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Original Article

Effects of psychological nursing intervention on pain and adverse psychology in patients with lung cancer

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Abstract: Objective: To explore the effect of psychological nursing intervention on pain and adverse psychology in patients with lung cancer. Methods: Seventy patients with lung cancer were divided into control group and intervention group according to the visiting sequence (both n=35). The patients in control group were treated with ordinary care intervention, while those in the intervention group with psychological nursing intervention. Self-rating anxiety scale (SAS), self-rating depressing scale (SDS), patient health questionnaire-9 (PHQ-9), Pittsburgh sleep quality Index (PSQI), visual analogue scale (VAS) and numerical rating scale (NRS) were used to assess the condition of lung cancer, and the patients were evaluated according to the quality of life questionnaire (QLQ). The changes of norepinephrine (NE), 5-hydroxytryptamine (5-HT), dopamine (DA) and hemoglobin (HB) before and after nursing intervention were recorded. Results: SAS, SDS, PHQ-9 and PSQI scores in intervention group were significantly lower than those in control group (P<0.05). VAS and NRS scores in the intervention group were significantly lower than those in the control group. The intervention group showed significantly lower scores in role, cognition, emotion and social function than the control group (P<0.05). The incidence of fatigue, nausea, vomiting, dyspnea and anorexia in the intervention group was significantly lower than that in the control group, while the satisfaction degree was significantly higher than that in the control group (P<0.05). NE, DA, 5-HT and HB in the intervention group were significantly higher than those in the control group (P<0.05). Conclusion: Psychological nursing intervention is effective in improving adverse psychology and reliving pain and discomfort of patients with lung cancer, as well as in improving quality of life and survival rate. Therefore, it is worthy of clinical application.

Keywords: Psychological nursing, lung cancer, pain, adverse psychology

Introduction

Lung cancer ranks first in the incidence and mortality of malignant tumors in China, accounting for 35.78% and 37.56% of the global lung cancer respectively, with an increasing trend year by year. However, with the diversification of social needs and the change of medical model, the existing nursing model can no longer meet the increasing health demands [1-3]. Caught by the fear and helplessness at the time of diagnosis, patients usually are trapped in anxiety and fear, let alone long-term chemoradiotherapy on the external image and physical condition. Besides, the patients are chronically at risk of recurrence and death. Therefore, patients with lung cancer often fall into anxiety, depression, insomnia, great psychological pressure, and their quality of life and determination to heal were reduced seriously [4-6]. About 2/5 of patients with lung cancer experience anxiety and depression. Chemotherapy patients generally have poor sleep quality, about 3/5 suffering from sleep disorders. About 4/5 of patients with advanced lung cancer experience varying degrees of pain [7, 8]. The negative psychology is easy to make patients lose the determination, affect the therapeutic effect and accelerate the development of diseases through negative feedback. He et al. confirmed that psychological support nursing reduces the anxiety and depression, and improves the self-perception and quality of life of patients with lung cancer [8]. Liu et al. reported that psychological nursing intervention can effectively relieve the postoperative pain of patients with lung cancer, and reduce their anxiety and depression, which is conducive to post-

operative recovery [9]. However, in the above studies, patients passively received psychological care and lacked interaction with nurses. Therefore, this study strengthened the interaction between nurses and patients, patients and patients, as well as patients and their families, in order to increase the effect of psychological care. In addition, most psychological nursing reports apply self-rating scale to assess the psychological state of patients, lacking effective hematological indicators. In this study, the changes of neurotransmitters before and after nursing intervention were observed, which objectively confirms the effect of psychological nursing.

Materials and methods

General information

Seventy patients with lung cancer who admitted to The First Bethune Hospital of Jilin University from January 2016 to January 2018 were selected and divided into control group and intervention group according to the visiting sequence (both n=35). Inclusion criteria: (1) aged 20-60 years old; (2) diagnosed with lung cancer according to the 8th edition of the TNM Classification of International Association for the Study of Lung Cancer [10]; (3) academic qualifications above junior high school (to ensure that patients can understand the nursing content); (4) expected survival period more than half a year; (5) signed informed consent form. Exclusion criteria: (1) pregnant or nursing women; (2) with mental disorders or unclear consciousness, communication difficulties; (3) complicated with severe cardiac, liver, kidney, blood, digestive and nervous system dysfunctions; (4) no support from family members; (5) complicated with other types of tumors. This study was approved by the Ethics Committee of The First Bethune Hospital of Jilin University.

