

Retraction

Retracted: Virtual Reality Technology Combined with Comprehensive Pulmonary Rehabilitation on Patients with Stable Chronic Obstructive Pulmonary Disease

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] X. Xie, J. Fan, H. Chen et al., "Virtual Reality Technology Combined with Comprehensive Pulmonary Rehabilitation on Patients with Stable Chronic Obstructive Pulmonary Disease," *Journal of Healthcare Engineering*, vol. 2021, Article ID 9987200, 9 pages, 2021.

Research Article

Virtual Reality Technology Combined with Comprehensive Pulmonary Rehabilitation on Patients with Stable Chronic Obstructive Pulmonary Disease

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With the popularization of medical knowledge and the development of medical technology, people pay more and more attention to COPD. This paper mainly studies the effect of virtual reality technology combined with comprehensive lung rehabilitation on patients with stable chronic obstructive pulmonary disease. 60 patients with stable chronic obstructive pulmonary disease were selected to collect their general information, such as name, gender, and age. They were divided into the experimental group and control group, 30 patients in each group. The experimental group was treated with virtual reality technology combined with lung rehabilitation, while the control group was treated with conventional rehabilitation. Patients in both groups needed medication and participated in a 30-minute disease description activity once a week. In addition, patients in the control group should walk for 20 minutes every day to monitor muscle fatigue. Breathing exercises are also carried out regularly. Patients are instructed to use their lips and abdomen for 5 minutes each time. The respiratory rate was 7 beats per minute. In addition to the routine training of the control group, the experimental group will also train the simulated bicycle for 20 minutes, which will be automatically saved on the computer after the training. After the experiment, the muscle function and motor ability of the two groups were evaluated, and the results were statistically analyzed. The total self-efficacy scores of patients before and after telemedicine technical support increased significantly (2.15 ± 0.21 before telemedicine technical support, 2.39 ± 0.20 after telemedicine technical support), and the difference was statistically significant ($P < 0.05$). The results show that the application of virtual reality technology can improve the rehabilitation belief of patients and strengthen the training effect.

1. Introduction

Chronic obstructive pulmonary disease (COPD) is a complex disease, which is often combined with other diseases [1]. Therefore, a systematic, structured, and multidisciplinary comprehensive management mode is needed in the stable stage of COPD to provide continuous health monitoring for patients, as well as comprehensive health management measures such as smoking cessation, symptom management, exercise training, psychological support, and drug treatment [2]. For patients with COPD in a relatively stable state, COPD is a preventable and treatable disease, which can

be accompanied by some significant extrapulmonary effects, which are related to the severity of the disease. The pathological changes of lung tissue are mainly characterized by airflow limitation, which is not completely reversible and progressive and is associated with abnormal inflammatory reaction of the lung to harmful gases or particles [3].

As the core content of lung rehabilitation, exercise has been proved to improve the health-related quality of life of COPD patients and also help patients reduce the muscle movement uncoordinated caused by wheezing and fatigue limitation, accompanied by the improvement of quality of life [4].

In recent years, in the stable stage of COPD, more and more attention has been paid to prevent the acute exacerbation of the disease and to improve the lung function and physical function of patients. Yu found insufficient gray matter volume in cognitively impaired patients with COPD. Although his research has certain advantages, it is not comprehensive [5]. Through data mining, Qing analyzed the characteristics of acupoint selection and plaster therapy for stable COPD. He searched CNKI, VIP, CBM, Wanfang, PubMed, EMBASE, and Cochrane databases for clinical studies on plaster therapy for stable COPD. After literature screening, 46 systematic reviews were included. Although his research method has high precision, it lacks specific research content [6]. Gupta believes that the assessment of functional status is essential for the correct treatment and rehabilitation plan for patients with COPD. After excluding asthma and other respiratory or nonrespiratory diseases, all patients diagnosed with stable COPD were evaluated by applying 6MWT, STST, and SqTST in the patients. He studied 90 patients and 20 healthy controls. Although his research content is more accurate, it lacks innovation [7]. Nayyar's goal is to study the prevalence of osteoporosis and osteopenia in stable COPD patients of Indian origin south of the Himalayas. After applying the inclusion and exclusion criteria, he treated 84 COPD patients as outpatients in the pulmonary department of the pulmonary department. He chose 60 healthy controls as the control group to compare with the COPD group. According to the global initiative of COPD standards, patients are tested for spirometry to stage the severity of COPD. His research content lacks specific experimental data to prove the content to be discussed [8].

