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Original Article

Application of traditional Chinese and Western medicine combined with chronic disease management in pulmonary rehabilitation and evaluation of efficacy

Chaojun Xi[1*], Fengri Li[2*], Wuzhong Cheng[3*], Shaoxia Wang[1], Rong Zhang[4], Yaping Wang[2], Lili Liu[2]

[1]Department of Critical Care Medicine, Shanghai Construction Group (SCG) Hospital, Hongkou, Shanghai 200083, China; [2]Department of Pain, Shanghai Quyang Hospital, Hongkou, Shanghai 200092, China; [3]Beijing Hospital of Traditional Chinese Medicine, Capital Medical University, Dongcheng, Beijing 100010, China; [4]General Affairs Section, Yangpu Hospital of Traditional Chinese Medicine, Shanghai 200090, China. [*]Equal contributors.

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Abstract: Objective: This study evaluated the efficacy of traditional Chinese and western medicine combined with chronic disease management on rehabilitation of chronic obstructive pulmonary disease (COPD) patients. Methods: A total of 199 COPD patients in Shanghai Construction Group (SCG) Hospital were recruited as research objects. The control group (CG) consisted of 100 patients treated with conventional western chronic disease management, and the research group (RG) consisted of 99 patients treated with chronic disease management with combined traditional Chinese and western medicine. The efficacy, pulmonary rehabilitation performance, compliance score, 6-minute walk test (6MWT), modified Medical Research Council dyspnoea scale (MMRC), COPD assessment test (CAT), pulmonary function (PaO_2, $PaCO_2$, FEV1, PEF), self-rating anxiety scale (SAS), self-rating depression scale (SDS) and patient satisfaction between the two groups were compared. Results: Pulmonary rehabilitation performance, 6MWT results, and patient satisfaction in the RG were significantly better than those in the CG. The total effective rate, compliance score, PaO_2, FEV1 and PEF of the RG were significantly higher than those of the CG. After treatment, the COPD symptom score, CAT score, $PaCO_2$, SAS score and SDS score in the RG were significantly lower than those in the CG. Conclusion: Chronic disease management with combined traditional Chinese and western medicine has great application value and high efficacy in pulmonary rehabilitation.

Keywords: Chinese and western medicine, chronic disease management, pulmonary rehabilitation, application and efficacy

Introduction

Chronic obstructive pulmonary disease (COPD) is a chronic respiratory disease which is related to airway inflammation [1, 2]. COPD can cause dyspnea, restricted exercise, anxiety, and depression, with varying degrees of negative effects on patients [3]. Pulmonary rehabilitation is beneficial to improve the breath, motor ability, and quality of life of patients, and reduce the negative impact of COPD on their health, which is positive for their physical health [4]. Therefore, exploring the management mode of pulmonary rehabilitation is of great value for improving the physical and mental health of patients.

Pulmonary rehabilitation has been proved to be an effective management strategy for chronic diseases such as COPD; At present, chronic disease management with conventional western medicine is prevalent, while reports on chronic disease management with combined traditional Chinese and western medicine are few [5-7]. There are some shortcomings in the traditional Chinese medicine treatment model, and management with the conventional western medicine also has some deficiencies, such as focusing on treating the disease but not the person, and the lack of understanding of patients' diet, daily life and physique increases the treatment difficulty of chronic diseases [8, 9]. The chronic disease management with combined traditional Chinese and western medicine, however, has Chinese characteristics, and emphasizes dialectical treatment and individualized management, which has played a role in various chronic diseases. For example, it has significantly

improved the quality of life of patients with chronic stable coronary heart disease [10]. Moreover, chronic disease management with combined traditional Chinese and western medicine can improve the hematological indexes of patients with chronic cytoreductive myelopathy and improve the long-term survival rate of patients in chronic kidney disease [11, 12].

Here, we report new reference for COPD patients' pulmonary rehabilitation management by comparing the two management modes in treatment of COPD.

Materials and methods

General data

A total of 199 chronic obstructive pulmonary disease (COPD) patients admitted to Shanghai Construction Group (SCG) Hospital from March 2017 to December 2019 were selected as research objects. Among them, 100 patients treated with conventional western chronic disease management were enrolled in the control group (CG), including 71 males and 29 females, with a mean age of (62.16±7.85) years. Another 99 patients treated with chronic disease management with combined traditional Chinese and western medicine were enrolled in the research group (RG), including 74 males and 25 females, with a mean age of (61.88±8.06) years.

