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Original Article

Application of peer support models in respiratory rehabilitation of patients with chronic obstructive pulmonary disease

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Abstract: Objective: This study aimed to explore the effect of peer support models on respiratory rehabilitation in patients with chronic obstructive pulmonary disease. Methods: 128 patients with chronic obstructive pulmonary disease who were admitted to our hospital were randomly divided into the research group and the control group, 64 patients in each group. The control group underwent respiratory rehabilitation training on the basis of routine nursing. Peer support models were added in the research group on the basis of routine nursing. The duration of intervention was 3 months. Pulmonary function, arterial blood PaO_2, $PaCO_2$ index, negative emotion, respiratory rehabilitation training compliance, quality of life and self-care ability before and after intervention were compared between the two groups. Results: The FVC, FEV1, FEV1/FVC, arterial blood PaO_2 and $PaCO_2$ indexes of the research group were significantly better than those of the control group ($P<0.05$). The negative emotion scores of the research group were significantly lower than those of the control group ($P<0.05$). Respiratory rehabilitation training compliance, quality of life and self-care ability of the research group were significantly higher than those of the control group ($P<0.05$). Conclusion: The application of peer support models in respiratory rehabilitation training for patients with chronic obstructive pulmonary disease can significantly improve the patient's rehabilitation training compliance, lung function and blood oxygen index, negative emotion, self-care ability and life quality. Peer support is worth promoting in the clinic.

Keywords: Peer support, chronic obstructive pulmonary disease, respiratory rehabilitation, application study

Introduction

Chronic obstructive pulmonary disease is a chronic respiratory disease characterized by airflow obstruction. Without prompt and effective treatment, the disease may further develop into respiratory failure. In recent years, increasing environmental pollution contributes to the frequent occurrence of chronic obstructive pulmonary disease. The disease is threatening people's health [1, 2]. No accurate explanation is proposed for the pathogenesis of chronic obstructive pulmonary disease, and drugs such as bronchodilators are mainly used for the current clinical treatment. The drugs play a certain role in controlling the development of the disease, but cannot reverse the persistent deterioration of the lung function of the patients [3, 4]. Therefore, in addition to treatment, the adoption of appropriate and effective nursing methods is of great significance for the rehabilitation of patients with chronic obstructive pulmonary disease [5].

Respiratory rehabilitation nursing is a kind of nursing intervention method including psychological counseling and lung breathing training on the basis of patients' condition [6]. Previous study [7] pointed out that respiratory rehabilitation training had a good effect on patients with chronic obstructive pulmonary disease, which could significantly improve the clinical symptoms of patients and promote the recovery of patients. However, patients with chronic obstructive pulmonary disease are commonly elder people. Most patients still have certain

defects in compliance and self-management, which makes it difficult for patients to achieve the expected therapeutic effect even after respiratory rehabilitation training [8]. Peer support is a kind of peer-assisted health education method from the UK. It mainly provides some social and emotional support to patients by sharing their knowledge and experience, thus helping patients to improve treatment compliance and self-management ability [9]. In some studies [10], peer support can significantly improve compliance in patients with silicosis, thereby improving patients' outcomes and quality of life. However, there is no relevant research on the application of peer support models in respiratory rehabilitation training for patients with chronic obstructive pulmonary disease.

In order to further improve the efficacy of current respiratory rehabilitation training on chronic obstructive pulmonary disease, we explored the application of peer support models in respiratory rehabilitation training for patients with chronic obstructive pulmonary disease.

Materials and methods

General information

128 patients with chronic obstructive pulmonary disease in Hunan People's Hospital from March 2017 to February 2019 were enrolled, including 72 males and 56 females. The average age of all patients was 63.34±8.14 years old, and the mean duration of disease was 7.33±1.19 years. The patients were randomly divided into the research group (n=64) and the control group (n=64). The patients in control group underwent respiratory rehabilitation training in addition to the routine nursing. The peer support was added to the research group based on the treatment of the control group.

Inclusion and exclusion criteria

Patients diagnosed with chronic obstructive pulmonary disease were included. Patients were excluded from the study if they had severe liver and kidney dysfunction, severe immune system diseases and other malignant tumors; they were extremely weak and unable to perform respiratory rehabilitation training; if they had cognitive dysfunction or communication impairment; if they refused to participate in the experiment. All patients and their families agreed to participate in the trial and signed an informed consent form. This experiment has been approved by the Hunan Provincial People's Hospital ethics committee.

