

ORIGINAL RESEARCH

The effect of refined nursing combined with targeted psychological care on postoperative pulmonary function and self-management ability in male patients with lung cancer

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Abstract

This study aimed to investigate the effects of refined nursing combined with targeted psychological care on postoperative pulmonary function and self-management ability in male patients diagnosed with lung cancer. The clinical data of 80 patients who underwent lung cancer surgery at our institution between January 2022 and January 2024 were retrospectively retrieved, and they were stratified into two groups based on intervention methods: an experimental group (received refined nursing in conjunction with targeted psychological care, $n = 40$ cases) and a control group (received refined nursing; $n = 40$ cases). After these interventions, the effects on patients' postoperative pulmonary function and self-management ability were compared. The results showed that the experimental group had a significantly shorter hospitalization duration, higher Forced Expiratory Volume in one second (FEV1), Forced Vital Capacity (FVC), FEV1/FVC ratio and Maximum Voluntary Ventilation (MVV), and higher scores in self-care concept, sense of self-responsibility, self-care ability, and health knowledge level compared to the control group ($p < 0.05$). Additionally, the experimental group had significantly lower scores on the Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS) ($p < 0.001$) and a lower incidence rate of complications ($p < 0.05$). In conclusion, the combined approach of refined nursing and targeted psychological care showed promising outcomes in improving postoperative pulmonary function, mitigating negative emotions, reducing complication rates, and enhancing self-management ability among male patients with lung cancer, thereby warranting further exploration for potential clinical implementation.

Keywords

Refined nursing; Targeted psychological care; Self-management ability

1. Introduction

Lung cancer is one of the most common malignancies in clinical practice, known for its high mortality rate, posing significant threats to life, health and societal well-being. Its clinical presentations commonly include symptoms such as coughing, hemoptysis, and chest pain. With a global incidence rate of approximately 23%, China alone accounts for over 40% of lung cancer cases [1, 2]. Presently, surgical resection of lung tissues remains the standard clinical treatment for lung cancer. However, this procedure is associated with substantial trauma to the patients, resulting in prolonged recovery periods and increased susceptibility to complications. Thus, there is a pressing need to bolster postoperative nursing interventions [3, 4].

Conventional nursing practices often employ uniform measures for monitoring patient conditions, administering medi-

cations, and providing dietary guidance. Nevertheless, these approaches frequently fail to address the diverse and specific nursing requirements of individual patients [5]. Therefore, there is an important need for more comprehensive and tailored nursing interventions aimed at optimizing patient outcomes. In this regard, refined nursing represents a systematic and comprehensive nursing model that employs early detection, treatment and intervention strategies to minimize patient harm and holds significant importance in the postoperative care of lung cancer patients [6]. Furthermore, the prolonged invasion of lung cancer, extended treatment regimens, diverse treatment modalities, and higher medication doses can profoundly impact patients' confidence and emotional well-being, making them often experience self-doubt and despair, with anxiety and fear regarding their illness, impeding treatment cooperation and adherence, thereby adversely affecting therapeutic outcomes and prognosis [7]. Related literature suggests that

effective nursing interventions during lung cancer treatment can improve treatment outcomes, alleviate patient distress, and mitigate adverse reactions [8]. Therefore, targeted nursing interventions have gained prominence in the care of lung cancer patients.

A considerable proportion of lung cancer patients are male, who are inherently more prone to unhealthy lifestyle habits such as smoking, resulting in a higher incidence of lung cancer compared to females. Additionally, men often adopt distinct psychological coping mechanisms when confronted with illness, necessitating tailored psychological interventions to assist them in navigating various challenges during the treatment journey. Hence, this study focuses on male lung cancer patients to investigate the impact of refined nursing combined with targeted psychological care on postoperative pulmonary function, self-management abilities, anxiety and depression levels, and complication rates.

2. Methods

2.1 Design

This study employed a retrospective observational design to assess the clinical data of patients who underwent lung cancer resection.

2.2 Study setting and sampling

A total of 80 male patients who underwent lung cancer surgery at Lishui People's Hospital in Zhejiang Province from January 2022 to January 2024 were identified (Fig. 1) and divided into an experimental group (40 cases) and a control group (40 cases) based on the intervention method they underwent. The general characteristics of both groups were comparable ($p > 0.05$) (Table 1).

