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ORIGINAL

EFFECT OF COMPREHENSIVE NURSING INTERVENTION ON QUALITY OF LIFE AND SELF-CARE ABILITY OF RETIRED ATHLETIC PATIENTS WITH LUNG CANCER UNDERGOING SURGERY

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ABSTRACT

Objective: To investigate the effectiveness of synthetical nursing intervention on the quality of life and self-care ability of lung cancer retired athletic patients undergoing surgery. **Methods:** 72 retired athletic patients with lung cancer and received surgical treatment were research subjects and put into two groups i.e., control group (n=36) and research group (n=36). The control group was given routine nursing intervention while the research group received a comprehensive nursing intervention on top of routine nursing intervention. Serum indexes, quality of life, self-care ability, complication rate and measure for nursing satisfaction were measured in both groups before and after intervention. **Results:** After the intervention, the serum measure of each index of the two groups were in a higher status than those before the intervention, and the levels of CRP, IL-6, MAP and RR in the research group were lower than those in the control group (P<0.05). The scores of family, relationship with doctors, emotion, function, and lung cancer-related status were all lower than those before intervention, and the ameliorate of quality of life in the research group was better than that in the control group (P<0.05). The scores of disease cognition and self-concept were higher than those before intervention, and the amelioration of self-care ability in the research group was better than that in the other (P<0.05); the incidence of complications in the research group (8.33%) was lower than in the control group (19.44%) (P>0.05). The nursing service satisfaction of the research group was 94.44% and significantly higher than that of the control group at

86.11% (P<0.05). **Conclusion:** Comprehensive nursing intervention in retired athletic patients with lung cancer surgery are able to elevate the quality of life and self-care ability of retired athletic patients and achieve significant nursing impression which are worthwhile for future clinical application.

Key words: lung cancer; Comprehensive nursing intervention; quality of life; Tumor immunology; self-care; impact analysis

1. INTRODUCTION

Lung cancer is a disease of uncontrolled cell growth in the lung parenchyma or within the bronchi. The disease has a high incidence and mortality rate globally with a reported 1.1 million deaths and responsible for 17.8% of all cancer related deaths in 2022(Kuşoğlu & Avcı, 2019). Lung cancer symptoms include shortness of breath, persistent coughing which may have blood in some cases and general loss of weight (Miao, Ji, Wang, & Wang, 2021). Considering the high risk of lung cancer, treatments to improve the quality of life of retired athletic patients is of outermost importance. Several mechanisms have been developed in this regard but still the management of lung cancer remains a challenge. This is due to the diversity of underlying biological factors of the disease and patient population dynamics. Some of the factor that make management difficult include cancer cell differentiation degree and type, patient age and symptoms, histology and treatment method preferences (Heinke & Vinod, 2020).

It is essential to find the most appropriate treatment as soon as possible as most retired athletic patients are diagnosed when the cancer is at an advanced stages making the cure and survival rate low. Depending on the patient's body state, biological type, cancer cell differentiation degree and type there is need to develop reasonable synthetical treatment plan. These may include a combination of Chinese and western drugs, surgery, chemoradiotherapy and biological targeted therapy to curb cancer cell differentiation as much as possible. The use of surgery as the main treatment for lung cancer significantly curbs lung cancer lesion tissues and cells, control the disease development(Kanzaki, 2019). However, surgery can be a strong irritant to the body is strong, prone to emphysema and atelectasis thereby affecting the prognosis impression and patient quality of life. In addition, this method requires high technical and clinical nursing level of the operator. Studies (Liu et al., 2020) have shown that providing high-quality nursing services to lung cancer retired athletic patients is able to regulate the health of retired athletic patients and ameliorate their quality of life. Therefore, implementing reasonable care measures is a key perioperative step for lung cancer patients. The perioperative nursing measures for lung cancer patients at home and abroad mainly focus on a single nursing mode and

method. This can be laborious to fulfill the requirements of retired athletic patients for nursing staff(Yu & Liu, 2019). There is still a lack of unified process and operational standards in research on synthetically nursing interventions. This synthetically nursing methods should have built its foundation on the clinical experience of nursing staff and medical resource. In this study, traditional nursing modes and synthetically nursing intervention are compared in a bid to explore their effect on quality of life of lung cancer patients who have undergone surgery. The research will also evaluate the self-care ability, complication rate and nursing satisfaction in the research groups.

2. MATERIALS AND METHODS

2.1 General Information

For this study, research subjects were 72 retired athletic lung cancer patients who had undergone surgical treatment during the period June 2019 to June 2021. Subjects were randomly split into two groups i.e., control group (n=36) and research group (n=36). A comparison of baseline data of the two groups indicated that there was no statistically significant difference (P> 0.05). The control group received routine care intervention while the research group received synthetical nursing intervention on top of routine care. This study was reviewed and approved by the Hospital Medical Ethics Construction Committee.

