

# Effects of Perioperative Psychological Reinforcement Intervention on Negative Emotion and Quality of Life in Lung Cancer Patients

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*Lin et al.*: Perioperative Psychological Reinforcement Intervention on Lung Cancer Patients

To study the effects of perioperative psychological reinforcement intervention on negative emotion and quality of life in lung cancer patients is the main objective. 120 lung cancer patients were selected and divided into two groups: experimental group and control group. The control group was given routine nursing and the experimental group was given psychological nursing. The difference in profile of mood states-short form scores, University of California, Los Angeles loneliness scale and distress tolerance scores, European organisation for research and treatment of cancer quality of life questionnaire C30 scores between the two groups before and after the intervention was comparatively analyzed to reveal the correlation between negative emotions and quality of life as well as the effects of psychological reinforcement interventions on negative emotions and quality of life. The difference in profile of mood states-short form scores, University of California, Los Angeles loneliness scale and distress tolerance scores between the two groups after the intervention were observed. Where, the total profile of mood states-short form score was (17.28±5.41) points in the experimental group and (37.62±11.50) points in the control group after the intervention. Correlation between negative emotions and quality of life was shown and psychological reinforcement intervention had significant impact on negative emotions and quality of life. Perioperative psychological reinforcement intervention can significantly improve negative emotions in lung cancer patients, improving patient satisfaction and prognosis.

**Key words:** Lung cancer, perioperative period, psychological reinforcement intervention, negative emotion, quality of life

Lung cancer is a malignant tumor of bronchial mucosa epithelium or gland. Due to the fast increase in morbidity and mortality of the disease, it has also become one of the most threatening malignant tumors to people's health and life<sup>[1,2]</sup>. In recent years, statistics have revealed that poor self-immunity and bad habits of smoking, etc., of the elderly makes incidence of lung cancer stay high in the elderly. The patient's main manifestations include cough, fever, chest pain and blood sputum. Other organs of the body, etc., will be involved in the severe cases<sup>[3]</sup>. At present, clinical treatment of lung cancer mainly includes surgery and chemotherapy to prolong patient's survival time<sup>[4,5]</sup>. Lung cancer patients need to stay in bed on a long-term basis for treatment and recuperation. Therefore, if nursing is untimely, patients will be prone to pressure sores or even paralysis, which seriously affects patient's quality of life. Routine nursing often taken clinically has certain effects in improving the patient's condition but the patient's negative emotions are not obviously relieved. Studies have found that psychological reinforcement intervention can relieve

patient's negative emotions to a certain extent, leading to significant prognosis. Therefore, in this study, 120 lung cancer patients were studied to investigate the impact of perioperative psychological reinforcement intervention on negative emotion and quality of life in lung cancer patients<sup>[6,7]</sup>.

## MATERIALS AND METHODS

### General information:

120 lung cancer patients who received chemotherapy at the Central Hospital from May 2018 to May 2020 were selected as subjects. The patients had average age of (35.34±8.58) y, including 65 male patients and 55 female patients.

**Inclusion criteria:** All patients meet the diagnostic criteria for lung cancer; the patient's clinical data are complete and accurate, with no contraindications to chemotherapy and other physical diseases; all subjects have signed informed consent.

**Exclusion criteria:** Lung cancer patients not diagnosed

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by pathological biopsy and cytology; patients who have received chemotherapy; patients with severe heart, liver and kidney organ failure or pregnant and lactating female patients; patients who cannot cooperate with this experiment<sup>[8,9]</sup>.

### Method:

The above 120 patients were divided into 2 groups, experimental group and control group. The control group was given routine nursing. The experimental group was given psychological nursing. That is, after the doctor and nurse understand the patient's condition in detail, they actively communicate with the patient to know about the patient's true ideas and take targeted counseling and psychological nursing to ease the patient's negative mood and promote the patient's quick recovery<sup>[10]</sup>. Changes in negative emotions and prognosis of the two groups are observed and comparatively analyzed.

