RESEARCH ARTICLE

Influence of self-management exercise intervention on the cancer-related fatigue severity and self-management efficacy of patients with non-small cell lung cancer after operation

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Abstract

Objective: To investigate the influence of self-management exercise intervention on postoperative cancer-related fatigue severity and self-management efficacy of patients with non-small cell lung cancer.

Methods: Seventy patients with non-small cell lung cancer were selected in Pidu district people's hospital from January 2018 to January 2019 and randomised into 2 groups with the random number table, including control group (35 cases) and experimental group (35 cases). The control group received conventional intervention, while the experimental group was intervened by self-management exercise based on the conventional intervention. The baseline clinical characteristics, simple fatigue scale scores, self-efficacy indicators, and physical and mental health scores of 2 groups were compared.

Results: The simple fatigue scale score of both groups were measured six weeks after surgery. The experimental group was significantly lower than that of control group ($P<0.05$). The self-efficacy scores of continuous walking for 30 minutes six weeks after the operation in both groups continuously increased with time and the result of the experimental group was significantly higher than that of control group ($P<0.05$). Similarly the postoperative balance ability self-efficacy scores of both groups were on the rise with time but the score of experimental group was significantly higher than that of control group after 6 weeks of surgical treatment ($P<0.05$). The postoperative health scores of both groups improved with time and the physical and mental health scores of experimental group were significantly higher than those of control group after 6 weeks of surgical treatment ($P<0.05$).

Conclusion: Self-management exercise intervention can effectively alleviate postoperative cancer-related fatigue of patients with non-small cell lung cancer, enhance self-management efficiency and contribute to improving the status of body functions.

Keywords: Exercise intervention, Non-small cell lung cancer, Surgery, Cancer-related fatigue, Self-management efficacy. (JPMA 70: 88 [Special Issue]; 2020)

Introduction

The report of foreign scholars[1] shows that the patients with non-small cell lung cancer (NSCLC) have higher supportive nursing demand than other cancer patients.[1] In particular, it is most common that fatigue and exercise demand are not met. Cancer-related fatigue refers to uncomfortable and continuous subjective fatigue or exhaustion related to cancer or cancer treatment, which affects daily activities and is unrelated to recent activities.[2] The past studies show that, over 75% of patients with cancer have obvious feeling of fatigue after receiving the treatment.[3] The proportion of moderate-severe fatigue in patients with lung cancer after the treatment is higher than that in patients with breast cancer, prostatic cancer and colorectal cancer. Meanwhile, high fatigue burden in patients with lung cancer has become the most important factor influencing healthy life. How to effectively relieve postoperative cancer-related fatigue symptoms in NSCLC patients and improve the quality of life, has received more and more attention in the nursing circle.[4] At present, there is no uniform scheme for postoperative rehabilitation of NSCLC patients at home and abroad, and there is no consensus on the optimal exercise plan.[5] The previous studies on evaluation of exercise intervention effect after the operation of patients with lung cancer are limited by heterogeneity of exercise programme, thus leading to low evidence level. Besides, the intervention effect of moderate-strenuous exercise is limited.[6] The studies in recent years indicate that establishing assisted exercise intervention through spontaneous self-efficacy contributes to improving the overall effect.[7] Thus, this study aimed to explore the effects of enhanced self-management exercise intervention on postoperative cancer-related fatigue severity of NSCLC patients and self-

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management efficacy and provide more references for formulating follow-up rehabilitation nursing scheme.

Patients and Methods

Seventy NSCLC postoperative patients treated in our hospital from January 2018 to January 2019 were selected and divided into control group (35 cases) and experiment group (35 cases) with random number Table. During grouping with random number table, if ≥ 0.5, the patient was classified into the control group; if < 0.5, the patient was classified into the experiment group.

Inclusion criteria: definitely diagnosed with NSCLC through surgical pathological examination; age $\geq$ 21 years; preoperative KPS score $\geq$ 70; stable condition of illness before and after the operation; accepted and completed telephone follow-up, able to communicate normally. Exclusion criteria: visual, hearing or language impairment; distant metastasis; accepted neoadjuvant chemoradiotherapy; epileptic seizure; dementia and incomplete clinical data. The research programme was approved by the Ethics Committee, and patients and their family members signed the informed consent form.