Methods

The patients from the control group received routine nursing care for lung cancer. Nursing staff warmly welcomed hospitalized patients, carried out health education to prevent infection, and guided the diet of patients to ensure optimal and balanced nutrition. The patients from the intervention group received psychological care on the basis of routine nursing care. The specific methods were as follows: (1) The patients were introduced with conventional knowledge of cancer, chemotherapy precautions, possible discomfort symptoms and complication care. The patients were educated to better understand the disease, so as to reduce their helplessness, and to correct their misunderstanding about lung cancer. (2) Patients with high coordination and good recovery were selected to communicate with those in the intervention group. Then the experience was summarized, and personalized rehabilitation plans were formulated. (3) The patients were instructed to relieve the tension and depression. Patients lied in a comfortable chair or bed, removed their glasses, watches, necklaces and other personal belongings, gradually tensed muscles from the upper body to the lower body, then relaxed, repeated for 3 times, so that they could fully relax. (4) Happy and relaxing stories were recorded in text or video to help them get rid of depression and experience more happiness. (5) Listening to relaxing and soft music enabled patients to adjust psychologically, physiologically and emotionally and improve their physical and mental state. Nurses selected appropriate music according to the patients' conditions. (6) The family members were encouraged to participate in the psychological recovery process of patients, with whose accompany, the patients may face psychological intervention positively. And in order to reduce the loneliness and depression of patients, the families were guided to communicate with them and accompany them to exercise and walk.

Outcome measures

Main outcome measures: The indexes before and after treatment of the patients were recorded. Self-rating anxiety scale (SAS) was used for anxiety assessment of the patients, self-rating depressing scale (SDS) for depression assessment, patient health questionnaire-9 (PHQ-9) for psychological assessment, Pittsburgh sleep quality index (PSQI) for sleep quality assessment, and visual analogue scale (VAS) and numerical rating scale (NRS) for pain degree scoring [11-16]. The attitude, language, frequency of house visits, basic care, emergency treatment, operation skills and rehabilitation points included in the self-made satisfaction table were evaluated, and disputes and complaints were recorded.

Table 1. Comparison of general information ($\bar{x}$ ± sd)

Group	Control group (n=35)	Intervention group (n=35)	t/χ^2	P
Age (year)	55.9 ± 8.2	59.7 ± 9.4	1.779	0.080
Gender (male/female)	25/10	23/12	0.066	0.797
Body mass index (kg/m^2)	19.50 ± 2.85	20.53 ± 3.55	1.339	0.185
Smoking (yes/no)	22/13	25/10	0.259	0.611
Disease staging (III/IV)	19/16	17/18	0.057	0.811

Secondary outcome measures: Questionnaire scores were obtained using the quality-of-life questionnaire (QLQ)-C30 (patients filled in according to their own subjective wills). The main evaluations included role, cognition, emotional and social functions, fatigue, nausea and vomiting, dyspnea and anorexia [17]. The changes of norepinephrine (NE) (Shanghai Xin Yu Biotechnology Co., Ltd., China), 5-hydroxytryptamine (5-HT) (Xiamen Huijia Biotechnology Co., Ltd., China) and dopamine (DA) (Shanghai J&L Biotechnology Co., Ltd., China) were detected by a fully automatic chemiluminescent immunoassay analyzer (UniCelDxI 800, Shanghai Health BioMed Co., Ltd., China). Hemoglobin (HB) content was measured by a hemocyte analyzer (UniCel DxH, BECKMAN COULTER, USA).