In this paper, through targeted to the patient's disease symptoms, activity ability, life influence, and psychological and emotional aspects of rehabilitation program, we promote mental health rehabilitation intervention measures to carry out three months of rehabilitation guidance. Virtual reality technology combined with lung rehabilitation is applied to the rehabilitation treatment of elderly patients with COPD in a stable period in China, which introduces a new attempt for the chronic disease management of this disease.

2. Virtual Reality Technology and Pulmonary Rehabilitation

2.1. Virtual Reality Technology. Users use various interactive devices such as head-mounted displays (HMDs) and data gloves to interact with entities in the virtual environment to give them a sense of immersion. Operators can actually enter this three-dimensional virtual environment to communicate. The basic characteristics of virtual reality technology are as follows: immersion, interaction, and sharing [9]. It is difficult for users to distinguish between true and false in their environment, and users can focus on the three-dimensional environment created by the computer. It can not only reproduce the actual environment but also freely imagine the environment without objective existence [10].

In virtual reality modeling, the nodes are as follows:

$$\begin{cases} \frac{\partial L(W, b; x, y)}{\partial W_{ij}^{(k)}} = a_j^{(k)} \delta_i^{(k+1)}, \\ \frac{\partial L(W, b; x, y)}{\partial b_i^{(k)}} = \delta_i^{(k+1)}. \end{cases} \quad (1)$$

The calculation formula is as follows:

$$\begin{aligned} \delta_i^{(k)} &= \frac{\partial L(W, b; x, y)}{\partial z_i^{(k)}} = \frac{\partial \left(1/2 \|y - o_{\text{out}}(x)\|^2 \right)}{\partial z_i^{(k)}} \\ &= -(y_i - a_i^{(k)}) \cdot f'(z_i^{(k)}). \end{aligned} \quad (2)$$

Among them, $z_i^{(k)}$ represents the weighted sum in the k -th layer. The residual calculation formula is [11]

$$\begin{aligned} \delta_i^{(k-1)} &= \frac{\partial L(W, b; x, y)}{\partial z_i^{(k-1)}} = \frac{\partial \left(1/2 \|y - o_{\text{out}}(x)\|^2 \right)}{\partial z_i^{(k-1)}} \\ &= \left(\sum_{j=1}^m W_{ji}^{(k-1)} \delta_j^{(k)} \right) \cdot f'(z_i^{(k-1)}). \end{aligned} \quad (3)$$

The calculation process of the data interface complexity is as follows:

$$H_a = -\frac{1}{k} \sum_{j=1}^k \frac{\sum_{q=1}^{n_{aj}} a_{jq}}{\sum_{i=1}^n a_i} \ln \frac{\sum_{q=1}^{n_{aj}} a_{jq}}{\sum_{i=1}^n a_i} \quad (4)$$

In the formula, n_{aj} represents the number of task elements constituting the j -th module [12].

The calculation engineering of cost complexity is as follows [13]:

$$H_c = \frac{1}{k} \sum_{i=1}^n [c_{ri} \cdot \ln c_{ri} + (1 - c_{ri}) \ln(1 - c_{ri})], \quad (5)$$

where c_{ri} represents the relative cost of the entity corresponding to the i -th ($i = 1, 2, \dots, n$) design task [14].

The normalized expression is as follows [15]:

$$X = \frac{X - X_{\min}}{X_{\max} - X_{\min}} \quad (6)$$

The fitness function is constructed as follows [16]:

$$\text{Fitness} = \begin{cases} \frac{1}{c + F}, \\ \frac{1}{c + F + T}, \end{cases} \quad (7)$$

where F is the objective function.

Assuming that $R = \{C_1, C_2, \dots, C_n\}$ is the evaluation result set of n persons, then

$$\begin{aligned} \overline{\text{Apr}}_{C_i} &= \bigcup \{C_k \leq C_i\}, \quad k = 1, 2, \dots, n, \\ \underline{\text{Apr}}_{C_i} &= \bigcup \{C_k \geq C_i\}, \quad k = 1, 2, \dots, n. \end{aligned} \quad (8)$$

The fuzzy number of C_i is

$$\begin{aligned} \text{RN}_{C_i} &= [C_i^L, C_i^U], \\ C_i^L &= \frac{\sum \text{Apr}_{C_i}}{M_L}, \\ C_i^U &= \frac{\sum \overline{\text{Apr}}_{C_i}}{M_U}, \end{aligned} \quad (9)$$

where M_L represents the number of the lower limit of C_i [17].

