

Influence of Evidence-based Nursing Combined with Clinical Nursing Pathway on Complications and Quality of Life in Lung Cancer Patients Undergoing Radiotherapy

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Influence of Evidence-based Nursing Combined with Clinical Nursing Pathway on Complications and Quality of Life in Lung Cancer Patients Undergoing Radiotherapy

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Abstract

Objective: Radiotherapy is one of the effective treatment modalities for lung cancer. However, the complications it causes seriously affect the patients' quality of life. This study aims to explore the intervention effect of evidence-based nursing combined with clinical nursing pathway on radiotherapy complications and quality of life in lung cancer patients undergoing radiotherapy.

Methods: A total of 256 lung cancer patients who received radiotherapy at Baoding First Central Hospital from October 2023 to October 2024 were selected as the study subjects and divided into a routine nursing group (n = 128) and a combined nursing group (n = 125). The routine nursing group received routine nursing intervention, while the combined nursing group received evidence-based nursing combined with clinical nursing pathway intervention. The incidence of complications, negative emotions, psychological status, cancer-related fatigue, and quality of life of the patients were compared.

Results: After the intervention, the incidence of complications in the combined nursing group was lower than that in the routine nursing group. The SAS and SDS scores of the patients in the combined nursing group were lower than those in the routine nursing group. The scores of each dimension in the CD - RIISC of the combined nursing group were higher than those of the routine nursing group. The combined nursing group had a lower PFS score than the routine nursing group. The scores of each dimension in the EORTC QLQ - C30 of the patients in the combined nursing group were higher than those in the routine nursing group.

Conclusion: Evidence-based nursing combined with clinical nursing pathway intervention for lung cancer patients undergoing radiotherapy can effectively reduce the incidence of complications, improve the patients' negative emotions and psychological status, reduce the degree of fatigue, and effectively improve the patients' quality of life.

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Original Manuscript

Influence of Evidence-based Nursing Combined with Clinical Nursing Pathway on Complications and Quality of Life in Lung Cancer Patients Undergoing Radiotherapy

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Abstract: Objective: Radiotherapy is one of the effective treatment modalities for lung cancer. However, the complications it causes seriously affect the patients' quality of life. This study aims to explore the intervention effect of evidence-based nursing combined with clinical nursing pathway on radiotherapy complications and quality of life in lung cancer patients undergoing radiotherapy. **Methods:** A total of 256 lung cancer patients who received radiotherapy at Baoding First Central Hospital from October 2023 to October 2024 were selected as the study subjects and divided into a routine nursing group (n = 128) and a combined nursing group (n = 125). The routine nursing group received routine nursing intervention, while the combined nursing group received evidence-based nursing combined with clinical nursing pathway intervention. The incidence of complications, negative emotions, psychological status, cancer-related fatigue, and quality of life of the patients were compared. **Results:** After the intervention, the incidence of complications in the combined nursing group was lower than that in the routine nursing group. The SAS and SDS scores of the patients in the combined nursing group were lower than those in the routine nursing group. The scores of each dimension in the CD - RIISC of the combined nursing group were higher than those of the routine nursing group. The combined nursing group had a lower PFS score than the routine nursing group. The scores of each dimension in the EORTC QLQ - C30 of the patients in the combined nursing group were higher than those in the routine nursing group. **Conclusion:** Evidence-based nursing combined with clinical nursing pathway intervention for lung cancer patients undergoing radiotherapy can effectively reduce the incidence of complications, improve the patients' negative emotions and psychological status, reduce the degree of fatigue, and effectively improve the patients' quality of life.

Keywords: Lung cancer; Radiotherapy; Evidence-based nursing; Clinical nursing pathway; Quality of life; Complications

Introduction

Lung cancer, as the most common malignant tumor globally, stands as the leading cause of cancer - related deaths worldwide [1]. With the advancement of treatment modalities, in recent years, multiple therapeutic approaches, including surgery, radiotherapy, chemotherapy, photothermal therapy, and immunotherapy, have been applied in the clinical treatment of lung cancer patients [2]. Among them, radiotherapy is regarded as the sole treatment modality indicated for patients across all disease stages and physical status categories [3]. Particularly, with the development of radiotherapy techniques, modalities such as stereotactic radiotherapy, intensity - modulated radiotherapy, and particle beam therapy have demonstrated favorable outcomes in treating both early - stage and advanced - stage lung cancer [4].

However, it cannot be denied that while radiotherapy saves patients' lives, it also subjects patients to the troubles of radiotherapy - related complications [5]. Some studies suggest that during the radiotherapy of lung cancer patients, approximately 15% - 40% of patients will experience a series of radiotherapy complications [6]. These complications mainly manifest as hematological toxicities, neurological dysfunctions, gastrointestinal disorders, skin problems, and cardiopulmonary sequelae. Patients may present with signs or symptoms such as neutropenia, thrombocytopenia, anemia, sepsis, fever, mucositis, dehydration, nausea, and vomiting [7 - 9]. On one hand, these complications lead to an increased hospitalization rate. Some studies indicate that the hospitalization rate of cancer patients with at least one complication exceeds 50%, and the hospitalization rate due to repeated complications even reaches 90% [10 - 12]. On the other hand, the presence of complications may exacerbate patients' mental distress, leading to psychological problems such as anxiety and depression, and even causing social cognitive impairment. This can deteriorate patients' psychological state when facing the disease and treatment, increase the degree of cancer - related fatigue (CRF), and ultimately affect the treatment efficacy [13 - 17]. Collectively, these factors result in a relatively poor quality of life for lung cancer patients undergoing radiotherapy [18].