2.3 Inclusion criteria

Patients meeting the following criteria were included: (1) Meeting the diagnostic criteria for lung cancer [9]; (2) Expected survival time exceeding six months; (3) Good communication ability; and (4) Provided signed informed consent.

2.4 Exclusion criteria

Those with the following were excluded: (1) Co-occurrence with other malignant diseases; (2) Presence of organ dysfunction such as heart, liver or kidney dysfunction; (3) Incomplete clinical data; and (4) Poor compliance with medical recommendations.

2.5 Intervention

Upon admission, ward rules and environment were introduced, routine intervention methods were explained, and intravenous drug treatment was administered as per doctors' orders. Electrolyte, liver and kidney function tests, along with routine blood tests, were conducted both before and at the end of treatment. Surgical resection of the lung cancer was performed for all patients in both groups. Additionally, eight patients in each group underwent 4–6 cycles of postoperative chemotherapy. The chemotherapy regimens varied based on the type of

lung cancer: for large cell lung cancer, the regimen included pemetrexed, cisplatin and etoposide; for adenocarcinoma, it included pemetrexed and cisplatin; and for squamous cell carcinoma, it included gemcitabine and cisplatin. The prognosis for these patients was relatively favorable. Following surgery, both groups received nebulized terbutaline sulfate: 5 mg of terbutaline sulfate solution mixed with 2 mL of 0.9% sodium chloride solution for nebulization, which was administered twice daily (morning and evening) for two continuous weeks, with each session lasting 10–15 minutes.

Both intervention groups are managed by the same nursing team. The same nurse provides refined care and targeted psychological nursing.

The control group received refined nursing interventions, which included the following components: (1) Postoperative Health Education: Tailored one-on-one education sessions were provided based on individual patient characteristics such as age and educational level to cover postoperative precautions and rehabilitation exercises aimed at enhancing patient awareness of the disease and surgical procedure. They also received guidance on postoperative abdominal breathing training and cardiopulmonary function exercises. (2) Postoperative Care: Regular monitoring of patients' vital signs was conducted following surgery. They were assisted in lying flat for six hours with their head turned to one side and were provided with low-flow continuous oxygen. The incision site was closely observed for signs of bleeding or exudation, with prompt dressing changes implemented if bleeding occurred. Measures such as pressure application or suturing were undertaken as needed to address bleeding. Postoperatively, catheters were removed, and patients were informed about potential pain and discomfort, with appropriate comfort measures provided. Drainage tubes were carefully managed to ensure they remained secure and free from blockage, compression or bending, and attention was paid to monitoring the amount and nature of drainage. For postoperative pain management, the patients received guidance in relaxation training to divert attention, with analgesic medication administered as necessary. (3) Lifestyle Guidance: A comfortable and hygienic ward environment was maintained for patients through daily disinfection procedures. Skin and oral care were provided to prevent infection. Patients were offered a liquid diet starting on day one post-surgery if they exhibited no symptoms such as nausea or vomiting. As their gastrointestinal function recovered, a transition to a normal diet was implemented, with an emphasis on increased intake of calories, protein and vitamins. The patients were encouraged to get out of bed and move around postoperatively, with precautions taken to ensure that the activities were conducted without causing palpitations or shortness of breath. Instructions were provided for continuing appropriate daily exercise after discharge to promote recovery, along with reminders for regular hospital checkups.

The experimental group received targeted psychological care in addition to the refined nursing provided to the control group, which encompassed cognitive-behavioral therapy, interpersonal psychotherapy, family psychotherapy, and group psychotherapy.

