ORIGINAL RESEARCH

Effect of Roy's Adaptation, Model-based, Perioperative Nursing Service on Patients: A Clinical Observational Study

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ABSTRACT

Context • Surgery for early-stage lung carcinoma (LC) is invasive and most patients will experience psychological disorders, such as depression and anxiety. Accumulating evidence has shown that a nursing intervention can exert significant improvements in clinical efficacy for perioperative patients.

Objective • The study intended to investigate the clinical value during the perioperative period of a nursing service based on Roy's Adaptation Model (RAM), for patients undergoing radical resection for early-stage LC, to provide accurate guidance and reference for a future clinical nursing intervention for LC patients.

Design • The research team designed a retrospective analysis, controlled study.

Setting • The study took place at Jiangsu Cancer Hospital in Nanjing, Jiangsu, China.

Participants • Participants were 69 patients with early-stage LC who had been admitted to the hospital between March 2018 and March 2020.

Intervention • The research team assigned participants to an intervention or a control group, with 42 participants in the intervention group receiving RAM nursing during hospitalization, and 27 participants in the control group receiving routine nursing care.

Outcome Measures • The study measured the alterations in pulmonary function (PF) pre- and postoperatively and assessed the incidence of complications postintervention. At baseline and postintervention, the research team also assessed participants' psychological states using the Self-rating Anxiety Scale (SAS) and the Self-rating Depression Scale (SDS) and their pain levels using a visual analogue scale (VAS). Postintervention, participants competed a nursing satisfaction survey. At baseline and postintervention, the participants completed the Karnofsky Performance Status (KPS) scale for functional status, the Self-Perceived Burden Scale in Cancer Patients (SPBS-CP), the Pittsburgh Sleep Quality Index (PSQI) for sleep quality, and the WHO-QOL-BREF questionnaire.

Results • Postoperatively, the PF indexes had decreased significantly for both groups, but the intervention group's value were significantly higher postoperatively than those in the control group ($P < .05$). No differences existed in the incidence of adverse reactions between the groups ($P > .05$). The intervention group had significantly lower SAS and SDS scores, pain scores, and SPBS-CP scores than the control group postintervention but had significantly higher KPS scores (all $P < .05$). The intervention group significantly higher nursing satisfaction, sleep quality, and quality of life than the control group did ($P < .05$).

Conclusions • RAM nursing can significantly protect the PF of patients with early-stage LC who are undergoing a radical resection and can effectively improve patients' psychological states, sleep quality, and nursing satisfaction, which makes it worthy of clinical reference and popularization. (*Altern Ther Health Med.* 2023;29(1):118-123).

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Worldwide, the incidence and mortality of lung carcinoma (LC) are extremely high and on the rise.[1] In recent years, statistics have shown that the morbidity and mortality from LC are the top cause of malignant tumors in men.[2] In women, the mortality from LC is second only to that from breast cancer.[3]

Currently, LC is the leading cause of death in both men and women all over the world,[4] posing a serious threat to human health and safety. And in parallel with the worsening environment and changes in people's living habits, its incidence at younger ages is an emerging trend.[5]

LC originates from bronchial mucosa or the lung's glands and is one of the most frequently occurring malignant tumors in clinics.[6] According to its histopathological characteristics, LC can be classified into small and non-small cell carcinoma,[7] among which non-small cell lung carcinoma (NSCLC) accounts for the majority of LC cases.[8] Up to now, researchers haven't completely clarified LC's etiology, but clinicians believe that the pathogenic factors mainly include smoking, occupational exposure, ionizing radiation, heredity, and history of lung disease.[9]

The most common clinical treatments for LC include chemotherapy, radiotherapy, and surgery. The survival rate for early-stage LC is high, and surgery is the first choice for early-stage LC patients and can achieve a good treatment effect.[10,11] Radical surgery has an aim of removing all of a patient's primary lesions to achieve a curative effect or of removing most of the lesions to create favorable conditions for other treatments.[10]

Unfortunately, surgery is an invasive approach, which inevitably causes oxidative stress and inflammatory damage to the human body and affects the therapeutic effects.[12] Most patients who undergo surgery will experience psychological disorders, such as depression and anxiety and adverse reactions can influence their moods.[13]

Baskaran et al have pointed out that cancer patients' negative emotions can affect their neuroendocrinal, sympathetic-adrenal-medullary, and immune-system functions,[14] all of which are closely related to their rehabilitation and prognoses.[15] Therefore, paying attention to changes in patients' psychological states is also a top priority of a modern nursing service.

