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ORIGINAL RESEARCH

The Impact of Psychological Nursing Combined with Respiratory Training on Mental Health, Pulmonary Function, and Quality of Life in Patients with Chronic Obstructive Pulmonary Disease: A Retrospective Analysis

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Objective: Patients with chronic obstructive pulmonary disease (COPD) often suffer from both physical limitations and psychological distress, affecting their overall well-being. This study aims to evaluate the impact of combined psychological nursing and respiratory training on anxiety, depression, pulmonary function, dyspnea, exercise tolerance, and quality of life in COPD patients.

Methods: Clinical data from 180 COPD patients admitted to a hospital between January 2021 and June 2024 were retrospectively collected and analyzed. Patients were divided into a control group (routine care, n=90) and an intervention group (psychological nursing combined with respiratory training, n=90) based on the care they received. The outcomes compared between the two groups included depression scores (SDS), anxiety scores (SAS), pulmonary function indicators (forced expiratory volume in one second [FEV1], forced vital capacity [FVC]), dyspnea grading (mMRC score), 6-minute walk test (6MWT), and quality of life scores (SGRQ scale).

Results: The SAS and SDS scores in the intervention group were significantly lower than those in the control group ($P<0.05$), indicating significant improvements in anxiety and depression. FEV1 and FVC levels were found to be significantly higher in the intervention group ($P<0.05$), reflecting improved pulmonary function. The mMRC score was significantly lower in the intervention group ($P<0.05$), indicating reduced dyspnea. The 6MWT distance was significantly longer in the intervention group ($P<0.05$), demonstrating enhanced exercise tolerance. The SGRQ score was significantly lower in the intervention group ($P<0.05$), suggesting a significant improvement in quality of life.

Conclusion: Psychological nursing combined with respiratory training significantly reduces anxiety and depression, improves lung function and exercise tolerance, relieves dyspnea, and enhances quality of life in patients with COPD. It is recommended as a key component of comprehensive COPD management.

Keywords: psychological nursing, respiratory training, chronic obstructive pulmonary disease, mental health, pulmonary function, quality of life

Introduction

Chronic obstructive pulmonary disease (COPD) is a long-term respiratory disease marked by continuous airflow obstruction, typically progressing slowly and often resulting in permanent lung function decline.[1–3] Currently ranked as the third leading cause of death globally, COPD affects approximately 8.6% of individuals aged 40 and above.[4] This disease not only poses a serious threat to patients' health and lives but also places a heavy burden on healthcare resources

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and socioeconomic systems. The clinical burden and chronic symptoms of COPD often lead to psychological stress. Psychiatric comorbidities have been shown to worsen the prognosis and clinical outcomes of COPD.

Anxiety and depressive disorders frequently coexist with COPD, exhibiting significantly elevated incidence rates compared to the general population.[5] These mental health disturbances significantly intensify patients' symptom burden while demonstrating strong correlations with clinical deterioration, frequent hospital admissions, and diminished life quality.[6] Additionally, COPD patients often experience a significant decline in exercise capacity, manifested as dyspnea, activity limitations, and reduced 6-minute walking distance.[7] Consequently, enhancing psychological wellbeing, respiratory performance, physical endurance, and overall health status in this patient population represents a critical therapeutic priority.

The therapeutic potential of non-drug approaches has emerged as a significant focus in contemporary COPD care paradigms, demonstrating particular efficacy in symptom mitigation and wellbeing enhancement.[8] Psychological nursing, as a systematic psychological intervention, can effectively alleviate patients' negative emotions and enhance their confidence in coping with the disease. Specifically, in patients with COPD, combining psychological nursing with respiratory training has been shown to significantly improve cardiopulmonary function, exercise tolerance, and quality of life.[9] Respiratory training, particularly inspiratory muscle training, helps reduce dyspnea and enhance exercise endurance by improving respiratory muscle function and increasing lung capacity.[10] Previous studies have demonstrated that these two interventions, when applied individually, have certain benefits for COPD patients. However, research on the combined intervention of psychological nursing and respiratory training remains limited, and the clinical value of their synergistic effects requires further exploration.