2.2 Inclusion and exclusion criteria (Xu et al., 2019)

Inclusion criteria: ① retired athletic patients who meet the diagnostic criteria of lung cancer by the World Health Organization (WHO); ② retired athletic patients whose lung cancer was confirmed by surgical biopsy and imaging examination; ③ patient underwent lung cancer surgical treatment; ④ card score (Karnofsky, KPS) > 60 (Tzouvelekis et al., 2018); ⑤ retired athletic patients without endocrine system and immune system disorder; ⑥ study subjects and families were notified of the research project and voluntarily signed consent to participate.

Exclusion criteria: ① retired athletic patients with heart, liver, kidney and other organ dysfunction; ② with other malignant tumors or distant metastases; ③ with estimated survival of <6 months; ④ with infection, infectious diseases or coagulopathy; ⑤ platelet count ≤50×10^9/L, prothrombin time> 18s; ⑥ with mental system and cognitive dysfunction; ⑦ poor compliance, midway withdrawal.

2.3 Research Methods

The control group was given routine nursing intervention after admission which

included recording of basic personal information, performance of lung examination, paying close attention to vital signs and blood gas indicators when giving medication and diet planning. The research group received a synthetical nursing intervention in addition to routine interventions also received by the control group. The synthetical nursing interventions included;

① Health education as well as psychological intervention – a WeChat platform was created where information about lung cancer was regularly shared through short videos, animation, posters, etc. This platform was meant to increase awareness of the disease by retired athletic patients to help them understand their psychological state, dispel any disease confusion, answer questions related to lung cancer care, help them relieve bad mood and increase their treatment confidence and compliance.

② Before the operation - establish patient personal information files to try and understand possible factors that contributed to the development of lung cancer. Patients are also informed on healthy nursing measures, avoid stimulating lung tissue, taught breathing methods and lung practice, ameliorate cough methods and reduce pulmonary fibro cell damage. Additionally, retired athletic patients are taught to shift focus from the disease which helps to promote microcirculation, relieve pain, asthma and other symptoms. The nursing intervention also involves informing retired athletic patients to fast for 4 hours before the surgery, giving coagulation and antiemetic drugs and explaining the need for these precautions during the operation.

③ During the operation - disinfection of the operating room and surgical instruments in advance to ensure that the operating room environment is clean. Temperature, humidity and light should also be appropriate while the patient is guided on how to maintain the appropriate surgical position.

④After the operation - closely monitor retired athletic patient’s vital signs, adjust their appropriate position to ensure smooth airway, observe breathing and any blood cough, and conduct symptomatic treatment. Blood cough: guide the patient to be in the lateral decubitus position, exclude oral secretions, pat the side back, eliminate blood clots, take oxygen treatment, to maintain smooth breathing and blood drainage; Pneumothorax: give retired athletic patient’s chest closed drainage, oxygen absorption treatment, monitor oxygen saturation, pay attention to avoid severe cough, keep smooth breathing, etc. Take note of the color and flow rate of the drainage pipe to ensure that the drainage pipe is working properly. If any abnormal situation is noticed, inform the patient's family members immediately. Depending on patience degree of pain, analgesic drugs were given appropriately. They can also be given anti-infection and diuretic drugs to avoid postoperative infection. Retired Athletic Patients and their families will receive regular breathing

training, appropriate sitting positions, hands on the knees, peaceful and how uniform breathing relieves muscle spasm. Dietary planning will also be implemented to ensure appropriate nutrition for the patient, ameliorate their nutritional status and promote wound healing. Family members are also taught the importance of massages, turn over, promote physical recovery, listening to soothing music according to patient interests and hobbies thereby reducing postoperative pain.

2.4 Observation indicators

① Serum index evaluation: 3ml of fasting venous blood was drawn before and after nursing interventions from the two groups and centrifuged at 3500 rpm for 10 min. The resulting supernatant was used to test serum levels of C-reactive protein (CRP) and IL-6 using ELISA method. The mean arterial pressure (MAP) and respiratory rate (RR) of the retired athletic patients were monitored closely by using a respirator.

②Quality of life measurement: the quality of life before and after intervention was assessed using the Functional Assessment of Cancer Therapy-lung (FACT-L) (Ponzetti, Laface, Milanesi, & Ciuffreda, 2021). The scale has 36 entries and 6 dimensions (physiology, social / family, relationship with physician, emotion, function, and, lung cancer-related status).

