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Original Article

Effect of high quality nursing on alleviating negative emotions in patients with advanced lung cancer

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Abstract: Objective: To analyze the risk factors of moderate and severe depression and to study the effect of high quality nursing on alleviating negative emotions and improving quality of life of patients with advanced lung cancer. Method: A total of 100 patients with advanced lung cancer were collected from our hospital. According to the SDS score before the nursing, the patients with SDS score ≤62 and >52 were enrolled in the mild depression group, and those with SDS score >62 were enrolled in the moderate, severe depression group. The risk factors that make mild depression develop into moderate/severe depression were studied. The patients were randomly divided into a control group (n = 50) and an observation group (n = 50). The patients in both groups were given routine nursing, and those in the observation group received high quality nursing on the basis of routine nursing. The QOL-C30 was used to evaluate the changes in quality of life. The SDS (Self-Rating Depression Scale) and SAS (Self-rating Anxiety Scale) were used for assessing the degree of anxiety and depression. The incidence of complications and the nursing satisfaction of patients were observed. Results: The multi-factor Logistic regression results showed that gender (OR: 3.398, 95% CI: 1.020-11.324), course of disease (OR: 0.676, 95% CI: 0.562~0.814), educational level (OR: 2.073, 95% CI: 1.165-3.688), and family income (OR: 1.676, 95% CI: 9.020) were the influence factors of moderate and severe depression. The QOL-30 score in the observation group was higher than those in the control group after nursing, and the changes in the observation group were significantly greater than those in the control group (P<0.05). After nursing, the observation group had much lower SAS and SDS scores and significantly greater changes than the control group (P<0.5). The total incidence of complications in the control group was statistically greatly higher than that in the observation group (P<0.05). The nursing satisfaction in the control group was statistically much lower than that in the observation group (P<0.5). Conclusions: Gender, course of disease, educational level, and family income are independent influencing factors of moderate and severe depression. High quality nursing can effectively improve the anxiety and depression, and quality of life of patients, which is worthy of being popularized clinically.

Keywords: High quality nursing, advanced lung cancer, depression, risk factors

Introduction

Lung cancer (LC) has become the most common malignancy in the world [1]. Clinically, the most effective treatment for LC is surgery. As there is no obvious reaction in the early stage of the disease and LC is characterized by high exacerbation and rapid development, LC is advanced in most patients at admission (stage III/IV). As a result, the patients are unable to receive the surgical treatment, and can only be given chemotherapy-based comprehensive treatment [2]. However, patients will have obvious toxic and adverse reactions during chemotherapy. These reactions are more likely to cause pernicious vomiting, cancer cell spreading and increased pain, and lead to uncontrolled emotion and declined quality of life [3].

Therefore, nursing and other ways are used to improve the negative emotions and quality of life of patients clinically [4]. High quality nursing is a new nursing model, and is continuously optimized by responsibility overall rationing system, human resource allocation and seamless whole course nursing service [5]. However, pre-

vious study showed that [6] the effects of high quality nursing in improving the quality of life and emotions of patients with advanced lung cancer is still not clear.

Depression is a common negative emotion during chemotherapy. Study has shown [7] that the changes of emotion have an influence on the treatment of lung cancer patients with stage III-IV, and the toxic and side reactions after chemotherapy can be alleviated by positive attitudes and emotions. However, currently there are few studies on the risk factors of depression of patients with advanced lung cancer.

We explored the risk factors of depression first and then conducted high quality nursing and comprehensive nursing centered on those risk factors. This study investigated the effect of high quality nursing on the negative emotions and quality of life of patients with advanced lung cancer, hoping to provide reference for medical staff.

Materials and methods

Clinical data

A total of 100 patients with advanced lung cancer were collected from our hospital. According to the SDS score before the nursing, 65 patients with a SDS score ≤62 (47 males and 18 females, with an average age of 65.9±5.1 years) were enrolled in the mild depression group, and 35 patients with a SDS score >62 (15 males and 20 females, with an average age of 65.9±5.1 years) were enrolled in the moderate, severe depression group. Afterward, all the 100 patients who met the 7th Edition of the AJCC (American Joint Committee on Cancer) Cancer Staging Manual 2008 qualifications [8] were randomly and equally divided into the observation group and the control group according to a random number table. There were 32 male patients and 18 female patients in the observation group, and they were 64.2±1.5 years old in average. There were 30 male patients and 20 female patients in the control group, and they were 65.2±1.9 years old in average. The study was approved by the medical ethics committee of our hospital.