Building upon existing evidence, this investigation conducted a retrospective analysis of medical records from 180 hospitalized COPD patients treated from January 2021 through June 2024. The research sought to evaluate the therapeutic impact of integrating psychological support with respiratory rehabilitation on multiple clinical outcomes, including emotional distress (anxiety/depression), respiratory parameters, breathlessness severity, physical endurance, and overall wellbeing. These findings contribute valuable empirical data to inform holistic COPD care protocols.

Materials and Methods

Study Subjects

This retrospective study analyzed 180 eligible COPD patients admitted between January 2021 and June 2024, all meeting inclusion criteria. Participants were equally divided into control (standard care, n=90) and intervention groups (standard care plus psychological nursing and respiratory training, n=90). The study was approved by the the Ethics Committee Committee of Suzhou Hospital of Combination of Chinese Traditional and Western Medicine [2022KY006-01]. All procedures performed in studies involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Inclusion and Exclusion Criteria

Inclusion Criteria

(1) age between 40 and 80 years; (2) clinically diagnosed with stable COPD based on GOLD guidelines; stable COPD refers to a stage in which the patient's respiratory symptoms (eg, cough, sputum, shortness of breath) are stable or relatively mild without acute exacerbation. According to the GOLD criteria and the Chinese Guidelines for the Diagnosis and Treatment of Chronic Obstructive Pulmonary Disease, patients in stable phase are further classified into four grades based on airflow limitation: GOLD 1 (mild, $FEV_1 \geq 80\%$ predicted), GOLD 2 (moderate, $50\% \leq FEV_1 < 80\%$), GOLD 3 (severe, $30\% \leq FEV_1 < 50\%$), and GOLD 4 (very severe, $FEV_1 < 30\%$).[11,12] (3) disease duration ≥1 year; (4) able to complete mental health assessments and pulmonary function tests; (5) provided informed consent and agreed to participate voluntarily.

Exclusion Criteria

(1) Comorbid severe cardiovascular or cerebrovascular diseases, malignant tumors, or other serious organic diseases; (2) Comorbid other chronic respiratory diseases, such as bronchial asthma or pulmonary fibrosis; (3) Presence of significant cognitive impairment or severe mental illness; (4) Incomplete data records, making them unsuitable for analysis.

Sample Size Calculation

According to previous studies and pilot data, we anticipated that psychological nursing plus respiratory training would yield a moderate effect (d=0.6) in reducing SAS and SDS scores. Using G*Power 3.1 (α=0.05, power=0.8), the minimum sample size was determined as 81 per group. Accounting for 10% attrition, 180 participants (90 per group) were enrolled.

Routine Care

Nursing staff systematically monitored patients' vital signs daily, including body temperature, pulse, respiratory rate, and blood pressure. Oxygen saturation (SpO_2) was dynamically monitored using a pulse oximeter to promptly detect changes in condition or risks of hypoxemia. Medication guidance was a core component of routine care. Nursing staff strictly followed medical orders to instruct patients on the correct use of bronchodilators, inhaled corticosteroids, and other COPD-related medications. They emphasized the proper use of inhalers, ensured timely medication administration, and monitored the effectiveness and potential adverse reactions of the drugs.

In terms of health education, nurses provided one-on-one education to patients, covering COPD-related knowledge, including disease mechanisms, symptom characteristics, and risk factors. Special emphasis was placed on smoking cessation guidance, helping smoking patients understand the importance of quitting and developing individualized cessation plans. Additionally, education included daily management strategies, such as avoiding exposure to air pollutants, maintaining a healthy living environment, and planning daily activities appropriately.

For nutritional support, nurses evaluated patients' nutritional condition using body weight, BMI, and relevant lab test findings., and laboratory test results. They developed personalized dietary plans, recommending high-protein, high-calorie, and easily digestible foods to prevent malnutrition and physical decline.

Psychological Nursing Combined with Respiratory Training

Psychological Nursing

Psychological nursing interventions were implemented by nurses who had received specialized training and included the following three components.

Individualized Psychological Intervention

Professional assessment tools were used to evaluate patients' psychological status, identifying issues such as anxiety, depression, and emotional instability. Based on the assessment results, individualized intervention plans were developed, employing techniques such as empathetic communication, positive guidance, and goal management to help patients identify and cope with psychological stressors and enhance their psychological resilience to the disease. Throughout the intervention, nurses maintained regular in-person communication with patients to evaluate the intervention's impact and make timely adjustments to care strategies.