Although there is a substantial body of literature reporting on radiotherapy complications, there are relatively few existing studies focusing on reducing the incidence of complications and improving patients' quality of life. With the development of nursing concepts, current cancer nursing has shown significant advantages in the clinical treatment of cancer patients, playing a notable role in reducing the incidence of complications and enhancing patients' quality of life [19 - 21]. Among them, evidence - based nursing is a novel nursing concept. It provides relevant and effective targeted

nursing measures by reviewing literature and integrating relevant professional knowledge, and has achieved good application results in multiple fields, including oncology nursing [22, 23]. Clinical nursing pathway is a standardized treatment model and process established based on the disease. It combines evidence - based medical evidence to promote favorable disease outcomes. This clinical nursing method can effectively improve the quality of clinical care and enhance the overall treatment efficacy [24]. It enables nurses to reasonably arrange all nursing work within the framework of standardized treatment and nursing processes, thereby promoting patients' recovery and reducing the risk of complications [25]. Therefore, this study aims to explore the impact of applying evidence - based nursing combined with clinical nursing pathway on lung cancer patients undergoing radiotherapy, in order to provide a basis and reference for reducing the risk of radiotherapy complications in clinical lung cancer patients and improving their quality of life.

1. Materials and Methods

1.1 Study Subjects

In this study, 260 lung cancer patients who received radiotherapy at the First Central Hospital of Baoding from October 2023 to October 2024 were selected as the study subjects. All the study subjects were numbered according to their order of consultation, and the random number table method was used to divide them into a combined nursing group (n = 130) and a routine nursing group (n = 130). The inclusion criteria for the study subjects were as follows: (1) The patients were diagnosed with primary lung cancer through CT, X - ray, and pathological biopsy; (2) The estimated survival time of the patients was ≥ 6 months; (3) The patients were receiving radiotherapy for the first time; (4) The patients had normal mental states and possessed normal language communication, cognitive, and hearing abilities. The exclusion criteria were as follows: (1) The patients had severe cognitive dysfunction or mental diseases; (2) The patients suffered from severe cardiovascular diseases or hepatic and renal insufficiency; (3) The patients had other concurrent malignant tumors; (4) The patients were pregnant or lactating; (5) The patients had concurrent diabetes, hematological diseases, or other physical diseases. This study was approved by the Ethics Review Committee of the First Central Hospital of Baoding (Ethics approval number: Quick [2023]089), and written informed consent was obtained from all participants. This study was conducted strictly in accordance with the Declaration of Helsinki.

1.2 Nursing Methods

All patients received routine radiotherapy intervention, with one radiotherapy cycle lasting 21 days.

1.2.1 Routine Nursing Group

Patients in the routine nursing group received routine nursing interventions, specifically: monitoring the patients' condition changes, providing health guidance and education on precautions, informing patients of the contraindicated diet and lifestyle habits during treatment, and carrying out basic nursing according to the radiotherapy process.

1.2.2 Combined Nursing Group

Patients in the combined nursing group received evidence - based nursing combined with clinical nursing pathway interventions, as follows:

(1) First, assess the patients' condition, psychological status, and understanding of cancer - related fatigue. Summarize the common problems during radiotherapy, propose preventive measures, and find ways to control adverse reactions. Use keywords such as "radiotherapy", "lung cancer", "complications", and "quality of life" as search terms to search on literature retrieval websites like PubMed and CNKI. Seek literature support and combine the literature content with the patients' actual situation and the nursing staff's own skills to formulate a clinical nursing pathway table.

(2) On the first day of hospitalization. Introduce the hospital environment, attending physician, and responsible nurse to the patients, and explain the visiting and accompanying systems. Communicate with the patients, inquire about their medical history, evaluate the patients' knowledge level of the disease and psychological state, and explain relevant knowledge about cancer - related fatigue to the patients. For high - risk patients such as those at risk of pressure ulcers, falls, and deep vein thrombosis, assess the patients' and their families' knowledge of complication prevention and their ability to collect test specimens.

(3) On the second day of hospitalization. Evaluate the psychological state, condition, and treatment compliance of the patients and their families. Explain the treatment methods and processes to the patients, and introduce the radiotherapy plan in detail. Explain to the patients' families the important influence of emotional and economic support on the disease.

(4) During radiotherapy. Patients are prone to experience negative emotions such as anxiety, pessimism, and fear during radiotherapy. Nursing staff should strengthen communication with patients, introduce successful cases to them, encourage patients to face the disease bravely, and enhance their confidence in treatment. Pain is a common stress response during radiotherapy. Nursing staff can guide patients to divert their attention through reading, listening to music, etc., according to their personal hobbies, to increase pain tolerance. For patients whose pain cannot be relieved, an appropriate amount of painkillers can be given. Patients are also prone to experience gastrointestinal reactions such as nausea and vomiting during radiotherapy. Malnutrition can lead to weight loss and accelerate disease deterioration. Therefore, nursing staff should formulate

personalized diet plans for patients, guide patients to eat more foods high in protein, vitamins, and fiber, and less salt and fat. Observe the patients' diet and water intake to prevent constipation. Before radiotherapy, drugs can be given to prevent complications, such as ondansetron to prevent gastrointestinal reactions and compound donkey-hide gelatin to prevent infections. Supervise patients to do appropriate aerobic exercises, such as walking, doing exercises, and practicing Tai Chi.