Inclusion criteria: patients met the COPD diagnostic criteria developed by GOLD [13]; patients received treatment for the first time; patients did not take drugs that might affect the results of this study within half a year. Exclusion criteria: patients were in GOLD class I; patients were complicated with malignant tumor or organ dysfunction; patients were in other research projects. The study was conducted with the approval of the ethics committee of SCG Hospital. Both the subjects and their guardians provided full informed consent. The inclusion criteria were applicable to both groups of patients.

Management method

Patients in the CG received conventional western medicine chronic disease management: they were given conventional symptomatic treatment, and antibiotics were given according to the situation. In addition, they were given salmeterol and fluticasone propionate powder inhalant (Roark Standards, Shenzhen, China, RC20190116) for inhalation therapy (containing 50 μg of salmeterol and 100 μg of fluticasone propionate), once each time. During hospitalization, chronic disease management guidance and post-discharge chronic disease management reminder and encouragement were provided during the hospitalization.

Patients in the RG received traditional Chinese medicine on the basis of the CG: the diet therapy based on syndrome differentiation of traditional Chinese medicine was given to them. Their physique types were firstly dialectically judged, and then the targeted diet guidance was given to them. They also received traditional Chinese medicine physiotherapy. The patients were given massage, acupuncture, acupoint application and other auxiliary therapies, and they were massaged at acupoint Neiguan, Pishu, Tiantu, Zhongji and Qihai for 3 minutes. The massage would be terminated when they felt acid distension. The massage was performed once a day. Health promotion of traditional Chinese medicine was carried out to popularize health knowledge of traditional Chinese medicine in plain language, including sleep, exercise, diet and other aspects. Traditional Chinese medicine rehabilitation training was applied to guide patients to carry out respiratory function training such as breathing and inhaling methods and Baduanjin.

Efficacy evaluation

Cured: patient's typical symptoms such as cough, sputum, and shortness of breath were basically controlled, and there was no recurrence within one year. Marked response: patient's symptoms were obviously improved, and the number and degree of attacks were obviously reduced. Effective response: patient's condition was not stable enough, but the symptoms and attack times were improved. No response: patient's condition aggravated or the number and degree of attacks did not improve. The total effective rate of treatment was the total proportion of non-ineffective patients.

Outcome measures

The pulmonary rehabilitation performance of the two groups were observed and compared,

Table 1. Comparison of baseline data of the two groups [n (%), mean ± SD]

Factors	n	CG (n=100)	RG (n=99)	χ^2/t	P
Gender				0.353	0.552
Male	145	71 (71.00)	74 (74.75)		
Female	54	29 (29.00)	25 (25.25)		
Average age (years)	199	62.16±7.85	61.88±8.06	0.248	0.804
Age (years)				0.933	0.334
<60	62	28 (28.00)	34 (34.34)		
≥60	137	72 (72.00)	65 (65.66)		
Course of disease (year)	199	3.58±2.84	3.70±2.95	0.292	0.770
BMI (kg/m^2)	199	22.95±3.15	23.08±3.01	0.298	0.766
GOLD grade				1.339	0.512
Grade II	30	16 (16.00)	14 (14.14)		
Grade III	125	59 (59.00)	66 (66.67)		
Grade IV	44	25 (25.00)	19 (19.19)		
Excessive drinking history				1.252	0.263
Without	125	59 (59.00)	66 (66.67)		
With	74	41 (41.00)	33 (33.33)		
Smoking history				1.142	0.285
Without	118	63 (63.00)	55 (55.56)		
With	81	37 (37.00)	44 (44.44)		
Educational level				0.136	0.712
Below middle school	114	56 (56.00)	58 (58.59)		
Above middle school	85	44 (44.00)	41 (41.41)		
Residence				0.040	0.841
Countryside	71	35 (35.00)	36 (36.36)		
City	128	65 (65.00)	63 (63.64)		

Table 2. Efficacy of the two groups [n (%)]

Group	n	Cured	Marked response	Effective response	No response	Total effective rate %
CG	100	5 (5.00)	35 (35.00)	30 (30.00)	30 (30.00)	70.00
RG	99	22 (22.22)	55 (55.56)	17 (17.17)	5 (5.05)	94.95
χ^2 value	-	-	-	-	-	4.341
P value	-	-	-	-	-	0.037

mainly including acupoint massage, breathing and inhaling, Baduanjin, etc., and the implementation rate of these three aspects of patients was recorded statistically.

