Original Article
Quality of life levels and physical and mental states of dyspnoeic patients with advanced lung cancer effectively improved by comprehensive nursing intervention

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Abstract: Objective: The aim of the current study was to investigate the effects of comprehensive nursing intervention on quality of life levels, as well as physical and mental statuses, of patients with advanced lung cancer. Methods: A total of 240 patients, diagnosed with lung cancer via pathology biopsies, were enrolled as subjects. They were randomly divided into two groups, including the study group (n = 120) receiving comprehensive nursing intervention and the control group receiving routine nursing (n = 120). Efficacy and quality of life levels of the two groups of patients were compared. Changes in respiratory function in the two groups were observed. Results: There were no significant differences in respiratory rates, maximum ventilation volume (MVV), and first-second forced vital capacity (FEV1) before intervention between the two groups (P > 0.05). After intervention, respiratory rates of the two groups of patients were lower than those before intervention (P < 0.05). Respiratory rates of the study group were lower than those of the control group (P < 0.05). MVV and FEV1 levels of the two groups were higher than those before intervention (P < 0.05). MVV and FEV1 levels of the study group were significantly higher than those of the control group (P < 0.05). Self-rating depression scale (SDS) and self-rating anxiety scale (SAS) scores of the two groups were decreased (P < 0.05). SDS and SAS scores of the study group were significantly lower than those of the control group (P < 0.05). Moreover, QLQ-C30 scores of the two groups were significantly higher than those before intervention (P < 0.05). QLQ-C30 scores of the study group were significantly higher than those of the control group (P < 0.05). Nursing satisfaction of the study group was significantly higher than that of the control group (P < 0.05). Conclusion: Comprehensive nursing intervention provides good application effects, improving respiratory function. Therefore, it is worthy of promotion in clinical practice.

Keywords: Comprehensive nursing intervention, advanced lung cancer, lung function, quality of life

Introduction

Lung cancer is the primary cause of cancer deaths, worldwide [1]. According to research data, there are more than 1.6 million people diagnosed with lung cancer. It accounts for 13% of all new cancers, with 1.4 million deaths attributed to lung cancer. The death toll accounts for 18% of all cancers [2]. Lung cancer has high incidence and mortality rates, with a tendency toward younger people [3]. Since the early symptoms of lung cancer are latent and diagnosis is mostly advanced, patients are more physically and psychologically troubled than with other cancers [4]. Moreover, the high cost of treatment will lead to a huge economic burden. This will bring about negative emotions for patients, greatly reducing quality of life levels [5]. At present, chemotherapy and radiotherapy are used to treat patients with advanced lung cancer. During treatment, negative emotions, such as anxiety and depression, often occur. These greatly impact patient lives [6]. Improving quality of life levels of patients with advanced lung cancer, as well as reducing occurrence of adverse emotions, are huge challenges for nursing staffs [7].

It is currently believed that nursing is an integral part of the lung cancer therapeutic process [8].

Studies have shown that scientific and reasonable nursing can significantly relieve patient pain, improving therapeutic efficacy during treatment [9]. The comprehensive nursing model is an advanced nursing concept. It can enhance communication between doctors and patients, provide patients with quality care, reduce adverse emotions, and build a friendly medical relationship [10]. The application of comprehensive nursing intervention will also help patients to develop good habits during treatment [11].

Comparing the effects of comprehensive nursing intervention and routine nursing intervention on quality of life levels, as well as physical and mental states, of patients with advanced lung cancer, the current study aimed to examine the clinical value of comprehensive nursing intervention in the treatment of advanced lung cancer.

Materials and methods

General information

A total of 240 patients with advanced lung cancer were treated as subjects. They were randomly divided into the study group receiving comprehensive nursing intervention (n = 120) and control group receiving routine nursing (n = 120). There were 88 males and 32 females in the study group.

Inclusion and exclusion criteria

Inclusion criteria: Patients with pathological stage of III or IV; Patients with complete clinicopathologic data; Patients willing to actively cooperate with the work; Patients that did not receive medical treatment before admission; Patients received surgery and postoperative chemotherapy after diagnosis of lung cancer; Patients with (KSP) ≥ 70 points; Patients with clear consciousness and language communication.

Exclusion criteria: Pregnant or lactating women; Patients with a family psychiatric history; Patients with autoimmune system defects; Patients with liver dysfunction and/or severe organ disease.

The current study was approved by the Ethics Committee of Union Hospital, Tongji Medical College, Huazhong University of Science and Technology. All subjects provided informed consent.