Inclusion and exclusion criteria

Inclusion criteria: Patients were in stage III and IV in accordance with the AJCC lung cancer staging. Patients were diagnosed by X-ray, nuclear magnetic resonance, CT and radionuclide scan. Education background was higher than primary school. Patients were diagnosed with lung cancer by pathological detection. Both the patients and their families were aware of the purpose of this study. The informed consent form was signed by patients.

Exclusion criteria: Patients with other malignancies. Patients with liver or kidney function diseases. Patients with infection or severe anemia before admission. Patients with neurological dysfunction. Patients with secondary lung cancer metastasized from other malignancies. Patients who were unable to answer the questionnaire.

Nursing plan

The patients in both groups were given routine nursing. The specific plan was as follows, including (1) Basic nursing. All patients were warmly received after admission to reduce the strangeness to the hospital; the attending physician, head nurse and other basic environment were introduced to the patients; the patients were given basic nursing of respiratory medicine. (2) Health education. Disease related knowledge was popularized in patients after admission. As a result, the disease, lung cancer related mechanisms and clinical manifestations, therapeutic regimen, chemotherapy related precautions, and adverse reactions during chemotherapy were fully understood. Corresponding solutions were simply described. Thus, the patients know the disease and cooperated with the treatment. (3) Infection prevention. Patients were guided to improve the indoor environment by opening windows for ventilation. The personal diet and health habits were supervised. Consequently, the patients were prevented from being infected, and getting worse because of the infection.

The patients in observation group were given high quality nursing. The specific plan was as follows, including (1) Pain nursing. As all the patients suffered from advanced lung cancer, the most significant clinical manifestation was pain. The pain not only had an impact on the body, but also affected the quality of life of patients. Medical staff relieved the pain by shifting the patient's attention. (2) Diet nursing. Patients were prone to loss of appetite and weakened immunity due to vomiting and nau-

sea during chemotherapy. Scientific diet regimen (based on high protein, high calorie and high fiber) was made by knowing the actual situations of individual patients and consulting dietitians.

Outcome measures

Primary outcome measures: Binary Logistic Regression was used to analyze the risk factors for mild depression developing into moderate/severe depression. The changes in quality of life were observed in both groups. QLQ-C30 was used to evaluate the quality of life, mainly in terms of emotional function, physical function, social function and role function [9]. Measurement of the degree of the anxiety and depression of patients were performed in both groups. SAS (Self-rating anxiety scale) was used to evaluate the anxiety, and the total score was 100 points [10]. The higher the score was, the more serious the anxiety was.

Secondary outcome measures: The incidence of complications and the nursing satisfaction were observed in both groups. Complications in this study included atelectasis, pulmonary infection, cardiac arrhythmia, and respiratory failure. Nursing satisfaction scale was used for evaluation. The scale was formulated by our hospital, and the total score was 100 points. Greater than 80 implied great satisfaction, 60-80 implied satisfaction, and <60 implied dissatisfaction.

Statistical analysis

In this study, data analysis was performed by SPSS 20.0, and the figures were plotted using GraphPad Prism 7. K-S test was applied to analyze the normal distribution of data. Enumeration data utilization rate (%) was analyzed with Chi-squared test and expressed with χ^2. Ranked data were analyzed with rand sum test and expressed with Z. Normally distributed measurement data were analyzed with t test and expressed with mean ± standard deviation (SD ± Mean). Independent-sample t test was used for comparison among groups. Paired t test was used for intra-group before-after comparison. Non-normally distributed measurement data were analyzed with non-parametric test and expressed with quartile. Risk factors were analyzed with multi-factor Logistic regression. The analysis was performed with the Forward LR method. The selection and assignment of variables were based on the single-factor analysis and only variables that showed statistical difference (P<0.05) between groups were chosen. P<0.05 implied a significant difference.