Compliance of patients was scored according to the amount of completion in the management project, with completion of more than 70% as 3 points, completion of 40-70% as 2 points, and completion of less than 40% as 1 point.

Six-minute walk test (6MWT) [14] was used to assess the longest distance the patient could walk on flat ground within 6 min.

Dyspnea scores (MMRC) [15] was adopted, with a score of 0-4 points. The patient only had difficulty in breathing during strenuous exercise, which was recorded as 0. The patient was short of breath when walking or climbing on foot, which was recorded as 1 point. The patient was slower than the peers when walking on the ground or climbing on foot, and needed rest, which was recorded as 2 points. The patient needed rest after walking on the ground for nearly 100 m or a few minutes, which was recorded as 3 points. The patient had difficulty in breathing in daily care and could not leave home, which was recorded as 4 points.

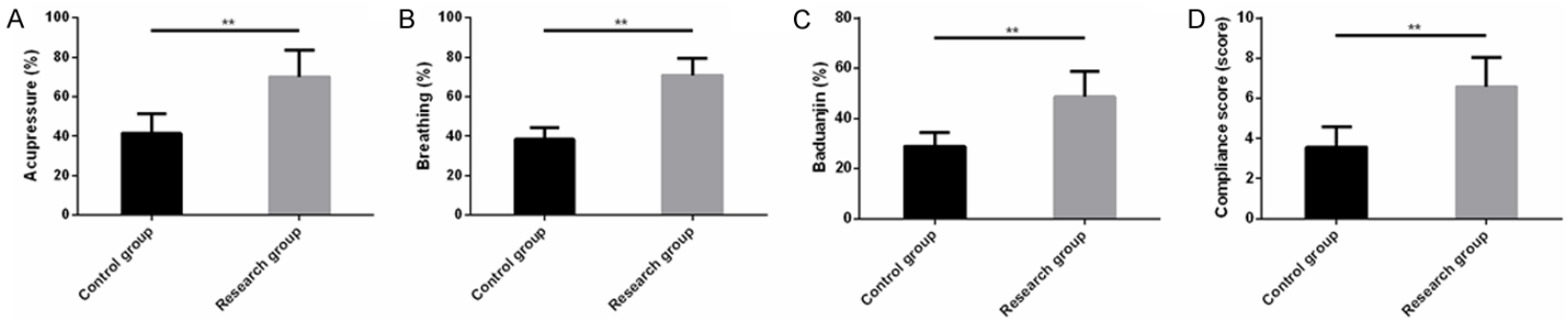

Figure 1. Comparison of pulmonary rehabilitation performance and compliance score between the two groups. A-C. The implementation rate of pulmonary rehabilitation in the RG is significantly higher than that in the CG in acupressure, breathing, Baduanjin, etc. D. The compliance score of the RG is significantly higher than that of the CG. Note: ** represents comparison between the two groups, $P<0.01$.

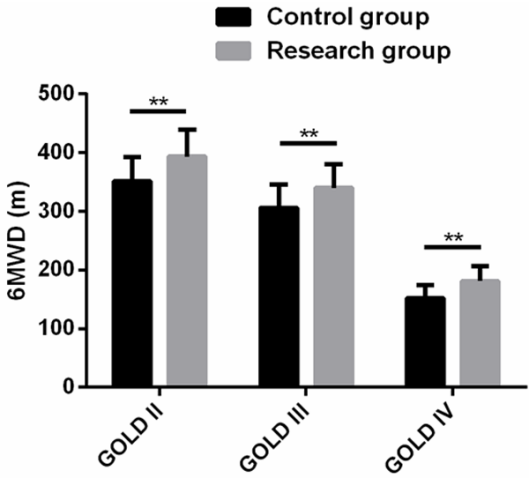

Figure 2. Comparison of 6MWD of GOLD grades between the two groups. Note: Comparison between the two groups, * represents P<0.05, ** represents P<0.01.

COPD assessment test (CAT) [16] evaluated the patient's symptoms and quality of life, with a total score of 0-40. The higher the score, the more serious the impact of COPD.