(5) One day before discharge. Evaluate the patients' psychological state, diet, rest, and exercise during radiotherapy, and provide health guidance. Guide patients or their families to join the WeChat group, help patients handle discharge procedures, and inform patients of the follow-up time, dietary and exercise precautions after discharge. Provide personalized guidance to patients again on the day of discharge and assist the patients' families in handling discharge procedures.

Both groups of patients received one radiotherapy-cycle intervention. After discharge, patients were followed up by phone, email, etc., to understand their situation and solve the problems they encountered during home care.

1.3 Observation Indicators

1.3.1 Incidence of Complications

The occurrence of complications in the two groups of patients during radiotherapy was recorded, including malnutrition, pulmonary infection, gastrointestinal reactions, and bone marrow suppression.

1.3.2 Negative Emotions

Before and after the intervention, the Self-Rating Depression Scale (SDS) and the Self-Rating Anxiety Scale (SAS) were used to assess the patients' negative emotions. Both scales are self-rating scales consisting of 20 items. Each item is scored on a scale of 1 to 4. A higher score indicates a more severe degree of anxiety and depression in patients [26].

1.3.3 Psychological State

Before and after the intervention, the Connor-Davidson Resilience Scale (CD-RISC) was used to evaluate the patients' psychological state. This scale comprises three dimensions: tenacity (13 items), strength (8 items), and optimism (4 items). Each item is scored from 1 to 4 points. A higher score reflects a better psychological state of the individual [27].

1.3.4 Cancer-related Fatigue

Before and after the intervention, the Piper Fatigue Scale (PFS) was employed to assess the cancer-related fatigue status of the two groups. This scale includes four dimensions: physical fatigue, emotional fatigue, cognitive fatigue, and behavioral fatigue. Each dimension is scored from 0 to 10 points, where 0 indicates no fatigue and 10 represents extreme fatigue [28].

1.3.5 Quality of Life

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire - Core 30 (EORTC QLQ - C30) was used to score the quality of life of the two groups of patients before and after nursing. It includes five dimensions: cognitive function, physical function, emotional function, role function, and social function. Each dimension has a full score of 100 points. A higher score indicates a better quality of life for the patients [29].

1.4 Statistical Methods

In this study, all data were analyzed using SPSS statistical software version 25.0. Measurement data were expressed as mean $\pm$ standard deviation. Independent - samples t - test was used for comparisons between groups, and paired t - test was used for comparisons within the same group before and after the intervention. Count data were presented as numbers/percentages (n/%). Chi - square test was used for comparison. A P - value less than 0.05 was considered statistically significant.

2. Results

2.1 Basic Characteristics of Patients

2. Results

2.1 Basic Characteristics of Patients

Statistically, a total of 300 lung cancer patients who underwent radiotherapy and were treated at Baoding First Central Hospital from October 2023 to October 2024 were selected for this study. Among them, 25 patients (8.33%) refused to participate, and 15 patients (5.00%) met the exclusion criteria. Finally, 260 patients were selected and randomly divided into a combined nursing group (n = 130) and a routine nursing group (n = 130). All patients successfully completed the experiment.

In the combined nursing group, there were 71 males and 59 females, with an average age of (67.45 ± 3.67) years. The pathological classification showed that 54 patients had adenocarcinoma, 37 had squamous cell carcinoma, and 39 had small - cell lung cancer. In terms of TNM staging, 80 patients were in stage II and 50 were in stage III. In the routine nursing group, there were 75 males and 55 females, with an average age of (67.62 ± 3.61) years. The pathological types included 52 cases of adenocarcinoma, 40 cases of squamous cell carcinoma, and 38 cases of small - cell lung cancer. Regarding TNM staging, 79 patients were in stage II and 51 were in stage III.

After comparison, there were no statistically significant differences in the basic characteristics such as gender, age, TNM staging, and pathological type between the two groups (gender: $P = 0.617$; age: $P = 0.695$; pathological type: $P = 0.920$; TNM staging: $P = 0.899$) (Table 1, Fig 1).

Table 1. Basic Information of Patients

Indicators	Combined Nursing Group(n=130)	Routine Nursing Group(n=130)	t/X ²	p
Gender (Male/Female)	71/59	75/55	0.250	0.617
Age (years)	67.45±3.67	67.62±3.61	0.392	0.695
Pathological classification				
Adenocarcinoma	54	52	0.168	0.920
Squamous cell carcinoma	37	40		
Small cell lung cancer	39	38		
TNM staging				
Stage II	80	79	0.016	0.899
Stage III	50	51		

Fig 1 Flow chart of the study

2.2 Results of radiotherapy complications in patients

Statistics showed that during radiotherapy, a total of 30 patients in the combined nursing group developed complications. Among them, 4 patients had malnutrition, 6 had pulmonary infections, 16 had gastrointestinal reactions, and 4 had bone marrow suppression. The overall incidence of complications was 23.08%. In the routine nursing group, 80 patients developed complications, including 17 with malnutrition, 20 with pulmonary infections, 26 with gastrointestinal reactions, and 17 with bone marrow suppression. The overall incidence of complications was 61.54%. Comparison revealed that the incidence of complications in the combined nursing group was lower than that in the routine nursing group ($P < 0.001$) (Table 2).