③ Self-care capacity: Pre and post intervention self-care capacity was assessed using exercise of self-care agency scale (ESCA) (Matthies et al., 2019). ESCA measures 43 items and 4 dimensions (self-care, responsibility, disease perception, and self-concept) which helped answer research questions were focused on.

④ Complication rate: record the occurrence of perioperative complications, including hypoxemia, dyspnea, atelectasis, pulmonary edema, infection, etc.

⑤ Care satisfaction: The Newcastle Satisfaction with Nursing Scale (NSNS) (Anders, 2018) is used to evaluate retired athletic patients' satisfaction with nursing services with a total of 19 items measured. Total score ranges from 19 – 95 where ≥90 means very satisfactory; 75-89 means quite satisfactory; 60-74 means satisfactory; <60 means not satisfactory.

Nursing Satisfaction = $\underline{\text{Very Satisfactory + Quite Satisfactory + Satisfactory cases}}$

Aggregate number of cases.

2.5 Statistical analysis

Using SPSS 24.0 statistical software, normally distributed data are measured in

$\bar{x}$±s. A student t-test was applied for comparisons between the groups; count data are in the expression of examples (n) and percentage (%), comparisons between groups were performed using the χ2 test, statistical significance was indicated as P <0.05.

3. RESULTS

3.1 Baseline data comparison

A comparison of sex, age, course, tumor site, disease type and cause of the disease between the two groups showed no statistically significant difference (P> 0.05) as indicated in Table 1.

Table 1: Comparison of basic information

Group		Control Group （n=36）	Research Group （n=36）	Statistic	P value
Sex (cases）	Male	21 (58.33）	22（61.11）	0.318	0.105
	Female	15（41.67）	14（38.89）		
Average Age (years）		54.95±3.24	54.67±3.28	6.584	0.064
Course（year）		2.54±0.51	2.53±0.51	3.069	0.090
Tumor site （cases）	Left lung	25（69.44）	24（66.67）	4.058	0.134
	Right lung	11（30.56）	12（33.33）		
Disease type （cases）	Small cell carcinoma	8（22.22）	6（16.67）	5.315	0.087
	Epidermoid carcinoma	8（22.22）	9（25.00）		
	Glandular cancer	19（52.78）	20（55.56）		
	Other	1（2.78）	1（2.78）		
Cause of the disease (cases）	Smoking	15（41.67）	16（44.44）	0.462	0.058
	Occupational exposure	14（38.89）	13（36.11）		
	Pulmonary infection	4（11.11）	5（13.89）		
	Other	3（8.33）	2（5.56）		

3.2 Comparison of serum index measure

There was no considerable statistical difference in serum levels between the two groups before the intervention（P>0.05). However, after interventions, serum levels increased statistically significantly (P<0.05). CRP, IL-6, MAP and RR levels were lower in the control group compared to the research group. The difference was statistically significant (P <0.05) as shown in Table 2 and figure 1.

Table 2: Comparison of the serum index measure （$\bar{x}$ ±s）.

Group	Time	Control Group （n=36）	Research Group （n=36）
CRP（mg/dL）	Before the intervention	0.56±0.19	0.54±0.20
	After the intervention	5.48±0.24*	3.86±0.22*#
IL-6（pg/mL）	Before the intervention	83.62±6.25	85.68±6.24
	After the intervention	142.68±13.18	115.77±10.58
MAP（kPa）	Before the intervention	9.42±2.20	9.45±2.17
	After the intervention	14.08±2.56*	11.67±2.43*#
RR（time/min）	Before the intervention	13.11±1.97	13.12±1.95
	After the intervention	21.52±2.53*	16.95±2.28*#

Note that, compared with the control groups before the intervention, *#P<0.05.