Pulmonary function indexes (PaO_2, $PaCO_2$, FEV1, PEF) were read and recorded by the pulmonary function detector.

The self-rating anxiety scale (SAS) and self-rating depression scale (SDS) [17] were utilized to assess the anxiety and depression degree of patients, with the score range of 20-80 points, and the score was proportional to the intensity of negative emotions.

Patient satisfaction was mainly evaluated in terms of the number and proportion of greatly satisfied, satisfied and dissatisfied patients.

Statistical analysis

The counting data were expressed by number of cases/percentage (n/%). Chi-square test was utilized to compare the counting data between groups. When the theoretical frequency in Chi-square test was less than 5, continuity correction Chi-square test was adopted. The measurement data were expressed by mean ± SEM. The measurement data between groups were compared by independent sample t-test, and paired t-test was utilized for intra-group comparison before and after treatment. GraphPad Prism 6 (GraphPad Software, San Diego, USA) was applied to analyze the data and draw pictures. When P<0.05, the difference was statistically significant.

Results

Baseline data

There was no significant difference between the two groups in gender, average age, age, course of disease, body mass index (BMI), GOLD grade, excessive drinking history, smoking history, educational level, residence and other aspects (P>0.05), as shown in **Table 1**.

The efficacy of the RG is significantly better than that of the CG

The total effective rate of the RG after treatment was remarkably higher than that of the CG (94.95% *vs.* 70.00%), and the difference was statistically significant (P<0.05), as shown in **Table 2**.

The pulmonary rehabilitation performance and compliance score of the RG is significantly better than those of the CG

The pulmonary rehabilitation performance in the RG in acupressure, breathing, Baduanjin and other aspects was significantly better than that in the CG, and the compliance score was also remarkably higher than that of the CG, with statistical significance (P<0.05), as shown in **Figure 1**.

The 6MWD of the RG in each GOLD grade is better than that in the CG

Compared with the CG, each GOLD grade in the RG showed significantly better 6MWD results, and the difference was statistically significant (P<0.05), as shown in **Figure 2**.

The MMRC and CAT scores in the RG are remarkably lower than those in the CG after treatment

There was no significant difference in MMRC and CAT scores between the two groups before treatment (P>0.05). After treatment, the two decreased to different degrees, and they were remarkably lower in the RG than those in the CG, with statistically significant difference (P<0.05), as shown in **Figure 3**.

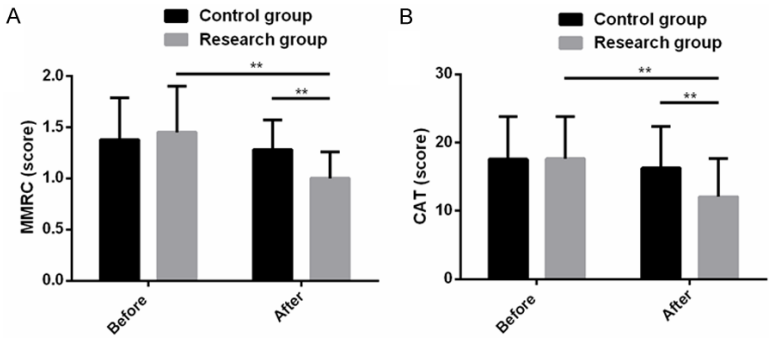

Figure 3. Comparison of MMRC and CAT scores between the two groups. A, B. The MMRC and CAT scores of the RG decrease significantly after treatment, and they are significantly lower than the CG. Note: Comparison between the two groups, ** represents P<0.01.

The improvement degree of pulmonary function indexes in the RG after treatment is better than that in the CG

Before treatment, there was no remarkable difference in pulmonary function indexes between the two groups (P>0.05). After treatment, PaO_2, FEV1 and PEF were significantly increased, while $PaCO_2$ was significantly decreased. PaO_2, FEV1 and PEF in the RG were notably higher than those in the CG, while $PaCO_2$ in the RG was significantly lower than those in the CG, with statistical significance (P<0.05) (**Figure 4**).

SAS and SDS scores in the RG were notably lower than those in the CG after treatment

There was no significant difference in SAS and SDS scores between the two groups before treatment (P>0.05). After treatment, the two scores decreased notably, and they were much lower in the RG than in the CG, with statistical difference (P<0.05) (**Figure 5**).