(1) Cognitive-Behavioral Therapy: Qualified nursing staff specializing in psychological counseling provided cognitive-

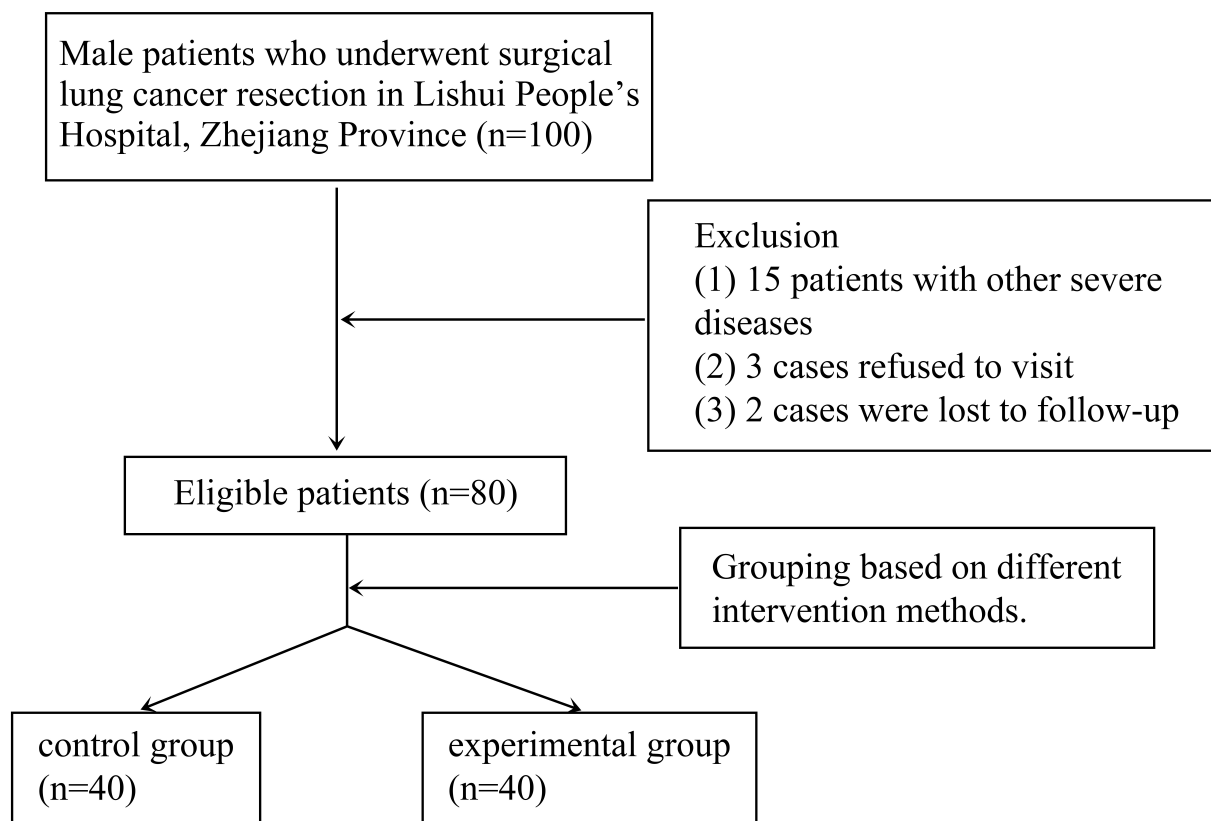


FIGURE 1. Flow chart of the study design and grouping.

TABLE 1. Comparison of general information between the two groups ($\bar{x} \pm s$).

Group	n	Age (yr)	Disease type		
			Adenocarcinoma	Squamous cell carcinoma	Large cell carcinoma
Experimental group	40	50.25 ± 7.51	18	9	13
Control group	40	51.50 ± 7.44	20	11	9
t/χ^2	-	0.748		1.033	
p	-	0.457		0.597	
Group	n	Smoking history	History of drinking	History of diabetes	History of hypertension
Experimental group	40	19	17	9	13
Control group	40	17	19	10	11
χ^2	-	0.202	0.202	0.069	0.238
p	-	0.653	0.653	0.793	0.626

behavioral education sessions to patients and their families to deepen their understanding of the roots and manifestations of anxiety and depression, as well as the impact of negative emotions on physical health. The patients were also guided to adjust their negative emotions and promote rational thinking to restore mental health. Educational sessions were scheduled on weekends for patients and family members by the psychological counseling nurse and the head nurse. (2) Interpersonal Psychotherapy: ① Relieving anxiety and depression: Nursing staff assisted patients in analyzing the causes of their depression and anxiety, helping them establish attachment relationships with friends and relatives to compensate for deficiencies in interpersonal relationships. ② Optimizing interpersonal psychology: Patients were educated on the