### Observation indicators and methods:

**Comparative analysis of Profile Of Mood States-Short Form (POMS-SF) scores in the two groups before and after intervention:** POMS-SF is mainly used to evaluate emotional changes of cancer patients before and after psychological intervention. The questionnaire consists of 30 adjectives, including 6 subscales of Tension-Anxiety (TA), Depression-Dejection (Dd), Anger-Hostility (Ah), Fatigue-Inertia (Fi), Confusion-Disorder (Cb) and Vitality-Activity (Va). The score is 0-4. Where, 0 means "not at all", 1 means "slightly", 2 means "sometimes", 3 means "quite a lot" and 4 means "greatly". Note that the first 5 subscales are negative scales, which means the mood is worse under a higher score, while VA is a positive scale, which means the mood is better under a higher score.

**Comparison of POMS-SF, University of California, Los Angeles loneliness scale (ULS-8) and Distress Tolerance (DT) score differences between the two groups before and after the intervention:** POMS-SF score difference is calculated as in comparative analysis of POMS-SF scores in the two groups before and after intervention. ULS-8 is a loneliness scale which contains 8 items. Where, 1 point means "never", 2 points means "rarely", 3 points means "sometimes" and 4 points means "always". A higher patient's score indicates stronger loneliness. DT is used to reflect the average pain experienced by the patient in the last week, with 1-3 points for mild pain, 4-6 points for moderate pain, 7-9 points for severe pain and 10 points for extreme

pain<sup>[11,12]</sup>.

**Comparative analysis of European organisation for research and treatment of cancer quality of life questionnaire C30 (QLQ-C30) score between the two groups before and after the intervention:** European organisation for research and treatment of cancer quality of life questionnaire C30 (QLQ-C30) contains a total of 30 items, including 5 functions of physical function, cognitive function, role function, emotional function and social function plus 3 symptoms of fatigue, pain, nausea and vomiting. Where, 1 point means "no completely", 2 points means "a little", 3 points means "quite a lot" and 4 points means "very much"<sup>[13,14]</sup>. A higher score in function indicates patient's better functional status and quality of life; a higher score in symptom indicates more symptoms or problems, that is, worse quality of life.

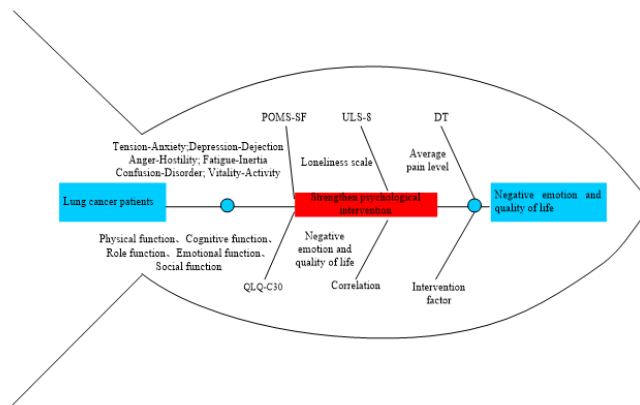
**Comparative analysis of QLQ-C30 score difference between the two groups before and after the intervention:** QLQ-C30 score difference is calculated as in comparative analysis of POMS-SF scores in the two groups before and after intervention.

**Correlation analysis of negative emotions and quality of life:** According to the research results of comparative analysis of POMS-SF scores in the two groups, comparison of POMS-SF, ULS-8 and DT score differences between the two groups, comparative analysis of QLQ-C30 score between the two groups and comparative analysis of QLQ-C30 score difference between the two groups before and after the intervention, the correlation between POMS-SF, DT and ULS-8 and QLQ-C30 is analyzed.