Table 2 Incidence of complications in patients

Group	Malnutrition n (%)	Pulmonary infection n (%)	Gastrointestinal reaction n (%)	Bone marrow suppression n (%)	Overall incidence of complications n (%)
Combined Nursing Group(n=130)	4(3.08)	6(4.62)	16(12.31)	4(3.08)	30(23.08)
Routine	17(13.08)	20(15.38)	26(20.00)	17(13.08)	80(61.54)

Nursing Group(n=130)					
X ²					39.394
p					<0.001

2.3 Results of patients' negative emotions

Statistically, before the intervention, the SAS score of patients in the combined nursing group was (55.23 ± 5.80) points, and the SDS score was (54.27 ± 5.45) points. In the routine nursing group, the SAS score was (54.58 ± 6.12) points, and the SDS score was (53.78 ± 5.79) points. After comparison, there were no statistically significant differences in the SAS and SDS scores between the two groups before the intervention (SAS score: $P = 0.383$; SDS score: $P = 0.488$).

After the intervention, the SAS score of patients in the combined nursing group was (43.45 ± 5.15) points, and the SDS score was (43.11 ± 4.79) points. In the routine nursing group, the SAS score was (50.43 ± 5.56) points, and the SDS score was (47.23 ± 4.98) points. After comparison, the SAS and SDS scores of patients in both groups decreased compared with those before the intervention (all $P < 0.001$), and the SAS and SDS scores of patients in the combined nursing group were lower than those in the routine nursing group (all $P < 0.001$) (Table 3).

Table 3 Results of intervention on patients' negative emotions

SAS score	Combined Nursing Group(n=130)	Routine Nursing Group(n=130)	t	p
Before intervention	55.23±5.80	54.58±6.12	0.875	0.383
After the intervention	43.45±5.15	50.43±5.56	10.506	<0.001
t	17.343	5.728		
p	<0.001	<0.001		
SDS score	Combined Nursing Group(n=130)	Routine Nursing Group(n=130)	t	p
Before intervention	54.27±5.45	53.78±5.79	0.695	0.488
After the intervention	43.11±4.79	47.23±4.98	6.807	<0.001
t	17.541	9.785		
p	<0.001	<0.001		

SAS: the Self - Rating Anxiety Scale (SAS); SDS: the Self - Rating Depression Scale (SDS) .

2.4 Results of patients' psychological states

Statistically, prior to the intervention, in the Connor - Davidson Resilience Scale (CD - RISC) scores of patients in the combined nursing group, the score for the optimism dimension was (7.76 ± 1.24) points, the score for the tenacity dimension was (28.41 ± 3.27) points, and the score for the strength dimension was (21.03 ± 2.87) points. In the routine nursing group, the score for the optimism dimension was (7.88 ± 1.32) points, the score for the tenacity dimension was (28.56 ± 3.34) points, and the score for the strength dimension was (21.16 ± 2.96) points. After comparison, there were no statistically significant differences in the CD - RISC scores of each dimension between the two groups before the intervention (optimism: $P = 0.438$; tenacity: $P = 0.722$; strength: $P = 0.718$).

After the intervention, in the CD - RISC scores of patients in the combined nursing group, the score for the optimism dimension was (13.24 ± 1.78) points, the score for the tenacity dimension was (36.75 ± 4.25) points, and the score for the strength dimension was (26.28 ± 3.49) points. In the routine nursing group, the score for the optimism dimension was (11.06 ± 1.51) points, the score for the tenacity dimension was (36.75 ± 1.25) points, and the score for the strength dimension was (23.95 ± 3.18) points. The CD - RISC scores of each dimension in both groups increased compared with those before the intervention (all $P < 0.001$), and the CD - RISC scores of each dimension in the combined nursing group were higher than those in the routine nursing group (all $P < 0.001$) (Table 4).

Table 4 Results of intervention on patients' psychological states

CD - RISC scores	Combined Nursing Group(n=130)	Routine Nursing Group(n=130)	t	p
Optimism				
Before intervention	7.76±1.24	7.88±1.32	0.778	0.438
After the intervention	13.24±1.78	11.06±1.51	27.560	<0.001
t	28.783	18.063		
p	<0.001	<0.001		
Tenacity				
Before intervention	28.41±3.27	28.56±3.34	0.356	0.722
After the intervention	36.75±4.25	36.75±1.25	4.967	<0.001
t	21.624	17.252		
p	<0.001	<0.001		
Strength				

Before intervention	21.03±2.87	21.16±2.96	0.361	0.718
After the intervention	26.28±3.49	23.95±3.18	5.610	<0.001
t	13.227	7.330		
p	<0.001	<0.001		

CD - RISC: the Connor - Davidson Resilience Scale

2.5 Results of cancer - related fatigue in patients

Statistical analysis revealed that before the intervention, in the Piper Fatigue Scale (PFS) scores of patients in the combined nursing group, the score for the physical fatigue dimension was (8.15 ± 0.93) points, the score for the behavioral fatigue dimension was (7.46 ± 0.84) points, the score for the emotional fatigue dimension was (8.12 ± 0.92) points, and the score for the cognitive fatigue dimension was (7.58 ± 0.80) points. In the routine nursing group, the score for the physical fatigue dimension was (8.06 ± 0.91) points, the score for the behavioral fatigue dimension was (7.39 ± 0.80) points, the score for the emotional fatigue dimension was (8.04 ± 0.89) points, and the score for the cognitive fatigue dimension was (7.61 ± 0.85) points. Comparison showed that there were no statistically significant differences in the PFS scores of each dimension between the two groups before the intervention (physical fatigue: $P = 0.460$; behavioral fatigue: $P = 0.497$; emotional fatigue: $P = 0.453$; cognitive fatigue: $P = 0.763$).