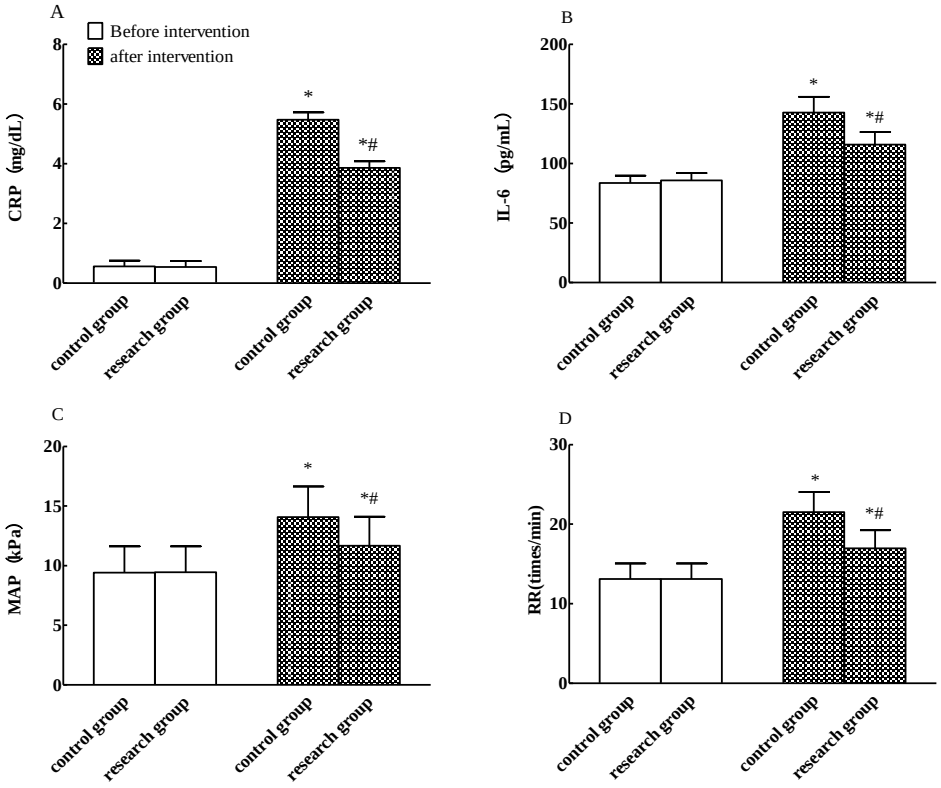

Figure. 1: Serum index level comparison between the two groups with *#P<0.05. (A) CRP; (B) IL-6; (C) MAP; (D) RR.

3.3 Comparison of quality of life

The results showed that there was no significant difference between the two groups before the intervention groups (P>0.05). After the intervention, the scores on physiology, society / family, relationship, emotion, function, and lung cancer-related status were all lower than those before the intervention. The difference was statistically significant (P <0.05) and the quality of life in the research group ameliorated compared to the control group as shown in Table 3 and figure 2

Table 3: Quality of life comparison（$\bar{x}$±s，point）

Group	Time	Control Group（n=36）	Research Group（n=36）
Physiology	Before the intervention	37.95±3.59	38.04±3.57
	After the intervention	25.69±2.81*	17.86±1.96*#
Society / family	Before the intervention	38.69±2.06	38.67±2.05
	After the intervention	26.83±1.85*	16.58±1.24*#
Relationship with doctors	Before the intervention	37.91±2.68	37.91±2.65
	After the intervention	26.58±1.82*	15.65±1.03*#
Emotion	Before the intervention	36.47±3.64	36.45±3.62
	After the intervention	28.94±2.76*	14.85±2.04*#
Function	Before the intervention	33.64±4.52	33.65±4.51
	After the intervention	24.07±2.75*	16.94±2.03*#
Lung cancer related status r	Before the intervention	39.77±6.58	39.77±6.59
	After the intervention	27.94±3.02*	19.86±2.37*#

Note that, compared with the control groups before the intervention, *#P<0.05.

