Based on the Stetler Model of Research Utilization: Evidence-Based Nursing Practice for Cancer-Related Fatigue in Lung Cancer Patients Undergoing Chemotherapy

Wei Zhao[1], Ziyi Li[2], Xiaoyan Duan[1,*]
[1]School of Nursing, Shaanxi University of Chinese Medicine, Xianyang, Shaanxi, China
[2]Department of Thoracic Surgery, Tangdu Hospital, Air Force Medical University, Xi'an, Shaanxi, China
**Corresponding Author.*

Abstract:Objective: To apply the best evidence of CRF care for lung cancer patients undergoing neoadjuvant chemotherapy to clinical practice and analyze its effectiveness. Method: A total of 178 lung cancer patients were selected from a tertiary hospital in Xi'an between June and November 2022. The control group (n = 89) received routine care, while the observation group (n = 89) received EBN intervention. Result: Seven clinical guidelines and one consensus statement were ultimately included. Statistically significant differences were observed between the two groups of the Revised PFS (*P*< 0.05). Significant improvements were also found in pulmonary function indicators and QoL as measured by the SF-36 (*P* < 0.05).Conclusion: Developing scientific and standardized continuous quality improvement based on this evidence-based practice is beneficial for lung cancer neoadjuvant chemotherapy patients to reduce CRF.

Key words: Lung Cancer; Cancer-Related Fatigue; Evidence-Based Practice; Stetler Studies

1. Introduction

Lung cancer is the most common malignant tumor in China, ranking first in both incidence and mortality rates[1]. Studies report that 70%–100% of lung cancer patients experience cancer-related fatigue (CRF), CRF is defined as a persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer that is not proportional to recent activity and interferes with usual functioning[2]. Evidence-based nursing (EBN), also known as evidence-based practice in nursing, is the application of evidence-based medicine within the nursing profession. It involves using valuable and credible scientific research findings to raise questions, seek and apply evidence, and provide optimal care to patients. It includes a series of steps for clinical decision-making based on evidence and for promoting the translation of research findings into practice [3]. This study guided by the Stetler Model applied the best available evidence for CRF nursing in lung cancer patients undergoing neoadjuvant chemotherapy to clinical practice, with favorable outcomes.

2. Materials

A total of 178 lung cancer patients receiving neoadjuvant chemotherapy were selected from hospital in Xi'an between June and November 2022. Inclusion criteria: aged 18–65 years; diagnosed with lung cancer and receiving chemotherapy; expected survival time >6 months. Exclusion criteria: concurrent pulmonary infection or respiratory failure; inability to participate in rehabilitation training; history of mental illness.

Table 1. Comparison of General Characteristic

Group	Age (years, mean±SD)	Gender		Type	
		Male	Female	Primary	Metastatic
Control	59.82±4.35	43	46	64	25
Intervention	58.77±4.52	45	44	68	21
t/χ^2	t=1.553	χ^2=0.090		χ^2=0.469	
P	0.109	0.881		0.608	

3. Methods

The department director served as the team leader, with attending physicians and the head nurse as deputy leaders. Resident physicians and two master's student in nursing formed an evidence retrieval team.

3.1 Theoretical Framework

The Stetler Model of Research Utilization[4] served as the theoretical framework, guiding the study through five phases.

After two months of observation , the key issues were identified: What are the recommended guidelines for CRF screening and assessment in adults? What is the efficacy of pharmacological and non-pharmacological interventions? When and how should CRF interventions be implemented in lung cancer patients?

A systematic search was conducted using keywords: “fatigue,” “cancer-related fatigue,” “assessment,” “supportive care,” “guideline.” Databases included NCCN, CSCO, CAPO, AWMF, CNKI, Web of Science, and PubMed.

Two researchers independently evaluated guideline quality using the AGREE II tool [5]. Evidence quality was classified using AHRQ criteria [6]: Level A: Ia (meta-analysis of RCTs), Ib (at least one RCT); Level B: IIa (well-designed non-randomized trials), IIb (well-designed quasi-experimental studies); Level C: III (non-experimental studies), IV (expert opinions or clinical experience).

The team assessed evidence quality, recommendation strength, applicability, feasibility, and current practice. GRADE criteria (2004)[7] were used to classify recommendations as “strong” or “weak.”