Conventional rehabilitation intervention was adopted for the control group. The clinician made the corresponding recovery scheme according to the patient's condition. After the operation, the trained nursing personnel conducted telephone follow-up and collected relevant evaluation data before the operation, the 3rd day after the operation, the 1st, 2nd, 3rd, 4th, 5th and 6th weeks after the operation. Based on the control group, enhanced self-management exercise intervention was used for the experiment group, including; Nursing personnel conducted telephone interview within 24 hours after hospital discharge to confirm whether the patient had been well prepared, and the standard is that VAS score of key symptoms including pain, fatigue, emesis and dyspnoea was $\leq$ 5. The first door-to-door follow-up visit was carried out on the 3rd day of discharge. The nursing personnel completed exercise intervention guidance through door-to-door propaganda and education or providing video materials. The telephone follow-up was conducted within 24 hours after the first door-to-door follow-up visit to answer the questions that the patients and family members were concerned about; The nursing personnel conducted the second door-to-door follow-up visit in the 2nd week after the operation, and carried out telephone follow-up in the 3rd-6th weeks. In the follow-up visit, the nursing personnel checked and analyzed patients' exercise intervention diaries, guided patients for self-management intervention according to self-efficacy and dynamically adjusted the exercise prescription. The patients used structured diary format to record weekly exercise activities, including daily walking time, number of balance exercises and type. The patients walked for 5 minutes every day in the 1st week after the operation, which lasted for 5 days. At the beginning of each week, the nursing personnel evaluated patients' self-efficacy. If self-efficacy was > 70%, the daily walking time was increased by 5 minutes.

Severity evaluation of cancer-related fatigue is based on the score of brief fatigue scale. The score of each item is 0-10. The higher score means the more severe fatigue. Three items are used to measure fatigue severity, and 6 items are used to measure the influence of 24 hour fatigue on daily functions. The total score divides 9 to gain the average score.[8] Fatigue self-management efficacy was evaluated with PSEFSM scale, with the scores of 0-10. The higher score refers to stronger confidence in fatigue self-management behaviour.[9] The scale prepared by Hoffman et al. was adopted for evaluation of walking time self-efficacy, with the score of 0-10. The higher score means stronger self-confidence in completing 5 min walking.[10] The scale prepared by Powell et al. was used for balance self-efficacy evaluation. There are 16 items in total, and the score of each item is 0-10. The higher score means the stronger self-confidence in maintaining balance.[11] Functional status includes physical and mental health. Six minutes walking experiment was adopted for physical health evaluation, while SF-36 scale was applied for mental health evaluation.[12] The average level of physical and mental health for normal people was 50 marks. The standard score was calculated based on the score of 0-100. The higher score prompts higher level of physical and mental health.

SPSS 18.0 software was chosen to process the data. Repeated measure of variance analysis and t test were adopted for measurement data comparison, expressed with ($\pm$ s). $\chi 2$ test was employed for enumeration data comparison, expressed with %. Inspection level $\alpha = 0.05$. The sample size was calculated by 5 times the average number of the items in the evaluation scales, that is, [(9+16)÷2]×5~63. Meanwhile, considering a loss rate of 10%-20%, the sample size was identified as 70.

Results

The comparison difference of baseline clinical data had no significance ($P < 0.05$), as shown in Table-1.

The comparison difference of both groups in brief fatigue scale scores had no significant difference before the operation and 3days after the operation ($P > 0.05$). The

Table-1: Comparison of baseline clinical data.

Indicator		Control group (n = 35)	Experiment group (n = 35)	P
Gender	Male	15	13	0.46
	Female	20	22	
Age (year)		67.21 ± 4.68	67.95 ± 4.81	0.33
BMI (kg/m2)		24.80 ± 4.13	24.29 ± 3.99	0.41
Marital status	Married	28	26	0.25
	Single	1	0	
	Widowed	6	9	
Working state	Work	24	22	0.49
	Retired	11	13	
Degree of education	Middle school and below	8	10	0.57
	High school	16	17	
	Junior college and above	11	8	
Operation method	Thoracotomy	28	26	0.43
	VATS	7	9	
Lesion resection program	Pulmonary lobectomy	30	28	0.37
	Wedge resection	5	7	
Pathological type	Adenocarcinoma	27	26	0.50
	Squamous carcinoma	8	9	
Postoperative clinical staging	I	22	21	0.82
	II	8	10	
	III	5	4	