As research has increased, studies have accumulated evidence that a nursing intervention can exert significant improvements in clinical efficacy for perioperative patients.[16] Nguyen et al found that high-quality nursing can effectively prevent adverse conditions in patients after the radical resection of LC.[17]

Agarwal and Epstein[18] have put forward the idea that nursing models can have a significant effect on cancer rehabilitation. Among them, Roy's Adaptation Model (RAM) of nursing is a patient-centered, comprehensive, which can be important to patients' survival in tumor diseases such as gastric cancer and lung cancer.[19]

RAM, as an emerging nursing model, always implements a patient-centered service, regards the patient's physical function as a whole, and helps the patient complete treatment of the disease through various ways, such as health education, active communication, and psychological counseling.[20]

Ursavas et al and Ordin et al have well documented the efficacy of RAM nursing in radical mastectomy and liver transplantation.[21,22] Afrasiabifar et al studied the influence of RAM on hemodialysis treatment and found RAM may improve quality of life after hemodialysis in patients with renal failure.[23] Ursavas and Karayurt found that RAM nursing can be highly effective in the treatment of malignant tumors,[24] but little research has occurred concerning its effects on the postoperative recovery of LC patients.

Accordingly, the current study intended to evaluate the clinical value during the perioperative period of a RAM-based nursing service for patients undergoing radical resection of early-stage LC, to provide accurate guidance and reference for a future clinical nursing intervention for LC patients.

METHODS

Participants

The research team designed a retrospective analysis controlled study. The study took place at Jiangsu Cancer Hospital in Nanjing, Jiangsu, China. Potential participants were patients with early-stage LC who had been admitted to the hospital between March 2018 and March 2020.

Potential participants were included in the study if they had: (1) a confirmed diagnosis of early-stage LC using laboratory tests, imaging studies, and a pathology diagnosis at the hospital that had met the World Health Organization's criteria[25] for LC, (2) a stable and normal coagulation system; (3) complete case data; and (4) no tumor metastasis.

Potential participants were excluded from the study if they: (1) had other malignant tumors, (2) had severe liver or kidney dysfunction, (3) had mental disorders, (4) had contraindications to surgery, (5) had a drug allergy, (6) had other cardiovascular or cerebrovascular diseases, (7) had other autoimmune diseases, (8) were bedridden for a long time or unable to take care of themselves due to a physical disability, (10) were referrals, because there may be a relationship of interest between them and the researcher.

After screening according to the inclusion and exclusion criteria, we only identified 69 subjects and no potential participants.

This study was conducted in accordance with the Declaration of Helsinki, the hospital's internal Ethics Committee approved the study's protocols without reserve, and all participants and their families provided an informed consent form before enrollment.

Procedures

Groups. The research team assigned participants to an intervention or a control group, with the intervention group receiving RAM nursing during hospitalization, and the control group receiving routine nursing care.

Primary outcome measures. Pre- and postoperatively, the research team measured participants' pulmonary function

(PF)—forced expiratory volume in 1s (FEV1), forced vital capacity (FVC) and FEV1/FVC, and postintervention, the team recorded the incidence of complications. At baseline and postintervention, the research team also assessed participants' psychological states using the Self-rating Anxiety Scale (SAS) and the Self-rating Depression Scale (SDS),[26] and their pain levels using a visual analogue scale (VAS) for pain.[27] Postintervention, participants competed a nursing satisfaction survey.

Secondary outcome measures. At baseline and postintervention, the participants completed the Karnofsky Performance Status (KPS) scale,[28] the Self-Perceived Burden Scale in Cancer Patients (SPBS-CP),[29] the Pittsburgh Sleep Quality Index (PSQI),[30] and the WHO-QOL-BREF questionnaire.[31]

Intervention

Control group. The routine nursing mainly involved the nursing staff giving oral medical advice to participants, calming and encouraging participants to actively receive treatment, monitoring their vital signs, providing medication, and creating the relevant records.