Nursing methods

Patients in the control group were treated with routine nursing (including medication and dietary guidance). Patient changes during the treatment period were constantly observed. The ward was cleaned continuously, providing a quiet and comfortable environment. Study group: (1) Psychological care: The nursing staff established a good relationship between patients and their families, educating and promoting disease-related knowledge. Patient psychological states were assessed according to their personality, including family background and educational levels. Patient doubts were answered patiently and meticulously. Comforting words and therapeutic terms were used to psychologically guide the patients, aiming to alleviate bad moods. If necessary, psychologists were invited to participate in psychological intervention; (2) Pain care: Pain was closely monitored. Patients were distracted by massages, based on personal preferences. For serious cases, analgesic drugs were given with permission of the doctor; (3) Dietary care: According to the physical condition of the patient, a reasonable and healthy daily diet plan was formulated. They were instructed to eat little and more often, with less salt, less sugar, less fat. They were given more food with rich vitamins, protein, and crude fiber, promoting the body's immunity; (4) Care of adverse reactions and complications: Patient changes during the treatment period were constantly observed. To prevent possible complications, symptomatic treatment was carried out as soon as possible. For common complications, such as hair loss, bone marrow suppression, and gastrointestinal reactions, patient moods were actively pacified. At the initial stage of hair loss, head massages were performed to improve the local circulation and reduce hair loss. The staff explained that hair loss was temporary. Hats or wigs may be used to help the patients remain confident. When bone marrow suppression occurred, attention was paid to the prevention of infections. The ward was maintained with appropriate temperature and humidity levels, along with regular disinfection. Sputum was removed in time, along with oral cleaning; (5) Life care: In daily life, related activities were actively organized to reduce the negative emo-

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

	Study group (n = 120)	Control group (n = 120)	X² or t	P
Gender			0.726	0.394
Male	88 (73.33)	82 (68.33)		
Female	32 (26.67)	38 (31.67)		
Age	57.82 ± 8.17	56.77 ± 8.07	1.002	0.318
Smoking			0.155	0.694
Yes	72 (60.00)	69 (57.50)		
No	48 (40.00)	51 (42.50)		
Drinking			0.154	0.695
Yes	68 (56.67)	71 (59.17)		
No	52 (43.33)	49 (40.83)		
Nationality			0.348	0.555
The Han nationality	91 (75.83)	87 (72.50)		
Minority	29 (24.17)	33 (27.50)		
BMI (kg/m²)	22.78 ± 2.11	22.37 ± 1.99	1.549	0.123
Education level			0.444	0.801
Primary school culture	27 (22.50)	30 (25.00)		
High school	56 (46.67)	51 (42.50)		
College or above	37 (30.83)	39 (32.50)		

tions of patients. These activities improve their confidence in life. Family members and friends can provide social support and build a favorable atmosphere for patients. Sleep guidance was given to ensure the quality of sleep. Moderate exercise was conducted, but exercise intensity and times were strictly controlled. Resistance was increased step by step. Moreover, patient physical conditions and temperature differences between day and night were closely monitored.

Outcome measures and assessment criteria

Outcome measures: Clinical efficacy levels of the two groups were observed. Respiratory function indicators of the two groups were compared before and after intervention. Quality of life scores, anxiety, and depression were recorded. Nursing satisfaction levels of the two groups were also investigated.

Evaluation criteria: 1) Self-rating anxiety scale (SAS) [12] and self-rating depression scale (SDS) [13] scores were used to observe changes in psychological status of the two groups before and after treatment. Higher scores indicate higher anxiety and depressive symptoms;

2) Evaluation of therapeutic effects based on solid tumors [12]: Complete remission (CR): After treatment, the lesion disappeared completely and lasted for more than one month; Partial remission (PR): The sum of the maximum diameter of the lesion was reduced by no less than 30%; Stable diseases (SD): The sum of the maximum diameter of the lesion was reduced by 20%-30%; Progression diseases (PD): The sum of the maximum diameter of the lesion was increased by no less than 20%; 3) Quality of Life Scale of European Cancer Treatment and Research Organization (QLQ-C30) [14] was used to compare quality of life levels of the two groups of patients before and after intervention.

Statistical analysis

Experimental data were statistically analyzed with SPSS 19.0 software (IBM, SPSS, Chicago, IL, USA). Enumeration data are indicated by [n (%)]. Chi-square tests were used for comparisons between groups. Measurement data are indicated by ($\bar{x} \pm$ sd). Independent sample t-tests were used for comparisons between the two groups. Paired sample t-tests were used before and after treatment. Multiple comparisons between groups were performed by Dunnett t-tests. P < 0.05 indicates statistical significance.

