

Original Articles: Systematic Review, Meta-Analysis, Integrative Review, Scoping Review

NON-PHARMACOLOGICAL THERAPY FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD): A SYSTEMATIC REVIEW

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Article history:

Received: February 04, 2025

Accepted: April 21, 2025

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Keywords:

Non-pharmacology, COPD,

Therapy, Intervention.

Page Number: 61-81

Abstract

Introduction: Chronic obstructive pulmonary disease (COPD) is one of the leading causes of death worldwide. This disease attacks the respiratory tract, resulting in chronic symptoms such as narrowing of the airways, shortness of breath, and coughing. However, the management of treatment for this disease is still very lacking. Therefore, the best treatment needs to be understood.

Objective: This review article aims to explain the best treatment for COPD sufferers.

Design: This study employed a systematic review design guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework.

Data Sources: A comprehensive literature search was conducted using four electronic databases—Scopus, PubMed, Science Direct, and Google Scholar—focusing on articles published between 2020 and 2025. Keywords used included "Non-Pharmacology", "COPD", "Chronic Obstructive Pulmonary Disease", "Therapy", "Intervention", and "Nursing". Studies were included if they used Pre-Experimental, Quasi-Experimental, Randomized Controlled Trial, or Qualitative research designs.

Review Methods: Two reviewers performed data extraction and risk of bias assessment independently using the Joanna Briggs Institute (JBI) checklist, with discrepancies resolved through consensus or a third reviewer.

Results: A review of 19 articles showed that non-pharmacological interventions, such as telerehabilitation, physical exercise, and breathing techniques, have been shown to help improve the functional capacity and quality of life of COPD patients.

Conclusions: The combination of physical and psychological therapies has shown more optimal results, especially with the support of technology. However, further research is needed to evaluate long-term effectiveness and ensure wider and more targeted implementation.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is one of the leading causes of death in the world and is often overlooked in primary care. Chronic Obstructive Pulmonary Disease (COPD) is a chronic respiratory disorder characterized by narrowing of the airways, shortness of breath, and coughing. (Rika Veryanti & Gede Wisesa Budiman, 2021). COPD has become the leading cause of death worldwide, and it is expected to become the third leading cause of death by 2020 (Gilda Simanjuntak & Serepina, 2020). The main therapies for COPD include bronchodilators and inhaled corticosteroids (Rika Veryanti & Gede Wisesa Budiman, 2021). Both can significantly increase peak expiratory value (Rika Veryanti & Gede Wisesa Budiman, 2021). However, cost-effectiveness analysis shows that a single dose of bronchodilator is cheaper than a combination therapy with corticosteroids. (Veryanti & Wulandari, 2020). Nevertheless, COPD management is still a significant challenge, especially non-pharmacological management. Many COPD patients experience exacerbations that can increase the risk of death, reduce quality of life, and reduce lung function. Common symptoms include cough, fever, and shortness of breath often appear. In addition, worse conditions may occur due to accompanying heart disease (Asyrofy et al., 2021). These findings emphasize the need for targeted non-pharmacological interventions to address COPD in Indonesia. Therefore, the search for the best non-pharmacological therapy is urgently needed.