Methods

The patients in the control group underwent respiratory rehabilitation training on the basis of the routine nursing. Routine nursing includes guiding patients' daily medication, paying attention to patients' mental health and providing timely services, as well as offering routine rehabilitation guidance. Then respiratory rehabilitation training was performed. The main contents of rehabilitation training were as follows: the first was pursed-lip breathing exercise. The patients were guided to use the nose to breathe deeply for 4 to 5 s in the case of closing the mouth, and the lung gas was slowly exhaled by pursed lip for 4 to 5 s. The patients were then instructed to practice vertical breathing. They were guided to raise the arms while inhaling in an upright state, and to release their arms when exhaling. Each group was performed 20 times in succession. Then, the patients were subjected to abdominal breathing exercise. While inhaling, patients put the hand on the abdomen to press, and slowly exhaled the gas through pursed lip. Finally, the patients were instructed to perform cross-leg breathing training. The upper body was kept straight and the hands were put on the knee. The breath was hold for 5-7 s after inhaling, and then the gas was slowly spit out. There were 20 times in each group, 3 groups in 1 round, and 2 rounds in a day.

In addition, the patients were instructed to perform aerobic exercise. According to the patient's physical condition, exercises such as brisk walking or jogging were taken. The patients exercised for 5 to 10 minutes each time, and the amount of exercise was gradually increased to enhance the patient's constitution.

Besides the routine nursing and respiratory rehabilitation training of the above control group, peer support was also introduced for the research group, as follows: (1) Firstly, a peer support group was established. According to the principle of voluntary participation, patients with chronic obstructive pulmonary disease who had been treated before and had better rehabilitation were selected. All the team mem-

bers had good communication skills, sufficient energy and time. Then they took peer training, related disease knowledge and skills training to meet the needs of peer support models. Peers were assigned, and peer support intervention was implemented according to the patient's specific situation. (2) Patients were supported to participate in knowledge lectures, community activities and fitness activities once every 2 weeks. The peer support team provided relevant disease information to patients through telephone, WeChat and other platforms, and took respiratory rehabilitation training with patients at least once a day during hospitalization. The effect of rehabilitation training was evaluated. The patients with better training completion were encouraged, and the patients with poor training completion were helped to improve. (3) Scene simulation training was performed on the patients. The nursing staff proposed corresponding scene simulation topics according to the relevant knowledge of the patients and their companions. For example, when the patients felt discomfort such as chest tightness and cough, how could the companions help the patients to relieve symptoms, and what kind of mitigation measures the patients would take? The duration of nursing was 3 months, and the effects of the two groups of patients were evaluated after the nursing.

Observation indicators

(1) Lung function was evaluated and compared after intervention in both groups, including forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), and FEV1/FVC. (2) The arterial blood PaO_2 and $PaCO_2$ after intervention in the two groups were detected and compared. (3) The negative emotion of the two groups of patients after intervention were recorded and evaluated using the SAS and SDS score sheets [11]. (4) The compliance of respiratory rehabilitation training before and after intervention in the two groups of patients was evaluated and compared using the clinical compliance scale (CCE) [12]. (5) The QLQ-C30 quality of life measurement scale [13] was used to evaluate and compare the quality of life of the two groups of patients after intervention. (6) The self-care ability of the two groups of patients before and after intervention was evaluated using the exercise of self-care agency (ES-CA) [14]. The higher the total score was, the stronger the self-care ability.

Statistical analysis

The data obtained in this study were analyzed using SPSS 19.0 statistical software (Beijing Net Number Times Technology Co., Ltd.). χ^2 test was used to compare the enumeration data. Independent t-test was used to compare the quantitative data. Paired t-test was used before and after the intervention. $P<0.05$ was considered statistically significant.

Results

General data comparison

No significant difference was observed in gender, age, BMI, lung function, blood oxygen index and negative emotion index between the two groups ($P>0.05$) (**Table 1**).

Comparison of lung function between the two groups after intervention

The FVC, FEV1 and FEV1/FVC of the research group were 1.93±0.68 L, 1.14±0.31 L and 50.09±6.25%, respectively. The FVC, FEV1 and FEV1/FVC of the control group were 2.45±0.69 L, 1.58±0.38 L and 58.36±7.01%. After intervention, the lung function index of the research group was significantly better than that of the control group ($P<0.05$) (**Figure 1**).