**Effect of time and intervention factors on quality of life and mood state:** Combining the research results of comparative analysis of POMS-SF scores in the two groups, comparison of POMS-SF, ULS-8 and DT score differences between the two groups, comparative analysis of QLQ-C30 score between the two groups and comparative analysis of QLQ-C30 score difference between the two groups before and after the intervention, the effect of time and intervention factors on quality of life and mood state are analyzed.

### Statistical methods:

SPSS 20.0 software was used for statistical analysis of the experimental data. The experimental data are expressed as mean±standard deviation ( $\bar{x}\pm s$ ). One-way analysis of variance is used for significance analysis of data.  $p < 0.05$  indicates difference in data between



**Fig. 1: Fishbone diagram of effect of perioperative psychological reinforcement**

the groups;  $p < 0.01$  indicates significant difference, as shown in fig. 1

## RESULTS AND DISCUSSION

The total POMS-SF score is  $(35.86 \pm 12.39)$  points in the experimental group and  $(36.35 \pm 12.28)$  points in the control group before the intervention; the total POMS-SF score is  $(17.28 \pm 5.41)$  points in the experimental group and  $(37.62 \pm 11.50)$  points in the control group after the intervention. Comparative analysis shows that cancer patients have obvious negative emotions. The ULS-8 and DT scores are respectively  $(20.03 \pm 3.05)$  and  $(4.42 \pm 1.13)$  points in the experimental group before the intervention, which are respectively  $(13.74 \pm 2.12)$  and  $(2.74 \pm 0.73)$  points after the intervention. The ULS-8 and DT scores are respectively  $(20.64 \pm 2.24)$  and  $(22.29 \pm 1.76)$  points in the control group before the intervention, which are respectively  $(4.31 \pm 0.73)$  and  $(4.40 \pm 0.83)$  points after the intervention. There is no

statistical difference in the total POMS-SF scores and the subscales between the experimental group and the control group before the intervention ( $p > 0.05$ ), showing comparability; statistical difference is shown after the intervention ( $p < 0.05$ ), shown in Table 1.

As shown in fig. 2, Note: 1 means total POMS-SF score; 2 means TA; 3 means DD; 4 means AH; 5 means FI; 6 means CB; 7 means VA; 8 means ULS-8; 9 means DT<sup>[15]</sup>.

There are statistically significant differences in POMS-SF, ULS-8 and DT scores between the two groups before and after the intervention ( $p < 0.05$ ) (Table 2).

After the intervention, except for diarrhea, the scores of functional areas in the experimental group show a significant upward trend, while the scores of symptoms and single test items decrease, showing statistically significant difference ( $p < 0.05$ ); except for dyspnea and financial difficulty ( $p < 0.05$ ), the scores of other items

**TABLE 1: COMPARISON OF THE SUCCESS RATE OF WEANING BETWEEN THE TWO GROUPS**

Item	Experimental group ( $n_1=60$ )				Control group ( $n_2=60$ )			
	Before the intervention	After the intervention	t	p	Before the intervention	After the intervention	t	p
Total POMS-SF score	35.86±12.39	17.28±5.41	7.54	0.001	36.35±12.28	37.62±11.50	-1.759	0.19
TA	5.78 ± 2.76	3.07±1.61	4.55	0.001	5.95±2.76	6.06±2.50	-1.187	0.245
DD	5.34±2.22	3.19±1.61	4.76	0.001	6.07±2.73	6.26±2.32	-0.394	0.684
AH	4.68±2.88	2.40±1.14	4.95	0.001	4.57±2.48	5.00±2.41	-0.983	0.325
FI	4.52±3.07	2.21±1.86	-4.97	0.001	4.97±2.79	5.62±1.61	-3.164	0.002
CB	6.87±1.97	2.81±1.14	4.27	0.001	6.73±2.16	6.72±2.14	0.641	0.562
VA	5.28±7.62	2.63±2.54	-5.70	0.001	6.73±2.16	5.12±1.83	-0.113	0.905
ULS-8	20.03±3.05	13.74±2.12	17.4	0.001	20.64±2.24	22.29±1.76	-4.04	0.001
DT	4.42±1.13	2.74±0.73	-5.77	0.001	4.31±0.73	4.40±0.83	-0.75	0.451