Relaxation Training

Evidence-based relaxation techniques were utilized, including deep breathing exercises, guided meditation, and music therapy. Deep breathing exercises aimed to alleviate tension by guiding patients to focus on slow and deep breathing patterns. Meditation practices helped reduce anxiety by directing patients' attention to their breathing rhythm. Music therapy further enhanced emotional stability by playing soothing music.

Health Education Group Activities

Weekly group activities led by nurses were organized, covering topics such as COPD disease management, mental health maintenance, and coping strategies. Through lectures, case analyses, and patient interactions, these activities helped patients comprehensively understand the relationship between the disease and mental health. Sharing experiences and mutual encouragement strengthened patients' confidence in treatment and adherence.

Respiratory Training

Respiratory training was guided and supervised by nurses and included the following three steps:

(1) Diaphragmatic Breathing Training: Patients were guided to breathe in through the nose and out through the mouth, focusing on abdominal expansion during inhalation and gradual contraction during exhalation. The training rhythm was set at 4 seconds for inhalation and 6 seconds for exhalation, ensuring deep and regular breathing. Each session lasted 20 minutes and was conducted twice daily. This training aimed to enhance diaphragmatic mobility, improve alveolar ventilation efficiency, and alleviate dyspnea symptoms.

(2) Pursed-Lip Breathing Training: Patients were guided to exhale slowly through lightly pursed lips, ensuring that the exhalation time was longer than the inhalation time. This method aimed to reduce small airway resistance, improve exhalation efficiency, and effectively alleviate lung hyperinflation.

(3) Progressive Training: Training intensity was gradually increased based on patients' baseline tolerance. In the initial phase, low-intensity respiratory training was used to help patients adapt. Subsequently, the training difficulty was progressively increased by extending the duration or frequency of sessions according to the patients' actual conditions. The training cycle lasted 12 weeks, with nurses assessing patients' progress weekly and dynamically adjusting the training plan to ensure scientific rigor and safety.

Observation Indicators

Mental Health

The SAS and the SDS were used to assess patients' mental health status. Both SAS and SDS are standardized self-rating scales, each containing 20 items rated on a four-point scale to reflect the patient's psychological state over the past week. The standard scores obtained by multiplying raw scores by 1.25 and rounding to the nearest integer. Higher SAS and SDS standard scores indicate more severe anxiety and depression, respectively.

Pulmonary Function

A professional pulmonary function testing device was used to measure patients' pulmonary function parameters, including FEV1 and FVC. The measurements were conducted strictly according to the operational standards of the American Thoracic Society (ATS)/European Respiratory Society (ERS) to ensure accuracy and reproducibility. FEV1 and FVC were used to evaluate the degree of airway obstruction and lung ventilation function. Before testing, patients were required to abstain from smoking for at least 4 hours and avoid strenuous exercise 30 minutes prior to the examination.

Dyspnea Grading

The Modified Medical Research Council Dyspnea Scale (mMRC) was used to grade the severity of patients' dyspnea. The mMRC score categorizes patients' subjective experience of dyspnea during different daily activities, ranging from grade 0 (no dyspnea) to grade 4 (dyspnea even while dressing or at rest). Higher scores indicate more severe dyspnea. The mMRC score was assessed before and after the intervention to reflect changes in patients' respiratory symptoms.

Exercise Tolerance

The 6-Minute Walk Test (6MWT) was conducted in a 30-meter corridor to assess exercise tolerance. Patients walked at their maximum tolerable speed for 6 minutes, and the distance (in meters) was recorded. Nursing staff guided patients to maintain a steady pace, monitored their breathing and fatigue levels, and provided immediate support if necessary. Before the test, patients were advised to avoid excessive food intake and strenuous exercise and to rest in a quiet state for at least 30 minutes to ensure the reliability of the results.

Quality of Life

The St. George's Respiratory Questionnaire (SGRQ) was used to comprehensively assess patients' quality of life. The SGRQ includes three dimensions: symptoms (frequency and severity of symptoms), activity (limitations in activities due to dyspnea), and disease impact (overall impact of the disease on daily life). The scale uses a percentage scoring system, with lower total and subscale scores indicating better quality of life. In this study, the total SGRQ score and subscale scores were measured before and after the intervention to evaluate the improvement in patients' quality of life.