Comparison of PaO_2 and $PaCO_2$ in arterial blood after intervention in two groups

The PaO_2 and $PaCO_2$ indexes of arterial blood in the research group were 84.33±4.23 and 45.79±2.26, and were 71.53±3.28 and 59.65±3.71 in the control group. The PaO_2 in the arterial blood of the research group was significantly higher than that of the control group, and the $PaCO_2$ was significantly lower than that of the control group ($P<0.05$) (**Figure 2**).

Negative emotion after intervention in two groups

The SAS and SDS scores of the negative emotion of the research group were 47.21±3.41 and 47.12±5.33. The SAS and SDS scores in the control group were 58.25±5.72 and 59.03±5.62. Both of the scores of the research group were lower than those of the control group after intervention, and the differ-

Table 1. Comparison of general data between the two groups of patients

Factor	Research group n=64	Control group n=64	X^2/t	P
Gender			0.127	0.722
Male	37 (57.81)	35 (54.69)		
Female	27 (42.19)	29 (45.31)		
Age (years old)			0.031	0.860
≤63	34 (53.13)	33 (51.56)		
>63	30 (46.88)	31 (48.44)		
BMI			0.031	0.860
≤23	31 (48.44)	32 (50.00)		
>23	33 (51.56)	32 (50.00)		
Mean course (year)	7.31±1.16	7.35±1.20	0.192	0.848
Whether smoking			0.033	0.856
Yes	40 (62.60)	39 (60.94)		
No	24 (37.50)	25 (39.06)		
Pulmonary function				
FVC (L)	1.41±0.62	1.44±0.61	0.276	0.783
FEV1 (L)	0.73±0.21	0.72±0.24	0.251	0.802
FEV1/FVC (%)	44.78±5.21	45.02±5.32	0.258	0.797
Coagulation				
PT (s)	14.41±1.34	14.33±1.32	0.340	0.734
APTT (s)	33.45±2.21	34.02±2.32	1.423	0.157
TT (s)	16.33±1.12	16.22±1.11	0.558	0.578
FIB (g/L)	2.97±0.24	3.03±0.27	1.329	0.186
Negative emotion				
SAS	62.43±6.21	63.11±6.32	0.614	0.540
SDS	63.56±7.11	64.12±7.33	0.489	0.662
Blood oxygen index				
PaO_2	66.25±3.95	67.11±4.10	1.208	0.229
$PaCO_2$	77.31±4.22	77.28±4.32	0.040	0.968

ence was statistically significant (P<0.05) (**Figure 3**).

Comparison of compliance of respiratory rehabilitation training between two groups before and after intervention

The compliance scores of the respiratory rehabilitation training in the research group were 49.33±6.49 and 90.46±6.51 before and after the intervention. In the control group, the compliance scores were 49.42±6.43 and 74.35±6.29 before and after the intervention. There was no significant difference between the two groups before intervention (P>0.05), but the compliance of the research group was significantly higher than that of the control group after the intervention (P<0.05) (**Figure 4**).

Comparison of quality of life between the two groups after intervention

The role function, emotional function, physical function, cognitive function and social function scores of the research group were 78.25±2.41, 80.27±2.38, 80.43±2.44, 79.91±3.32, and 80.15±2.57. In the control group, those scores were 60.29±2.11, 61.43±2.39, 61.02±3.03, 60.95±2.86, 61.48±2.43, respectively. The scores of quality of life in research group were higher than those in control group. The differences were statistically significant (P<0.05) (**Table 2**).

Assessment of self-care ability before and after intervention in two groups

The self-care ability scores of the research group before and after intervention were 93.26±11.23 and 129.71±23.22. In the control group, the scores were 94.13±12.75 and 109.25±17.52. There was no significant difference before intervention (P>0.05). However, the self-care ability score of the research group was significantly higher than that of the control group (P<0.05) (**Figure 5**).

Discussion

Chronic obstructive pulmonary disease is clinically recognized as an incompletely reversible chronic lung disease. Its treatment relies on drugs such as bronchodilators, but the condition of continuous development still cannot be changed [15, 16]. At present, effective nursing is clinically applied to alleviate the patient's condition and improve the patient's lung function and various symptoms [17]. Respiratory rehabilitation care is a widely used clinical application with a good effect. However, without high compliance, it will be difficult to achieve the desired results [18].