Statistical methods

SPSS 21.0 software was used for statistical processing. The measurement data were expressed as mean ± standard deviation ($\bar{x}$ ± sd). Paired t-test was used for intra-group comparison, and independent sample t-test for comparison between groups. The counting data expressed as the number of cases/percentage (n/%) were analyzed by the corrected χ^2 test. P<0.05 was considered statistically significant.

Results

General information

There was no difference in age, gender, body mass index, number of smokers and disease stage between the two groups (P>0.05). See **Table 1**.

Comparison of psychological status

Before nursing intervention, there was no difference in SAS, SDS, PHQ and PSQI between the two groups (P>0.05). After nursing intervention, the above scores in the intervention group were significantly lower than those in the control group, with statistically significant differences (P< 0.05). See **Figure 1**.

Comparison of pain indexes

Before nursing intervention, there was no difference in VAS and NRS scores between the two groups (P>0.05). Whereas after intervention, the scores in the intervention group were significantly lower than those in the control group, with statistically significant difference (P<0.05). See **Figure 2**.

Comparison of quality of life

Before nursing intervention, there was no difference in role, cognition, emotion and social function scores between the two groups (P> 0.05). After intervention, the scores in the intervention group were significantly lower than those in the control group, with statistically significant difference (P<0.05). See **Figure 3**.

Comparison of the number of patients with discomfort

The incidence of fatigue, nausea, vomiting, dyspnea and anorexia in the intervention group was significantly lower than that in the control group, with statistically significant difference (P<0.05). See **Table 2**.

Comparison of patient satisfaction

The satisfaction of patients in the intervention group was significantly higher than that in the control group (P<0.05). However, there was no difference in the number of doctor-patient disputes and complaints (P>0.05). See **Table 3**.

Comparison of serum indicators

Before treatment, there was no difference in levels of NE, 5-HT, DA and HB between the two groups (P>0.05). After treatment, the levels in the intervention group were significantly higher than those in the control group, with statistically significant difference (P<0.05). See **Figure 4**.

