

Original Article

Effects of nursing based on Orem's self-care model on self-care efficacy, quality of life and adverse emotions in patients with advanced lung cancer

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Abstract: Objective: To investigate the effects of nursing based on Orem's self-care model on self-care efficacy, quality of life (QOL) and adverse emotions of patients with advanced lung cancer (ALC) receiving chemotherapy. Methods: A total of 71 patients with ALC aged 50-70 years, from our hospital were selected as the study subjects and divided into the control group (CNG, n = 35) and the experimental group (EXG, n = 36) using the random number table method. The CNG was treated with conventional chemotherapy combined with conventional nursing, while the EXG was treated with conventional chemotherapy combined with nursing based on Orem's self-care model. The effects on self-care efficacy, QOL and adverse emotions in the two groups were observed before and after nursing. The General Self-Efficacy Scale (GSES) was scored in both groups. The patients' body, physiology, psychology, society and health were scored using the QOL questionnaire for Chinese cancer patients receiving chemotherapy (QLQ-CCC). The self-rating anxiety scale (SAS) and self-rating depression scale (SDS) in the two groups were scored using the Hamilton anxiety scale (HAMA) and Hamilton depression scale (HAMD). Results: The GSES scores in the EXG were remarkably higher than those in the CNG after intervention ($P < 0.05$). After intervention, the scores of the patients' body, physiology, psychology, society and health in the EXG were higher than those in the CNG ($P < 0.05$). The scores of SAS and SDS in the EXG were lower than those in the CNG ($P < 0.05$). Conclusion: Nursing based on Orem's self-care model can effectively improve the self-care efficacy and QOL, adverse emotions (e.g., anxiety and depression), and degree of pain of patients with ALC receiving chemotherapy. Therefore, it has a positive clinical significance.

Keywords: Advanced lung cancer, nursing based on Orem's self-care model, self-care efficacy, quality of life, adverse emotions

Introduction

Lung cancer (LC) is the most common malignant lung tumor. Aggravated environmental pollution and smoking are closely related to LC [1]. Recently, the morbidity and mortality rates of LC have been on the rise. According to the *Global Cancer Statistical Report* in 2018, there were 2.09 million newly diagnosed LC patients globally, accounting for 11.6% of the total newly diagnosed cancer population, and 1.76 million LC patients died, accounting for 18.4% of the total number of cancer deaths [2]. In 2019, the

latest national cancer statistics released by the China Cancer Center showed that LC was the type of malignant tumor with the highest morbidity in China. The early symptoms of LC in patients are not obvious, which may easily lead to a delay in medical treatment. Most LC patients are clinically diagnosed with LC in the middle and advanced stages, and miss the optimal time for treatment. The 5-year survival rate of LC patients is merely 11%-15% [3]. With advances in the medical field, the implementation of a variety of comprehensive therapeutic options has prolonged the overall survival (OS)

Study on advanced lung cancer

of LC patients, resulting in a rise in the number of patients with ALC. Currently, chemotherapy, radiotherapy, targeted therapy and biological immunotherapy are the main options for the treatment of LC. Among them, chemotherapy is the most cost-effective and commonly implemented option. Generally, patients with ALC are treated with repeated combined chemotherapy, so as to control the progression of disease. Chemotherapy kills healthy cells as well as tumor cells. With the increase of the course of chemotherapy, the patients show symptoms such as reduced immunity, accumulated toxic side effects, bone marrow suppression, nausea, vomiting, and fatigue, which all lead to adverse emotions, reduced quality of life (QOL), and elevated psychological burden, thus negatively affecting the therapeutic effect [4-6]. Regarding LC patients, a 21-day chemotherapy regime is generally taken as the course of treatment. On day 1 and 8, drugs are administered. In order to reduce the medical cost and ensure that LC patients can receive chemotherapy on schedule, outpatient infusion and chemotherapy are carried out. When the chemotherapy drugs are not completely metabolized, and the patients have returned home, the incidence of toxic reactions is high.

The purpose of this study is to analyze the effects of nursing based on Orem's self-care model on the self-care efficacy, QOL and adverse emotions of patients with ALC via implementing nursing based on Orem's self-care model for the treatment of patients with advanced lung cancer (ALC) undergoing chemotherapy, so as to provide a theoretical basis for the improvement of self-care efficacy, chemotherapy-induced side effects, physical function, emotions, and QOL of patients with ALC.