Statistical Analysis

Statistical analysis was carried out with SPSS software (v26.0). Measurement data were expressed as means ± standard deviations. The normality of data distribution was assessed using the Shapiro–Wilk test. Data conforming to a normal distribution were analyzed using Student's *t*-test, while the Mann–Whitney *U*-test was used for comparisons involving non-normally distributed data. Count data were shown as case numbers (percentages) and compared by χ^2-test. The significance threshold was set at $P<0.05$.

Results

Comparison of General Characteristics Between the Two Groups

There were no significant differences between the two groups regarding gender, age, BMI, duration of illness, smoking history, education level, or baseline lung function (FEV_1% and FVC%) ($P > 0.05$), suggesting the groups were well matched (Table 1). Male proportions were 68.9% and 71.1% in the control and intervention groups, with mean ages of 65.8 ± 8.2 and 66.3 ± 8.5 years. The proportions of patients with a smoking history were 63.3% and 65.6%, respectively. In terms of educational level, the proportions of patients with junior high school education or below were 64.4% and 61.1%, respectively. The BMI values were 23.6 ± 2.8 kg/m^2 and 23.4 ± 2.7 kg/m^2, and the disease durations were 7.5 ± 2.3 years and 7.8 ± 2.5 years, respectively. There were no notable differences in baseline lung function measures (FEV_1% and FVC%) between the two groups.

Comparison of Mental Health Between the Two Groups

The mental health status of the two groups was assessed using the SAS and the SDS (see Table 2). Prior to the intervention, no statistically significant disparities were observed in the SAS and SDS scores between the control and intervention groups, suggesting comparable initial mental health conditions. Following the intervention, the SAS score in the intervention group demonstrated a decrease from 52.9 ± 7.8 to 39.1 ± 6.7, while the SDS score exhibited a decline from 56.1 ± 8.3 to 40.3 ± 6.2. In the control group, the SAS score decreased from 53.4 ± 8.1 to 50.2 ± 9.3, and the SDS score decreased from 55.7 ± 7.6 to 53.4 ± 8.5. The enhancement observed in the intervention group exhibited a significantly greater magnitude than that recorded in the control group, with statistically significant disparities being identified between the two groups ($P<0.001$). The findings of this study indicate that a combination of psychological nursing interventions and respiratory training may contribute to the effective alleviation of anxiety and depression, leading to an enhancement in the mental well-being of COPD patients.

Table 1 General Information

Feature	Control Group (n=90)	Intervention Group (n=90)	χ^2/t	P-value
Gender				
Male	62 (68.9%)	64 (71.1%)	0.105	0.746
Female	28 (31.1%)	26 (28.9%)		
Average Age (Years)	65.8 ± 8.2	66.3 ± 8.5	0.377	0.707
Smoking History				
Yes	57 (63.3%)	59 (65.6%)	0.091	0.762
No	33 (36.7%)	31 (34.4%)		
Education Level				
Junior High School or Below	58 (64.4%)	55 (61.1%)	0.208	0.648
High School or Above	32 (35.6%)	35 (38.9%)		
BMI (kg/m^2)	23.6 ± 2.8	23.4 ± 2.7	0.452	0.652
Disease Duration (Years)	7.5 ± 2.3	7.8 ± 2.5	0.817	0.415
Baseline Lung Function				
FEV1%	48.5 ± 12.7	47.8 ± 13.1	0.363	0.717
FVC%	67.3 ± 14.2	66.9 ± 13.8	0.169	0.866

Note: Data are presented as mean ± SD or n (%). t: Student's *t*-test; χ^2: Chi-square test; P < 0.05 indicates statistical significance. The same applies to subsequent tables.

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Table 2 Comparison of Anxiety Scores (SAS) and Depression Scores (SDS) Before and After Intervention in the Two Groups of Patients

Time/Score	Control Group (n=90)	Intervention Group (n=90)	t-value	P-value
Anxiety Score (SAS)				
Before Intervention	53.4 ± 8.1	52.9 ± 7.8	0.423	0.674
After Intervention	50.2 ± 9.3	39.1 ± 6.7*	9.19	<0.001
Depression Score (SDS)				
Before Intervention	55.7 ± 7.6	56.1 ± 8.3	0.337	0.736
After Intervention	53.4 ± 8.5	40.3 ± 6.2*	11.81	<0.001

Note: *$P < 0.05$.