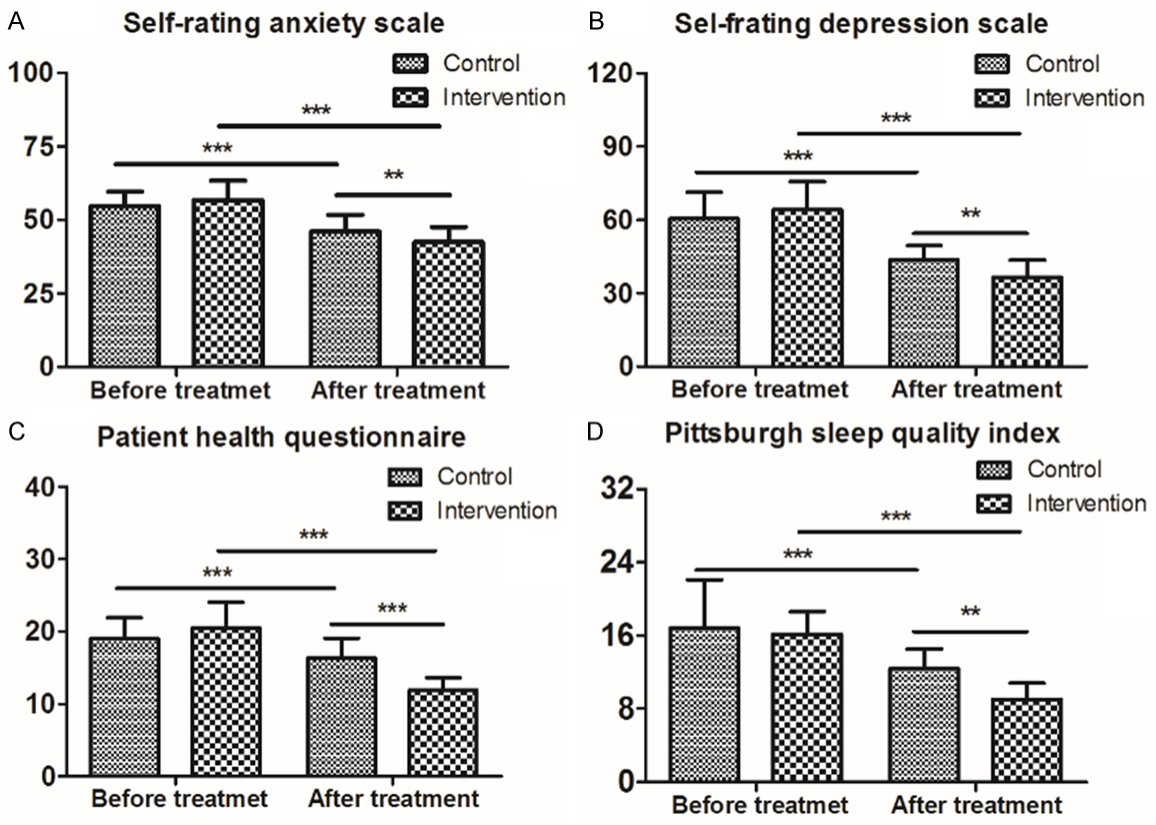

Figure 1. Comparison of psychological status ($\bar{x}$ ± sd). A. Self-rating anxiety scale. The higher the score, the higher the anxiety level; B. Self-depression scale. The higher the score, the higher the degree of depression; C. Patient health questionnaire. The higher the score, the higher the degree of depression; D. Pittsburgh sleep quality index. The lower the index, the better the sleep quality. ***P<0.001, **P<0.01.

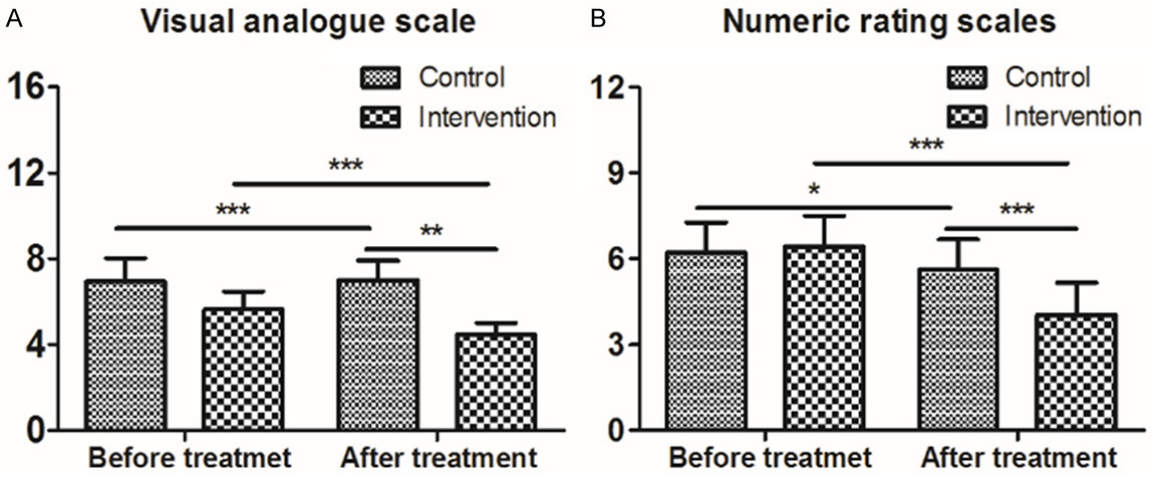

Figure 2. Comparison of pain indexes ($\bar{x}$ ± sd). A. Visual analogue scale. The higher the score, the greater the degree of pain; B. Numerical rating scale. The higher the score, the greater the degree of pain. ***P<0.001, **P<0.01, *P<0.05.