2.2. Pulmonary Rehabilitation. Long course of the disease, prone to changes in the condition, irreversible changes in lung function, and even gradual deterioration are all salient features of COPD. Due to the characteristics of these diseases, the daily activities and social life of patients will be affected to varying degrees in terms of social life. The limitation of the physical activity has even more impact on people who are physically active. Inspiratory muscle exercise as an auxiliary exercise is also one of the important methods of rehabilitation treatment [18]. When the patients are discharged from hospital, they should also do a comprehensive evaluation and give the patients individualized home exercise guidance program. At the same time, the immune function of children in chemotherapy is often damaged in various degrees. There are many types of chemotherapy. Therefore, the child's drug toxicity is superimposed, and the increase of the particle ball is different, which are all conditional pathogens. Meningitis in children can lead to death, disability, and mental sequelae. Under normal circumstances, the reproduction of *Streptococcus pneumoniae* will further affect the content of hemoglobin and further affect the average cardiac output [19].

2.3. Stable COPD. The characteristics of COPD are shown in Figure 1. The destruction of lung parenchyma is mainly manifested as loss of alveolar attachment and weakening of elastic retraction, causing hyperventilation of the lung. The destruction of pulmonary blood vessels is manifested from the thickening of the vascular intima to the hyperplasia of smooth muscles, which eventually causes the thickening of the vascular wall, which can lead to the increase of pulmonary artery pressure and cause chronic pulmonary heart disease and right heart failure. In addition to pulmonary manifestations, COPD can also cause systemic adverse effects including systemic inflammation and skeletal muscle dysfunction [20]. Many plasma pneumonia infections have very similar properties to other pneumonias and are relatively mild. They lack reliable diagnosis for confirming microbiological diagnosis, and there is a possibility that many infections cannot be detected. When bacteria form biofilms, they are not only insensitive to antibiotics but also able to avoid the host's immune system attack. Therefore, the formation of biofilm is closely related to the reproduction of pneumococcus.

The family ward provides patients with a familiar living environment, right in their own homes, which minimizes the impact of environmental inadaptability on patients. The family ward provides a good environment for patients' daily rehabilitation training, as well as a familiar social environment for patients. The care and care of family members, neighbors, and friends are the guarantee of patients' social health; telemedicine technology provides convenience for the communication between doctors and patients in family wards, so that patients' closer contact with doctors promotes the improvement of patients' overall health. The comprehensive intervention model of cardiopulmonary rehabilitation has a benign effect on the quality of life of elderly patients with COPD in a stable period, which can reduce negative emotions in a stable period and guide positive emotions.

Comprehensive intervention of cardiopulmonary rehabilitation improves the quality of life of stable elderly patients with COPD, increases positive emotions, supplemented by positive psychology theory to actively self-direct the patients, enhances the confidence of disease recovery, and promotes the process of disease recovery. The scientific and standardized exercise instruction program is an important reference basis for exercise education and guidance for COPD patients, but the current research on the intervention programs of exercise for patients with stable COPD is inconsistent and has not formed a unified program. Therefore, it is necessary to build a standardized and unified exercise guidance program for COPD patients in order to provide scientific and standardized guidance and education on exercises for COPD patients.

3. Curative Effect Analysis Experiment of Patients with Stable COPD

3.1. Subjects. Patients with stable COPD who visited the respiratory department of the hospital from November 2013 to March 2014, or patients who had been diagnosed with COPD and visited our hospital regularly were collected. A total of 60 patients were collected, including 54 males and 6 females. Methods: 60 COPD inpatients who met the inclusion criteria were numbered according to the order of admission, and the number was corresponding to the two random numbers selected in the random number table at the back of the statistical book. In order to reduce the influence of other variables, patients in the same intervention group were assigned to the same ward. The experimental group uses virtual reality technology combined with pulmonary rehabilitation, while the control group uses conventional rehabilitation. Each participant voluntarily participated in the study and completed the informed consent form. This research follows the CONSORT specification.