Recent studies indicate that the global prevalence of chronic obstructive pulmonary disease (COPD) ranges from 1.3% to 36.7%, with an average of 12.64% using fixed ratio criteria and 7.38% using the lower limit of standard criteria (AL Wachami et al., 2024), (Zhu et al., 2023). The prevalence of COPD increases significantly with age, with nearly one-third of individuals with COPD aged over 70 years found in South Korea. (Kim et al., 2023). Major risk factors include smoking, air pollution, occupational exposure, and aging (Viegi et al., 2020), (Zhu et al., 2023). Men generally have a higher COPD prevalence than women, and it is commonly found in smokers and the elderly (AL Wachami et al., 2024). Regional variations exist, with the highest prevalence reported in the Americas using fixed ratio criteria and in Southeast Asia using the lower limit of standard criteria (AL Wachami et al., 2024). COPD remains a significant global health problem, requiring better prevention and treatment strategies. (Viegi et al., 2020). According to the WHO, around 3 million people died from COPD in 2019, making it the fourth leading cause of death in the world. In Indonesia, the prevalence of COPD has shown a significant increase, with many sufferers not being diagnosed until the advanced stage. The majority of COPD patients are elderly men, with severe cases reaching 47.4% (Najihah et al., 2023). Smoking is the primary environmental risk factor, leading to chronic inflammation and oxidative stress in the airways (Suryadinata, 2018). The inflammatory process involves increased neutrophils, macrophages, and T lymphocytes, along with the release of pro-inflammatory cytokines and mediators. Free radicals from cigarette smoke trigger both local and systemic inflammation, increasing the risk of exacerbations in COPD patients. The severity of COPD correlates with patients' quality of life, with those having

moderate COPD generally experiencing a better quality of life compared to those with severe COPD (Aji et al., 2020).

COPD treatment has developed a lot. Pharmacological therapy for COPD focuses on bronchodilators and inhaled steroids aimed at reducing symptoms and preventing exacerbations. However, many patients still experience exacerbation symptoms. Therefore, research on non-pharmacological therapies such as pulmonary rehabilitation therapy has shown promising results in recent years. In addition, research on psychological therapies that help improve immunity, such as telerehabilitation, can improve the quality of life of COPD patients. Another non-pharmacological therapy that can be used is respiratory therapy, which involves breathing techniques and exercises. This study aims to explore the effectiveness and safety of these non-pharmacological therapies in the management of COPD, and provide evidence-based guidelines to maximize the treatment of this disease in the clinic.

METHODS

Design

This study employed a *systematic review* design following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. This design aimed to systematically identify, evaluate, and synthesize existing scientific evidence on the effectiveness of non-pharmacological therapies for patients with Chronic Obstructive Pulmonary Disease (COPD). Rather than conducting primary experimental research, this study analyzed and integrated findings from previously published studies within the last five years (2020–2025).

Search Methods

Data sources were selected from four reputable electronic databases: Scopus, PubMed, Science Direct, and Google Scholar. A structured search strategy was used, employing specific keywords including “Non-Pharmacology”, “COPD” or “Chronic Obstructive Pulmonary Disease”, “Therapy”, “Intervention”, and “Nursing” to capture relevant studies addressing non-pharmacological interventions for adults diagnosed with COPD.

Search Outcome

The selection process involved multiple stages, beginning with the removal of duplicate records, followed by screening of titles and abstracts, and ending with full-text evaluation based on predefined inclusion and exclusion criteria. Eligible studies included those with Pre-Experimental, Quasi-Experimental, Randomized Controlled Trial (RCT), or Qualitative designs. Out of 202 articles initially identified, 19 studies met the inclusion criteria and were included in the final review.

Quality Appraisal

Methodological quality and risk of bias were independently assessed by two reviewers using the Joanna Briggs Institute (JBI) critical appraisal tool. Disagreements during selection or appraisal were resolved through discussion or adjudicated by a third reviewer when necessary.

Data Abstraction

Data abstraction was performed systematically using a standardized data extraction form developed based on the study objectives. Two independent reviewers extracted relevant data from each of the included studies. The extracted information included: (1) author(s) and year of publication, (2) country of origin, (3) study design, (4) sample size and population characteristics, (5) type of non-pharmacological intervention, (6) intervention duration and frequency, (7) outcome measures, and (8) main findings. Discrepancies in data extraction between reviewers were resolved through discussion, and if consensus could not be reached, a third reviewer was consulted. The data were then synthesized and organized into summary tables to compare characteristics and results across the included studies. Particular attention was paid to interventions that demonstrated improvements in functional capacity, oxygen saturation, symptom management (such as dyspnea or anxiety), and overall quality of life in COPD patients. Additionally, the extracted data were assessed for completeness and relevance before being included in the final analysis. Any missing or unclear data were followed up by reviewing the full texts of the respective articles. The extracted data formed the basis for evaluating the effectiveness and applicability of each non-pharmacological therapy in COPD management.