After the intervention, in the PFS scores of patients in the combined nursing group, the score for the physical fatigue dimension was (3.34 ± 0.60) points, the score for the behavioral fatigue dimension was (3.12 ± 0.58) points, the score for the emotional fatigue dimension was (3.96 ± 0.63) points, and the score for the cognitive fatigue dimension was (2.89 ± 0.57) points. In the routine nursing group, the score for the physical fatigue dimension was (6.23 ± 0.74) points, the score for the behavioral fatigue dimension was (5.84 ± 0.71) points, the score for the emotional fatigue dimension was (6.55 ± 0.71) points, and the score for the cognitive fatigue dimension was (6.12 ± 0.70) points. The PFS scores of each dimension in both groups decreased compared with those before the intervention (all $P < 0.001$), and the PFS scores of each dimension in the combined nursing group were lower than those in the routine nursing group (all $P < 0.001$) (Table 5).

Table 5 Results of intervention on patients' cancer - related fatigue

PFS scores	Combined Nursing Group(n=130)	Routine Nursing Group(n=130)	t	p
Physical fatigue				

Before intervention	8.15±0.93	8.06±0.91	0.740	0.460
After the intervention	3.34±0.60	6.23±0.74	34.453	<0.001
t	49.324	17.740		
p	<0.001	<0.001		
Behavioral fatigue				
Before intervention	7.46±0.84	7.39±0.80	0.681	0.497
After the intervention	3.12±0.58	5.84±0.71	33.582	<0.001
t	48.473	16.506		
p	<0.001	<0.001		
Emotional fatigue				
Before intervention	8.12±0.92	8.04±0.89	0.751	0.453
After the intervention	3.96±0.63	6.55±0.71	31.314	<0.001
t	42.493	14.882		
p	<0.001	<0.001		
Cognitive fatigue				
Before intervention	7.58±0.80	7.61±0.85	0.302	0.763
After the intervention	2.89±0.57	6.12±0.70	40.539	<0.001
t	54.430	15.343		
p	<0.001	<0.001		

PFS: the Piper Fatigue Scale.

2.6 Results of patients' quality of life

Statistical analysis indicated that prior to the intervention, in the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire - Core 30 (EORTC QLQ - C30) scores of patients in the combined nursing group, the score for the physical functioning dimension was (50.31 ± 5.25) points, the score for the role functioning dimension was (50.85 ± 6.93) points, the score for the cognitive functioning dimension was (50.92 ± 5.14) points, the score for the emotional functioning dimension was (50.35 ± 5.48) points, and the score for the social functioning dimension was (51.33 ± 5.02) points. In the routine nursing group, the score for the physical functioning

dimension was (50.65 ± 4.54) points, the score for the role functioning dimension was (51.91 ± 5.06) points, the score for the cognitive functioning dimension was (51.30 ± 4.06) points, the score for the emotional functioning dimension was (50.38 ± 5.16) points, and the score for the social functioning dimension was (50.57 ± 5.80) points. Comparison showed that there were no statistically significant differences in the EORTC QLQ - C30 scores of each dimension between the two groups before the intervention (physical functioning: $P = 0.588$; role functioning: $P = 0.160$; cognitive functioning: $P = 0.513$; emotional functioning: $P = 0.954$; social functioning: $P = 0.326$).

After the intervention, in the EORTC QLQ - C30 scores of patients in the combined nursing group, the score for the physical functioning dimension was (70.84 ± 4.17) points, the score for the role functioning dimension was (71.24 ± 5.06) points, the score for the cognitive functioning dimension was (71.36 ± 4.87) points, the score for the emotional functioning dimension was (73.59 ± 4.96) points, and the score for the social functioning dimension was (77.05 ± 5.14) points. In the routine nursing group, the score for the physical functioning dimension was (65.13 ± 5.01) points, the score for the role functioning dimension was (64.35 ± 4.12) points, the score for the cognitive functioning dimension was (65.02 ± 4.58) points, the score for the emotional functioning dimension was (66.11 ± 5.16) points, and the score for the social functioning dimension was (68.41 ± 4.93) points. The EORTC QLQ - C30 scores of each dimension in both groups increased compared with those before the intervention (all $P < 0.001$), and the EORTC QLQ - C30 scores of each dimension in the combined nursing group were higher than those in the routine nursing group (all $P < 0.001$) (Table 6).

Table 6 Results of intervention on patients' quality of life

EORTC QLQ-C30 scores	Combined Nursing Group(n=130)	Routine Nursing Group(n=130)	t	p
Physical function				
Before intervention	50.31±5.25	50.65±4.54	0.5432	0.588
After the intervention	70.84±4.17	65.13±5.01	9.983	<0.001
t	34.879	24.415		
p	<0.001	<0.001		
Role function				
Before intervention	50.85±6.93	51.91±5.06	1.410	0.160
After the	71.24±5.06	64.35±4.12	12.025	<0.001

intervention				
t	27.079	21.755		
p	<0.001	<0.001		
Cognitive function				
Before intervention	50.92±5.14	51.30±4.06	0.6558	0.513
After the intervention	71.36±4.87	65.02±4.58	10.807	<0.001
t	32.907	25.550		
p	<0.001	<0.001		
Emotional function				
Before intervention	50.35±5.48	50.38±5.16	0.058	0.954
After the intervention	73.59±4.96	66.11±5.16	12.030	<0.001
t	35.830	24.777		
p	<0.001	<0.001		
Social function				
Before intervention	51.33±5.02	50.57±5.80	0.984	0.326
After the intervention	77.05±5.14	68.41±4.93	13.835	<0.001
t	40.807	26.574		
p	<0.001	<0.001		

EORTC QLQ - C30: the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire - Core 30

3. Discussion

Radiation therapy is one of the effective methods for treating lung cancer clinically. It offers patients the greatest possibility of long - term disease control. However, simultaneously, the complications associated with radiation therapy seriously affect the patients' quality of life [30, 31]. This study found that for lung cancer patients undergoing radiation therapy, evidence - based nursing combined with clinical nursing pathways effectively reduced the incidence of radiation therapy complications, improved the patients' negative emotions and psychological states, effectively alleviated the patients' fatigue, and significantly enhanced the patients' quality of life.