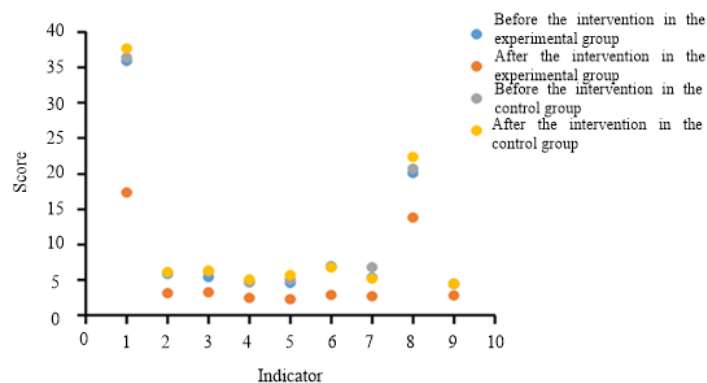


Fig. 2: Scatter diagram of comparative analysis of POMS-SF scores in the two groups before and after the intervention

TABLE 2: COMPARATIVE ANALYSIS OF DIFFERENCE IN POMS-SF, ULS-8 AND DT SCORES BEFORE AND AFTER THE INTERVENTION ( $\bar{x}\pm s$ )

Item	Experimental group ( $n_1=60$ )			Control group ( $n_2=60$ )			t	p
	Before the intervention	After the intervention	Difference value	Before the intervention	After the intervention	Difference value		
Total POMS-SF score	35.86 $\pm$ 12.39	17.28 $\pm$ 5.41	18.58 $\pm$ 5.69	36.35 $\pm$ 12.28	37.62 $\pm$ 11.50	1.27 $\pm$ 11.75	7.25	0.001
TA	5.78 $\pm$ 2.76	3.07 $\pm$ 1.61	2.71 $\pm$ 1.89	5.95 $\pm$ 2.76	6.06 $\pm$ 2.50	0.11 $\pm$ 2.66	6.58	0.001
DD	5.34 $\pm$ 2.22	3.19 $\pm$ 1.61	2.15 $\pm$ 1.98	6.07 $\pm$ 2.73	6.26 $\pm$ 2.32	0.19 $\pm$ 2.68	5.85	0.001
AH	4.68 $\pm$ 2.88	2.40 $\pm$ 1.14	2.28 $\pm$ 2.65	4.57 $\pm$ 2.48	5.00 $\pm$ 2.41	0.43 $\pm$ 2.45	5.63	0.001
FI	4.52 $\pm$ 3.07	2.21 $\pm$ 1.86	2.31 $\pm$ 2.85	4.97 $\pm$ 2.79	5.62 $\pm$ 1.61	0.65 $\pm$ 2.54	5.32	0.001
CB	6.87 $\pm$ 1.97	2.81 $\pm$ 1.14	4.06 $\pm$ 1.87	6.73 $\pm$ 2.16	6.85 $\pm$ 2.14	0.2 $\pm$ 2.14	7.05	0.001
VA	5.28 $\pm$ 7.62	2.63 $\pm$ 2.54	2.65 $\pm$ 5.60	6.73 $\pm$ 2.16	7.12 $\pm$ 1.83	0.39 $\pm$ 1.89	6.74	0.001
ULS-8	20.03 $\pm$ 3.05	13.74 $\pm$ 2.12	6.29 $\pm$ 2.74	20.64 $\pm$ 2.24	22.29 $\pm$ 1.76	1.65 $\pm$ 2.01	14.60	0.001
DT	4.42 $\pm$ 1.13	2.74 $\pm$ 0.73	1.68 $\pm$ 0.85	4.31 $\pm$ 0.73	4.40 $\pm$ 0.83	0.09 $\pm$ 0.75	7.50	0.001