3.2. Ethical Principles

- (1) Compliance with voluntary of this study is based on the informed consent signed by the research object after understanding the purpose, content, and method of the study, and the research object has the

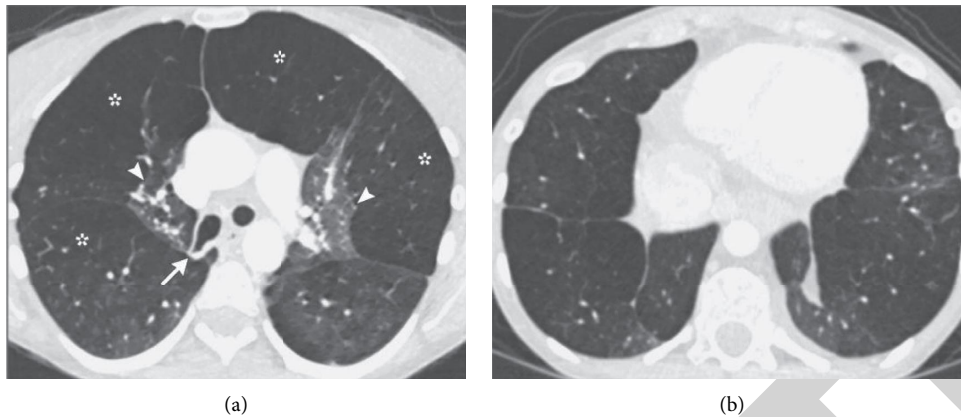


FIGURE 1: Chronic obstructive lung characteristics (picture source: <http://alturl.com/huh5i>).

right to give up the withdrawal automatically in the process of intervention.

- (2) It is clearly stated in the confidential informed consent that the information related to the research object is only used for this study. At the same time, all members of the research team are required to abide by the confidentiality provisions and never disclose any information of the research object.
- (3) In the process of fair and beneficial research, all subjects were provided with publicity materials, health education manual, lung rehabilitation exercise atlas, 6MWD measurement, lung function examination, and other services related to this study.

3.3. Treatment Methods. Both groups of patients require medication and participate in a 30-minute disease explanation activity once a week. Also they carry out breathing exercises regularly. We instruct the patient to use the lips and abdomen to breathe for 5 minutes each time. The breathing rate is 7 breaths/minute. In addition to the regular training of the control group, the experimental group will also train a simulated bicycle for 20 minutes, which will be automatically saved on the computer after the training is completed. The experiment time is 8 weeks.

3.4. Evaluation Index. Pulmonary function evaluation: there was no smoking within 1 hour before the examination, and no short-acting bronchodilator was used in the first 6 hours. We use the same instrument to measure height and weight before the examination. And we carefully explain and demonstrate the action essentials of the inspection.

Motor ability evaluation: the two groups of subjects completed the maximum walking distance as required within 6 minutes. Before the test, we inform the subjects of the steps and precautions in detail. The length of the walking test is not less than 30 meters.

The test was carried out 1.5–2 hours after eating. Firstly, the resting lung function of the subjects was detected by the MasterScreen PX exercise cardiopulmonary function system, which was made by Germany Jaeger company,

including FEV1% PERD and FEV1/FVC. The measurement was repeated for three times, and the highest value was taken for calculation. After rest for 10 minutes, the cardiopulmonary function was tested with lower limb power bicycle. The exercise program was graded and increased, that is, rest for 1 minute, no-load exercise for 2 minutes, starting load for 20 W, increasing by 20 W every 2 minutes, and keeping the speed at 35–45 R/min, until the subjects stopped exercise and continued no-load exercise for 4 minutes.

3.5. Statistical Processing. We use SPSS11.5 for data entry and statistical analysis. The exact probability method was used to compare the count data between groups. The measurement data that do not conform to the normal distribution, such as the course of disease and the difference, are represented by M (QR). Inspection level $\alpha = 0.05$, two-sided inspection.

4. Results and Discussion

4.1. Comparison of Efficacy. The patient's participation is shown in Figure 2. The CAT score of the quality of life of patients with COPD was used as the dependent variable, and the 16 factors in the demographic characteristics and basic clinical data were used as the independent variables. The gradual forward entry method was used for multiple linear regression analysis. The independent variable entered the equation standard $\alpha = 0.05$, eliminated the standard $\beta = 0.1$, the results showed that 1 year due to COPD aggravated hospitalizations, knowledge of pulmonary rehabilitation exercises, and implementation of pulmonary rehabilitation exercises finally entered the equation, affecting the quality of life of COPD patients ($P < 0.05$).