Discussion

Lung cancer is a disease with high fatality rate, mainly with the clinical symptoms of cough, blood sputum, dyspnea, acute asthma, pleural effusion and chest pain. It is also associated with digestive and blood system diseases, posing serious threat to patients [18, 19]. Affected

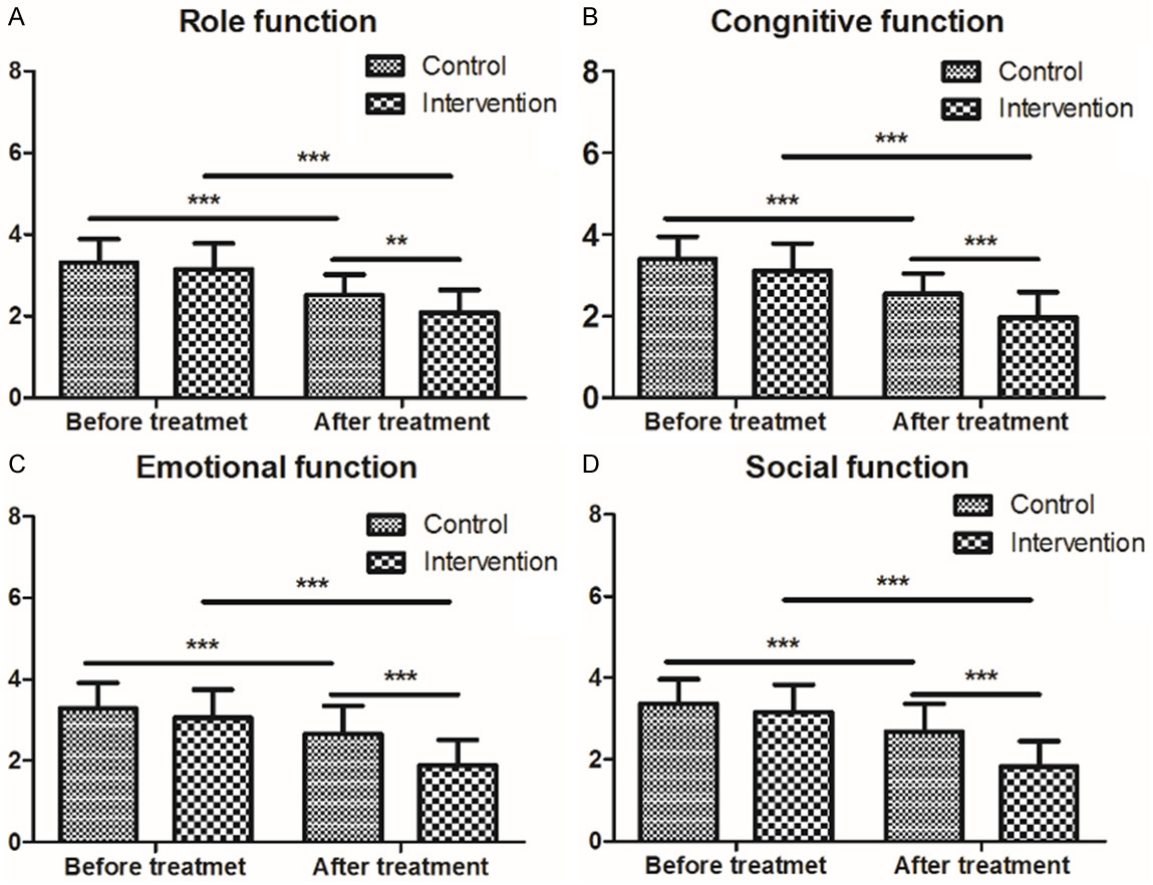

Figure 3. Comparison of quality of life ($\bar{x}$ ± sd). A. Role function; B. Cognitive function; C. Emotional function; D. Social function. The lower the index, the better the life quality. ***P<0.001, **P<0.01.