Results

Single-variate analysis for the risk factors of moderate, severe depression

The patients were grouped according to the SDS score before the nursing. The patients with SDS score >62 were enrolled in the moderate, severe depression group (n = 35), and those with SDS score ≤62 were enrolled in the mild depression group (n = 65). Clinical data were collected for single-factor analysis. The results showed that there were no differences in age, BMI, ACJJ grading, past medical history, smoking index, or history of alcoholism between the two groups (P>0.05), but there were differences in gender, disease of course, educational level and family income (P<0.05) (**Table 1**).

Multi-factor logistic regression for the risk factors of moderate, severe depression

Significant single-factor measures were collected for assignment (**Table 2**). Entry mode was selected for multi-factor Logistic regression. The results showed that gender (OR: 3.398, 95% CI: 1.020-11.324), disease of course (OR: 0.676, 95% CI: 0.562-0.814), educational level (OR: 2.073, 95% CI: 1.165-3.688), and family income (OR: 1.676, 95% CI: 9.020) were the influence factors of moderate, severe depression (**Table 3**).

No differences were observed in baseline data

The 100 patients were randomly divided into two groups. The analysis on clinical data showed that the gender, age, BMI, course of disease, pathological grading, past medical history, smoking index, alcoholism history, educational level, family income, and degree of depression were not statistically different between the two groups (P>0.05) (**Table 4**).

The observation group showed more changes of QLQ-C30 scores

The QLQ-C30 scores between the two groups were not significantly different before nursing

Table 1. Single-factor analysis of mild, moderate, severe depression

Factor		Moderate, Severe Depression Group (n = 35)	Mild Depression Group (n = 65)	t/2/Z Value	*P* Value
Gender	Male	15 (42.86)	47 (72.31)	8.375	0.004
	Female	20 (57.14)	18 (27.69)		
Age (Years old)		64.5±4.3	65.9±5.1	0.394	0.694
BMI (kg/m^2)		22.08±1.81	22.59±1.49	1.513	0.134
Course of Disease (Month)		23.59±2.76	19.59±4.26	5.011	<0.001
ACJJ Grading	III	15 (42.86)	31 (47.69)	0.214	0.644
	IV	20 (51.14)	34 (52.31)		
Past Medical History	Hypertension	15 (42.86)	31 (47.69)	0.214	0.664
	Diabetes Mellitus	12 (34.29)	31 (47.69)	1.668	0.197
	Hyperlipemia	10 (28.57)	23 (35.38)	0.478	0.49
Smoking Index	≥mok	27 (77.14)	51 (78.46)	0.023	0.879
	<300	8 (22.86)	14 (21.54)		
History of Alcoholism	Yes	5 (14.29)	8 (12.31)	0.079	0.779
	None	30 (85.71)	57 (87.69)		
Educational Level	Junior high school	15 (42.86)	6 (9.23)	-2.798	0.005
	Senior high school	8 (22.86)	29 (44.62)		
	College	10 (28.57)	18 (27.69)		
	University	2 (5.71)	12 (18.46)		
Family Income (Yuan)	<1000	15 (42.86)	7 (10.77)	-3.145	0.002
	1000~3000	15 (42.86)	41 (63.08)		
	>3000	5 (14.28)	17 (26.15)		

Table 2. Assignment table

Factor	Assignment
Depression Condition (Y)	Mild depression = 1 (reference), moderate, severe depression = 2
Gender (X)	Male = 1, Female = 2
Course of Disease (X)	The data were continuous variables, and raw data were used for analysis
Educational Level (X)	Junior high school = 1 (reference), senior high school = 2, college = 3, university = 4
Family Income (X)	<1000 = 1 (reference), 1000~3000 = 2, >3000 = 3

Table 3. Multi-factorial logistic regression analysis for risk factors for severe depression

Factor	β	S.E,	Wals	Sig.	Exp (β)	95% CI of EXP (β)	
						Lower Limit	Upper Limit
Gender	1.223	0.614	3.968	0.046	3.398	1.020	11.324
Course of Disease	-0.391	0.095	17.043	0.000	0.676	0.562	0.814
Educational Level	0.729	0.294	6.149	0.013	2.073	1.165	3.688
Family Income	1.358	0.429	9.999	0.002	3.888	1.676	9.020

(P>0.05). However, the QLQ-C30 scores were significantly improved and markedly increased after nursing. Comparison between the two groups showed higher values in the observation group than in the control group. After calculating, we found that the changes in the observation group were significantly larger than those in control group (P<0.05) (**Table 5**).