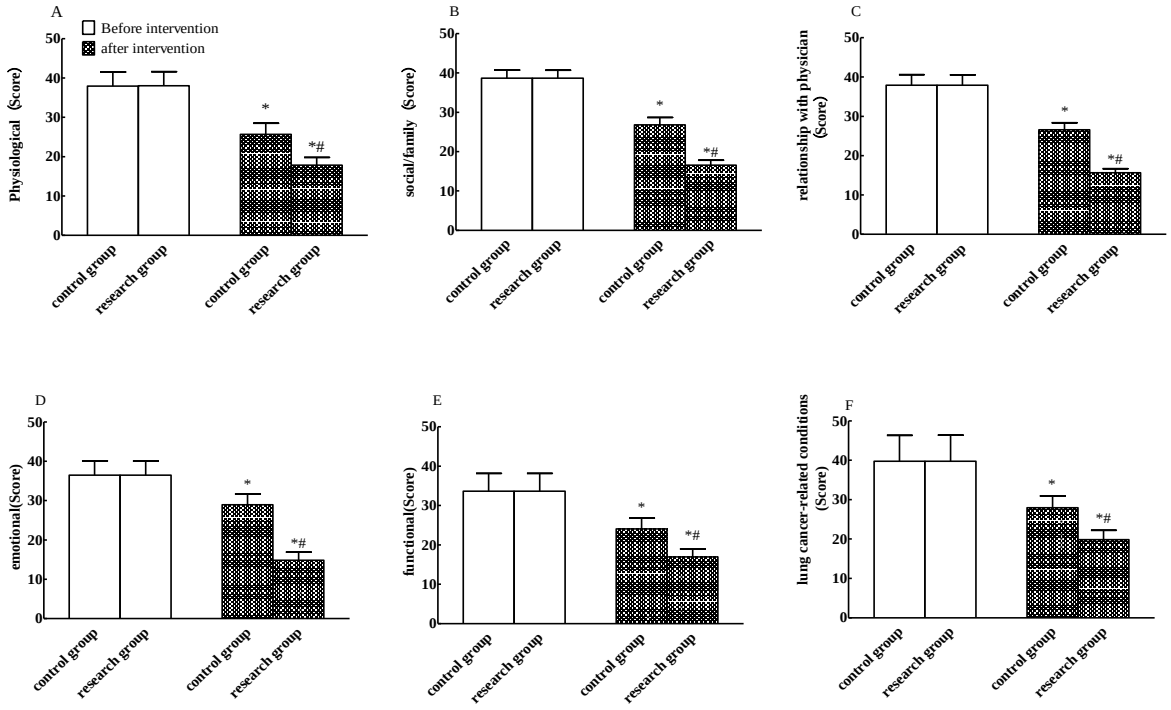

Figure 2: Quality of life comparison between the two groups before and after intervention *#P<0.05. (A) Physiological (B) social/family (C) relationship with physician (D) emotional (E) functional (F) lung cancer-related conditions.

3.4 Comparison of self-care ability

The results showed that there was no phenomenal diversity in the self-care ability between the two groups before the intervention (P> 0.05). After the intervention, the self-care, responsibility, disease cognition, and self-concept scores were all higher than before, which was statistically significant (P <0.05). The research group ameliorated better in self-care ability than the control group, which was statistically significant (P <0.05). Table 4 and figure 3 shows these results.

Table 4: Comparison of Self-care Ability ($\bar{x}$± s, sub) （$\bar{x}$±s，point）

Group	Time	Control group（n=36）	Research group（n=36）
Self-care	Before the intervention	23.64±4.69	23.62±4.68
	After the intervention	28.79±5.02*	35.95±5.36*#
Responsibility	Before the intervention	36.86±7.83	36.85±7.81
	After the intervention	40.35±9.65*	49.68±10.52*#
Disease cognition	Before the intervention	14.07±3.55	14.06±3.54
	After the intervention	20.05±4.09*	33.48±4.51*#
Self-concept	Before the intervention	13.97±3.24	13.95±3.22
	After the intervention	18.54±3.57*	28.73±4.08*#

Note, compared with the control group before the intervention, *#P<0.05.