TABLE 3: COMPARATIVE ANALYSIS OF QLQ-C30 SCORES BETWEEN THE EXPERIMENTAL GROUP AND THE CONTROL GROUP BEFORE THE INTERVENTION ( $\bar{x}\pm s$ )

Item	Experimental group ( $n_1=60$ )				Control group ( $n_2=60$ )			
	Before the intervention	After the intervention	t	p	Before the intervention	After the intervention	t	p
Functional area								
Physical function	8.67 $\pm$ 3.32	11.10 $\pm$ 1.63	5.25	0.001	8.76 $\pm$ 2.48	8.65 $\pm$ 2.33	1.102	0.312
Role function	2.09 $\pm$ 1.48	3.58 $\pm$ 0.88	3.67	0.001	2.89 $\pm$ 1.45	2.71 $\pm$ 1.02	0.755	0.452
Cognitive function	3.67 $\pm$ 1.48	4.21 $\pm$ 0.61	2.70	0.001	3.83 $\pm$ 1.07	3.33 $\pm$ 0.90	1.875	0.065
Emotional function	7.53 $\pm$ 2.40	7.95 $\pm$ 0.71	4.91	0.001	7.78 $\pm$ 2.45	3.71 $\pm$ 1.03	0.592	0.695
Social function	3.11 $\pm$ 1.40	4.37 $\pm$ 0.98	3.48	0.001	3.33 $\pm$ 1.56	7.36 $\pm$ 0.82	1.725	0.485
Overall health condition	7.74 $\pm$ 1.54	8.17 $\pm$ 0.94	4.07	0.001	7.88 $\pm$ 1.22	2.60 $\pm$ 1.21	1.942	0.170
Symptom/single item								
Fatigue	2.81 $\pm$ 1.62	2.26 $\pm$ 0.76	4.84	0.001	2.58 $\pm$ 1.95	2.60 $\pm$ 1.21	0.043	0.956
Pain	2.74 $\pm$ 1.64	1.84 $\pm$ 0.81	7.36	0.001	2.49 $\pm$ 1.46	2.21 $\pm$ 1.05	4.254	0.382
Nausea and vomiting	2.28 $\pm$ 1.75	1.19 $\pm$ 0.45	5.19	0.001	2.09 $\pm$ 1.68	2.31 $\pm$ 1.35	1.050	0.285
dyspnea	1.88 $\pm$ 0.83	1.16 $\pm$ 0.49	4.26	0.001	2.18 $\pm$ 1.10	1.74 $\pm$ 0.80	2.262	0.025
Insomnia	2.18 $\pm$ 0.84	1.63 $\pm$ 0.49	4.75	0.001	2.06 $\pm$ 0.75	2.36 $\pm$ 0.75	1.679	0.095

Loss of appetite	2.80±0.73	1.95±0.62	4.50	0.001	2.54±0.95	2.60±0.83	0.470	0.638
Constipation	1.96±1.05	1.33±0.61	2.87	0.001	1.82±0.83	1.98±0.90	0.965	0.336
Diarrhea	1.18±0.46	1.02±0.15	4.67	0.001	1.25±0.44	1.12±0.33	0.441	0.285
Financial difficulty	2.56±0.82	3.23±0.57	4.274	0.001	2.86±0.78	3.40±0.59	3.290	0.001

in the control group show no statistically significant difference before and after the intervention ( $p>0.05$ ), shown in Table 3.

In terms of difference in quality of life (QLQ-C30) scores between the two groups before and after the intervention, except for social function, dyspnea, diarrhea and financial difficulty which show no

statistically significant difference ( $p>0.05$ ), scores of other indicators show statistically significant difference before and after the intervention ( $p<0.05$ ) shown in Table 4.

