

# Effect of Intensive Nursing Care in Elderly Patients undergoing Video-assisted Thoracoscopic Lung Cancer Surgery: A Randomised Control Study

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## ABSTRACT

**Introduction:** Lung Cancer (LC) is a prominent cause of death worldwide, with both non small cell and small cell types increasing in prevalence. Multiple therapeutic options such as chemotherapy, radiation, and surgery, including Video-assisted Thoracoscopic Surgery (VATS), have been developed, although postoperative complications remain a concern. Nursing care has been advocated as a means to mitigate these adverse effects. However, the actual association between nursing care and LC postoperative complications and outcomes remains unknown.

**Aim:** To assess the effects of Intensive Nursing Care (INC) on LC patients treated with VATS.

**Materials and Methods:** The present study was a randomised control study in which a total of 256 Non Small Cell Lung Cancer (NSCLC) patients over the age of 60 years who underwent VATS in the Division 1 of Thoracic Surgery at Handan Central Hospital between January 2021 and January 2023 were included. The participants were randomly allocated to different groups: an INC group (n=126) and a control group receiving normal care (n=130). Lung function, reported symptoms, hospitalisation duration, psychological wellbeing (anxiety and depression scores), and occurrence of postsurgery symptoms (pain, fatigue, insomnia,

dyspnea, nausea/vomiting) were assessed. T-tests or Fisher's-Exact tests were used to compare baseline and postsurgical variables between the INC and Normal Nursing Care (NNC) groups using IBM Statistical Package for Social Sciences (SPSS) version 26.0 software.

**Results:** The study population consisted of 53.1% females with an average age of 73.51±7.61 years, ranging from 60 to 85 years. INC significantly improved hospitalisation duration {Mean Difference (MD)=-1.9; 95% Confidence Interval (CI), -2.6 to -1.2; p-value <0.001}, the occurrence of postsurgery symptoms (p-value <0.001), and psychological states assessed by both the Self-rating Anxiety Scale (SRAS) (MD=-17.99; 95% CI, -18.63 to -17.35; p-value=0.001) and the Self-rating Depression Scale (SRDS) (MD= -9.04; 95% CI, -9.95 to -8.13; p-value=0.008) in comparison to NNC patients.

**Conclusion:** Given the global burden of LC, it is crucial to emphasise not only the development of treatments for this illness but also care regimens that alleviate complications associated with these therapies. In this study, INC as an alternative to routine nursing care in postsurgery recovery has proven to be more beneficial to patients by decreasing their hospitalisation stay, the occurrence of postsurgery symptoms, and by enhancing their mental state.

**Keywords:** Mental state, Non small cell lung cancer, Self-rating anxiety scale, Self-rating depression scale

## INTRODUCTION

The LC is a prominent cause of mortality in China and globally, as reported by the Global Cancer Statistics 2018 [1-5]. The occurrence of both NSCLC and SCLC has been steadily rising in recent decades and is projected to continue increasing in the future [6-9]. Several procedures have been developed to treat LC, including chemotherapy, radiation, and surgery, such as VATS [10-14]. An increasing number of patients with NSCLC, at a precocious stage of the evolution of the disease, have taken advantage of surgical resection as a modality of treatment. Unfortunately, they have encountered several detrimental consequences, such as a significant occurrence of pulmonary problems in up to approximately 25% of patients after surgery [5]. Nursing care as a model of clinical intervention has been proposed as an efficient method to mitigate these reactions in patients with LC [15-22]. Although limited clinical studies have explored the effects of nursing care on anxiety and depression relief and quality of life in general among perioperative patients with LC [5,10], it is unclear the actual association between nursing care and LC postoperative morbidity and prognosis. The current study evaluates the impact of INC on lung function, symptom management, duration of hospitalisation and psychological wellbeing in LC patients undergoing VATS.

## MATERIALS AND METHODS

This randomised controlled study was conducted on 256 NSCLC patients who underwent VATS at the Thoracic Surgery Division 1 of Handan Central Hospital, Handan, Hebei, China from January 2021 to January 2023. The Hospital's Committee of Medical Ethics approved this study (project N: 331522121), and all patients gave their written consent to participate.

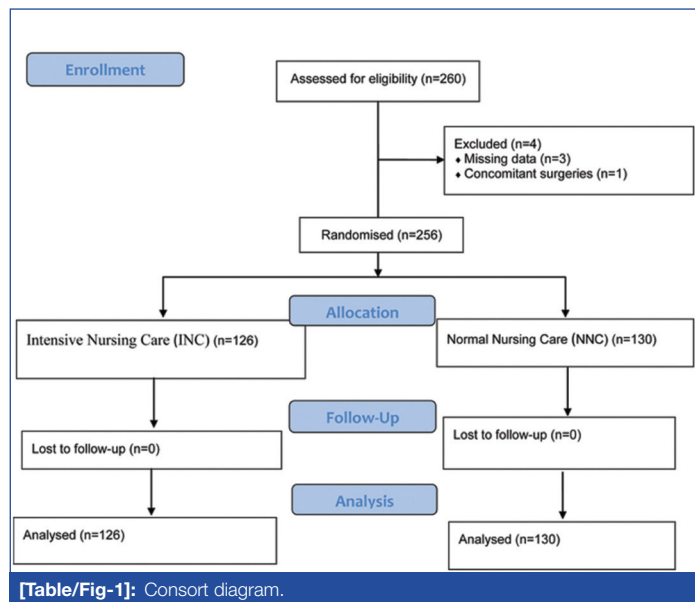
**Inclusion criteria:** The criteria for inclusion were as follows: 1) Patients aged 60 years or older; 2) Patients without physical limitations who can comprehend and collaborate with healthcare professionals; 3) Patients who have indications for VATS 4) Patients who have received a confirmed diagnosis of LC based on postoperative pathology samples.