Table 2. Comparison of the number of patients with discomfort ($\bar{x}$ ± sd)

Group	Control group (n=35)	Intervention group (n=35)	t/χ^2	P
Fatigue	13 (37.14)	4 (11.43)	4.972	0.026
Nausea and vomiting	12 (34.29)	3 (8.57)	5.430	0.020
Dyspnea	14 (40.00)	4 (11.43)	6.058	0.014
Anorexia	17 (48.57)	5 (14.29)	8.021	0.005
Other	16 (45.71)	8 (22.86)	2.553	0.110

Table 3. Comparison of satisfaction degree ($\bar{x}$ ± sd)

Group	Control group (n=35)	Intervention group (n=35)	t/χ^2	P
Satisfaction degree			9.426	0.009
Great satisfaction	9 (25.71)	13 (37.14)		
Satisfaction	12 (34.29)	19 (54.29)		
Dissatisfaction	14 (40.00)	3 (8.57)		
Medical dispute	3 (8.57)	0	1.393	0.238
Complaint	5 (14.29)	1 (2.86)	1.641	0.200

by the disease, high costs and high recurrence rate, patients are prone to anxiety, depression and insomnia, which may eventually lead to deterioration of the disease and reduction of the cure rate [20]. Anticancer drugs, chemoradiotherapy and surgery are the main treatments for lung cancer currently. Early chemotherapy and drug control can effectively reduce the recurrence and increase the cure rate. However, with the appearance of side effects, patients will have great emotional fluctuations, resulting in anxiety, loss of appetite, insomnia and other adverse emotions, leading to poor compliance or even suicide [21]. The traditional nursing mainly focuses on patients' diet, rest and environ-

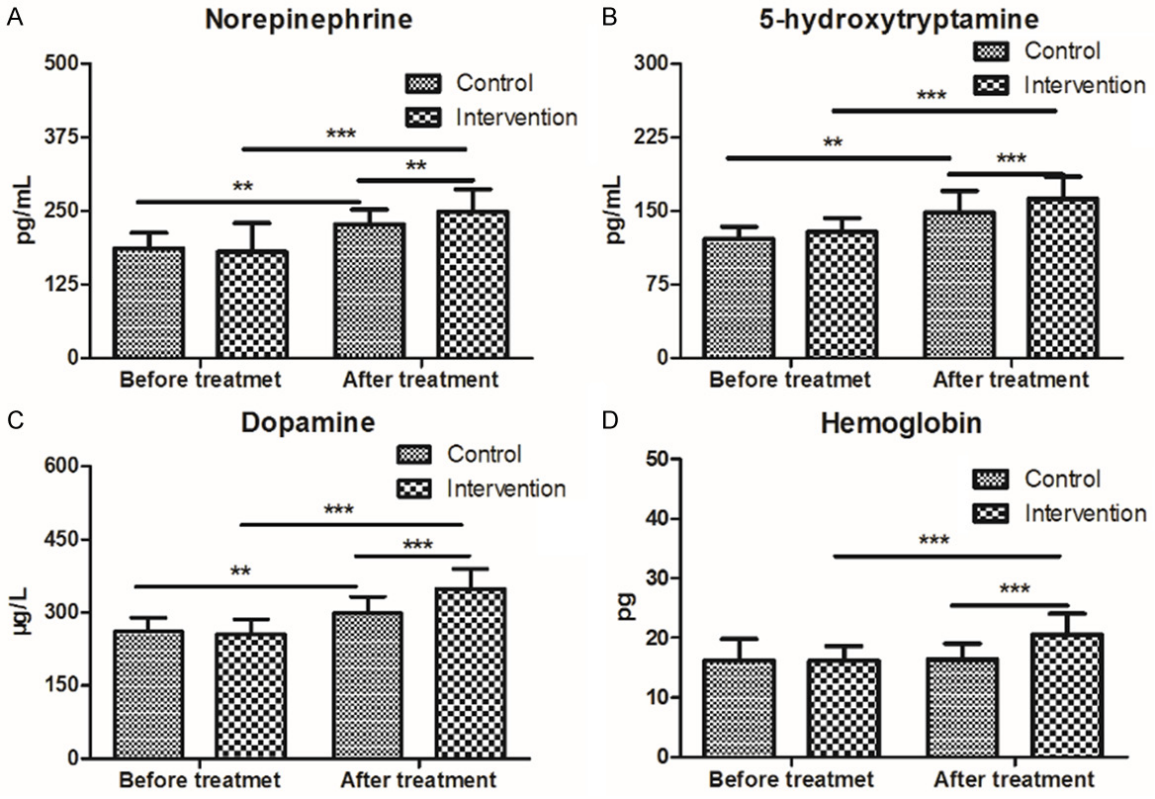

Figure 4. Comparison of serum indicators ($\bar{x} \pm sd$). A. Norepinephrine. The higher the level, the stronger the antidepressant ability; B. 5-hydroxytryptamine. The higher the level, the stronger the antidepressant ability; C. Dopamine. The higher the level, the stronger the antidepressant ability; D. Hemoglobin. The higher the level, the better the body's recovery. ***P<0.001, **P<0.01.