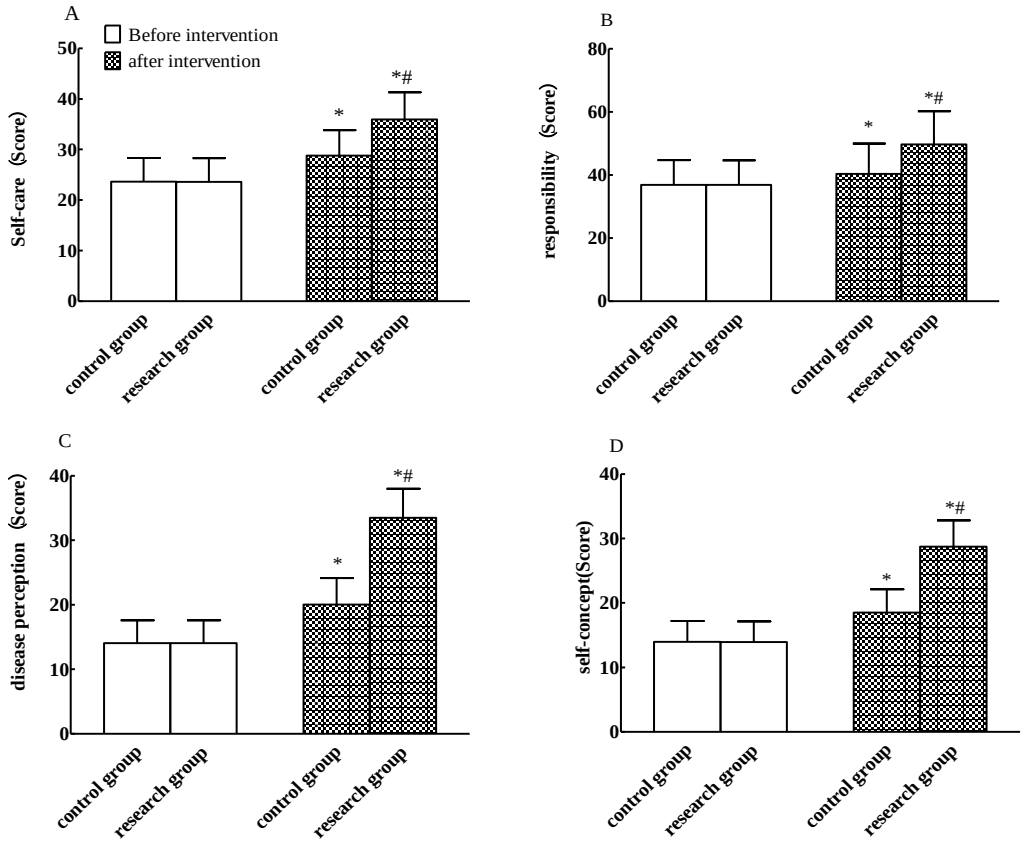

Figure. 3 Comparison of the self-care abilities pre- and post -intervention between the two groups *#P<0.05. (A) Self-care (B) responsibility (C) disease perception (D) self-concept

3.5 Comparison of the complication rates

The results show that the incidence of complication is significantly lower in the research group (8.33%) compared to the control group (19.44%). The difference is statistically significant at P> 0.05 as shown in Table 5.

Table 5: Comparison of the complication rates（cases，%）

Group	Control group （n=36）	Research group （n=36）	χ^2	P
Meionectic blood	2（5.56）	1（2.78）	-	-
Expiratory dyspnea	0（0.00）	0（0.00）	-	-
Telectasis	1（2.78）	0（0.00）	-	-
Pneumonedema	2（5.56）	1（2.78）	-	-
Infect	2（5.56）	1（2.78）	-	-
The incidence of adverse reactions	19.44%	8.33%	5.348	0.026

3.6 Comparison of nursing service satisfaction

The results show that the nursing service satisfaction rate increased from 86.11% in the control group to 94.44% in the research group. The difference was statistically significant at (P <0.05) as shown in Table 6.

Table 6: Nursing service satisfaction comparison（cases，%）

Group	Control group （n=36）	Research group （n=36）	χ2	P
Very satisfied	14（38.89	21（58.33）	-	-
Quite satisfied	10（27.78）	8（22.22）	-	-
Satisfied	7（19.44）	5（13.89）	-	-
Not satisfied	5（13.89）	2（5.56）	-	-
Nursing Satisfaction	86.11%	94.44%	2.362	0.001

4. DISCUSSION

Lung cancer has become one of the malignant tumors that threaten human health, ranking first in the mortality rate of malignant tumors. According to epidemiological data more than 1.2 million new lung cancer retired athletic patients are reported worldwide each year with China accounting for 20% of the cases. It is estimated that by 2025, the number of retired athletic patients in China will reach 1 million which is a serious threat to economic activities (Piredda et al., 2015). At present, the pathogenesis of lung cancer is not clear. It is mostly believed that smoking, long-term exposure to air pollution, some occupational exposure and other factors lead to a decrease in bronchial glands or lung epithelial cells, causing lung gene mutations, immune system imbalance, and induce lung cancer (Team, 2019). There are many ways to treat lung cancer clinically mostly depending on the disease stage and tolerance of body. The body tolerance will limit proliferation, differentiation and metastasis as much as possible, reduce their clinical symptoms, prolong the expected survival time and ameliorate the perioperative quality of life. However, the treatment cycles are mostly long-term and continuous which negatively influences the physiology and psychology of retired athletic patients(Rafiemanesh et al., 2019). The continuous treatment reduces patient's immune function and tolerance degree, leads to a decline in the quality of life and other adverse reactions which are not conducive to the effectiveness of the treatment (Mei et al., 2019).

Therefore, active and reasonable nursing measures to maintain patients' physical and mental health and ameliorate their self-initiative are necessary. In this study, the synthetical nursing intervention of Retired athletic patients can significantly alleviate their lung injury degree, ameliorate their quality of life and self-care ability, alleviate the possibility of postoperative complications, ameliorate nursing satisfaction, and achieve the ideal nursing impression. Retired athletic Patients with lung cancer can experience traumatic physiological stress response during surgery, release of inflammatory factors and reactive oxidation substances, activate protein, lipid levels, cause postoperative inflammatory reaction, and affect the body's immune system(Innos, Oselin, Laisaar, & Aareleid, 2019). Among them, CRP, as an acute time-phase response protein, serves as an important biomarker of inflammation and stress injury, and increases with the enhancement of inflammation with the degree of inflammation. IL-6 will engage the accommodation of the immune system, stress response and apoptosis,

which can reflect the immune level with sensitivity and accuracy. MAP and RR can indicate the perioperative life status of retired athletic patients, and indicate the impact of surgery on their myocardial function and respiratory system (Okada et al., 2020).