value of interpersonal relationships and communication skills, with nursing staff facilitating the establishment of emotional attachments and support systems to aid health recovery and alleviate pain. ③ Enhancing psychological gains: Through interpersonal exchanges, patients received emotional support and psychological comfort, which served as spiritual motivation to overcome cancer-related pain. (3) Group Psychotherapy: Group activities were conducted every Friday in the oncology ward by a psychological counseling nurse, lasting 1.5 hours. The treatment included: ① Helping the patients to become familiar with one another and establish interactive relationships. ② Assisting patients in accepting each other, building trust and fostering harmonious relationships. ③ Encouraging patients to exchange experiences, motivate one

another, and self-improvement. ④ Allowing patients who had recovered well to share their experiences and insights, fostering communication and exchanges both during the meeting and offline to relieve psychological tension and foster harmonious relationships among patients. (4) Family Psychotherapy: Upon admission, the psychological counseling nurse established contact methods with patients using WeChat groups and phone calls. Family members were convened on weekends, according to their schedules, to participate in two-hour sessions. Nursing staff explained the role of psychological and emotional care in alleviating pain, improving negative emotions, and enhancing the quality of life for cancer patients. Tailored psychological counseling and comfort were provided based on the educational level and personality of the patients' families to reduce negative emotions and anxiety. Family members were guided to meticulously observe patients' comfort levels and psychological mood fluctuations, offering increased familial care. Outside the hospital, patients experiencing physical and mental discomforts were advised to promptly communicate with the head nurse.

For patients who cannot receive adequate intervention on some surgery days, for the patients who are unable to attend the group therapy sessions on Friday, the nurse will record the situation and send the on-site video to the patient. The patient will then study the relevant content from the video. Then the nurses will gather together to arrange the on-site communication and sharing activities. As for those absent from the family psychotherapy activities on Sunday, the psychological consultation nurse will spare time to provide a unified explanation, psychological counseling, and comfort, as well as guidance.

Both groups underwent interventions for two weeks and were followed up for two months after discharge. Nurses conducted telephone or home visits every two weeks to assess the progress of patient recovery.

2.6 Outcome measures

2.6.1 Respiratory function parameters

The comparison of respiratory function indicators before and after the intervention in both groups involved respiratory function tests conducted on the second-day post-surgery (before the intervention) and after two weeks of intervention (after the intervention). The measured parameters included Forced Expiratory Volume in one second (FEV1), Forced Vital Capacity (FVC), the percentage of FEV1 to FVC (FEV1/FVC ratio), and Maximum Voluntary Ventilation (MVV).

2.6.2 Self-management ability

This was assessed using the Self-Care Ability Scale (ESCA) [10], which comprises four dimensions: self-care concept, sense of self-responsibility, self-care capability, and level of health knowledge, with a higher score on the ESCA indicating stronger self-management ability.

2.6.3 Anxiety and depression

Before and after nursing, the Self-Rating Anxiety Scale (SAS) [11] was utilized to assess the patient's anxiety condition. This scale consists of 20 items, each rated on a scale of 1 to 4 points.

The sum of the scores for the 20 items is multiplied by 1.25 to derive a final score. A cut-off value of 50 points indicates the presence of anxiety, with higher scores indicating more severe anxiety. Similarly, the Self-Rating Depression Scale (SDS) [12] was used to evaluate the patients' depression status. The cut-off value is set at 53 points, with scores ≥ 53 indicating the presence of a depressive mood. Similar to the SAS, higher scores on the SDS denote more severe depression.

2.6.4 Incidence of complications

The incidence rates of pulmonary infection, arrhythmia, atelectasis, hypoxemic syndrome, and other conditions were recorded.

2.7 Statistical analysis

Data analysis was performed using the SPSS v22.0 statistical software (IBM, Armonk, NY, USA). Quantitative data are described using means and standard deviations and compared using the *t*-test. Categorical data are shown as percentages (%) and compared using the chi-squared test (χ^2 test). $p < 0.05$ was considered statistically significant.