Results

Comparison of general data between the study group and control group

Analysis of clinical data of the two groups of patients showed no significant differences in gender, age, smoking and drinking, nationality, body mass index (BMI), and education levels between the two groups. Differences were not statistically significant (P > 0.05). The age range was (57.82 ± 8.17) years and the BMI range was (22.78 ± 2.11) kg/m². There were 82 males and 38 females in the control group. The age range was (56.77 ± 8.07) years and the BMI range was (22.37 ± 1.99) kg/m² (**Table 1**).

Table 2. Comparison of therapeutic effects between the two groups [n (%)]

	CR	PR	SD	PD	Total effective rate
Study group	21 (17.50)	49 (40.83)	36 (30.0)	14 (11.67)	70 (58.33)
Control group	16 (13.33)	37 (30.83)	41 (34.17)	26 (21.67)	53 (44.16)
X^2					4.820
P					0.028

Comparison of therapeutic effects between the two groups

Therapeutic effects of the two groups were compared. After intervention, the total effective rate of the study group was 58.33%. After intervention, the total effective rate of the control group was 44.16%. The total effective rate of the study group was higher than that of the control group. The difference was statistically significant (t = 4.820, P < 0.05) (**Table 2**).

Comparison of respiratory function between the two groups

There were no significant differences in respiratory rates, maximum ventilation volume (MVV), and first-second forced vital capacity (FEV1) before intervention between the two groups (P > 0.05). After intervention, respiratory rates of the two groups of patients were lower than those before intervention (P < 0.05). The respiratory rate of the study group was lower than that of the control group (P < 0.05). After intervention, MVV and FEV1 levels of the two groups were higher than those before intervention (P < 0.05). MVV and FEV1 levels of study group were higher than those of the control group (P < 0.05) (**Table 3**).

Comparison of SDS and SAS scores between the two groups

There were no significant differences in self-rating anxiety scale (SAS) and self-rating depression scale (SDS) scores between the two groups of patients before intervention. Differences were not statistically significant (P > 0.05). After intervention, SDS and SAS scores of the two groups were decreased (P < 0.05). SDS and SAS scores of the study group were lower than those of the control group, with statistically significant differences (P < 0.05) (**Figures 1**, **2**).

Comparison of quality of life scores between the two groups

Quality of life scores of the two groups were compared from the five aspects of role fact (RF), physical fact (PF), cognition fact (CF), emotion fact (EF), and social fact (SF). There were no significant differences in quality of life scores between the two groups before intervention (P > 0.05). After intervention, quality of life scores of the two groups were higher than those before treatment. Differences were statistically significant (P < 0.05). RF, PF, CF, EF, and SF scores in the study group were higher than those in the control group (P < 0.05) (**Table 4**).

Comparison of nursing satisfaction levels between the two groups

Nursing satisfaction levels of the two groups are shown in **Table 5**. Nursing satisfaction of the study group was 93.33%. Nursing satisfaction of the control group was 80.00%. Nursing satisfaction of the study group was higher than that of the control group. Differences were statistically significant (P < 0.05).

Discussion

Lung cancer is a respiratory disease caused by multiple factors (smoking, environmental pollution, and age) [15]. Of these, advanced lung cancer usually refers to patients in stages III and IV [16]. Recently, outstanding progress has been achieved in oncology treatments of advanced lung cancer. However, the survival rate is still very low, seriously threatening the lives of patients [17]. Lung cancer is difficult to treat. It requires patients to resist the disease for a long time. Research at home and abroad has suggested that cancer is a physical and mental disease. Occurrence and development have a negligible connection with emotions [18, 19]. It has been reported that negative emotions, such as anxiety and depression, with malignant tumors during treatment have a great influence on prognosis. The compliance of patients receiving treatment is often reduced, leading to a decrease in therapeutic effects [20]. Dyspnea is a common symptom of lung cancer, especially for advanced lung cancer patients [21, 22]. It

Table 3. Comparison of respiratory function between the two groups before and after intervention ($\bar{x}$ ± sd)