Materials and methods

General data

A total of 71 patients with ALC aged 50-70 years from the Respiratory Medicine Department in our hospital from May 2019 to May 2020 were selected. The subjects were treated with a chemotherapy regimen of gemcitabine and cis-platinum. The subjects were in stage III-IV in accordance with TNM staging criteria for LC [7]. There were 71 patients with a 3-month overall survival (OS). Among them, there were 40 males and 31 females aged 50-70 years, with a mean age of (59.97 ± 6.26) years.

Exclusion criteria: patients with unconsciousness; mental disorders; severe cardiovascular and cerebrovascular diseases; and those who were treated with synchronous radiotherapy, targeted therapy and immunotherapy were excluded.

Totally, 71 patients were divided into the control group (CNG, n = 35) and the experimental group (EXG, n = 36). There were 19 males and 16 females with a mean age of (59.89 ± 5.51) years in the CNG, and 21 males and 15 females with a mean age of (60.06 ± 6.67) years in the EXG. There was no significant difference in the general data (e.g., gender, age and course of disease) between patients of the two groups ($P > 0.05$), which were comparable.

The personal files of the 71 patients enrolled were established, and their information (e.g., name, gender, age, contact number, address) was registered. Informed consent forms were signed, and patients voluntarily participated in this study. This study has been reviewed and approved by the Ethics Committee of Nanfang Hospital, Southern Medical University.

Intervention methods

The CNG received conventional nursing.

The EXG received nursing intervention based on Orem's self-care model. First, a professional team consisting of 1 physician, 3 nurses, 2 psychological counselors and 1 nutritionist was established. Second, the patients' conditions and self-care abilities were comprehensively assessed. Finally, based on the assessment results, the patients were divided into patients with full self-care ability, patients with partial self-care ability and totally incapacitated patients [8-10]. The three types of patients received different nursing models.

Patients with full self-care ability

The instructions were provided for the patients. The patients were encouraged to perform daily activities and basic exercise on their own, with the help of the nurses' demonstration and instructions.

Patients with partial self-care ability

The implementation of self-care and others' care was proposed for the patients. The patients were encouraged to carry out simple

Study on advanced lung cancer

Table 1. Comparison of general clinical indices between the two groups ($\bar{x} \pm sd$)/[n (%)]

General clinical data		Control group (n = 35)	Experimental group (n = 36)	t/X ²	P
Gender	M	19	21	-0.333	0.795
	F	16	15		
Mean age (years)		59.89 ± 5.51	60.06 ± 6.67	-0.093	0.926
Mean weight (kg)		59.91 ± 8.21	60.40 ± 8.06	-0.323	0.748
Mean course of disease (years)		2.69 ± 1.71	2.71 ± 1.76	-0.084	0.934

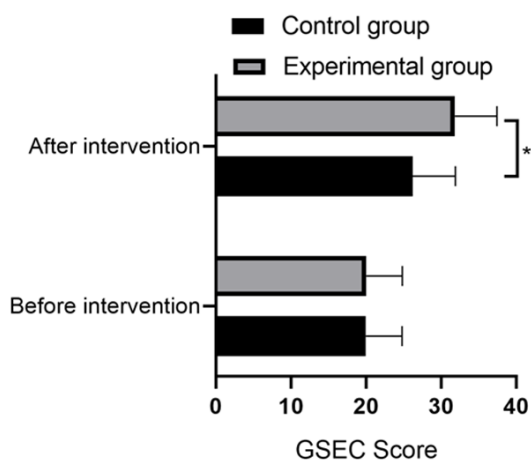


Figure 1. Analysis of changes in scores of self-care efficacy in the two groups before and after intervention. There was no significant difference in the comparison of GSEC scores between the two groups before intervention ($P > 0.05$). After intervention, the scores in the groups increased, and the scores in the experimental group were significantly higher than those in the control group ($P < 0.05$). * indicates a statistically significant difference between the two groups regarding the same indices.

daily activities on their own. Difficult activities were assisted by the families and nurses.

Totally incapacitated patients

The patients were fully taken care of by the families and nurses. Verbal encouragement was given during the intervention.

When the EXG was treated with nursing based on Orem's self-care model, the patients were assessed in regard to the changes in their conditions and compliance. Bases on the assessment results, the nursing methods and contents based on Orem's self-care model were adjusted in a timely manner to achieve more effective nursing effects.

Observational indices and assessment criteria

Analysis of changes of self-care efficacy before and after intervention: Before and after inter-

vention, the self-care efficacies in the two groups were assessed using the General Self-Efficacy Scale (GSES). GSES, prepared by R. Schwarzer and M. Jerusalem, is a psychological measurement scale with 10 items. Each item scores from 1 point (totally incorrect) to 4 points (totally correct). A higher score indicates a higher self-care efficacy [11-13].