Figure 3 shows the changes in self-efficacy before and after telemedicine technical support. The total self-efficacy scores of patients before and after telemedicine technical support increased significantly (2.15 ± 0.21 before telemedicine technical support, 2.39 ± 0.20 after telemedicine technical support), and the difference was statistically significant ($P < 0.05$). However, the effect of emotional

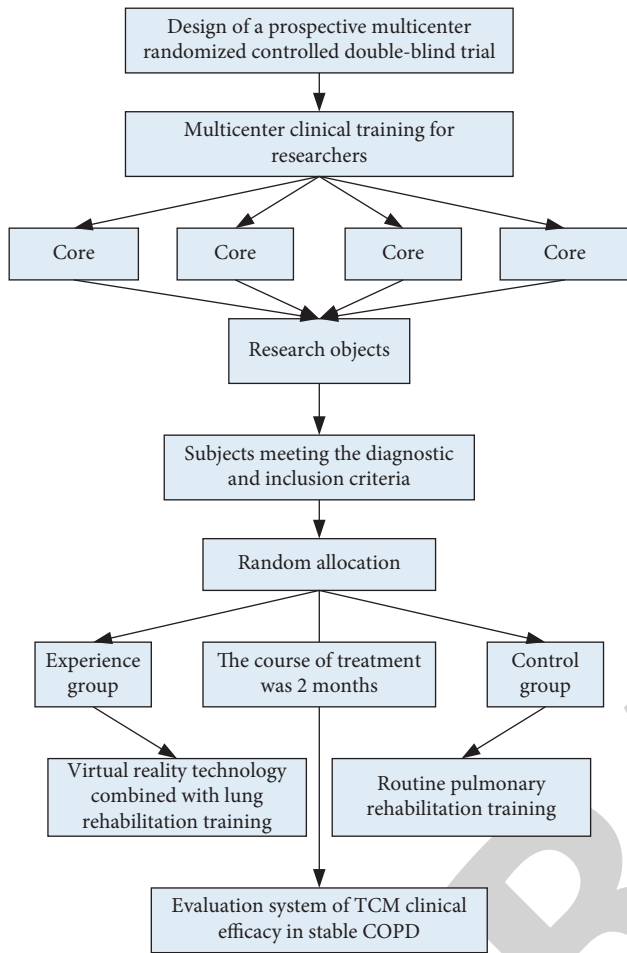


FIGURE 2: The patient's participation.

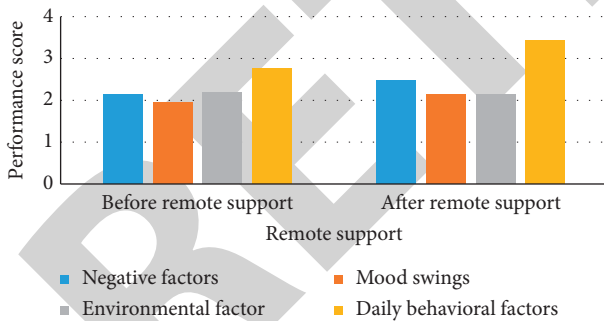


FIGURE 3: Changes in self-efficacy before and after telemedicine technical support.

management was not obvious (1.96 ± 0.37 before remote support, 2.14 ± 0.24 after remote support); the score for environmental factors (before remote support, it was 2.19 ± 0.24 ; after remote support, it was 2.15 ± 0.41) is slightly lower than before remote technical support.

Table 1 shows the comparison of lung function between the two groups of subjects before and after intervention. In the third and sixth months of the study, record the lung function index data of the intervention group. The highest score in the knowledge dimension is the

duration of pulmonary rehabilitation training, and the lowest is the importance of pulmonary rehabilitation training; the highest score in the attitude dimension is the knowledge of pulmonary rehabilitation training. The highest score in the behavioral dimension is that patients will take the initiative to carry out various pulmonary rehabilitation training, and the lowest is that they cannot persist in pulmonary rehabilitation training for 6–12 weeks or even longer.

