore, imparting knowledge and techniques remains a new requirement for nursing. Nurses are required to pay attention to the patients' self-care abilities, mobilize their subjective initiatives, and encourage the patients to assume their self-care responsibility. In this study, Orem's self-care theory was used to investigate the effects of educational intervention on elderly HF patients. Due to the procedural nursing measures and the multiple defects in conventional orthopedic nursing plans, the patients are accustomed to passive nursing, and their subjective initiatives are not incorporated into the nursing plan. Therefore, the patients often experience poor nursing, which is not conducive to their postoperative rehabilitation. Based

on the patients' specific conditions and diseases, it is of great significance to dynamically assess the self-care abilities of the patients using the self-care theory, adopt different nursing measures, and formulate self-care models suitable for different individuals at different stages.

In this study, the changes in the VAS and Barthel indexes at weeks 1 and 6 after the surgery were statistically significant ($P < 0.05$). Compared with the CG, the EG had a higher level of self-care knowledge, motivation and abilities, and better sleep quality ($P < 0.05$). All the patients in the EG underwent counseling services and were engaged in their own nursing decisions from the time of admission. By encouraging the patients and their families and mobilizing their enthusiasm, we can help patients to effectively explore their self-care abilities, which is conducive to the patients' rehabilitation and prevention of complications during their hospital stays and after discharge.

OSCM can help patients understand the disease correctly and master the related self-care knowledge, thus mitigating the incidence of complications and improving the postoperative physiological functions. Based on Orem's theory, some specific measures were formulated, and the EG underwent a detailed nursing intervention, including decreasing multiple common complications, such as pneumonia, urethral infections, wound infections, and the like. According to each patient's condition, a wholly compensatory nursing system, a partial compensatory nursing system, or a supportive-educative system was implemented. According to the study results, compared with those in the CG, the complications in the EG were significantly reduced ($P < 0.05$). The comprehensive incidence of these complications during the hospital stays was 20% [17-19]. On the psychological level, SCL-90 was used as a tool, and the results indicated that the EG improved more remarkably than the CG ($P < 0.05$). These physiological and psychological improvements ultimately led to improved survival rates among the vulnerable populations [20-23]. Therefore, educational intervention based on OSCM is effective at reducing complications. The important change comes from the cognitive changes in the patients, so that each lifestyle behavior is conducive to their rehabilitation. OSCM and conventional nursing are effective tools for improving HF patients' quality of life. Therefore, the medical personnel can take the design and formulation of the self-care plans as a part of the treatment process and prevent multiple physiological and psychological issues. Shad et al. [24] performed studies on Orem's self-care intervention for hemodialysis patients, and the results revealed that the self-care intervention was effective in regard to the patients' physiology, psychology, sleep, and complications. Meanwhile, some studies suggest that Orem's self-care intervention is effective at preventing osteoporosis [25], and effectively prevents the recurrence of fractures. OSCM can improve the functions and overall quality of patients' lives.

There are some limitations to this study. First of all, the sample size was insufficient, and there is a lack of any subgroup analysis. If there were a sufficiently-large sample size, more significant differences could be observed among the different groups. Second, in this study, the selection of the variables and the investigation tools were investigated through an extensive literature review. Since the related theories are being developed, there may be tools and variables that have not been considered yet. Third, the lack of any long-term follow-up results in this study hinders future studies to some extent.

Conclusion

In summary, the self-care plan based on OSCM can significantly improve the quality of life and complications of early HF patients. The carefully-designed nursing measures must be implemented properly to meet the needs and interests of the patients. A supportive-educative nursing system is feasible and effective in treating HF. Therefore, a self-care plan should be formulated based on OSCM to reduce complications and issues closely related to fragile HF.

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Disclosure of conflict of interest

None.

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