Intervention group. Under RAM nursing, the nursing staff created a good and warm ward environment through adjusting the ward's temperature and humidity, disinfecting and cleaning regularly, and opening windows for ventilation, to reduce participants' tension and fear. In addition, the nursing staff closely observed each participant's condition, worked to understand a participant's needs, and gave the sedative drugs that a doctor had prescribed at half an hour before the participant went to bed.

Furthermore, timely communication with participants was conducted to evaluate their psychological states, and tailored interventions were performed in a timely manner to eliminate any disease-induced negative emotions, such as fear, rejection of medical staff, rejection of treatment, etc., The nursing staff also helped participants understand their disease and talked about successful cases to improve participants' treatment enthusiasm.

The nurses also formulated a healthy diet for participants and emphasized the benefits of maintaining an optimistic attitude. Moreover, the nursing staff cooperated with each participant's family members to encourage them to play a supportive role and give the patient sufficient support. The staff also regularly communicated with participants to answer their questions and improve their prognoses.

Outcome Measures

Pulmonary function. FEV1, FVC, and FEV1/FVC Use a spirometer (M&B spirometer, Wuhan, Hubei, China) to check, the higher the test result, the better the lung capacity of the patient.

Incidence of complications. Possible complications included atelectasis, pneumothorax, and pulmonary infection.

SAS and SDS.[26] In modern medical service, changes in patients' psychological states is an important factor affecting prognosis. The lower the score, the better the participants' state of mind. 53-62 points are mild depression, 63-72 points are moderate depression, and more than 72 points are severe depression.

VAS.[27] The scale measured pain. 0 = no pain and 10 = severe pain, the lower the score, the lower the participants' pain level.

Nursing satisfaction. The research team surveyed participants' satisfaction with their care when they were discharged from the hospital, with very satisfied, satisfied, improvement needed, and dissatisfied being the possible results. The rating is based on the attitudes of medical staff, treatment feelings, and treatment effects after admission, and is done independently by the patient upon discharge.

KPS.[28] A total of 100 points, each 10 is divided into 1 level, 0 = dead and 100 = normal, no pathological symptoms, the score is proportional to the participants' functional status.

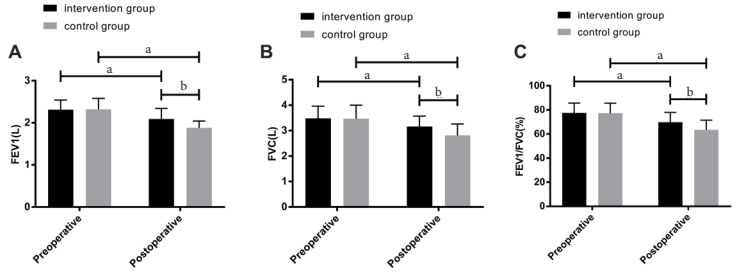
SPBS-CP.[29] It includes 4 dimensions of care burden, economic/family burden, psychological/emotional burden and treatment burden, 0 = no burden, 100 = very heavy burden. The higher the score, the heavier the participants' self-perceived burden

PSQI.[30] Cabezas et al found that LC patients are susceptible to sleep-disordered breathing, which is closely related to intermittent hypoxia and daytime sleepiness.[32] 0-5 means excellent sleep quality, 6-10 means normal sleep quality, 11-15 means average sleep quality, and 16-21 means poor sleep quality, the score is inversely proportional to sleep quality.