Analysis of changes of QOL before and after intervention: Before and after intervention, the QLQ-CCC was used to assess the patients' QOL. The QLQ-CCC comprises 35 items, involving 5 aspects of LC patients. The specific aspect includes disease and body for treatment (9 items), and the non-specific aspects include physiology (7 items), psychology (5 items), society (5 items) and health (9 items) [14, 15]. A higher score indicates a higher QOL.

Analysis of changes of adverse emotions before and after intervention: The anxiety (Self-Rating Anxiety Scale, SAS) and depression (Self-Rating Depression Scale, SDS) in the two groups were scored using Hamilton Anxiety Scale (HAMA) and Hamilton Depression Scale (HAMD) before and after intervention. HAMA, prepared by Hamiltonz in 1959, consists of 14 items, including anxiety, cognitive function, nervousness and fear. A scoring system of 0-4 points was adopted. A score of 0 point indicates asymptomatic, and a score of 4 points indicates extremely severe. A higher score indicates more severe anxiety [16]. HAMD was prepared by Hamiltonz in 1960. There are three versions of HAMD, namely, HAMD comprising of 17 items, HAMD consisting of 21 items, and HAMD composed of 24 items. A scoring system was adopted. A higher score indicates more severe depression [17].

Degrees of pain before and after intervention

The degrees of pain in the two groups were assessed by visual analogue scale (VAS). A 10

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Table 2. Comparison of quality of life indices between the two groups ($\bar{x} \pm sd$)/[n (%)]

		Body	Physiology	Psychology	Society	Health
Before intervention	Control group	47.23 ± 5.38	51.80 ± 4.79	49.23 ± 5.13	50.20 ± 5.35	52.02 ± 4.49
	Experimental group	47.78 ± 5.68	51.23 ± 5.13	49.12 ± 4.68	50.43 ± 6.13	52.28 ± 6.02
After intervention	Control group	56.23 ± 5.19 ^{&}	59.18 ± 5.11 ^{&}	55.89 ± 5.70 ^{&}	60.41 ± 4.75 ^{&}	60.29 ± 4.13 ^{&}
	Experimental group	64.23 ± 4.68 ^{*,&}	66.18 ± 5.37 ^{*,&}	64.41 ± 6.13 ^{*,&}	65.98 ± 5.18 ^{*,&}	67.87 ± 3.91 ^{*,&}

Note: [&] indicates the comparison before and after intervention ($P < 0.05$), ^{*} indicates the comparison between groups after intervention ($P < 0.05$).

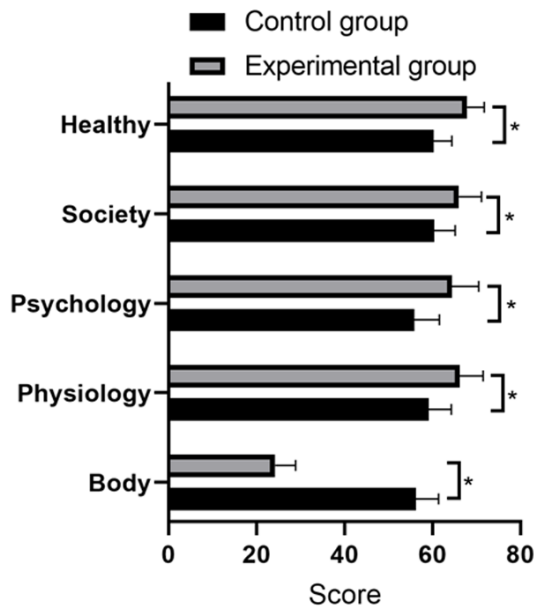


Figure 2. Analysis of changes in scores of quality of life in the two groups after intervention. The scores of body, physiology, psychology, society and health in QLQ-CCC in the experimental group were remarkably higher than those in the control group after intervention ($P < 0.05$). * indicates a statistically significant difference between groups regarding the same indices.

cm horizontal line was drawn on a piece of paper. Aero indicates painless and 10 indicates severe pain. The patients were instructed to draw a mark on the horizontal line based on their degree of pain. A higher VSA score indicates a higher degree of pain.

Statistical methods

SPSS 23.0 was used for statistical analysis. GraphPad Prism 8 was used for plotting. The measurement data were expressed as mean ± standard deviation ($\bar{x} \pm sd$), and the differences between groups were compared by t test. $P < 0.05$ indicated a statistically significant difference.

Results

Comparison of general clinical indices between the two groups

There was no statistical significance in general clinical indices (e.g., gender, age and course of disease) between the CNG and the EXG ($P > 0.05$), which were comparable (Table 1).