Professional and effective nursing plays a crucial role in reducing the complications caused by radiation therapy in cancer patients [32]. The results of this study showed that after lung cancer patients received the intervention of evidence - based nursing combined with clinical nursing

pathways, the incidence of complications was significantly lower than that of patients who only received routine nursing. This result indicates that implementing evidence - based nursing combined with clinical nursing pathways for lung cancer patients undergoing radiation therapy effectively reduces the incidence of radiation therapy complications. This finding is consistent with previous research results [33]. The reason can be analyzed as follows: Evidence - based nursing consists of four continua: evidence - based questions, evidence - based support, evidence - based observation, and evidence - based application. It requires nurses to organically combine the currently available best nursing research evidence with nurses' personal experience and skills, actual situations, and patients' nursing needs [34, 35]. In this study, by retrieving relevant literature on radiation therapy complications, we effectively identified the risk factors that could lead to complications in patients and implemented active and effective nursing intervention measures for high - risk patients. This effectively reduced the risk of radiation therapy complications in patients. In addition, the clinical nursing pathway provides high - quality and orderly care services for patients through a programmed and standardized intervention plan. Medical staff involved in the disease rehabilitation and treatment jointly participate in disease management to achieve synergy. Staff from various fields cooperate to formulate intervention measures, providing patients with comprehensive psychological intervention, exercise guidance, and dietary guidance [36].

The occurrence of radiation therapy and its complications significantly increases the risk of negative emotions in patients and affects their psychological states when facing the disease [37]. This study found that after lung cancer patients undergoing radiation therapy received the intervention of evidence - based nursing combined with clinical nursing pathways, their negative emotions were significantly improved, and their psychological states and cancer - related fatigue were also significantly alleviated. This result indicates that the intervention of evidence - based nursing combined with clinical nursing pathways effectively improves the patients' psychological states and reduces the risk of negative emotions. This is mainly because evidence - based nursing is carried out on the basis of understanding patients' needs. By establishing a good nurse - patient relationship, it helps patients correctly understand the development, treatment, and prognosis of the disease, effectively relieving the psychological pressure of patients when facing the disease and related complications, and enabling patients to face the disease and its complications with a more positive attitude [38, 39]. The clinical nursing pathway can provide more standardized and personalized nursing services for patients. Medical staff can formulate customized nursing plans according to the characteristics of patients, improve patients' cognitive levels, enable them to have a more comprehensive understanding of their treatment conditions, thereby enhancing their confidence in

rehabilitation and self - efficacy [40, 41].

After lung cancer patients receive radiation therapy, their quality of life is often at a low level due to the influence of complications and related negative psychological states [42, 43]. The results of this study showed that after receiving the intervention of evidence - based nursing combined with clinical nursing pathways, the patients' quality of life was significantly improved. This result indicates that implementing evidence - based nursing combined with clinical nursing pathways for lung cancer patients undergoing radiation therapy can effectively improve the patients' quality of life. The reason is that the intervention of evidence - based nursing combined with clinical nursing pathways not only reduces the incidence of complications in patients but also improves their psychological states, enabling patients to face the disease and treatment with a more positive attitude, enhancing their confidence in treatment and expectations for future life, and ultimately improving their quality of life.

Although this study has revealed the positive effects of evidence - based nursing combined with clinical nursing pathways on lung cancer patients undergoing radiation therapy in reducing the incidence of complications, improving negative emotions and psychological states, relieving fatigue, and enhancing the quality of life, there are still certain limitations. The research sample may have biases in terms of geography and case selection, which limits the extrapolation of the results. The study did not conduct an in - depth analysis of long - term follow - up results, making it difficult to clarify the long - term effects of this nursing model. Moreover, there is a lack of comparative studies with other innovative nursing models, so it is impossible to comprehensively evaluate its relative advantages. Future research can expand the sample scope, conduct long - term follow - up, and carry out multi - model comparative studies to further improve the understanding of this nursing model.

In conclusion, implementing evidence - based nursing combined with clinical nursing pathways for lung cancer patients undergoing radiation therapy can effectively reduce the incidence of complications, improve the patients' negative emotions and psychological states, alleviate fatigue, and effectively enhance the patients' quality of life.

Author Contributions

Lu Zhang and Yun Feng, study concept and design. Jin Li and Yuan Liu, manuscript writing. Shuo Qi and Wei Hou, performed experiments. All authors data analysis. All authors read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflicts of interest related to this study.

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Human Ethics and Consent to Participate declarations

This study was approved by the Medical Ethics Committee of Baoding First Central Hospital.

None.