3. Results

3.1 Clinical indicators and comparison of respiratory function parameters

The results showed that the hospitalization time of the experimental group was significantly shorter than that of the control group ($p < 0.05$) (Table 2), and the intervention rate of family members participating in family psychotherapy in the experimental group was 87.5% (35/40). Following the intervention, the experimental group exhibited higher values for FEV1, FVC, FEV1/FVC and MVV compared to the control group ($p < 0.05$) (Table 3).

TABLE 2. Comparison of clinical indicators between the two groups ($\bar{x} \pm s$).

Group	n	Hospitalization time (d)
Experimental group	40	15.60 \pm 1.20
Control group	40	19.67 \pm 1.35
<i>t</i>	-	14.251
<i>p</i>	-	<0.001

3.2 Comparison of self-management ability

After the intervention, the scores of various dimensions of self-management ability in the experimental group were all significantly higher than those of the control group ($p < 0.05$) (Table 4).

3.3 SAS and SDS scores

After the intervention, the SAS and SDS scores of the experimental group were significantly lower than those of the control group ($p < 0.05$) (Table 5).

TABLE 3. Comparison of respiratory function parameters between the two groups ($\bar{x} \pm s$).

Group	n	FEV1 (L)		FVC (L)	
		Before intervention	After intervention	Before intervention	After intervention
Experimental group	40	1.49 ± 0.18	2.59 ± 0.39	3.06 ± 0.39	3.94 ± 0.70
Control group	40	1.53 ± 0.24	2.20 ± 0.34	3.15 ± 0.54	3.56 ± 0.70
<i>t</i>	-	0.843	4.767	0.855	2.428
<i>p</i>	-	0.402	<0.001	0.395	0.018
Group	n	FEV1/FVC (%)		MVV (L/min)	
		Before intervention	After intervention	Before intervention	After intervention
Experimental group	40	48.65 ± 3.16	66.28 ± 5.39	109.67 ± 4.47	135.95 ± 6.20
Control group	40	48.61 ± 3.58	62.31 ± 5.97	110.35 ± 4.69	127.65 ± 5.31
<i>t</i>	-	0.053	3.122	0.664	6.431
<i>p</i>	-	0.958	0.003	0.509	<0.001

FEV1: Forced Expiratory Volume in one second; FVC: Forced Vital Capacity; MVV: Maximum Voluntary Ventilation.

TABLE 4. Comparison of self-management ability of the two groups ($\bar{x} \pm s$, points).

Group	n	Self-care concept		Self-responsibility	
		Before intervention	After intervention	Before intervention	After intervention
Experimental group	40	17.15 ± 3.40	27.35 ± 5.17	16.30 ± 3.15	25.33 ± 5.08
Control group	40	17.63 ± 3.60	22.15 ± 3.80	15.88 ± 3.08	20.60 ± 4.53
<i>t</i>	-	0.613	5.126	0.603	4.395
<i>p</i>	-	0.542	<0.001	0.548	<0.001
Group	n	Self-care ability		Health knowledge level	
		Before intervention	After intervention	Before intervention	After intervention
Experimental group	40	29.85 ± 3.19	40.35 ± 6.26	37.30 ± 4.24	52.55 ± 5.99
Control group	40	30.05 ± 3.62	36.15 ± 5.13	38.05 ± 4.40	44.68 ± 5.39
<i>t</i>	-	0.262	3.282	0.776	6.177
<i>p</i>	-	0.794	0.002	0.440	<0.001

TABLE 5. Comparison of SAS and SDS scores between the two groups ($\bar{x} \pm s$, points).

Group	n	SAS		SDS	
		Before intervention	After intervention	Before intervention	After intervention
Experimental group	40	56.35 ± 3.16	45.38 ± 3.08	58.60 ± 3.58	46.30 ± 3.30
Control group	40	55.90 ± 3.19	50.20 ± 3.19	57.90 ± 3.35	51.25 ± 3.41
<i>t</i>	-	0.634	6.875	0.903	6.597
<i>p</i>	-	0.528	<0.001	0.369	<0.001

SAS: Self-Rating Anxiety Scale; SDS: Self-Rating Depression Scale.

3.4 Complication rates

The incidence of complications in the experimental group was lower than in the control group ($p < 0.05$), as shown in Table 6.