The lungs of patients with COPD are shown in Figure 4. In the NS group, the small airway wall and epithelial layer were intact. In the S group and the COPD group, the small airways showed obvious pathological changes, and all showed airway epithelial cell degeneration, necrosis, erosion, metaplasia, cilia shedding, mucus goblet cell hyperplasia, pathological changes such as airway smooth muscle cell proliferation, and the inflammatory cells infiltrated by the tube wall are mainly lymphocytes.

The changes in the respiratory frequency (RR) of COPD subjects are shown in Table 2. The breathing rate before, during, and after exercise did not change significantly with the increase of threshold load ($P > 0.05$). Under the threshold loads of 9 cm H₂O, 20% MIP, 30% MTP, 40% MIP, 50% MIP, and 60% MIP, the breathing rate during exercise was significantly lower than before and after exercise ($P < 0.05$).

Table 3 shows the comparison of lung function between the two groups of patients before intervention. There was no statistical significance in the grade and test of the sequential parameter data used by the mMRC in the two groups of patients. Therefore, before the two groups of patients participate in the treatment, the effect of each treatment must be evaluated for the balance of the index baseline data, and the effect after the intervention is relatively good.

After a period of clinical acute attack, the clinical symptoms of COPD patients improved or alleviated, but their lung dysfunction continued to worsen. At this time, the patient's own defense and immune functions are affected to the same extent. The reduced level and the effects of various external factors or patient predisposing factors make COPD more likely to recur and be accompanied by various serious complications. This also increases the psychological burden and life pressure of patients and their families. Figure 5 shows the lung conditions of patients with stable COPD. Before the experiment, there was no difference in the average walking distance between the two groups of patients in the 6-minute walking experiment, and between the two groups, after the experiment, the average walking distance of the patients was significantly better than before the experiment.

The current quality of life of COPD patients at different stages of pulmonary rehabilitation exercise behavior is shown in Figure 6. Among 94 COPD patients, 24 patients (25.5%) were in the preintentional phase of pulmonary rehabilitation exercises, and the quality of life of 24 patients (25.5%) was severely affected by COPD, and 18 patients (19.1%) were seriously affected by COPD. The quality of life of 4 patients (4.3%) was slightly affected by COPD, and the quality of life was moderately affected by 7 patients (7.4%) due to COPD. The results of this study show that the load on

TABLE 1: Comparison of lung function between the two groups of subjects before and after intervention.

Index	Group	Before intervention	Intervention for 3 months	Intervention for 6 months	<i>F</i>
FEV ₁ %pred	Intervention group	45.42 ± 5.82	50.02 ± 6.62	53.60 ± 16.39	57.959
	Control group	45.63 ± 5.58	45.29 ± 5.94	43.88 ± 6.04	
FEV ₁ /FVC	Intervention group	59.92 ± 5.88	63.42 ± 4.63	65.17 ± 4.33	17.253
	Control group	60.27 ± 6.18	59.52 ± 6.28	57.63 ± 6.32	

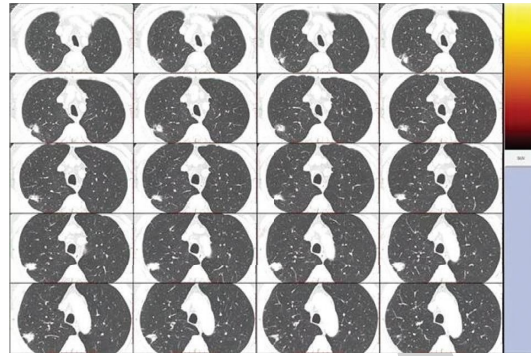


FIGURE 4: The lungs of patients with COPD (picture source: <http://alturl.com/oiab7>).

TABLE 2: Changes in respiratory rate (RR) of subjects with COPD.

RR (bpm)	Before exercise	During exercise	After exercise
9 cm H ₂ O	14.2	11.4	13.6
20% MIP	13.9	11.5	15.1
30% MIP	14.0	11.3	13.8
40% MIP	14.3	10.9	14.3
50% MIP	13.3	10.7	15.4
60% MIP	14.0	11.9	16.3

TABLE 3: Comparison of lung function between the two groups before intervention.