The observation group showed more changes of SAS and SDS scores

No statistical difference was found between the two groups before the nursing in terms of the SAS and SDS scores (P>0.05). However, the SAS and SDS scores were significantly improved and dramatically declined after nursing. The

Table 4. Comparison of clinical data

Factors		Control Group (n = 50)	Observation Group (n = 50)	t/2/Z	*P* Value
Gender	Male	30 (60.00)	32 (64.00)	0.170	0.680
	Female	20 (40.00)	18 (36.00)		
Age (years old)		65.2±3.9	64.2±3.5	0.447	0.656
BMI (kg/m^2)		22.15±1.55	22.05±1.42	1.349	0.180
Course of Disease (Month)		21.40±4.25	20.41±5.11	1.053	0.295
ACJJ Grading	III	25 (50.00)	21 (42.00)	0.644	0.422
	IV	25 (50.00)	29 (58.00)		
Past Medical History	Hypertension	24 (48.00)	22 (44.00)	0.161	0.688
	Diabetes mellitus	20 (40.00)	23 (46.00)	0.367	0.545
	Hyperlipemia	15 (30.00)	18 (36.00)	0.407	0.524
Smoking Index	≥mok	38 (76.00)	40 (80.00)	0.233	0.629
	<300	12 (24.00)	10 (20.00)		
History of Alcoholism	Yes	5 (10.00)	8 (16.00)	0.796	0.372
	None	45 (90.00)	42 (84.00)		
Educational Level	Junior high school	10 (20.00)	11 (22.00)	-0.432	0.666
	Senior high school	20 (40.00)	17 (34.00)		
	College	15 (30.00)	13 (26.00)		
	University	5 (10.00)	9 (18.00)		
Family Income (Yuan)	<1000	12 (24.00)	10 (20.00)	-1.059	0.289
	1000~3000	30 (60.00)	27 (54.00)		
	>3000	8 (16.00)	13 (26.00)		
Degree of depression	Mild depression	31 (62.00)	34 (68.00)	0.396	0.529
	Moderate, severe depression	19 (38.00)	16 (32.00)		

Table 5. Changes in QLQ-C30 score in both groups

Factor	Control Group (n = 50)			Observation Group (n = 50)		
	Before nursing	After nursing	Difference	Before nursing	After nursing	Difference
Emotional Function	68.54±4.25	78.42±5.24*	9.88±3.25	67.25±5.22	88.74±6.25$^{*,\#}$	21.49±10.22$^\Delta$
Physical Function	72.94±4.15	81.22±5.77*	8.28±4.25	73.44±4.58	93.55±7.21$^{*,\#}$	20.11±11.33$^\Delta$
Social Function	65.05±4.32	75.24±5.05*	10.19±5.22	66.22±4.94	89.54±6.55$^{*,\#}$	23.32±10.58$^\Delta$
Role Function	70.21±5.22	83.55±7.22*	13.34±5.84	71.32±5.48	92.33±6.11$^{*,\#}$	21.01±12.39$^\Delta$

Note: *implied the difference before and after nursing (P<0.05), $^\#$implied the difference compared with control group (P<0.05), and $^\Delta$implied the difference compared with the difference in the control group (P<0.05).

SAS and SDS sores in the observation group were significantly lower than those in the control group. After calculating, we found that the changes in the observation group were significantly larger than those in the control group (P<0.05) (**Table 6** and **Figure 1**).