Correlation analysis between QLQ-C30 item scores and total POMS-SF scores, subscale scores, loneliness scores and psychological pain scores shows that the

**TABLE 4: COMPARATIVE ANALYSIS OF QLQ-C30 SCORE DIFFERENCE BETWEEN THE TWO GROUPS BEFORE AND AFTER THE INTERVENTION ( $x\pm s$ )**

Item	Experimental group ( $n_1=60$ )			Control group ( $n_2=60$ )			t	p
	Before the intervention	After the intervention	Difference value	Before the intervention	After the intervention	Difference value		
Functional area								
Physical function	8.67±3.32	11.10±1.63	2.47±2.03	8.76±2.48	8.65±2.33	-0.09±2.38	4.029	0.001
Role function	2.09±1.48	3.58±0.88	1.49±0.94	2.89±1.45	2.71±1.02	-0.17±1.35	3.686	0.001
Cognitive function	3.67±1.48	4.21±0.61	0.54±0.69	3.83±1.07	3.33±0.90	-0.48±1.06	6.158	0.001
Emotional function	7.53±2.40	7.95±0.71	0.42±1.31	7.78±2.45	3.71±1.03	0.08±2.45	7.685	0.001
Social function	3.11±1.40	4.37±0.98	1.26±1.18	3.33±1.56	7.36±0.82	0.40±1.46	1.823	0.085
Overall health condition	7.74±1.54	8.17±0.94	0.43±0.72	7.88±1.22	2.60±1.21	-0.50±0.92	6.852	0.001
Symptom/ single item								
Fatigue	2.81±1.62	2.26±0.76	-0.55±1.23	2.58±1.95	2.60±1.21	0.03±1.16	3.653	0.001
Pain	2.74±1.64	1.84±0.81	-0.88±0.67	2.49±1.46	2.21±1.05	-0.27±0.98	4.152	0.001
Nausea and vomiting	2.28±1.75	1.19±0.45	-1.07±0.85	2.09±1.68	2.31±1.35	0.24±1.10	3.895	0.001
dyspnea	1.88±0.83	1.16±0.49	-0.70±0.44	2.18±1.10	1.74±0.80	-0.45±0.79	1.260	0.306
Insomnia	2.18±0.84	1.63±0.49	-0.53±0.60	2.06±0.75	2.36±0.75	0.33±1.04	5.682	0.001
Loss of appetite	2.80±0.73	1.95±0.62	-0.84±1.05	2.54±0.95	2.60±0.83	0.10±0.86	3.561	0.001
Constipation	1.96±1.05	1.33±0.61	-0.60±1.13	1.82±0.83	1.98±0.90	0.17±0.89	2.652	0.015
Diarrhea	1.18±0.46	1.02±0.15	-0.12±0.37	1.25±0.44	1.12±0.33	-0.09±0.71	0.185	0.865
Financial difficulty	2.56±0.82	3.23±0.57	0.65±0.64	2.86±0.78	3.40±0.59	0.57±0.43	0.052	0.856