**Exclusion criteria:** The exclusion criteria were as follows: 1) Recent medical treatment involving chemotherapy or radiotherapy; 2) History of previous lung surgery; 3) Concomitant presence of additional tumours and/or serious co-morbidities such as cardiovascular, cerebrovascular, and pulmonary diseases; 4) Previous diagnosis of depression; 5) Incomplete medical records.

## Study Procedure

The eligible patients were randomly allocated into groups using their hospitalisation numbers. The hospitalisation numbers were entered

on an Excel spreadsheet, with number 1 representing NNC and number 2 representing INC. This random assignment divided them into two different groups: INC (n=126) and normal care (n=130) [Table/Fig-1]. The NNC group received standard nursing care, which included monitoring vital signs and symptoms, dietary and wound management, adherence to anti-infection protocols, and other routine postsurgical treatments. In the intensive nursing group, additional measures such as early ambulation and respiratory training were initiated two hours after intervention, including exercises like abdominal breathing and effective cough training. Patients were also instructed in techniques such as deep relaxation breathing and music therapy to manage stress and anxiety.



Data regarding the basic features of the patients, their hospitalisation duration, and symptoms were directly acquired from their medical records. Vital indicators, including Heart Rate (HR), Mean Arterial Pressure (MAP), Oxygen Saturation (SpO<sub>2</sub>), Forced Expiratory Volume in one second (FEV1), and Forced Vital Capacity (FVC) were measured during their stay. The psychological wellbeing of the patients was also examined. Anxiety and depression levels were assessed using self-reported surveys SRDS and SRAS [23,24]. Each survey lists several items, with a score from 1 to 4 attributed according to the patient's responses. The sum of each item's score determines the level of anxiety or depression within specific ranges (normal, mild, moderate, severe) as provided by the scale. Additionally, the overall wellbeing of the patients was measured using the European Association for Research and Treatment of Cancer Quality of Life questionnaire (EORTC QoL-C30) [25,26]. This self-report questionnaire, translated into several languages and validated by numerous studies, was used in its Chinese version to assess the physical, cognitive, emotional, and social functioning of postoperative cancer patients. It consists of several modules subdivided into items with scoring similar to the SAS and SDS, ranging from 1 to 4 according to the surveyed responses.

Baseline and postsurgical variables were compared between the INC and NNC groups.

### STATISTICAL ANALYSIS

The analysis was performed using IBM SPSS 26.0 software. When appropriate, data are expressed as mean±Standard Deviation (SD) or as a percentage. T-tests or Fisher's-Exact tests were used to compare the intensive and NNC groups. A p-value of <0.05 was considered significant.

### RESULTS

A cohort of 256 patients was selected and a group of nurses assessed them during the extent of their postsurgery hospitalisation. The study

population consisted of 53.1% females with an average age of 73.51±7.61 years, ranging from 60 to 85 years old. The participants were assigned to two groups of nursing care, namely intensive: INC (n=126) and normal: NNC (n=130). A 54% of the INC group was female compared to 52.3% of the NNC group. The average age of the NNC group was 74.2±7.69, while the INC group had a lower mean age of 72.79±7.5. Adenocarcinomas were the most common pathological diagnosis among the NNC patients 71 (54.6%), but Squamous carcinoma 71 (56.3%) was more prevalent in INC patients. Hospitalisation duration was significantly reduced among the INC group, showing a mean difference of -1.9 (95% CI, -2.6 to -1.2; p<0.001) days compared to the NNC group [Table/Fig-2].

Characteristic	Intensive Nursing Care (INC) (n=126)	Normal Nursing Care (NNC) (n=130)	p-value
<b>Sex</b>			
Female	68 (54)	68 (52.3)	0.803
Male	58 (46)	62 (47.7)	
Age±SD	72.79± 7.5	74.20±7.69	
Smoking history	61 (48.4)	63 (48.5)	1.000
Heart rate (bpm) M±SD	84.1±2.32	84±2.	0.619
Mean Arterial Pressure (MAP) (mmHg) M±SD	86.9±8.96	87.32±8.99	0.842
<b>Lung function</b>			
SpO <sub>2</sub>	90.96±2.92	90.42±2.9	0.839
FEV1	102.45±8.77	100.83±9.11	0.348
FVC	102.52±8.84	100.48±8.77	0.931
<b>Pathological diagnosis</b>			
Adenocarcinoma	55 (43.7)	71 (54.6)	0.082
Squamous carcinoma	71 (56.3)	59 (45.4)	
Hospitalisation duration M±SD	8.02±2.02	9.93±3.45	<0.001