ment optimization. There are no effective nursing measures in patients' coordination, compliance, anxiety and psychological communication. Psychological nursing is a supplement to the traditional nursing that improves patients' treatment belief through communication, understands patients' psychological problems through listening, improves patients' sense of security through guiding patients' families to talk with them, and solves patients' treatment doubts through successful case sharing [22].

Moreover, psychological nursing is a commonly used clinical auxiliary treatment method based on the clinical symptoms of patients, which analyzes the factors causing patients' negative emotions, and implements psychological communication and health education scientifically, so as to correct the wrong views of patients, enhance treatment confidence, and ultimately improve the cure rate [23]. The prominent role of psychological nursing lies in eliminating patients' psychological barrier, changing their pessimistic mood, and making them full of yearning for life. The results of this study showed that after psychological nursing intervention, the SAS, SDS, PHQ and PSQI scores of patients in the intervention group were significantly lower than those in the control group, with statistically significant differences. The main reason is that the depression and anxiety often cause chronic pain and reduce the threshold of pain. We detailed the principle of pain for patients, guided them to adjust their bad emotions and shifted their attention by playing soothing music and intimate chats. Therefore, the VAS and NRS scores of patients in the intervention group were significantly lower than those in the control group, which is consistent with the results of Gao et al. [24]; Dong et al. also confirmed that psychological nursing and scientific explanation of chemotherapy-related operations, possible adverse reactions and treatment costs can reduce the negative emotions of patients, improve their cognition and enhance their determination [25]. This is consistent with our result that the patients in the intervention group showed significantly lower

scores in role, cognition, emotion and social function than those in the control group. It suggests that psychological nursing intervention can relieve patients' adverse emotions, enhance their self-confidence and compliance, thus improving the quality of life. In this study, the incidence of fatigue, nausea, vomiting, dyspnea and anorexia in the intervention group was significantly lower than that in the control group, while the satisfaction degree was significantly higher than that in the control group.

Polański et al. stated that anxiety, depression and other adverse emotions increase the release of catecholamine hormones in large quantities that can act on sympathetic nerves via L-leucine, resulting in increased nerve excitability, stimulating endocrine hormones and causing hormone secretion disorder [26]. The levels of serum NE and 5-HT were reported to be significantly reduced in patients with depression and anxiety [27]. This study showed that patients in the intervention group were significantly higher than those in the control group in the level of NE, DA and 5-HT. It is consistent with the results confirmed by Yuan et al. that graded psychological nursing can effectively relieve anxiety and depression and increase the level of plasma 5-HT in patients with gastroesophageal reflux [28]. The HB content of patients in the intervention group was significantly higher than that in the control group, which further proves that psychological nursing intervention can improve the overall quality of life, increase the coordination and strengthen the therapeutic effect of lung cancer patients.

However, due to the small sample size and the influence of regional and cultural differences, the experimental results are somewhat biased and lack of representativeness. Besides, the effect of psychological intervention on improving patient mood and quality of life is unsustainable and is easily affected by the external environment. Moreover, because of different treatment methods, physiological and immune indexes were not used to evaluate the clinical effect, and there is lack of sufficient data support. Therefore, further researches well be carried out to confirm our results.

To sum up, psychological nursing intervention is effective in improving adverse psychology and reliving pain and discomfort of patients with lung cancer, as well as in improving quality of life and survival rate. Therefore, it is worthy of clinical application.

Disclosure of conflict of interest

None.

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