Table 1. Demographic and Clinical Data at Baseline (N = 69)

	Intervention Group n = 42 Mean ± SD n (%)	Control Group n = 27 Mean ± SD n (%)	*t* or χ^2	*P* value
Age (years)	57.8 ± 6.2	58.2 ± 5.9	0.267	.791
BMI (KG/cm^2)	24.58 ± 3.75	24.76 ± 4.12	0.187	.852
Gender			0.043	.836
Male	29 (69.05)	18 (66.67)		
Female	13 (30.95)	9 (33.33)		
Living Environment			0.097	.755
Urban	31 (73.81)	19 (70.37)		
Rural	11 (26.19)	8 (29.63)		
Education Level			0.017	.897
<High school	24 (57.14)	15 (55.56)		
≥High school	18 (42.86)	12 (44.44)		
History of Smoking			0.102	.749
Yes	34 (80.95)	21 (77.78)		
No	8 (19.05)	6 (22.22)		
History of Drinking			0.041	.839
Yes	27 (64.29)	18 (66.67)		
No	15 (35.71)	9 (33.33)		
Ethnicity			0.998	.318
Han	41 (97.62)	25 (92.59)		
Ethnic minorities	1 (2.38)	2 (7.41)		

Figure 1. Changes of Pulmonary Function pre- and postoperatively in the Intervention and Control Groups. Figure 1A shows FEV1 changes; Figure 1B shows FVC changes; and Figure 1C shows FEV1/FVC changes.



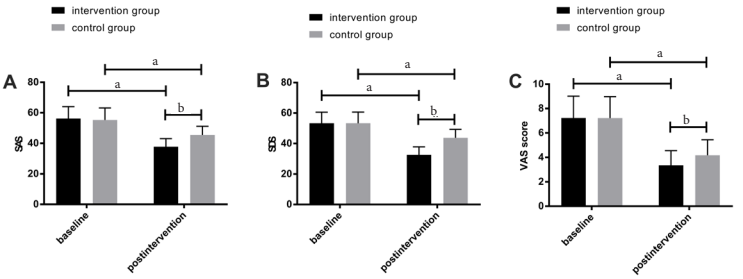
[a]$P < .05$, indicating that the FEV1, FEVC, and FEV1/FVC significantly decreased between the preoperative and postoperative periods for both groups
[b]$P < .05$, indicating that the FEV1, FEVC, and FEV1/FVC were significantly higher in the intervention group than in the control group postoperatively

Abbreviations: FEV1, forced expiratory volume; FVC, forced vital capacity.

Table 2. Incidence of Complications Postintervention in the Intervention and Control Groups (N = 69)

	Atelectasis n (%)	Pneumothorax n (%)	Pulmonary Infection n (%)	Total Incidence (%)
Intervention group	1 (2.38)	1 (2.38)	1 (2.38)	7.14
Control group	0 (0.00)	1(3.70)	1 (3.70)	7.41
χ^2				0.002
P value				.967

Figure 2. Psychological and Pain Scores in the Intervention and Control Groups at Baseline and Postintervention. Figure 2A shows the SAS score; Figure 2B shows the SDS score; Figure 2C shows the VAS score.



[a]$P < .05$, indicating that the SAS, SDS, and VAS scores all significantly decreased between the baseline and postintervention for both groups
[b]$P < .05$, indicating that the SAS, SDS, and VAS scores all were significantly lower in the intervention group than in the control group postintervention

Abbreviations: SAS, self-rating anxiety scale; SDS, self-rating depression scale; VAS, visual analogue scale for pain.

WHO-QOL-BREF.[31] The questionnaire measures QoL has four subdomains: environment, social relationships, psychological health, and physical health. Each sub-area is scored on a scale of 0-25, with a total score of 100, with higher scores representing better quality of life.

Statistical Analysis

SPSS22.0 (Sichuangweida, Beijing, China) and Graphpad8 (GraphPad Software, San Diego, CA, USA) were employed for statistical analysis and image rendering of the collected data, respectively. Counting data, recorded as a number and percentage, were compared using the Chi-square test. Measurement data were represented as means ± standard deviations (SDs) and compared using the *t* test and paired *t* test. The significance level was set at $P < .05$.

RESULTS

Participants

The study included and analyzed the data of 69 participants, with 42 being assigned to the intervention group and 27 being assigned to the control group. The two groups' demographic and clinical data weren't significantly different at baseline, as Table 1 shows ($P > .05$).