The total satisfaction of the RG after treatment is remarkably higher than the CG

The satisfaction degree of the RG after treatment was notably higher than that of the CG (95.96% *vs.* 87.00%), and the difference was statistically significant (P<0.05), as shown in **Table 3**.

Discussion

COPD has killed more than 3 million people worldwide. Its typical clinical symptoms are dyspnea, cough, expectoration, etc., and smoking cessation and vaccination are current preventive measures [18, 19]. It may be of great significance to study the pulmonary rehabilitation management mode for COPD patients to reduce the mortality rate.

In this study, CG adopted conventional chronic disease management with western medicine, and the RG adopted chronic disease management with combined traditional Chinese and western medicine. The effective rate of treatment in the RG was remarkably higher than that in the CG, suggesting that chronic disease management with combined traditional Chinese and western medicine is helpful to improve the efficacy of patients. Studies have shown that chronic disease self-management programs have a positive effect in the pulmonary rehabilitation process of COPD patients, with significant improvements in both the physical and psychological health, suggesting that the chronic disease management model may improve the efficiency of the treatment by ameliorating their physical and mental health [20]. Then, we compared the patients' pulmonary rehabilitation performance and compliance score. It was found that patients in the RG had higher degree of participation and completion, indicating that the chronic disease management with combined traditional Chinese and western medicine was more acceptable. According to the team of Cai [21], the application of a two-way quality feedback nursing model is beneficial in improving the adherence of COPD patients to treatment and in improving their quality of life, suggesting that the administration of high-quality nursing interventions can help alleviate their condition. It is reported that the measurement result of 6MWT was 6MWD, and a longer 6MWD indicated a stronger motor ability [22]. In our study, the 6MWD of patients in each grade in the RG was considerably longer than that in the CG, indicating that this management mode can help improve the walking tolerance of patients, which also shows that the advantages of this management mode are not limited to the disease classification. We speculate that such above is correlated with the rehabilitation training of traditional Chinese medicine. The rehabilitation training of the RG

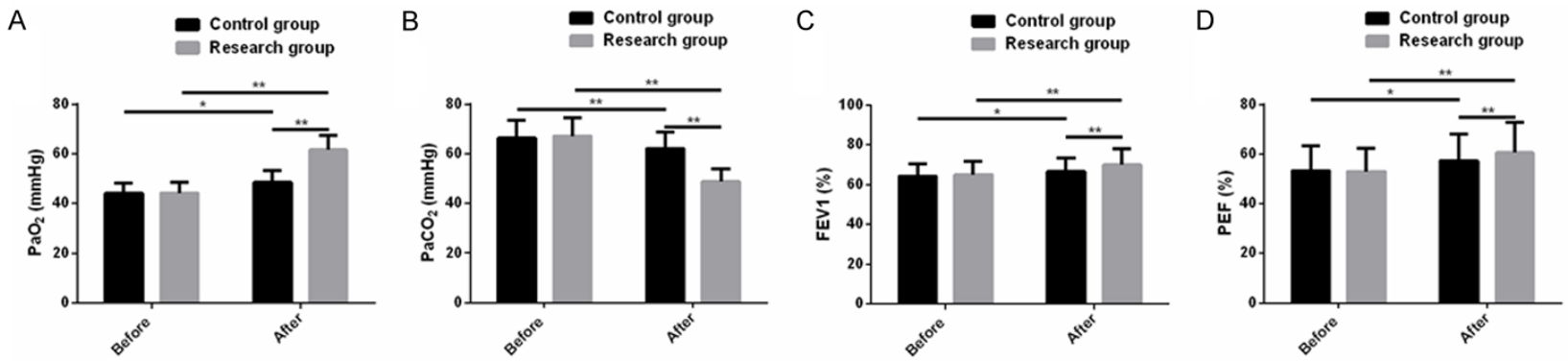

Figure 4. Comparison of pulmonary function indexes between the two groups. A, C, D. PaO_2, FEV1, PEF in the RG are significantly higher than those in the CG. B. $PaCO_2$ decreases remarkably in the RG, and is significantly lower than that in the CG. Note: Comparison between the two groups, * represents P<0.05, ** represents P<0.01.