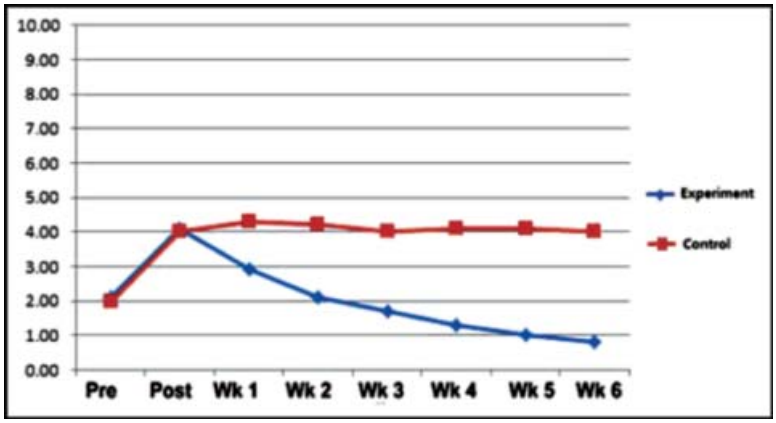

Figure-1: Comparison of brief fatigue scale scores.

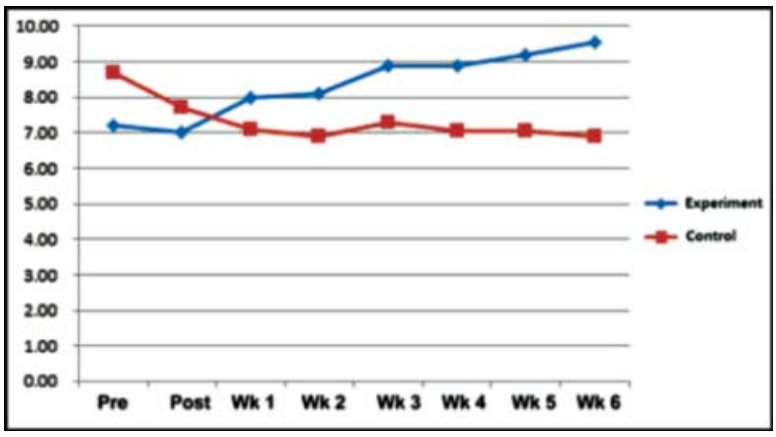

Figure-2: Comparison of fatigue self-management self-efficacy scores.

brief fatigue scale score of experiment group was significantly lower than that of control group 6 weeks after the operation (P <0.05). The postoperative brief fatigue scale score of experiment group continued to lower with time extension (P <0.05), while the postoperative brief fatigue scale score of control group had no obvious change with time extension (P >0.05), as shown in Figure-1.

The comparison differences of both groups in fatigue self-management self-efficacy scores had no significance before the operation and 3 days after the operation (P >0.05). The fatigue self-management self-efficacy score of experiment group was significantly higher than that of control group 6 weeks after the operation (P <0.05). The postoperative fatigue self-management self-efficacy score of experiment group continued to increase with time extension (P <0.05), whereas that of control group had no obvious change with time extension (P >0.05), as shown Figure-2.

The comparison differences of both groups in continuous 30 minutes walking self-efficacy scores had no significant difference before the operation and 3 days after the operation (P >0.05). The postoperative continuous 30 minutes walking self-efficacy scores of both groups improved continually with time