	Sudy group		t	P	Control group		t	P
	Before	After			Before	After		
Respiratory rate (a time/min)	20.01 ± 5.78	12.08 ± 2.45	13.140	< 0.001	20.11 ± 5.89	17.93 ± 3.65*	3.612	< 0.001
MVV(L)	47.76 ± 12.09	69.34 ± 11.65	14.290	< 0.001	48.11 ± 11.76	53.86 ± 11.27*	3.808	< 0.001
FEV1(L)	0.87 ± 0.32	1.78 ± 0.43	20.000	< 0.001	0.91 ± 0.37	1.34 ± 0.27*	9.448	< 0.001

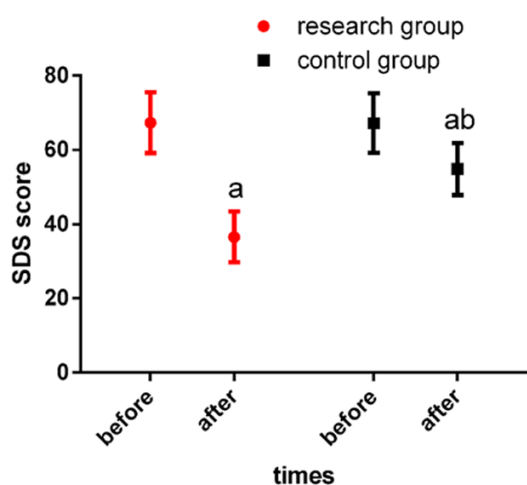Note: * compared with the study group, *P < 0.05.

Figure 1. Comparison of SDS scores between the two groups. Before intervention, there were no significant differences in SDS scores between the two groups (P > 0.05). After intervention, SDS scores of the two groups were lower than those before intervention (P < 0.05). SDS scores of the study group were lower than those of the control group (P < 0.05). Note: [a]indicates a comparison with that before intervention, [a]P < 0.05; [b]indicates a comparison with that of the study group after intervention, [b]P < 0.05.
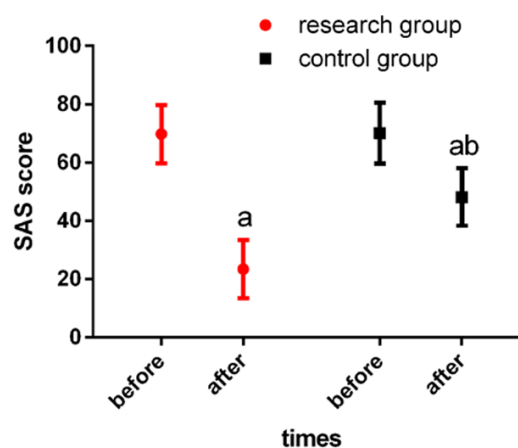

Figure 2. Comparison of SAS scores between the two groups. Before intervention, there were no significant differences in SAS scores between the two groups (P > 0.05). After intervention, SAS scores of the two groups were lower than those before intervention (P < 0.05). SAS scores of the study group were lower than those of the control group (P < 0.05). Note: [a]indicates a comparison with that before intervention, [a]P < 0.05; [b]indicates a comparison with that of the study group after intervention, [b]P < 0.05.

will aggravate patient conditions, affecting survival time and quality. Moreover, it will aggravate negative emotions [23, 24].

Routine nursing mostly relies on drug regulation and corresponding health education. Although it has certain effects, it lacks individualization and pertinence. Its application effects are limited to patients undergoing lung cancer chemotherapy [25]. Comprehensive nursing intervention is a brand-new nursing model, intervening from various aspects. It strives to improve the quality of life of patients and enhance the psychological status [26]. Studies have shown that implementation of comprehensive nursing intervention can effectively improve pregnancy outcomes of infertility patients with *in vitro* fertilization-embryo transfer (IVF-ET)

polycystic ovary syndrome. It can also increase quality of life [23]. Comprehensive nursing can reduce postoperative anal bulge degrees in patients with rectal mucosal prolapse, decrease anxiety and depression, and improve nursing efficacy [27]. At present, QLQ-C30 is mainly used to evaluate the quality of life of patients [28]. It has been reported that heart rates, MVV levels, and FEV1 levels can reflect the cardiopulmonary function of patients with lung cancer [29]. The current study examined the psychological status of patients via SAS and SDS scales.