Barriers to implementation were identified, and strategies were developed to address them.

Post-intervention outcomes were evaluated using Revised PFS[8]; Pulmonary function indicators: FEV_1, FEV_1/FVC, PEF; Quality of life: SF-36 [9].

3.2 Statistical Analysis

SPSS 22.0 was used for data analysis. Categorical data were expressed as frequency and percentage; continuous data as mean ± SD. Independent-sample t-tests were used; $P<0.05$ was considered statistically significant.

4. Results

A total of seven international guidelines and one expert consensus were included [10] (Table 2). The final results of the evidence-based scheme are shown in Table 3.

Table 2. Guideline Characteristics

Guideline Developer	Update Time	Development Method	Target Age	Applicable Phase	Evidence Category
ASCO	April 2014	ADAPTE	Adults	Post-treatment	NCCN and ONS
NCCN	Version 2, February 2022	Evidence-supported Expert Consensus	Adults and Adolescents	Post-treatment	NCCN and Consensus
ONS	Version 3,August 2014	Systematic Review	Adults	During and Post-treatment	ONS
CAPO	Version 2, April 2015	Systematic Review and ADAPTE	Adults	During and Post-treatment	GRADE
CAPO	June 2013	Systematic Review	Adults	During and Post-treatment	GRADE
CRPC	January 2022	Systematic Review and Clinical Research	Adults	During and Post-treatment	—
Chinese Society of Clinical Oncology	2021	Systematic Review and Expert Clinical Experience	Adults and Adolescents	During and Post-treatment	GRADE
ESMO	March 2020	—	Adults	During and Post-treatment	—

Table 3. Evidence-Based Practice Protocol

Recommendations	Evidence Level	Recommendation
I. Initial Screening for Fatigue		
1.Screen patients using assessment tools.	IV	Strong
2.Use NRS for the initial screening of CRF.	Ib	Strong
3.For fatigue severity scores of 0–3, provide patients and their families with health education on CRF.	Ib	Strong
4.For fatigue severity scores of 4–10, conduct a more detailed assessment.	Ib	Strong
II.Pre-Intervention Assessment for Moderate to Severe Fatigue (A) Medical History Assessment		
1.Assess tumor type, stage, and presence of metastases.	IV	Strong
2.Assess the time since diagnosis and treatment.	IV	Strong
3.Evaluate tumor status and adverse reactions to chemotherapy.	IV	Strong
4.Evaluate social support system and presence of a caregiver.	IV	Strong

5.Assess economic status.	IV	Strong
(B) Assessment of Treatable Factors		
1.Assess pain level.	IV	Strong
2.Assess emotional distress.	IV	Strong
3.Assess for sleep disordersand poor sleep hygiene habit.	IV	Strong
4.Assess nutritional status.	IV	Strong
(C)Assessment of Comorbidities/Treatment Sequelae		
1.Assess cardiac or pulmonary insufficiency.	IV	Strong
2. Assess gastrointestinal dysfunction.	IV	Strong
3.Assess the presence of active infection.	IV	Strong
III. Interventions for Fatigue		
(A)Non-Pharmacological Interventions		
1.Recommend appropriate aerobic exercise.	Ia	Strong
2.Recommend practice Baduanjin exercises.	Ib	Strong
3.Recommend implement cognitive behavioral therapy for psychological intervention.	Ia	Strong
4.Recommend developing an individualized nutritional management plan.	Ib	Strong
5.Recommend acupressure massage.	Ia	Strong
6.Sleep Interventions	Ia	Weak
Stimulus Control: Advise patients to go to bed only when sleepy. If unable to fall asleep, get out of bed after 20 minutes.	Ib	Strong
Sleep Restriction: Avoid prolonged or late naps and limit total time in bed.	Ib	Strong
Good Sleep Hygiene: Ensure a dark, quiet, and comfortable sleep environment.	Ib	Strong
7. Recommend bright white light therapy. (B) Pharmacological Interventions	Ia	Strong
1.Non-steroidal anti-inflammatory drugs or morphine for cancer pain.	Ib	Strong
2.Selective serotonin reuptake inhibitor for affective disorders.	Ib	Weak
3.Iron supplements or erythropoietin are used for anemia.	IIb	Strong
4.Short-term use of dexamethasone.	Ib	Weak
IV. Outcome Assessment		
1.After interventions, use CFS to re-screen and assess CRF.	IV	Strong
2.Assess pulmonary function including FEV1, FEV1/FVC, and PEF.	IV	Strong
3.Use the SF-36 Quality of Life scale to assess life status.	IV	Strong

4.1 Best-Practice Care Pathway

Clinical algorithm for CRF(Figure 1).