Comparison of Pulmonary Function Indicators Between the Two Groups

To assess the effect of the combined intervention on lung function, FEV_1 and FVC were recorded in both groups before and after treatment (Table 3). Baseline FEV_1 and FVC values showed no significant differences between groups ($P > 0.05$), indicating comparable pulmonary function prior to treatment. Post-intervention, the intervention group exhibited a more substantial improvement in lung function than the control group. Specifically, FEV_1 increased from 1.81 ± 0.41 L to 2.75 ± 0.51 L, compared to 1.83 ± 0.43 L to 2.07 ± 0.46 L in the control group ($P < 0.001$). Similarly, FVC rose from 2.11 ± 0.56 L to 2.99 ± 0.64 L in the intervention group, while only a slight increase was observed in the control group (2.13 ± 0.58 L to 2.20 ± 0.60 L) ($P < 0.001$). These findings highlight the superior effectiveness of integrating psychological nursing with respiratory training in enhancing pulmonary function among COPD patients, compared to routine care alone.

Comparison of Dyspnea Grading (mMRC Score) Between the Two Groups

Dyspnea severity alterations were evaluated in both cohorts utilizing the mMRC scale, with comparative pre- and post-intervention results detailed in Table 4. Before the intervention, the mMRC scores of the two groups were similar, with 2.53 ± 0.67 in the control group and 2.47 ± 0.63 in the intervention group, showing no statistically significant difference (t=0.62, P=0.537), indicating comparable baseline dyspnea levels.

Following the intervention period, the intervention group demonstrated a marked reduction in mMRC scores from 2.47 ± 0.63 to 1.84 ± 0.59, while the control group showed a more modest decrease from 2.53 ± 0.67 to 2.31 ± 0.71. The post-intervention between-group difference reached statistical significance (t=4.83, P<0.001). These findings indicate that the integrated approach combining psychological nursing with respiratory training produces significantly greater improvement in dyspnea symptoms among COPD patients compared to standard care alone.

Comparison of Exercise Tolerance (6MWT Results) Between the Two Groups

Functional exercise capacity was assessed via the standardized 6-minute walk test (6MWT), with comparative results presented in Table 5. Initial evaluation revealed comparable baseline performance between groups (control: 320.6 ±48.2 m; intervention: 318.2±50.3 m; P=0.763). Following treatment, the intervention group demonstrated a clinically

Table 3 Comparison of Pulmonary Function Indicators Between the Two Groups of Patients (Before and After Intervention)

Time/Indicator	Control Group (n=90)	Intervention Group (n=90)	t-value	P-value
FEV1 (L)				
Before Intervention	1.83 ± 0.43	1.81 ± 0.41	0.32	0.75
After Intervention	2.07 ± 0.46	2.75 ± 0.51*	9.4	<0.001
FVC (L)				
Before Intervention	2.13 ± 0.58	2.11 ± 0.56	0.235	0.814
After Intervention	2.20 ± 0.60	2.99 ± 0.64*	8.54	<0.001

Note: *$P < 0.05$.

Table 4 Comparison of Dyspnea Grading (mMRC Scores) Between the Two Groups of Patients

Time/Indicator	Control Group (n=90)	Intervention Group (n=90)	t-value	P-value
mMRC Score				
Before Intervention	2.53 ± 0.67	2.47 ± 0.63	0.62	0.537
After Intervention	2.31 ± 0.71	1.84 ± 0.59*	4.83	<0.001

Note: *$P < 0.05$.

Table 5 Comparison of Exercise Tolerance (6MWT Results) Between the Two Groups of Patients

Time/Indicator	Control Group (n=90)	Intervention Group (n=90)	t-value	P-value
6MWT Distance (meters)				
Before Intervention	320.6 ± 48.2	318.2 ± 50.3	0.302	0.763
After Intervention	348.7 ± 52.6	395.2 ± 58.1*	6.72	<0.001

Note: *$P < 0.05$.

significant improvement in walking distance (318.2±50.3 m to 395.2±58.1 m), substantially greater than the control group's modest gain (320.6±48.2 m to 348.7±52.6 m). The post-intervention between-group difference was highly significant ($P<0.001$), demonstrating superior efficacy of the combined psychological-respiratory intervention for enhancing functional capacity in COPD patients compared to conventional care.