The observation group showed higher nursing satisfaction

The statistics on the complications of patients showed that there were 2 cases of atelectasis, pulmonary infection, 1 case of arrhythmia, and 1 case of respiratory failure, respectively that occurred in the observation group, and 5 cases of atelectasis, pulmonary infection, 4 cases of arrhythmia, and 4 cases of respiratory failure, respectively that occurred in the control group. The total incidence of complications was significantly different between the two groups (P<0.05, **Table 7**) The statistics on nursing satisfaction showed that there were, respectively, 38 cases of great satisfaction, 10 cases of satisfaction, and 2 cases of dissatisfaction in the observation group, and there were, respectively, 27 cases of great satisfaction, 12 cases of

Table 6. Changes in SAS and SDS scores

Group	SAS Score					SDS Score				
	Before nursing	After nursing	t	P	Difference	Before nursing	After nursing	t	P	Difference
Control Group (n = 50)	54.25±5.11	48.24±3.84	5.465	<0.001	6.00±3.21	62.44±8.54	49.55±4.82	11.388	<0.001	12.89±5.88
Observation Group (n = 50)	55.14±4.84	41.33±3.54*	18.222	<0.001	13.81±4.25	63.25±7.35	42.32±4.33*	16.208	<0.001	20.93±6.33
t value	0.894	9.355			10.369	0.508	7.890			6.580
P value	0.373	<0.001			<0.001	0.612	<0.001			<0.001

Note: *implied the difference compared with the control group (P<0.05).

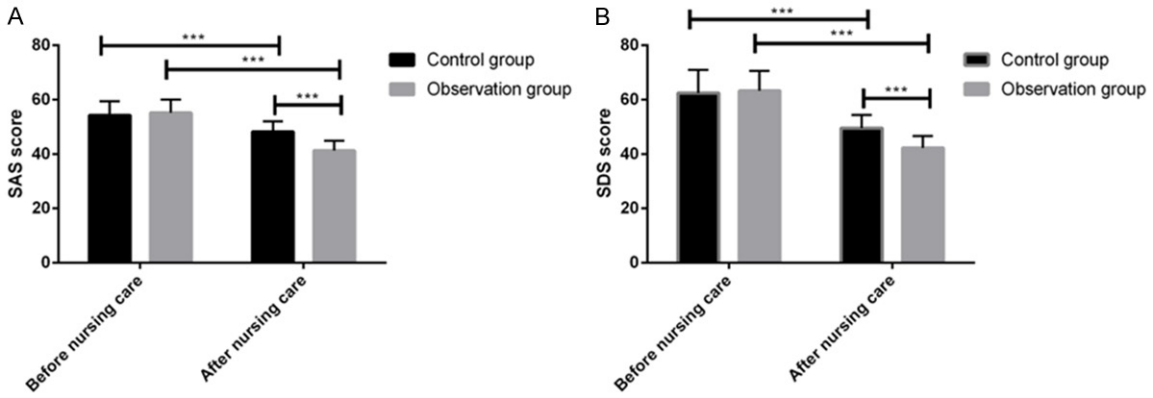

Figure 1. SAS and SDS scores before and after nursing. A. SAS scores before and after nursing. B. SDS scores before and after nursing. ***implied a significant difference between the two groups (P<0.001).

Table 7. Statistics on complications

Group	Atelectasis, pulmonary infection	Arrhythmia	Respiratory Failure	Total Incidence
Control Group (n = 50)	5 (10.0)	4 (8.00)	4 (8.00)	13 (26.00)
Observation Group (n = 50)	2 (4.00)	1 (2.00)	1 (2.00)	4 (8.00)
χ^2 Value	1.382	1.895	1.895	5.741
P Value	0.240	0.169	0.169	0.017

Table 8. Comparison of nursing satisfaction

Group	Great Satisfaction	Satisfaction	Dissatisfaction	Z Value	*P* Value
Control Group (n = 50)	38 (76.00)	10 (20.00)	2 (4.00)	-2.597	0.009
Observation Group (n = 50)	27 (54.00)	12 (24.00)	11 (22.00)		

satisfaction, and 11 cases of dissatisfaction in the control group. A difference was recognized between the two groups concerning the nursing satisfaction (P<0.05) (**Table 8**).