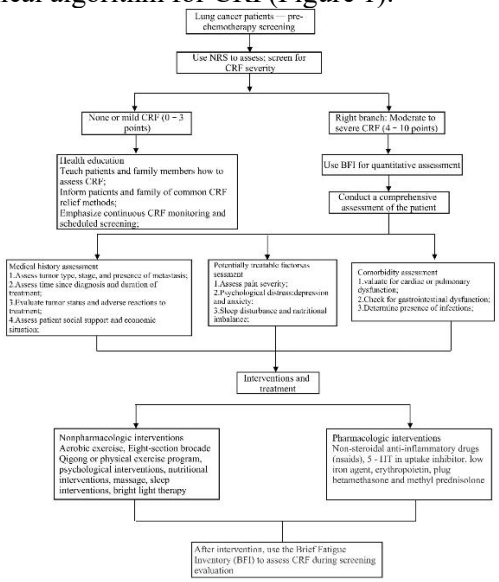

Figure 1. Best Practice Workflow for CRF Nursing

4.2 CRF

The four PFS-R subscale scores were significantly lower in the intervention group than in the control group ($P < 0.05$, Table 4).

Table 4. Comparison of PFS

Group	Cognitive	Affective	Sensory	Behavioural
Control	5.50±0.94	5.33±0.58	5.64±0.48	5.47±0.50
Intervention	4.92±0.84	4.92±0.48	5.43±0.53	5.13±0.82
t	3.312	3.860	2.130	2.462
P	＜0.001	＜0.001	＜0.05	＜0.05

4.3 Pulmonary Function

FEV_1, FEV_1/FVC and PEF values were all significantly higher in the intervention group than in the control group ($P < 0.05$, Table 5).

Table 5. Comparison of Pulmonary Function

Group	FEV_1(L)	FEV_1/FVC(%)	PEF(L/s)
Control	2.47±0.35	45.59±4.58	1.48±0.18
Intervention	2.92±0.339	69.02±6.67	1.94±0.34
t	5.865	22.358	9.206
P	＜0.05	＜0.05	＜0.05

4.4 Quality of Life

All eight SF-36 domains were significantly better in the intervention group ($P < 0.05$, Table 6).

Table 6. Comparison of SF-36

Domain	Control	Intervention
Physical	63.46±7.03	69.07±8.18*
Social	67.24±9.73	79.17±9.25*
Role-Physical	69.48±7.52	77.39±8.28*
Role-Emotional	70.89±9.83	78.09±10.52*
Mental Health	71.69±8.97	79.66±9.87*
Vitality	69.42±9.14	78.92±9.12*
General Health	70.20±7.99	82.10±8.17*
Bodily Pain	66.12±8.72	75.61±9.08*

Note:*A statistically significant difference was observed($P < 0.05$).

5. Discussion

No gold-standard intervention exists for the cluster of anxiety, fatigue, pain and emesis experienced during lung-cancer chemotherapy [18]. This study translated high-quality, multicultural guidelines into a locally feasible protocol through the structured Stetler process, yielding clinically and statistically significant reductions in fatigue, improved pulmonary performance, and enhanced quality of life.

The significant between-group differences in PFS-R scores confirm that multifaceted, EBN interventions—especially personally tailored exercise, cognitive-behavioural strategies, sleep-hygiene, and nutritional support—can effectively mitigate CRF.

Pulmonary function gains are equally noteworthy. Our integrated programme progressively increased patients' activity tolerance, enhanced ventilatory efficiency.

In conclusion, EBN interventions grounded in the Stetler model facilitate the amelioration of CRF and pulmonary function indices in lung cancer patients undergoing chemotherapy, thereby promoting better quality of life.

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