Comparison of Quality of Life Assessment (SGRQ Results) Between the Two Groups

In order to evaluate the improvement in quality of life in COPD patients, the quality of life of the two groups was assessed using the SGRQ scale, as demonstrated in Table 6. Prior to the intervention, the total SGRQ scores and subscale scores of the two groups were comparable, exhibiting no significant differences ($P>0.05$). Following the intervention, the improvement in the total SGRQ score and subscale scores in the intervention group was significantly greater than that in the control group ($P<0.001$). Specifically, the total SGRQ score in the intervention group demonstrated a decrease from 58.7 ± 8.7 to 45.6 ± 7.1, the symptom dimension score exhibited a decline from 22.9 ± 5.4 to 18.5 ± 4.8, the activity dimension score decreased from 19.3 ± 4.8 to 15.6 ± 4.3, and the disease impact dimension score decreased from 16.5 ± 4.2 to 11.5 ± 3.9. While the control group demonstrated enhancements in the total SGRQ score and subscale scores following the intervention, the magnitude of these improvements was considerably less pronounced than that observed in the intervention group. Moreover, these differences did not attain statistical significance ($P > 0.05$). The findings of this

Table 6 Comparison of Quality of Life Assessment (SGRQ Results) Between the Two Groups of Patients

Time/Dimension	Control Group (n=90)	Intervention Group (n=90)	t-value	P-value
SGRQ Total Score				
Before intervention	59.3 ± 9.2	58.7 ± 8.7	0.432	0.667
Post intervention	53.4 ± 8.9	45.6 ± 7.1*	6.92	<0.001
Symptom dimension				
Pre intervention	23.4 ± 5.6	22.9 ± 5.4	0.622	0.535
Post intervention	21.2 ± 5.5	18.5 ± 4.8*	3.55	<0.001
Activity dimension				
Pre intervention	19.7 ± 4.9	19.3 ± 4.8	0.565	0.573
Post intervention	18.2 ± 4.7	15.6 ± 4.3*	3.57	<0.001
Disease impact dimension				
Pre intervention	16.2 ± 4.4	16.5 ± 4.2	0.438	0.662
Post intervention	14.0 ± 4.0	11.5 ± 3.9*	3.68	<0.001

Note: *$P < 0.05$.

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study suggest that a combination of psychological nursing and respiratory training results in a substantial enhancement in the quality of life of COPD patients, particularly with regard to symptom relief, activity ability, and disease impact.

Discussion

As COPD progresses, patients may experience declining lung function and reduced exercise capacity.[13] The persistent nature of COPD also contributes to psychological problems such as anxiety and depression, which significantly undermine overall well-being.[5] Although pharmacological treatments and routine respiratory rehabilitation play important roles in managing COPD symptoms, interventions targeting patients' mental health have not received sufficient attention.[14] In recent years, integrating psychological nursing with respiratory training has emerged as a promising non-pharmacological strategy that supports both emotional resilience and physical recovery.[15] This study, through a retrospective analysis of clinical data from 180 COPD patients, demonstrated that psychological nursing combined with respiratory training significantly alleviates anxiety and depression, improves pulmonary function, reduces dyspnea, enhances exercise tolerance, and effectively improves quality of life.

COPD patients frequently experience mental health challenges, particularly anxiety and depression, often driven by their understanding of the disease, chronic symptom burden, and uncertainty about the future.[16] These psychological conditions not only diminish quality of life but also intensify physical symptoms, contributing to a negative feedback loop.[17] This study found that psychological nursing combined with respiratory training significantly reduced anxiety (SAS) and depression (SDS) scores in the intervention group, consistent with findings from other studies. Psychological interventions can effectively alleviate psychological stress in COPD patients and improve their anxiety and depression.[18] Respiratory training, by improving breathing patterns, helps patients better cope with dyspnea, further reducing their psychological burden.[19] Based on existing research, psychological nursing can enhance patients' psychological adaptability, improve their emotional state, and contribute to the comprehensive management of COPD.