**TABLE 5: CORRELATION ANALYSIS OF NEGATIVE EMOTIONS AND QUALITY OF LIFE**

QLQ-C30	TA	FI	DD	AH	CD	VA	Total POMS-SF score	ULS-8	DT
Physical function	0.025	0.263	0.052	0.052	0.052	0.063	0.065	0.141	0.279
Role function	0.012	0.285	0.063	0.084	0.065	0.008	0.152	0.185	0.120
Emotional function	0.456	0.201	0.582	0.465	0.043	0.052	0.625	0.263	0.123
Cognitive function	0.165	0.305	0.26	0.083	0.038	0.165	0.263	0.254	0.196
Social function	0.085	0.185	0.284	0.082	0.082	0.075	0.152	0.056	0.155
Overall health condition	0.089	0.186	0.167	0.186	0.125	0.103	0.012	0.082	0.241
Nausea and vomiting	0.065	0.011	0.34	0.26	0.070	0.036	0.011	0.028	0.001
Fatigue	0.024	0.23	0.165	0.256	0.096	0.080	0.263	0.264	0.023
Pain	0.238	0.184	0.238	0.233	0.154	0.029	0.305	0.380	0.168
Dyspnea	0.147	0.162	0.154	0.118	0.056	0.050	0.262	0.054	0.012
Insomnia	0.084	0.325	0.207	0.205	0.286	0.016	0.238	0.058	0.025
Loss of appetite	0.063	0.275	0.085	0.241	0.019	0.105	0.294	0.063	0.227
Constipation	0.176	0.023	0.267	0.261	0.145	0.056	0.164	0.025	0.052
Diarrhea	0.096	0.042	0.203	0.045	0.087	0.063	0.245	0.362	0.053
Financial difficulty	0.123	0.182	0.308	0.108	0.056	0.196	0.063	0.215	0.065

general trend in that the functional areas of quality of life are significantly correlated with negative emotions ( $p < 0.05$ ), the symptom areas and single items are significantly correlated with negative emotions ( $p < 0.05$ ) shown in Table 5.

The impact of perioperative psychological reinforcement intervention on negative emotions and quality of life in lung cancer patients is analyzed. Perioperative psychological reinforcement is an intervention factor that exerts insignificant effect on loss of appetite, diarrhea and financial difficulty in QLQ-C30 with statistical difference ( $p > 0.05$ ), but significant effect is exerted on other areas of quality of life and mood state, showing statistical differences ( $p < 0.05$ ). At the same time, except for social function, dyspnea, diarrhea and financial difficulty in QLQ-C30, there is interaction between intervention factors and time factors in other areas and mood state ( $p < 0.05$ ).

Lung cancer is a common malignant tumor in China, which shows gradually increasing incidence under gradually increasing pressure and influence of external factors such as irregular life, seriously threatening patient's health and quality of life. Moreover, most

patients are in advanced stage in clinical examination<sup>[16]</sup>. Recent years witness high incidence of lung cancer in the elderly, mainly due to reduced immunity in the elderly<sup>[17]</sup>. Clinical investigation found that most patients currently take rest after surgery, which brings certain negative emotions<sup>[18]</sup>. The conventional nursing methods adopted in clinical practice display some drawbacks, such as emotional instability which leads to a decline in rehabilitation ability. Comparatively speaking, psychological reinforcement intervention can significantly relieve negative emotions and improve quality of life in lung cancer patients<sup>[19]</sup>. The results of this experiment indicate that perioperative psychological reinforcement intervention can significantly improve negative emotions of lung cancer patients, thereby improving patient satisfaction and prognosis.

Psychological reinforcement intervention can relieve negative emotions of lung cancer patients to a certain extent and help patients positively face occurrence and treatment of the disease. Firstly, it creates a harmonious relationship between medical staff and patients, which will relieve the patient's anxiety so that patients receive treatment more easily, thereby improving psychological state. Secondly, it provides psychological counseling

to effectively help patients solve their physical and psychological problems based on patient's treatment plan. Thirdly, it provides a good and comfortable environment for rapid postoperative recovery as well as corresponding dietary supplement to promote the improvement of the patient's lung tissue function, thereby improving quality of life.

To conclude, the impact of perioperative psychological reinforcement intervention on negative emotions and quality of life in lung cancer patients is scientifically studied. By giving comprehensive consideration to various factors such as medical, social and economic factors, etc., standardized psychological nursing can provide patients with comprehensive treatment plan to effectively improve the nursing quality and patient's acceptability. To enable more scientific grasp of the condition of the disease, rehabilitation treatment and research on its pathogenesis and rules should be carried out to lay a theoretical foundation and provide corresponding technical support to help patient's rehabilitation and future research.

#### Conflicts of interest:

The authors declared no conflict of interest.

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