In order to explore how to achieve better results in patients undergoing respiratory rehabilitation training, the application of peer support models in the respiratory rehabilitation of

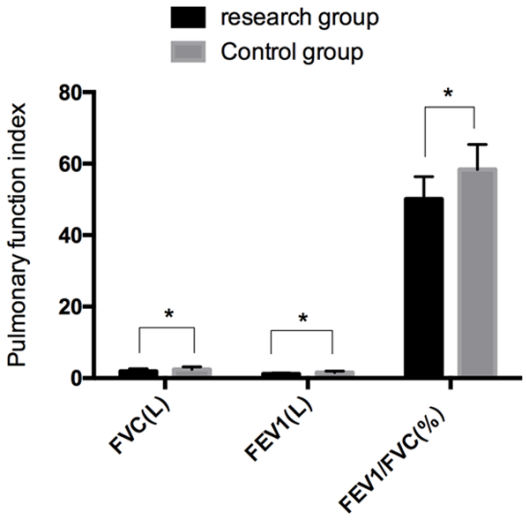

Figure 1. Comparison of lung function after intervention in two groups of patients. The lung function of the two groups after intervention was compared. After the intervention, the lung function index of the research group was significantly better than that of the control group (P<0.05). Note: *indicated P<0.05.

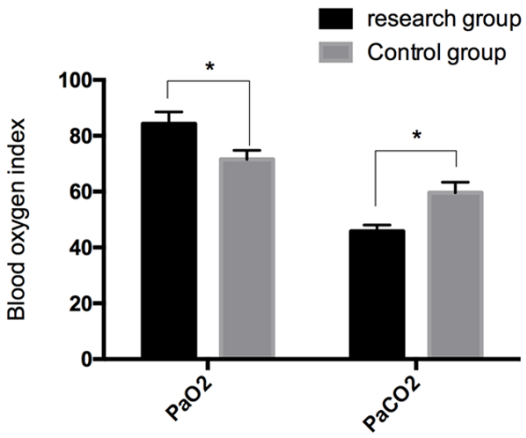

Figure 2. Comparison of PaO_2 and $PaCO_2$ in arterial blood after intervention in two groups of patients. The PaO_2 and $PaCO_2$ indexes of arterial blood after intervention in the two groups were significantly higher than those in the control group, and the $PaCO_2$ was significantly lower than that in the control group (P<0.05). Note: *indicated P<0.05.

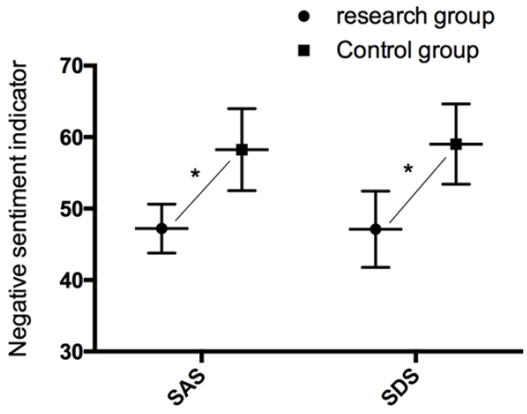

Figure 3. Negative sentiment scores after intervention in both groups. The negative emotion of the two groups was scored after intervention. The SAS and SDS scores of negative emotion in the research group were significantly lower than the control group (P<0.05). Note: *indicated P<0.05.

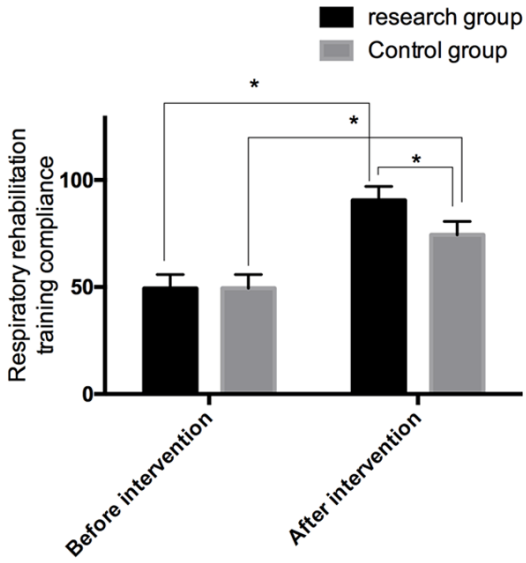

Figure 4. Comparison of compliance of respiratory rehabilitation training before and after intervention in two groups of patients. The compliance of respiratory rehabilitation training was compared between two groups of patients before and after intervention. There was no significant difference in the compliance of respiratory training compliance between the two groups before intervention (P>0.05), but the compliance of the research group was significantly higher than that of the control group (P<0.05). Note: *indicated P<0.05.