Improving pulmonary function is one of the key goals in COPD treatment.[20] COPD patients experience a gradual decline in pulmonary function, particularly in inspiratory and expiratory capacities, which significantly limits their ability to perform daily activities.[21]

Respiratory training, as a non-pharmacological intervention, can significantly improve pulmonary function by increasing lung ventilation, strengthening respiratory muscles, and enhancing breathing efficiency.[20] In this study, the intervention group exhibited more pronounced gains in FEV1 and FVC than the control group. This result aligns with the findings of Huang et al, who reported that regular respiratory training helps enhance pulmonary function in COPD patients.[1] The adjunctive role of psychological nursing may reduce patients' psychological burden, encouraging their active participation in respiratory training and thereby improving treatment outcomes.[22]

Dyspnea is a frequent symptom in COPD, often linked to reduced pulmonary function and limited exercise capacity.[23] The mMRC score, a key indicator for assessing dyspnea severity, is widely used in clinical research and patient evaluation. In this study, the intervention group had significantly lower mMRC scores than the control group, suggesting that combining psychological support with respiratory training can effectively relieve breathlessness. Related studies have also shown that respiratory training not only improves pulmonary function but also effectively reduces dyspnea symptoms.[20,21,24] Overall, the integrated intervention appears beneficial in improving multiple aspects of COPD symptomatology.

Reduced exercise tolerance is another significant issue for COPD patients.[25] Due to impaired pulmonary function, COPD patients often experience shortness of breath and fatigue during physical activities, limiting their ability to perform daily tasks.[26] In this study, the intervention group achieved significantly longer 6MWT distances compared to the control group ($P < 0.001$), suggesting improved endurance capacity. These results align with earlier findings showing that respiratory training improves pulmonary function and oxygen supply, thereby extending endurance training time and walking distance, particularly in enhancing respiratory muscle endurance and maximal inspiratory pressure.[27] Additionally, psychological nursing, including mind-body exercises, helps boost patients' confidence and engagement, further promoting improvements in exercise tolerance.[28]

COPD patients often experience a marked decline in quality of life, particularly in physical activity, self-care, and pain management.[29] In this study, the intervention group showed significantly lower total and subscale scores on the SGRQ compared to the control group ($P < 0.001$), reflecting better perceived health status. These results indicate that

psychological nursing combined with respiratory training not only improves physiological function but also effectively enhances the quality of life in COPD patients. This finding aligns with other studies, which have demonstrated that respiratory training increases walking distance, improves exercise capacity, and enhances daily activity performance, thereby significantly improving quality of life.[7] Moreover, psychological nursing provides emotional support and psychological counseling, alleviating anxiety and depression and further improving overall health.[30]

Although this study showed notable benefits of combining psychological nursing with respiratory training across several outcomes, certain limitations should be acknowledged. First, this study is a retrospective analysis and lacks a randomized control group, which may introduce selection bias. Second, the relatively short intervention period limited assessment of long-term outcomes. Future prospective randomized controlled trials are warranted to further confirm the sustained efficacy and safety of this intervention. Additionally, this study did not explore the specific mechanisms by which psychological nursing combined with respiratory training improves quality of life in COPD patients. Future research should investigate its mechanisms from multiple dimensions.

Conclusion

This study demonstrates that psychological nursing combined with respiratory training significantly alleviates anxiety and depression, improves pulmonary function and exercise tolerance, reduces dyspnea, and enhances quality of life in COPD patients. This intervention not only improves physiological function but also promotes mental health, making it a valuable approach worthy of promotion in clinical practice.

Data Sharing Statement

The simulation experiment data used to support the findings of this study are available from the corresponding author upon request.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study is approved by the Ethics Committee of Suzhou Hospital of Combination of Chinese Traditional and Western Medicine [2022KY006-01]. Written informed consent was obtained.

Consent for Publication

Informed consent was obtained from all individual participants included in the study.

Author Contributions

Ling Chu: guarantor of integrity of the entire study, study concepts and design, definition of intellectual content, clinical studies, manuscript preparation and editing;

Yanan Yang: study concepts, literature research, data acquisition & analysis, manuscript review, statistical analysis.

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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