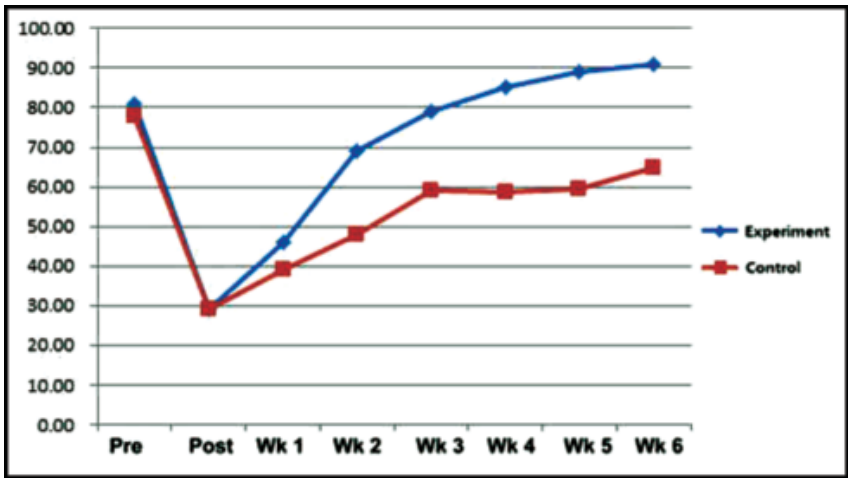

Figure-3: Comparison of continuous 30min walking self-efficacy scores.

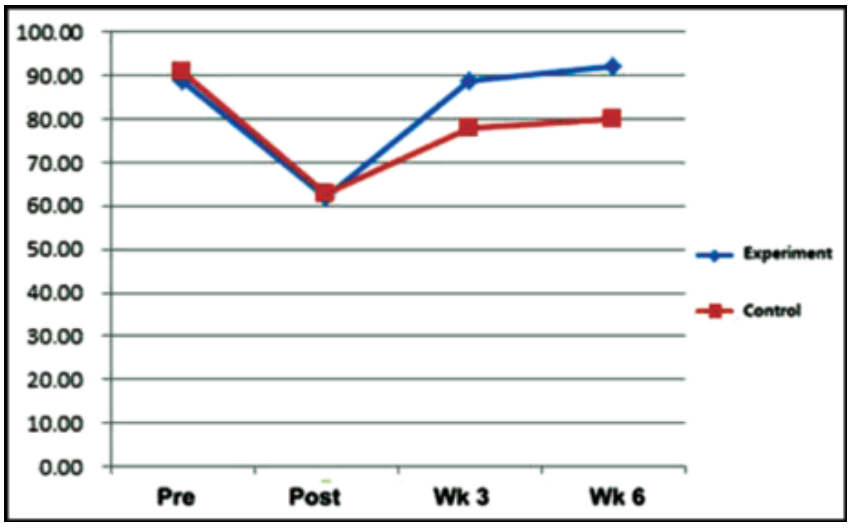

Figure-4: Comparison of balance capacity self-efficacy scores.

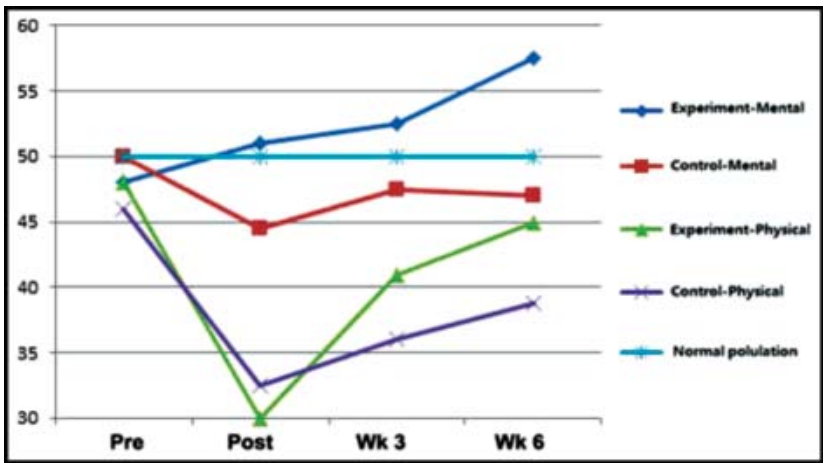

Figure-5: Comparison of physical and mental health scores.

extension (P <0.05). Besides, the continuous 30 min walking self-efficacy score of experiment group was significantly higher than that of control group 6 weeks after the operation (P <0.05), as shown Figure-3.

The comparison differences of both groups in balance capacity self-efficacy scores had no significant difference before the operation and 3days after the operation (P >0.05). The postoperative balance capacity self-efficacy scores of both groups improved continuously with time extension (P <0.05). In addition, the postoperative balance capacity self-efficacy score of the experiment group was significantly higher than that of control group 6 weeks after the operation (P <0.05), as shown in Figure-4.