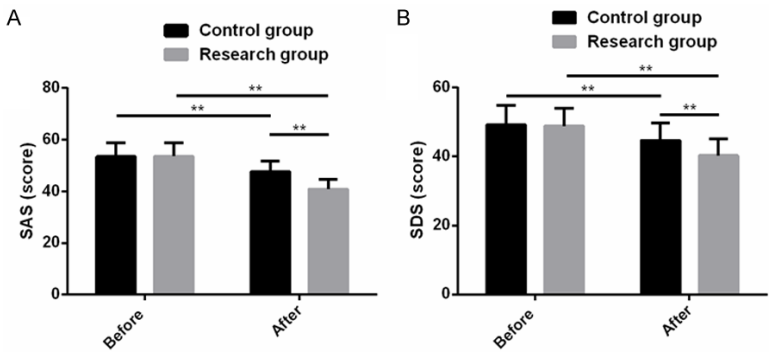

Figure 5. Comparison of SAS and SDS scores between the two groups. A, B. After treatment, SAS and SDS scores in the RG are significantly lower than those in the CG. Note: Comparison between the two groups, ** represents P<0.01.

Table 3. Satisfaction of the two groups after treatment [n (%)]

Type	CG (n=100)	RG (n=99)	χ^2 value	*P* value
Dissatisfied	13 (13.00)	4 (4.44)	-	-
Satisfied	22 (22.00)	6 (6.66)	-	-
Greatly satisfied	65 (65.00)	89 (89.90)	-	-
Overall satisfaction	87 (87.00)	95 (95.96)	5.111	0.024

included acupressure, breathing, Baduanjin and other unique rehabilitation methods of traditional Chinese medicine. These training methods are potentially of great help to the respiratory function of patients. The team of Liu [23] pointed out in their study that Baduanjin is a traditional health qigong in China, and its exercise intensity is mild to moderate, which can be applied to most patients and can also be used as an exercise prescription for COPD patients. It has positive effects on pulmonary function and athletic ability of patients.

MMRC and CAT scoring systems are reliable and accurate in assessing the respiratory and disease status of COPD patients', and both scores are inversely correlated with the improvement of the patient's condition [15, 24]. In our study, the scores of MMRC and CAT in the RG were notably lower than those in the CG, suggesting that the dyspnea degree of the RG was significantly reduced and COPD symptoms were significantly relieved after management. Further analysis showed that PaO_2, FEV1 and PEF in the RG were considerably higher than those in the CG, while $PaCO_2$ was considerably lower, indicating that the management mode adopted by the RG is more conducive to the recovery of patients' pulmonary function. It is understood that anxiety and depression are common complications of COPD patients, and the causes may be related to patients' inability to carry out normal daily social interaction and social duties due to respiratory distress [25, 26]. We also evaluated the psychological state of the patients. The results showed that the SAS and SDS scores in the RG were significantly lower than those in the CG, suggesting that the chronic disease management with combined traditional Chinese and western medicine has a positive protective effect on the psychological status of the patients. Finally, we compared the patients' satisfaction degree and found that the total satisfaction of the RG was remarkably higher than that of the CG (95.96% *vs.* 87.00%), indicating that chronic disease management with combined traditional Chinese and western medicine is more popular with patients. It is reported that giving COPD patients health guidance in nursing interventions is beneficial for improving their compliance with treatment and trust in the healthcare system, and also has a positive effect on their depressive mood [27].

Although this study proves that chronic disease management with combined traditional Chinese and western medicine has good application value and high efficacy for pulmonary rehabilitation of COPD patients, there is still some room for improvement. First of all, we can analyze the impact of the two combined on patients with other chronic diseases. Secondly, we can supplement the long-term effect of chronic disease management with combined traditional Chinese and western medicine on COPD patients, which can be conducted in the future.

To sum up, chronic disease management with combined traditional Chinese and western medicine in COPD pulmonary rehabilitation is conducive to improving the efficacy, treatment compliance, and pulmonary function of patients, and can help to maintain the positive psychology of patients.

Disclosure of conflict of interest

None.

Address correspondence to: Lili Liu and Yaping Wang, Department of Pain, Shanghai Quyang Hospital, NO. 333 Yutian Road, Hongkou, Shanghai 200092, China. Tel: +86-13761848110; E-mail: 13761848110@163.com (LLL); Tel: +86-86-137-01803342; E-mail: lpwyptfb@163.com (YPW)

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