4. Discussion

Lung cancer, a serious respiratory disease with an unclear etiology, is closely associated with factors such as obesity, smoking, environmental pollution, and excessive mental stress. Research suggests that its incidence and mortality rates continue to escalate annually. The primary treatment modalities for

lung cancer encompass chemotherapy, radiation therapy, immunotherapy, and surgery, with surgical resection being the predominant and most efficacious method [13]. Effective postoperative care plays a crucial role in accelerating patient rehabilitation and minimizing the occurrence of complications.

In current clinical practice, the integration of radical lung cancer surgery with postoperative nursing intervention has become widespread and demonstrated favorable therapeutic outcomes. Xue *et al.* [14] reported that lung cancer patients often endure significant suffering from the disease and stress of surgical treatment, which can elicit various adverse emotions.

TABLE 6. Comparison of complications between the two groups (n (%)).

Group	n	Pulmonary infection	Arrhythmias	Atelectasis of the lungs	Hypoxia syndrome	Total
Experimental group	40	0 (0.00)	1 (2.50)	1 (2.50)	0 (0.00)	2 (5.00)
Control group	40	1 (2.50)	2 (5.00)	3 (7.50)	2 (5.00)	8 (20.00)
χ^2						4.114
<i>p</i>						0.043

These negative emotions can detrimentally impact patients' treatment adherence and prognosis. However, scientific and effective nursing interventions have been shown to help patients accurately comprehend their disease and enhance their confidence in the treatment process. Zhao *et al.* [15] found that dietary intervention combined with refined nursing care could effectively alleviate pain, calm patients, reduce complication rates, improve nutrition and sleep quality, and enhance overall quality of life, thus warranting clinical application and promotion. Collectively, these studies highlight the positive outcomes achievable through surgical treatment coupled with nursing intervention in lung cancer management.

Our study findings revealed that after the intervention, the experimental group had higher FEV1, FVC, FEV1/FVC and MVV values compared to the control group, suggesting that the integration of refined nursing with targeted psychological care could indeed significantly enhance the recovery of respiratory function in postoperative lung cancer patients. Consistent with our findings, Juan Du's study, which involved continuous nursing combined with breathing exercises for 60 lung cancer patients, demonstrated higher postoperative respiratory function indices in the combined group compared to the conventional care group [16]. These findings support the notion that postoperative health education contributes to patients' comprehension of postoperative rehabilitation and improves their confidence in recovery.

Refined nursing provides professional guidance in various areas such as expectoration, oxygen inhalation, closed chest drainage, and enhancement of respiratory functions, ultimately leading to improved lung function indices while maintaining stable vital signs. Moreover, patients receive instructions on performing diaphragmatic breathing exercises and cardiopulmonary functional training post-surgery, allowing them to acquire diverse breathing techniques, resulting in favorable overall rehabilitation outcomes and enhanced cooperation with treatment, thereby facilitating both surgical procedures and recovery processes. Effective pain management post-surgery, involving analgesic drugs, early mobilization, and timely removal of urinary catheters, promotes blood circulation, encourages lung expansion, reduces atelectasis, and minimizes pulmonary infections, consequently contributing to the effective improvement of lung function. Throughout the entire nursing process, psychological nursing plays a pivotal role in positively influencing patients' mental states through various methods and channels. The nurses strive to assist patients in attaining the most suitable mental and physical states under their specific conditions by implementing effective psychological care measures tailored to patients' psychological activity patterns and response characteristics. These measures

include group psychotherapy and the organization of group exchange activities to enhance connections among different patients, thereby enhancing their motivation and confidence in recovery. This approach positively impacts patients' perceptions and understanding, alters their psychological state and behavior, and aids in their adaptation to new interpersonal relationships and medical environments, thus establishing an optimal psychological milieu conducive to treatment and recovery, ultimately facilitating early recovery. Furthermore, targeted psychological nursing through preoperative basic care and patient education on relevant knowledge and psychological adjustments can mitigate patients' tension and panic, enhance their compliance, and foster greater cooperation with behavioral training [17].