Grouping	<i>N</i>	Social security	Agricultural insurance	No medical insurance	χ^2	<i>P</i>
Test group	30	20 (66.67%)	7 (23.33%)	3 (10.00%)	0.74	0.690
Control group	30	23 (76.67%)	5 (16.67%)	2 (6.67%)		
Total	60	43 (71.67%)	12 (20.00%)	5 (8.33%)		



FIGURE 5: Lung conditions of patients with stable COPD (picture source: <http://alturl.com/jh8jc>).

the corresponding common factors of the 26 items of the questionnaire is ≥ 0.4 and there is no multiple load. According to the gravel diagram, a total of 4 common factors can be extracted to explain 65.292% of the total variation,

and its structure includes slow resistance. The basic knowledge, importance knowledge, attitudes, and behaviors of pulmonary rehabilitation training for lung patients are basically the same as the theoretical structure of the

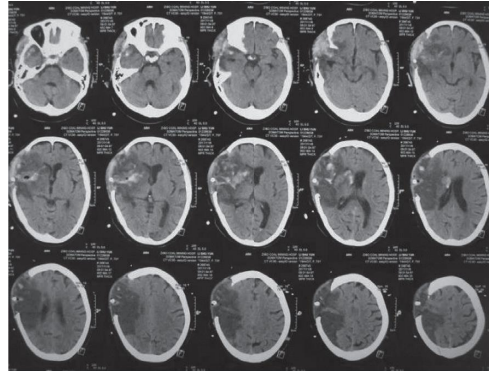


FIGURE 6: The current quality of life of COPD patients at different stages of pulmonary rehabilitation exercise behavior (picture source: <http://alturl.com/7fa9j>).

TABLE 4: Phase comparison of pulmonary rehabilitation and general exercises.

Exercise behavior stage	3 months after intervention		6 months after intervention		9 months after intervention	
	Control group	Test group	Control group	Test group	Control group	Test group
Preintent exercise	10 (12.99)	16 (20.78)	8 (10.39)	3 (3.90)	3 (3.90)	1 (1.30)
Intentional exercise phase	20 (25.97)	21 (27.27)	15 (19.48)	6 (7.79)	16 (20.78)	3 (3.90)
Prepare to implement the exercise phase	15 (19.48)	14 (18.18)	20 (25.97)	29 (37.66)	19 (24.68)	12 (15.58)
Exercise action phase	16 (20.78)	12 (15.58)	18 (23.38)	13 (16.88)	18 (23.38)	18 (23.38)
Maintain the exercise phase	16 (20.78)	14 (18.18)	16 (20.78)	26 (33.77)	21 (27.27)	43 (55.84)

questionnaire. It covers two major types of knowledge that COPD patients need to master when performing pulmonary rehabilitation training, including the attitude of COPD patients when performing pulmonary rehabilitation training and the behavior of COPD patients to actively study and conduct pulmonary rehabilitation training.

4.2. *Balanced Analysis of Stage Distribution of Pulmonary Rehabilitation Exercise Behavior in COPD Patients.* Table 4 shows the comparison of the stages of pulmonary rehabilitation and general exercises. 6 months after training, the distribution of the whole body training exercise for pulmonary rehabilitation in groups is as follows: previous intention, maintenance training phase distribution of the study group COPD patients with pulmonary rehabilitation, and the incidence of exercise was 16 cases, the previous intention training phase was 3 cases, the intention training phase was 6 cases, the training phase was 29 cases, the exercise phase was 13 cases, and the training phase was 26 cases ($P < 0.05$).

Figure 7 shows the comparison of CAT scores before and after management in the comprehensive evaluation group. According to the comprehensive evaluation method, the patients in the management group were divided into groups, and the CAT scores before and after management were compared. The results of group B and group D were $P < 0.05$, and the difference was statistically significant. The CAT scores of patients in group B and D were compared with those before management for 6 months and 12 months, $P < 0.05$, and the difference was statistically significant. The CAT scores of the patients in group D for 12 months were

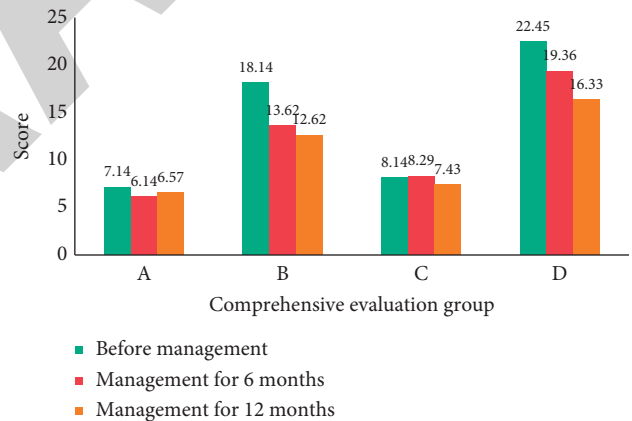


FIGURE 7: Comparison of CAT scores in the management group before and after management in the comprehensive evaluation group.

compared with those for 6 months, $P < 0.05$, and the difference was statistically significant.