The comparison differences of both groups in physical and mental health scores of both groups had no significant difference before the operation and 3days after the operation (P > 0.05). The physical health scores of both groups improved continuously with time extension (P <0.05). The postoperative mental health score of experiment group increased continuously with time extension (P <0.05), while the postoperative mental health score of control group had no obvious change with time extension (P > 0.05). In addition, the mental health score of experiment group was significantly higher than that of control group 6 weeks after the operation (P <0.05), as shown in Figure-5.

Discussion

The results of this study show that, cancer-related fatigue degree of experiment group lowered significantly, and self-efficacy also improved significantly, compared with the control group. Moreover, the authors observed that cancer-related fatigue degree and self-management efficacy of control group did not improve with time extension, further verifying the advantages of enhanced self-management exercise intervention in

improving cancer-related fatigue degree and self-management efficacy after NSCLC operation.

Six minutes walking experiment is a major objective indicator to clinically evaluate the degree of fatigue in patients with cancer. In this study, it was used to assess patients' physical health. The results of this study show that physical health score of both groups improved continuously with time extension ($P < 0.05$), and physical health score of experiment group was significantly higher than that of control group 6 weeks after the operation ($P < 0.05$), indicating that enhanced self-management exercise intervention can increase patients' walking distance under the state of fatigue degree relief through enhancing patients' walking exercise self-efficacy and conditioned reflex. The mental health score of experiment group was significantly higher than that of control group 6 weeks after the operation ($P < 0.05$), demonstrating that exercise intervention can improve patients' physical and mental health and the two promote each other and finally form a virtuous circle, which is consistent with the previous results of scholars.[13,14] Furthermore, the comparison difference of baseline clinical data of both groups had no significant difference ($P < 0.05$). The age and education degree of patients had a wide difference. In the meantime, the operation basically covered main types, indicating the research conclusions are widely applicable.

Cancer-related fatigue is one of important syndromes in NSCLC patients.[15] In this study, symptom severity of control group increased first from the 3rd day of the operation and maintained a stable level in the 3rd-6th weeks. Cancer-related fatigue severity of experiment group presented the gradual downtrend, and recovered below the preoperative level in the 6th week of the operation. Besides, compared with the experiment group, the walking distance of control group in postoperative 6 minutes walking test was shorter. This indicator has been verified to be a key indicator reflecting the living quality and prognosis of patients with lung cancer. The reports of some scholars prompt that for the patients with lung cancer, the death risk will reduce 13% with every increase of 50 meters 6 minutes walking test distance.[16] When walking distance > 452 meters, the survival time of patients with lung cancer extends significantly. In this study, conventional rehabilitation exercise adopted for the control group did not include systematic exercise prescription, and patients' postoperative fatigue degree continuously kept a high level. The self-efficacy of experiment group effectively improved after the operation through walking and balance exercise, and physical and mental health level further improved.

Currently, there are just a few studies on improving functional status of NSCLC patients in the perioperative period through exercise intervention. The results of this study suggest that enhanced self-management exercise intervention has advantages in improving postoperative physical and mental health level of NSCLC patients, which complies with the previous reports that is, exercise intervention can improve physical and mental functional status.[17] A foreign study about postoperative physical and mental functional status of NSCLC patients prompts that, the decline of physical functional status of patients 6 months after the operation can increase long-term risk of death.[18]

A retrospective study on living quality of patients with lung cancer reveals that enhancing symptom self-management contributes to improving patients' long-term functional status.[19-21] Exercise intervention may be related to health-related living quality. In this study, physical and mental health score of experiment group was lower than the average level of normal people, but they could almost recover to the preoperative level after effective exercise intervention for 6 weeks.[22,23] The author considers that, this may suggest that for the people with poor physical functional state, early enhanced self-management exercise intervention contributes more to improving symptom self-management efficacy, relieving fatigue symptom and improving quality of life.

Conclusion

In conclusion, enhanced self-management exercise intervention can effectively relieve postoperative cancer-related fatigue in NSCLC patients, promote self-management efficacy and contribute to improving physical functional state, without the impacts of other nutrition-related indicator, laboratory biochemical indicators, nutrient intake index and bioelectrical impedance index.

Limitations

There are also some drawbacks in this study: Researchers could easily identify the groups of patients, so double blind could not be achieved; The sample size was small and the study is from a single centre, so the conclusions still remain to be verified.

Disclaimer: None.

Conflict of Interest: None.

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