Studies by Zhang (LI et al., 2021) showed that nursing intervention performed according to the clinical symptoms and vital signs of retired athletic patients undergoing lung cancer radiotherapy and chemotherapy, enhance patient self-identification, ameliorate treatment compliance and improve quality of life. Results in this study where serum levels (CRP, IL-6, MAP and RR) and quality of life score (physiology, social / family, relationship, emotion, function, and lung cancer-related status) increased after the nursing intervention are similar to those in the Zhang study. This suggests that synthetical nursing intervention for retired athletic patients with lung cancer undergoing surgery can efficaciously alleviate the stimulation degree of the operation and significantly ameliorate the quality of life of retired athletic patients. Synthetically nursing provides perioperative overall intervention for lung cancer patients through the establishment of disease professional knowledge system, reasonable psychological construction, amelioration of the environmental comfort and appropriate nutrition interventions. This intervention further retired athletic patients' understanding of disease and treatment methods as well as teach appropriate breathing and exercise which can increase microcirculation and respiratory function. Perioperative trauma and inflammatory reactions of retired athletic patients can increase fear, anxiety and other emotions, affecting patients' mental health and treatment compliance. The self-construction of patients can enhance self-management ability, eliminate psychological barriers, cooperate with medical staff, and reduce the risk of adverse events.

Kneuertz and others (Zhang, Lu, Fan, & Wang, 2022) observed lung indicators, clinical symptoms and signs during and after discharge, so as to improve their self-care level, treatment compliance and satisfaction; Ishikawa S focus on perioperative oral health problems of lung cancer patients, maintain their smooth respiratory tract and reduce the risk of respiratory tract infection. The study results showed that the self-care, responsibility, disease cognition and self-concept scores of the two groups were higher than those of the retired athletic patients before the intervention, and the improvement of self-care ability was better than that of the control group; The complication rate was lower in the research group than in the control group; satisfaction of nursing services was higher in the research group than in the control group; similar to the results of Kneuertz P J and Ishikawa S, it shows that the synthetical nursing intervention plays an active role in the self-care ability and nursing satisfaction of surgical retired athletic patients with lung cancer, and is also able to reduce and occur the incidence. The reasons are analyzed as follows: the synthetically nursing intervention is patient-centered, understands the patients' psychological, physiological, cognitive and tolerance

degree, and increases the patients' correct understanding of the disease through health education and psychological counseling; informing patients of the specific surgical procedure, matters needing attention and prognosis improvement can help them establish systematic disease knowledge, eliminate anxiety and unease during treatment, reduce the uncertainty of the treatment process, clarify the importance and specific measures of self-care, and improve their self-responsibility; In addition, reasonable diet and postoperative nursing guidance can help to improve the body nutrition status and immune level, preventive nursing measures can improve the adverse event risk, at the same time improve the recognition of medical work, and enhance its self-care ability and quality of life, obtain obvious nursing satisfaction, reduce the postoperative adverse reactions.

Synthetical nursing intervention applied to perioperative lung cancer athletic patients can potentially offer significant clinical initiatives that are applicable in different set ups. However, this study still has certain limitations. The sample size used in the study was very small and the study was restricted to one demographic region. A larger sample size and different region may produce different results as lung cancer proliferation is influenced by environmental factors. Another limitation is that, the study period was relatively short as a result, long-term effects and prognosis could not be determined. To further improve the study, there is need increase the sample size, extending the follow-up time, establishing a standardized nursing process and standards.

5. CONCLUSION

Synthetical nursing intervention for lung cancer athletic patients to reduce the inflammatory stress response to the body during treatment can significantly ameliorate the quality of life and self-care level, control the occurrence of perioperative adverse events, and improve nursing satisfaction. Given these potential benefits, implementing this strategy would be feasible.

Declaration of conflict of interest: None.

Data Availability Statement: The data used to support the findings of this study are available from the corresponding author upon request.

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REFERENCE

Anders, M. (2018). Self-Care, Self-Care Agency, and Self-Rounding: A Descriptive Study Focusing on Self-Care Agency between Bedside Nurses and Nursing Students. *Self-Care Agency, and Self-Rounding: A Descriptive Study Focusing on Self-Care Agency between Bedside*

Nurses and Nursing Students (March 12, 2018).

Heinke, M. Y., & Vinod, S. K. (2020). A review on the impact of lung cancer multidisciplinary care on patient outcomes. *Translational Lung Cancer Research, 9*(4), 1639.

Innos, K., Oselin, K., Laisaar, T., & Aareleid, T. (2019). Patterns of survival and surgical treatment in lung cancer patients in Estonia by histologic type and stage, 1996–2016. *Acta Oncologica, 58*(11), 1549-1556.