Data availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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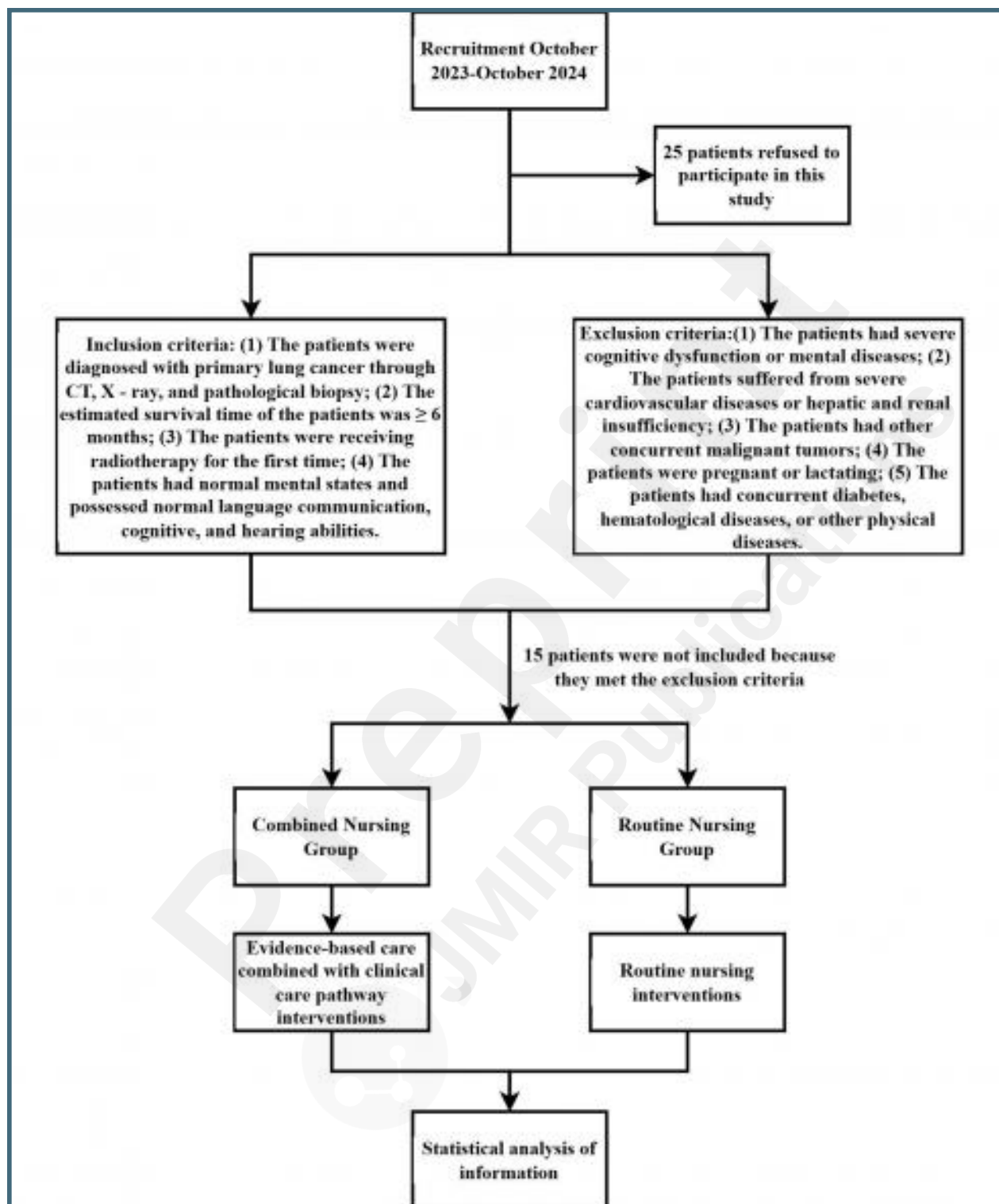
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Supplementary Files