Analysis of changes of self-care efficacy before and after intervention

The GSES scores exhibited that before intervention, there was no marked difference in the scores (19.98 ± 4.85 points VS 20.05 ± 4.80 points) between the CNG and the EXG ($P > 0.05$). After intervention, the scores in the two groups were markedly elevated, and there were significant differences in the scores (26.20 ± 5.71 points VS 31.80 ± 5.60 points) between the CNG and the EXG ($P < 0.05$) (Figure 1).

Analysis of changes of QOL before and after intervention

The QLQ-CCC scores showed that after intervention, the scores of body, physiology, psychology, society and health were significantly elevated in the two groups compared with those before intervention ($P < 0.05$). After intervention, the scores of the five dimensions in the EXG were higher than those in the CNG, and there were remarkable differences in the same dimension between groups after intervention ($P < 0.05$) (Table 2 and Figure 2).

Analysis of changes of adverse emotions before and after intervention

The HAMA and SAS scores exhibited that before intervention, there was no marked difference in the scores (55.29 ± 4.92 points VS 55.23 ± 4.68 points) between the CNG and the EXG ($P > 0.05$). After intervention, the scores were mark-

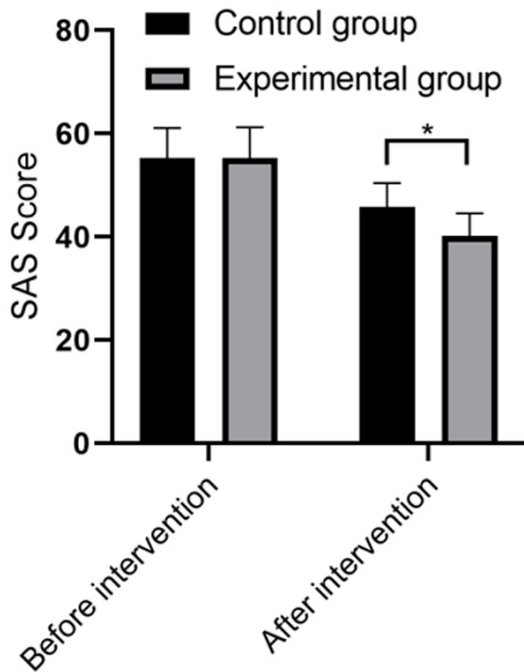


Figure 3. Analysis of changes of SAS scores in the two groups before and after intervention. There was no marked difference in HAMA and SAS scores between the two groups before intervention ($P > 0.05$). After intervention, the scores were reduced in the two groups, and the scores in the experimental group were significantly lower than those in the control group ($P < 0.05$). * indicates a statistically significant difference between groups regarding the same indices.

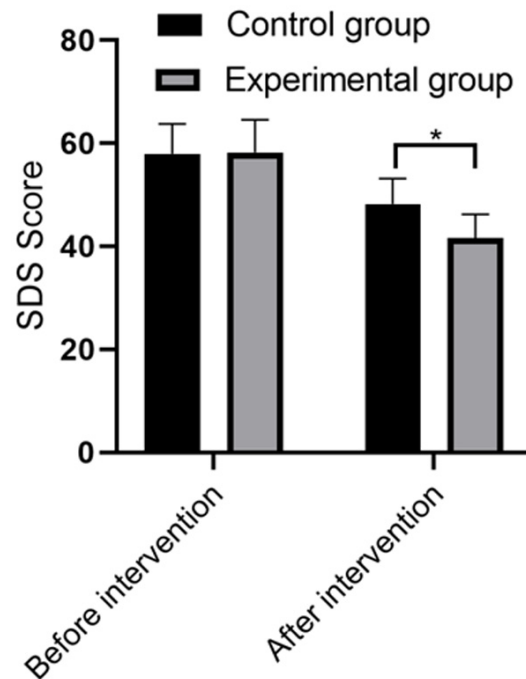


Figure 4. Analysis of changes of SDS scores in the two groups before and after intervention. There was no marked difference in HAMA and SDS scores between the two groups before intervention ($P > 0.05$). After intervention, the scores were reduced in the two groups, and the scores in the experimental group were significantly lower than those in the control group ($P < 0.05$). * indicates a statistically significant difference between groups regarding the same indices.

edly reduced in the two groups compared with those before intervention, and there were remarkable differences in the scores (45.78 ± 4.01 points VS 40.23 ± 3.48 points) between the CNG and the EXG ($P < 0.05$) (Figure 3).