Kanzaki, M. (2019). Current status of robot-assisted thoracoscopic surgery for lung cancer. *Surgery Today, 49*, 795-802.

Kuşoğlu, A., & Avcı, Ç. B. (2019). Cancer stem cells: A brief review of the current status. *Gene, 681*, 80-85.

LI, X., CAO, X., ZHU, W., LIU, Y., CUI, X., & REN, Q. (2021). Effect of preemptive analgesia with butorphanol on perioperative stress response and postoperative pain in lung cancer patients undergoing thoracoscopic lobectomy. *Cancer Research and Clinic*, 28-32.

Liu, Z., Qiu, T., Pei, L., Zhang, Y., Xu, L., Cui, Y., . . . Huang, Y. (2020). Two-week multimodal prehabilitation program improves perioperative functional capability in patients undergoing thoracoscopic lobectomy for lung cancer: a randomized controlled trial. *Anesthesia & Analgesia, 131*(3), 840-849.

Matthies, L. M., Taran, F.-A., Keilmann, L., Schneeweiss, A., Simoes, E., Hartkopf, A. D., . . . Wallwiener, S. (2019). An electronic patient-reported outcome tool for the FACT-B (functional assessment of cancer therapy-breast) questionnaire for measuring the health-related quality of life in patients with breast cancer: reliability study. *Journal of medical Internet research, 21*(1), e10004.

Mei, J., Guo, C., Xia, L., Liao, H., Pu, Q., Ma, L., . . . Yang, Z. (2019). Long-term survival outcomes of video-assisted thoracic surgery lobectomy for stage I-II non-small cell lung cancer are more favorable than thoracotomy: a propensity score-matched analysis from a high-volume center in China. *Translational Lung Cancer Research, 8*(2), 155.

Miao, J., Ji, S., Wang, S., & Wang, H. (2021). Effects of high quality nursing in patients with lung cancer undergoing chemotherapy and related influence on self-care ability and pulmonary function. *American Journal of Translational Research, 13*(5), 5476.

Okada, S., Shimomura, M., Tsunezuka, H., Teramukai, S., Ishihara, S., Shimada, J., & Inoue, M. (2020). *Prognostic significance of perioperative C-reactive protein in resected non-small cell lung cancer.* Paper presented at the Seminars in Thoracic and Cardiovascular Surgery.

Piredda, M., Vellone, E., Piras, G., Fida, R., Latour, J. M., Matarese, M., . . . De Marinis, M. G. (2015). Psychometric evaluation of the newcastle satisfaction with nursing scales. *Journal of nursing care quality, 30*(1), 84-92.

Ponzetti, A., Laface, R., Milanesi, E., & Ciuffreda, L. (2021). Three proposals to optimise the eastern cooperative Oncology group and Karnofsky scales in the molecular and COVID-19 era. *Clinical Oncology, 33*(3),

e192.

Rafiemanesh, H., Mehtarpour, M., Khani, F., Hesami, S. M., Shamlou, R., Towhidi, F., . . . Moini, A. (2019). Erratum to epidemiology, incidence and mortality of lung cancer and their relationship with the development index in the world. *Journal of Thoracic Disease, 11*(2), E24.

Saha, S., Pal, P., Halder, S., Dhara, K., & Saha, N. (2022). Shark diversity in the Indian Sundarban biosphere. *FishTaxa, 23*, 53-56.

Team, N. L. S. T. R. (2019). Lung cancer incidence and mortality with extended follow-up in the National Lung Screening Trial. *Journal of Thoracic Oncology, 14*(10), 1732-1742.

Tzouvelekis, A., Spagnolo, P., Bonella, F., Vancheri, C., Tzilas, V., Crestani, B., . . . Bouros, D. (2018). Patients with IPF and lung cancer: diagnosis and management. *The Lancet Respiratory Medicine, 6*(2), 86-88.

Xu, H., Xue, R., Cheng, Y., Zhang, Y., Rao, J., Liu, M., . . . Shu, Y. (2019). Mental distress evaluation and intervention for cancer patients. *Oncology and Translational Medicine, 5*(6), 301.

Yu, X., & Liu, J. (2019). Effects of high-quality nursing care for patients with lung cancer during the perioperative period: a protocol of systematic review of randomized controlled trials. *Medicine, 98*(48).

Zhang, T., Lu, J., Fan, Y., & Wang, L. (2022). Evidence-based nursing intervention can improve the treatment compliance, quality of life and self-efficacy of patients with lung cancer undergoing radiotherapy and chemotherapy. *American Journal of Translational Research, 14*(1), 396.

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