Therapeutic effects of the two groups were compared. After intervention, the total effective rate of the control group was 44.16%. The total effective rate of the study group was 58.33%. The total effective rate of the study group was

Table 4. Quality of life scores of the two groups ($\overline{x} \pm$ sd)

	Study group				Control group			
	Before	After	t	P	Before	After	t	P
RF	65.23 ± 7.88	82.37 ± 6.85	16.896	< 0.001	64.97 ± 8.25	72.11 ± 8.36*	7.039	< 0.001
PF	80.34 ± 6.21	90.26 ± 5.21	13.587	< 0.001	80.77 ± 6.01	85.32 ± 5.11*	6.232	< 0.001
CF	80.11 ± 7.21	91.09 ± 6.11	13.361	< 0.001	80.51 ± 5.73	84.65 ± 6.32*	5.038	< 0.001
EF	60.21 ± 4.65	84.32 ± 5.17	37.206	< 0.001	61.09 ± 4.89	70.77 ± 5.34*	14.938	< 0.001
SF	50.11 ± 5.01	64.28 ± 5.96	19.920	< 0.001	50.08 ± 4.97	56.12 ± 6.01*	8.491	< 0.001

Note: * represents a comparison with the study group after intervention, *P < 0.05.

Table 5. Comparison of satisfaction degrees between the two groups [n (%)]

	Great satisfaction	Satisfaction	Dissatisfaction	Degree of satisfaction
Study group	66 (55.00)	46 (38.33)	8 (6.67)	112 (93.33)
Control group	41 (34.17)	55 (45.83)	24 (20.0)	96 (80.00)
X^2				7.236
P				0.007

higher than that of the control group. Results showed that comprehensive nursing intervention can markedly improve therapeutic effects of patients with advanced lung cancer. Studies have shown that nursing intervention is more effective than routine nursing, improving the therapeutic efficacy of patients with non-small cell lung cancer and concurrent radio-chemotherapy [30]. However, the effects of comprehensive nursing on advanced lung cancer remain to be confirmed. At present, there are few studies concerning comprehensive respiratory nursing for patients with advanced lung cancer. Results of the current study suggest no significant differences in respiratory rates, MVV levels, and FEV1 levels between the two groups. After intervention, respiratory function indicators of both groups were improved. Effects of the study group were more significant. Studies by HUANG [31] et al. showed that self-management education and behavioral intervention, based on routine nursing intervention, can significantly improve MVV, forced vital capacity (FVC), and FEV1 indicators, promoting the recovery of lung function. The study showed that comprehensive nursing can significantly improve the respiratory function of patients with advanced lung cancer. Some scholars in China have reported that depression and anxiety levels in patients with advanced non-small cell lung cancer and chemotherapy were obvious [32]. Before intervention, there were no signifi-

cant differences in SDS and SAS scores between the two groups. After intervention, SDS and SAS scores of the two groups were higher than those before intervention. SDS and SAS scores of the study group, after intervention, were lower than those of the control group (P < 0.05). Related studies have shown that comprehensive nursing intervention is more effective in improving SDS and SAS scores of elderly patients with advanced lung cancer, compared to routine nursing [33]. Present results indicate that implementation of comprehensive nursing can improve negative emotions, such as anxiety and depression, in patients with advanced lung cancer. Before intervention, there were no significant differences in quality of life scores between the two groups. After intervention, quality of life scores of the two groups were higher than those before intervention. RF, PF, CF, EF, and SF scores in the study group were higher than those in the control group (P < 0.05). GQO-LI74 scores were used to assess the quality of life scores of patients with lung cancer after comprehensive nursing. Results showed that postoperative quality of life scores of patients with comprehensive nursing intervention were higher than those with routine nursing [34]. Results suggest that comprehensive nursing intervention can effectively alleviate cancerous fatigue in lung cancer patients. This contributes to improved quality of life. According to the statistics of nursing satisfaction in the two groups, satisfaction levels of patients in the study group were higher than those in the control group. It has been reported that patients with lung cancer are more satisfied with comprehensive nursing than conventional nursing. In addition, results suggest that comprehensive nursing can significantly re-

duce incidence of complications in lung cancer patients [35].

The current study compared the use of routine nursing and comprehensive nursing in patients with advanced lung cancer. However, the current study had certain limitations. Long-term follow-up investigations on the prognosis of patients were not conducted. In future research, physiological and immunological indicators should be used to evaluate clinical efficacy, providing data to support the evaluation of comprehensive nursing efficacy for patients with advanced lung cancer.

In summary, comprehensive nursing intervention can significantly improve quality of life levels and psychological states of patients with advanced lung cancer. This method of nursing provides good application effects, improving the respiratory function of patients. Therefore, it is worthy of promotion in clinical practice.

Disclosure of conflict of interest

None.

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