The HAMD and SDS scores showed that before intervention, there was no marked difference in the scores (57.98 ± 5.79 points VS 58.23 ± 6.37 points) between the CNG and the EXG ($P > 0.05$). After intervention, the scores were markedly reduced in the two groups compared with those before intervention, and there were remarkable differences in the scores (48.23 ± 4.92 points VS 41.58 ± 4.68 points) between the CNG and the EXG ($P < 0.05$) (Figure 4).

Analysis of changes in degrees of pain before and after intervention

Before intervention, the degrees of pain were relative high in the two groups, and there were no marked differences in the scores between

the two groups ($P > 0.05$). After intervention, the VAS scores were reduced in the two groups compared with those before intervention, and there were remarkable differences in the scores between the two groups ($P < 0.05$) (Table 3).

Discussion

The aggravation of environmental issues and the changes in people’s daily life and diet have led to a rise in the incidence of LC. Therefore, LC has become the type of cancer with the highest morbidity and mortality rates [18]. Although the experimental data show that targeted therapy and biological immunotherapy have achieved good therapeutic effects, the high medical expenses are unbearable for most patients. Therefore, traditional chemotherapy and radiotherapy are still widely used.

Chemotherapy drugs act on all cells with different growth and reproduction cycles to inhibit or

Study on advanced lung cancer

Table 3. Comparison of degrees of pain in VAS between the two groups ($\bar{x} \pm sd$)/[n (%)]

Group	Before intervention	After intervention	T	P
Control group	8.76 \pm 3.42	6.36 \pm 1.73	4.442	0.021
Experimental group	8.54 \pm 4.20	3.87 \pm 1.08	22.94	0.000

kill tumor cells. Additionally, the drugs act on normal histocytes while killing tumor cells, exerting toxic side effects on blood system, digestive system, immune system, and hepatic and renal functions of human body [19-21]. Other studies have indicated that chemotherapy can significantly prolong the OS of LC patients. If economic and physical conditions permit, elderly LC patients aged over 80 years receiving intermittent chemotherapy can have a longer OS [22, 23]. In order to achieve better results, patients are often treated with high-dose combination chemotherapy. However, patients are susceptible to toxic side effects (e.g., serious bone marrow suppression, damage to hepatic and renal functions), and these toxic side effects have obvious synergistic enhancement effects. The increase in adverse reactions leads to a decline in the patients' physical tolerance, and eventually leads to the failure of chemotherapy and even the death of the patients. Recently, a growing number of studies have focused on the nursing care of patients with ALC receiving chemotherapy. Improved nursing care can relieve adverse emotions, and support confidence in overcoming ALC, as well as raise the self-care efficacy, and QOL of patients with ALC [24, 25].

In this study, Orem's self-care nursing model was implemented in the treatment of patients with ALC receiving chemotherapy. The results showed that after nursing intervention based on Orem's self-care model, the scores of self-care efficacy and QOL in the EXG were higher than those in the CNG ($P < 0.05$), while the scores of SAS and SDS, and VAS scores for degree of pain in the EXG were lower than those in the CNG ($P < 0.05$). Experiments showed that an established professional team can comprehensively assess the conditions and self-care abilities of patients, classify the patients based on the assessment results, and implement different nursing care for different patients based on Orem's self-care nursing model. After nursing intervention, the self-care efficacy and QOL,

adverse emotions (e.g., anxiety and depression), and degree of pain in patients with ALC receiving chemotherapy are effectively improved.

In summary, nursing based on Orem's self-care model can effectively improve the self-care efficacy and QOL, adverse emotions (e.g., anxiety and depression), and degrees of pain of patients with ALC receiving chemotherapy. Therefore, it is worthy of clinical promotion and implementation. The innovation of this study lies in the implementation of nursing methods based on Orem's self-care model for the daily nursing of patients with ALC receiving chemotherapy instead of providing patients with ALC with conventional nursing care. Based on the early assessment of patients with ALC, a personalized and comprehensive nursing mode is formulated, the conditions of disease and physical conditions of patients with ALC are understood through follow-ups, and the nursing plan can be revised in a timely manner to improve the adverse emotions (e.g., anxiety and depression), self-care efficacy, and QOL of patients with ALC. Additionally, nursing based on Orem's self-care model can be extensively implemented. The shortcomings of this study are as follows: (1) insufficient and regional samples lead to a lack of universality in the study conclusions. (2) The follow-up duration for patients with ALC was short, and there was a lack of assessment on the long-term effects. In view of the aforementioned shortcomings, future studies with multi-regional interventions, a larger sample size and a longer follow-up duration will be performed, so as to provide a more detailed theoretical basis for the treatment of patients with ALC.

Disclosure of conflict of interest

None.

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Study on advanced lung cancer

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