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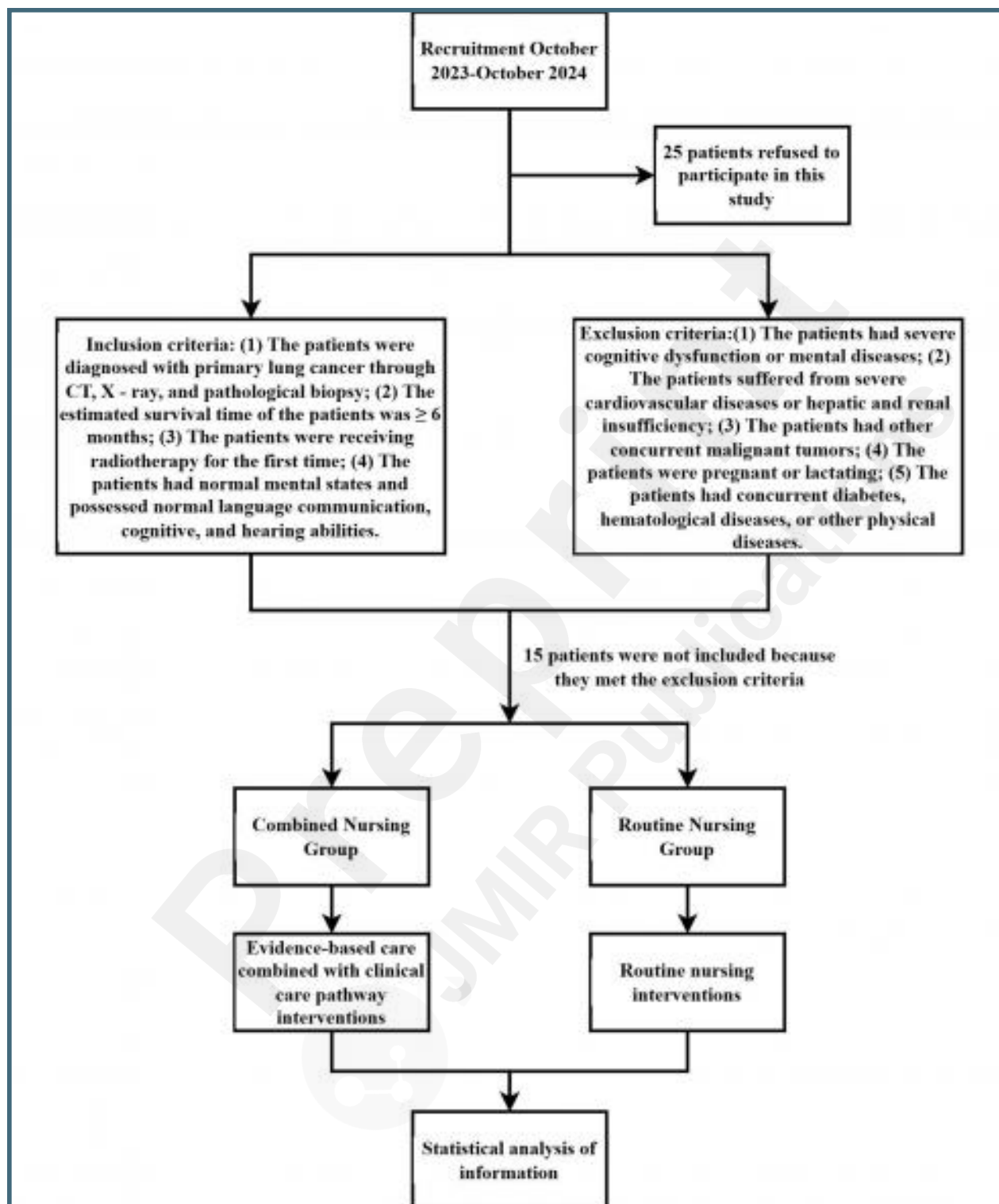
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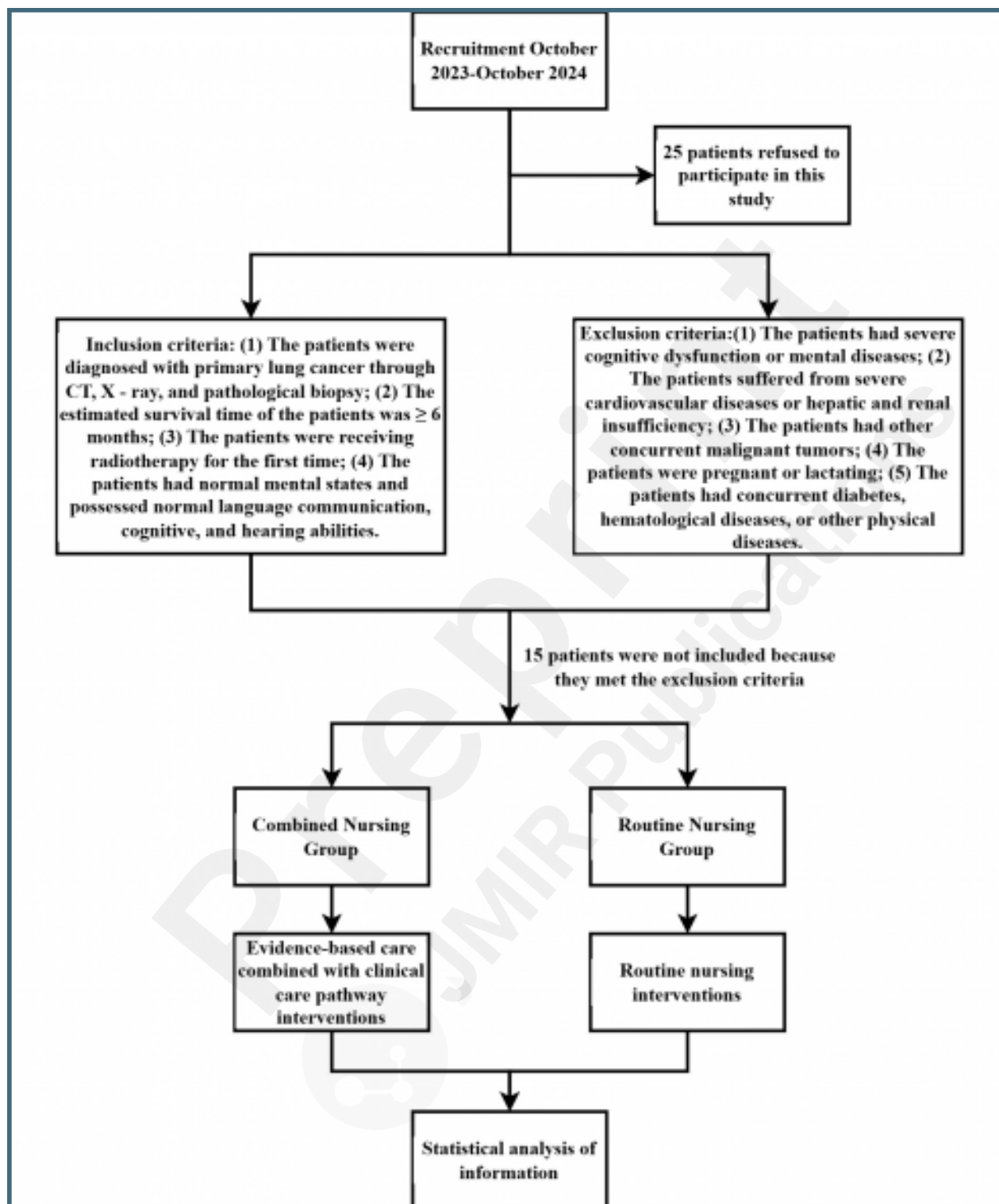
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