Pre- and Postoperative PF

Figure 1 shows that the PF indexes weren't significantly different between the intervention and control groups preoperatively ($P > .05$), and they had decreased significantly postoperatively for both groups ($P < .05$). The intervention group's values, however, were significantly higher postoperatively than those of the control group ($P < .05$).

Incidence of Complications

Table 2 shows that no significant differences existed postintervention between the intervention and the control groups in the total incidence of adverse reactions, at 7.14% and 7.41%, respectively ($P > .05$).

SAS, SDS, and VAS Scores

Figure 2 shows that the SAS, SDS, and VAS scores weren't significantly different between the intervention and control groups at baseline ($P > .05$), and they had decreased significantly postintervention for both groups ($P < .05$). The intervention group's values, however, were significantly lower postintervention compared with those of the control group ($P < .05$).

KPS and SPBS-CP Scores

Figure 3 shows that the KPS and SPBS-CP scores weren't significantly different between the intervention and control

groups at baseline. Postintervention, the KPS scores had significantly increased while the SPBS-CP scores had significantly decreased in both the intervention and the control group. Postintervention, the intervention group's KPS values were significantly higher and its SPBS-CP values were significantly lower, however, than those of the control group ($P < .05$).

Nursing Satisfaction

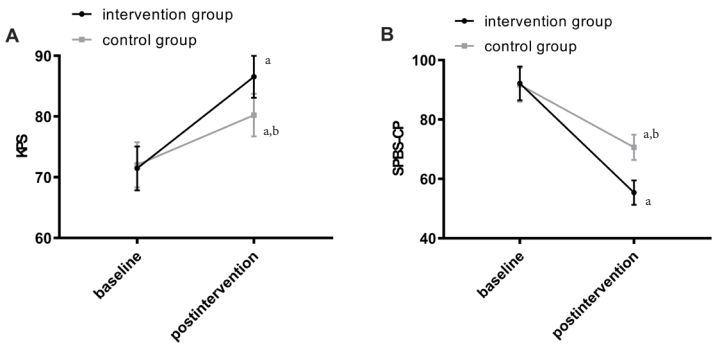
Postintervention (Table 3), the intervention group's nursing satisfaction, with 29 participants (69.05%) indicating that they were very satisfied and one (2.38%) indicating dissatisfaction, was significantly higher than that of the control group, with 6 participants (22.22%) indicating that they were very satisfied and 5 (18.52%) indicating dissatisfaction ($P < .05$).

PSQI and QoL Scores

Figure 4 shows that the PSQI scores weren't significantly different between the intervention group and the control group at baseline ($P > .05$), and they had decreased significantly postintervention for both groups. The intervention group's scores, however, were significantly lower postintervention than those of the control group ($P < .05$).

The intervention group's QoL scores was obviously higher postintervention than those of the control group ($P < .05$).

Figure 3. KPS and SPBS-CP Scores in the Intervention and Control Groups at Baseline and Postintervention. Figure 3A shows the KPS score, and Figure 2B shows the SPBS-CP score.



[a]$P < .05$, indicating that the KPS scores significantly increased and the SPBS-CP scores significantly decreased between baseline and postintervention for both groups

[b]$P < .05$, indicating that the KPS scores were significantly lower and the SPBS-CP scores were significantly higher in the control group than in the intervention group postoperatively

Abbreviations: KPS, Karnofsky Performance Status scale; SPBS-CP, Self-Perceived Burden Scale in Cancer Patients scale

Table 3. Comparison of Nursing Satisfaction Between the Intervention and Control Groups (N = 69)

	Intervention Group n = 42	Control Group n = 27	χ^2	*P* value
Very satisfied	29 (69.05)	6 (22.22)	14.420	.001[a]
Satisfied	10 (23.81)	12 (44.44)	3.222	.073
Improvement needed	2 (4.76)	4 (14.81)	2.092	.148
Dissatisfied	1 (2.38)	5 (18.52)	5.391	.020[a]

[a]$P < .05$, indicating that the number of participants who were very satisfied was significantly higher and the number who were dissatisfied was significantly lower in the intervention group the numbers of participants in each category in the control group