Postoperative interventions such as tube removal and airway management are essential in restoring normal respiratory functions postoperatively. After the intervention, the experimental group demonstrated higher scores than the control group across various dimensions of self-management ability. Miao Jing's study, which divided 108 cancer patients into a control group receiving conventional care and an observation group receiving comprehensive high-quality care, reported increased Self-care scores post-intervention in both groups, with the observation group exhibiting higher scores than the control group. This underscores the effectiveness of high-quality care in improving self-management abilities and enhancing the postoperative quality of life for cancer chemotherapy patients [18]. Combined nursing encompasses comprehensive care interventions for patients, including targeted preoperative health education to enhance patients' understanding of their disease, regular WeChat notifications about disease-related knowledge to enhance patients' awareness and chemotherapy compliance, and follow-up calls to monitor medication usage and physical condition. These monitoring efforts serve as a foundation for physicians to adjust treatment plans. Moreover, timely and comprehensive assessment of patients' psychological states postoperatively combined with targeted counseling can reduce negative emotions and feelings of burden. In addition, dietary and exercise interventions can further contribute to enhancing patients' resistance. Under combined nursing intervention, patients establish effective communication with nurses, receive professional guidance, and enhance their self-management skills [19]. The implementation of psychological care serves to alleviate patients' anxiety and fear, thereby providing an optimal state for receiving treatment. It effectively instills confidence in recovery, enabling patients to confront the disease courageously, develop a correct understanding of the illness, and cultivate healthy living habits, which in turn facilitates patients' psychological adjustment and promotes

improvements in their social functioning.

Addressing clinical challenges through diverse solutions and nursing interventions, coupled with health education and stress-relief psychological communication, can effectively mitigate patients' adverse behavioral habits and comprehensively enhance their self-management abilities. After the intervention, the experimental group exhibited significantly lower SAS and SDS scores compared to the control group and a reduced incidence of complications, which indicates the significant improvement in patients' negative emotions achieved through refined nursing combined with targeted psychological care. Wang Fengju's research corroborates this finding, highlighting the effectiveness of psychological interventions in enhancing the psychological health and quality of life of postoperative lung cancer patients [20]. Patients with lung cancer often face emotions such as depression and anxiety, which can precipitate autonomic nervous system dysfunction and physiological and pathological changes. Integrated nursing throughout the treatment process, accompanied by a range of care measures, offers substantial physical and psychological comfort to patients, thereby diminishing the occurrence of postoperative adverse reactions, expediting recovery, and enhancing postoperative quality of life [21, 22]. Thus, targeted psychological nursing intervention represents a humane approach aimed at influencing patients' cognitive judgments and subjective perceptions of their condition, thereby enhancing adherence to and cooperation with treatment plans.

Appropriate psychological care interventions not only alleviate pain and mitigate depression and anxiety but also foster active engagement with treatment and coping with related unfavorable factors in postoperative lung cancer patients. Psychological care has been shown to enhance adrenal cortical function and improve immunity in lung cancer patients, significantly alleviating their perceived burden. Herein, multidimensional psychological nursing interventions were implemented for postoperative lung cancer patients to address negative emotions from various angles. These interventions notably reduced postoperative pain perception, alleviated anxiety and depression, enhanced confidence in treatment, and promoted active cooperation with treatment [23], which indirectly demonstrates the effectiveness of refined nursing combined with psychological care intervention in reducing patients' negative emotions, enhancing quality of life, and offering advantages over conventional care. However, the small sample size in this study may introduce biases in the results. Future research is needed to focus on increasing the sample size and conducting multicenter studies to enhance the accuracy of research findings.

5. Conclusions

In conclusion, the integration of refined nursing with targeted psychological care has shown promising results in improving postoperative pulmonary function, alleviating negative emotions, reducing complication rates, and enhancing self-management skills. These findings collectively show the potential value of this combined approach in clinical practice, warranting further promotion for potential implementation.

AVAILABILITY OF DATA AND MATERIALS

The authors declare that all data supporting the findings of this study are available within the paper and any raw data can be obtained from the corresponding author upon request.

AUTHOR CONTRIBUTIONS

LFC—designed the study and carried them out; prepared the manuscript for publication and reviewed the draft of the manuscript. LFC, XPC and JJC—supervised the data collection, analyzed the data, interpreted the data. All authors have read and approved the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Ethics Committee of Lishui People's Hospital (LLW-FO-403). Written informed consent was obtained from a legally authorized representative for anonymized patient information to be published in this article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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