The relevant test indicators of the subjects' lung function are shown in Table 5. In the 3-month experimental study, the 16 subjects in the control group mainly received necessary medical treatment. There was no intervention by other means in the experimental group: male subjects' vital capacity, FVC, FEV1, FEV1%, FEV1/FVC, and heart rate before and during the experiment; female subjects' vital capacity, FVC, FEV1, FEV1%, FEV1/FVC, and heart rate before and during the experiment. In the study, the experimental subjects in the control group did not have the intervention of exercise rehabilitation. In

TABLE 5: Test indicators related to subjects' lung function.

	Vital capacity (L)	FVC (L)	FEV1 (L)	FEV1%	FEV1/FVC (%)	Heart rate
Before experiment	2.50 ± 0.04	2.44 ± 0.04	1.25 ± 0.01	54.92 ± 1.24	51.08 ± 0.60	62.92 ± 1.16
	2.23 ± 0.01	2.00 ± 0.02	1.03 ± 0.01	55.50 ± 1.29	51.44 ± 0.24	65.00 ± 0.82
In experiment	2.49 ± 0.04	2.44 ± 0.04	1.25 ± 0.01	55.00 ± 0.60	51.13 ± 0.36	63.08 ± 0.90
	2.24 ± 0.01	2.01 ± 0.02	1.03 ± 0.01	55.00 ± 0.82	51.49 ± 0.20	65.25 ± 0.50

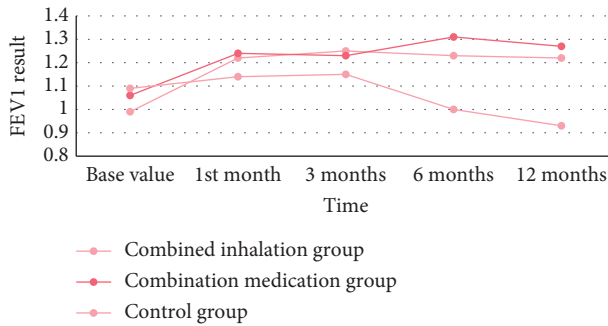


FIGURE 8: Comparison of patients' FEV1 results.

the experiment, the experimental subjects basically maintained the basic characteristics of COPD, but the lung function indicators of the experimental subjects did not change significantly.

The comparison of patients' FEV1 results is shown in Figure 8. Clinically, for patients with loss of exercise ability and acceptable quality of life, we can choose Western medicine comprehensive pulmonary rehabilitation with a relatively small financial burden; for patients with poor exercise ability and quality of life, we can choose Chinese medicine in various ways of comprehensive pulmonary rehabilitation, so as to achieve the purpose of improving sports ability. In terms of the number of hospitalizations, 83% of patients were hospitalized once a year due to this disease, and the treatment of COPD has become more and more standardized, so most patients' conditions can be better controlled. In terms of difficulty, the proportion of level 2 is 50%; in terms of lung function, the proportion of level II or above is 80%, indicating that the symptoms are not obvious when the lung function is mild, only coughing and sputum.

5. Conclusions

In this study, the routine PR group received pulmonary rehabilitation education combined with rehabilitation training to enable patients to enhance their exercise capacity in a short period of time and improve exercise volume and quality of life. However, after the end of rehabilitation training, the exercise capacity decreased with time, and the weekly exercise volume and quality of life could not be maintained. This may be because there is no guidance and supervision after the rehabilitation training, and the regular exercise is poor. The patient's exercise motivation and confidence are insufficient, and the exercise frequency, time, and intensity are also insufficient, and it is difficult for the body to make adaptive changes. Patients' happiness and sorrow can be understood more, and patients can get help

from their relatives faster when they encounter problems. However, breathing exercises cannot have the same effect as the drugs used in the acute exacerbation period to quickly alleviate the symptoms of patients.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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