patients with chronic obstructive pulmonary disease was investigated in our study. Peer support models refer to the sharing of learning and experiences between patients, which can further improve the patients' treatment confidence and compliance [19]. In our study, patients in the research group were superior to patients in the control group in terms of compliance with respiratory rehabilitation training, lung function, blood oxygen, negative emotion and quality of life after intervention. Previous study [20] in the application of peer support

Table 2. Comparison of quality of life between the two groups of patients

Project	Research group n=64	Control group n=64	t	P
Role function	78.25±2.41	60.29±2.11	44.86	<0.001
Emotional function	80.27±2.38	61.43±2.39	44.69	<0.001
Physical function	80.43±2.44	61.02±3.03	39.91	<0.001
Cognitive function	79.91±3.32	60.95±2.86	34.61	<0.001
Social function	80.15±2.57	61.48±2.43	42.23	<0.001

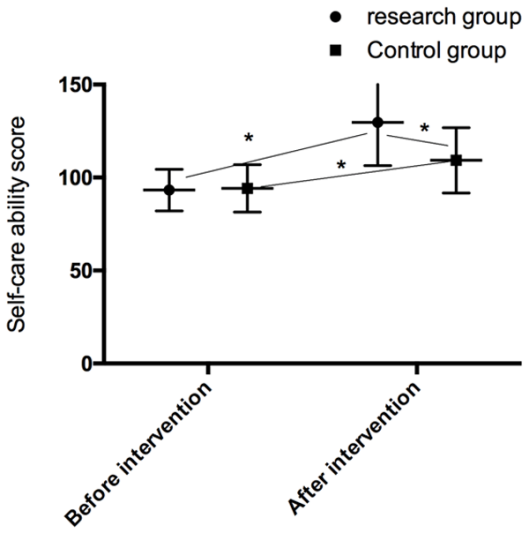

Figure 5. Evaluation of self-care ability before and after intervention in two groups of patients. The self-care ability of the two groups before and after intervention was evaluated. There was no significant difference in self-care ability between the two groups before intervention (P>0.05). However, the self-care ability score of the research group was significantly higher than that of the control group after the intervention (P<0.05). Note: *indicated P<0.05.

models after radical mastectomy indicated that peer support models can promote the functional recovery of breast cancer patients, improve the quality of life of patients, and promote the comprehensive rehabilitation of patients. Some studies [21] showed that peer support significantly improved the negative emotion of diabetic patients. These studies confirmed our conclusions. The improvement of the all indicators in the research group was thought to be a result of the disease treatment and encouragement continuously shared by support group. The subjective initiative of the patients was fully stimulated, and the patients were more active in the treatment. Finally the purpose of improving the condition was achieved. The patient's self-care ability was also evaluated. The results showed that the self-care ability scores of the research group were significantly higher than that of the control group. Previous study [22] showed that peer support groups and patient exchanges can significantly help patients to alleviate negative emotion while improving their self-care ability and quality of life. There was a close correlation between cognition and emotion. With the relevant knowledge and the judgment of the condition, patients could improve the coping skills accordingly, and alleviate their negative emotion [23]. In the peer screening, patients with good recovery of chronic obstructive pulmonary disease were selected. The correct attitude and positive mentality toward the disease were purposed to be shared by the recovered personas. Thereby, the negative emotion of the patients was reduced and the self-care ability was improved [24]. And peer support team members also communicated with patients in real time through the network. They encouraged patients to build confidence in the fight against disease, which was conducive to the patient's physical and mental health and quality of life [25]. This is consistent with our conclusions. Scene simulation training was also carried out for patients to help them improving their self-care ability. Some studies [26] indicated that role-playing in specific scenarios could help patients actively strengthen their ability to cope with the disease. At this point, our study drew the same conclusion.

In summary, the application of peer support models in respiratory rehabilitation training for patients with chronic obstructive pulmonary disease can significantly improve the patient's rehabilitation compliance, lung function, blood oxygen index, emotion, self-care ability and quality of life. Peer support is worth promoting in the clinic. However, there were certain deficiencies in this study. For example, the evaluation of patients was not comprehensive enough. More experiments, indicators and related studies are needed to further confirm our conclusions.

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Disclosure of conflict of interest

None.

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