Discussion

At present, there is no effective treatment for malignancy. Therefore, it is particularly important to improve the quality of life of patients in their final days [11]. Study has shown [12] that depression is the most common adverse psychological reaction in cancer patients. Study of Pascoe et al. [13] has shown that depression occurred in more than 35.1% of 4996 patients with 14 different cancers. Patients with severe depression may give up the treatment, or commit suicide, etc. Therefore, it is particularly critical to apply psychological intervention in patients. We analyzed the risk factors of moderate, severe depression in 100 patients, and found that gender, duration, educational level and family income were the independent influencing factors. We speculate that the main causes of moderate and severe depression in female patients may be as follows: Female patients are not conditioned to express their feelings in a healthy way, and the patients with

advanced lung cancer tend to be older, postmenopausal, and with lower estrogen. Similarly, educational level and family income are also closely related to depression. The patients with better family conditions have higher educational level due to less economic pressure. Thus, they have more economic resources to face diseases. On the contrary, the family conditions of the patients with lower educational level are relatively poor. Most of the family members are unwilling to inform the patients of their conditions, resulting in the increase in the psychological burden of patients. Moreover, the patients have little chance of survival after knowing the condition and course of the disease, and their depression is aggravated. The high quality nursing significantly improves the depression and quality of life of patients, and helps patients establish the correct values and build confidence in this study.

High quality nursing is a comprehensive nursing plan. Under the conditions of basic nursing, medical staff takes the patient as the core to complete all work, and implement a people oriented service concept to meet the basic requirements of the patient. In addition, the patients are ensured to be free from injury. Moreover, not only the patient's body is guaranteed to be comfortable, but also psychological intervention and counseling are given to patients [14]. In this study, the effect of high quality nursing on negative emotions and quality of life of patients with advanced lung cancer was investigated to provide reference for clinicians. QLQ-C30 is a quality of life scale for cancer patients and was developed by the European Organization for Research and Treatment of Cancer (EORTC). Its effect has been confirmed in multiple clinical trials [15]. In the study of Kang et al. [16], the QLQ-C30 score of patients with breast cancer was significantly improved by comprehensive nursing. Comprehensive nursing, recognized by nursing staff to be effective, covers a wild range of aspects, but is poorly patient-oriented. High quality nursing emphasizes the comfort of patients, aiming to make patients more comfortable without causing damage, to handle their negative emotions, and to improve their quality of life. The clinical manifestations of patients with advanced breast cancer were similar to those of the patients with lung cancer. In this study, we found that all function scores were significantly improved after nursing. The improvement and changes in the observation group were significantly higher than those in the control group, indicating that high quality nursing can effectively improve the QLQ-C30 score and quality of life of patients. This is mainly because the quality of life is improved through psychological intervention, pain nursing, and diet nursing.

Afterwards, we also compared the SAS and SDS scores between the two groups. The SAS score has been widely used clinically, and can well reflect the subjective feelings of patients with anxiety. The SDS score can directly reflect the changes in depression, but it has certain requirements for the educational level of patients [17, 18]. After comparing, we found that the SAS and SDS scores in the two groups were significantly reduced after nursing. After the nursing, the observation group had much lower SAS and SDS scores and significantly greater changes than the control group, which might be a result of the intensive enlightenment and communication for patients with higher risk of depression. In the study of Fan et al. [19], the SAS and SDS scores of patients with LC were significantly improved by focused nursing, and the reduction was significantly higher than that of patients without focused nursing. The same effect was also obtained from high quality nursing, indicating that high quality nursing can effectively improve the anxiety and depression.

Moreover, we performed statistics analysis on nursing satisfaction and complications of patients. According to the results, patients in the observation group presented higher nursing satisfaction and lower incidence of complications than the control group, indicating the advantages of high quality nursing being able to improve the nursing satisfaction and lower the incidence of complications. Reducing the complications is beneficial to the treatment of patients and can avoid unnecessary costs. As a result, the nursing satisfaction is well improved.

In this study, we found that gender, course of disease, education level, and family income were independent factors for moderate to severe depression. However, quality nursing can effectively improve anxiety, depression, and quality of life.

There are still some limitations in this study. There is no long-term follow-up. It is not clear whether we can improve the survival time of

patients through quality nursing. Secondly, whether this nursing model is effective in other cancer types is still unclear. Third, we did not explore the costs of nursing model and the financial burden that patients may bear. We will consider these factors in future research.

Disclosure of conflict of interest

None.

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