DISCUSSION

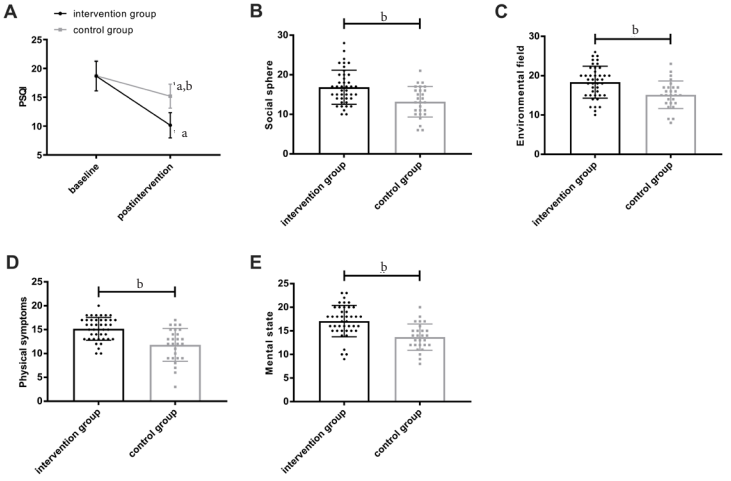
The current study investigated the perioperative clinical effects of RAM nursing in patients undergoing radical resection of LC to study whether it provides a good auxiliary effect for postoperative recovery of LC patients.

The PF had decreased significantly in both groups postoperatively but the intervention group's value were significantly higher postoperatively than those of the control group, suggesting that RAM nursing can more effectively protect the PF in LC patients than routine nursing can. The current research teams believes that the findings occurred because RAM nursing requires nurses to strengthen patients tumor knowledge and to patiently explain the surgery's principles, purpose, and precautions to patients before the operation.

Through education and encouragement, a patient's fear of and resistance to surgery can be reduced, which may mitigate the stress reaction that surgery causes to a certain extent, thereby improving the PF and safety after surgery. The current research team found lower SDS and SAS scores for the intervention group, indicating that RAM nursing can significantly improve the patients' psychological state, which is consistent with the previous research on the benefits of RAM.[23] The current study's results verify the importance of the RAM concept for the improvement of patients' psychological state. Under RAM, the nurses create a good environment, support the intervention, and improve the degree of patients' cooperation and compliance with the surgery and nursing care, which underlies its critical role in tumor surgery.

The present study also found that the PSQI score of participants in the intervention group decreased significantly with the RAM nursing, indicating that RAM can also improve the respiratory state of patients. Finally, the intervention group's significantly higher nursing satisfaction also shows that RAM nursing can provide remarkable achievements in improving the doctor-patient relationship and improving the patients' medical experiences.

Figure 4. Sleep Quality and Quality of Life Scores in the Intervention and Control Groups. Figure 4A shows the PSQI score; Figure 4B shows the social sphere score; Figure 4C shows the environmental field score; Figure 4D shows the physiological symptom score; and Figure 4E shows the mental state score.



[a]$P < .05$, indicating that the PSQI scores significantly decreased and the social sphere, environmental field, physiological symptom, and mental state scores significantly increased between baseline and postintervention for both groups

[b]$P < .05$, indicating that the PSQI, social sphere, environmental field, physiological symptom, and mental state scores were significantly lower in the control group than in the intervention group postintervention

Abbreviations: PSQI, Pittsburgh Sleep Quality Index.

However, due to the current study's short period, the research team was unable to evaluate the participants' long-term prognosis. In addition, the current study focuses only on early-stage LC patients undergoing a radical operation, so further investigation is warranted to determine the effects of RAM nursing for patients undergoing radiotherapy and chemotherapy. The current research team plans to conduct a more comprehensive experimental analysis as soon as possible to address the above limitations.

CONCLUSION

RAM nursing can significantly protect the PF of patients with early-stage LC who are undergoing a radical resection and can effectively improve patients' psychological states, sleep quality, and nursing satisfaction, which makes it worthy of clinical reference and popularization.

AUTHOR CONTRIBUTIONS

Zhu Yu and Wen Jia contributed equally to this work.

AUTHORS' DISCLOSURE STATEMENT

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