**[Table/Fig-2]:** Baseline characteristics of the patients.

Fisher's exact test

Furthermore, according to [Table/Fig-3], INC was found to alleviate symptoms and consequences more effectively than a routine nursing strategy (p-value <0.001). Patients' overall quality of life was not significantly enhanced in the INC group. However, their average scores for both anxiety and depression were lower compared to the normal nursing group, with a MD of -17.99 (95% CI, -18.63 to -17.35; p-value=0.001) for anxiety and a MD of -9.04 (95% CI, -9.95 to -8.13; p-value=0.008) for depression [Table/Fig-4].

Symptoms	Intensive Nursing Care (INC)	Normal Nursing Care (NNC)	p-value
Pain	39	82	<0.001
Fatigue	34	78	<0.001
Insomnia	46	88	<0.001
Dyspnoea	47	83	<0.001
Nausea/Vomitting	46	81	<0.001

**[Table/Fig-3]:** Impact on postsurgery symptoms.

Fisher's exact test

	Intensive Nursing Care (INC)	Normal Nursing Care (NNC)	p-value (<0.05)
Quality of life (0-100)	81.11±4.09	70.47±4.85	0.128
Depression score (0-100)	43.55±4.18	52.59±3.15	0.008
Anxiety score (0-80)	36.40±2.26	54.39±2.9	0.001

**[Table/Fig-4]:** Impact on quality of life and mental well-being.

Fisher's exact test

### DISCUSSION

Despite the tremendous progress in treatment options for NSCLC, from chemotherapy to radiation, including surgery and VATS [10-14],

LC remains the leading cause of cancer-related mortality, accounting for 18% of cancer deaths worldwide, and specifically in China, with approximately 733,300 deaths registered in 2022 [1-5]. Therefore, it is crucial to develop appropriate care regimens or protocols to monitor these treatments, aiming to reduce the burden of this illness on both patients and the healthcare system. Recent clinical studies have suggested positive impacts of high-quality or individualised nursing care focused on patients' mental and physical wellbeing [15-22,27].

The present study aimed to enhance understanding in that regard by investigating the effect of INC on the recovery of postoperative patients who benefited from VATS. Present study observations indicate that patients enrolled in the INC group experienced significantly shorter overall hospitalisation, fewer symptoms, and less anxiety and depression. However, their lung function (SpO<sub>2</sub>, FEV<sub>1</sub>, FVC) and their Quality of Life (assessed by the EORTC QOL-C30) did not significantly improve compared to those receiving NNC.

In this research, both the SRAS and SRDS were lower in the INC group compared to the NNC group. Additional research conducted by Wang M et al., Brocki BC et al., and dos Santos TD et al., respectively performed in China, Europe, and Albuquerque, have reported a positive impact of high-quality nursing on the level of psychological distress among NSCLC patients [20-22]. Possible explanations for these results may be that the INC patients received more thorough and extensive treatment, which better equipped them to cope with the stress of recovery. They were provided with improved assistance and educated on stress management techniques such as breathing exercises and music therapy.

Although in this study, the Quality of Life of INC patients did not statistically improve (p-value=0.128) as opposed to the findings of Wang M et al., where their comprehensive approach group scored higher than the routine care group. The variations observed in the case of Wang M et al., may be attributed to the utilisation of a distinct questionnaire, namely the Dutch version of the World Health Organisation Quality of Life evaluation instrument WHOQoL-100, which incorporates different items and scoring methods [22].

Moreover, hospitalisation duration was shorter in the INC group. The reduction of symptoms might explain the shorter hospital stays among them. Present study observation follows disparity in hospitalisation similar trends presented by Zhao H et al., even though our average duration is -1.9 days, whereas their study reported -4.1 days [19]. Early ambulation and the adoption of breathing exercises themselves could be the reason for these improvements in the hospitalisation of present study INC patients, as suggested by other studies [28,29].

### Limitation(s)

This research unfortunately presents some limitations. First, it incorporates data exclusively from a single hospital in China, which may limit the generalisability of present study findings. In addition, the emphasis on the immediate effects of nursing care may have overlooked long-term variables, such as survival rates. Finally, psychological assessment of the patients upon admission and again upon discharge would have allowed for a comparative and more in-depth analysis of the patients' mental state progression during their hospitalisation.

### CONCLUSION(S)

The LC stands as a leading cause of illness and mortality both in China and globally. As a result, it is imperative to prioritise not only the development of therapies that specifically aim to reduce the burden of LC but also care regimens that alleviate its complications. This research found that patients who underwent VATS as LC therapy and were subjected to INC experienced reduced symptoms, shorter hospital stays, and lower scores for depression and anxiety compared to those who received NNC. The integration of psychological training within nursing curricula would therefore

enhance nursing practice as a whole, and in this case, lessen the burden of LC surgery and recovery on both families and healthcare systems.

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