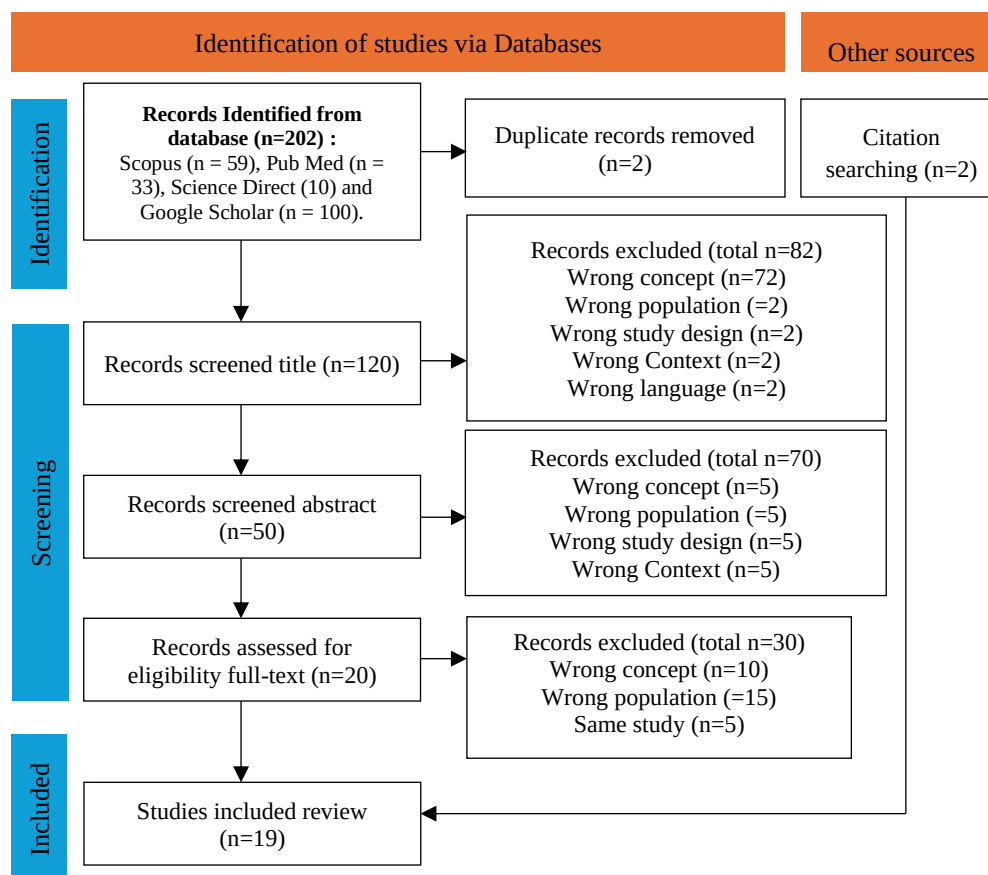


Figure 1. Flowchart of the articles selected for the Systematic Review and the Selection Process Using PRISMA.

Data Analysis/ Synthesis

The data obtained from the included studies were analyzed using a narrative synthesis approach. Given the heterogeneity of study designs, interventions, and outcome measures, a meta-analysis was not conducted. Instead, the results were systematically grouped and compared based on key themes, including the type of non-pharmacological intervention, the frequency and duration of implementation, and the reported clinical outcomes in COPD patients. The synthesis focused on evaluating the impact of each intervention on primary outcomes such as functional capacity, oxygen saturation, symptom severity (e.g., dyspnea, anxiety), and quality of life. Interventions were categorized into thematic clusters, including telerehabilitation, breathing techniques, physical exercise, complementary therapies (e.g., yoga, tai chi, acupuncture), and technology-assisted interventions (e.g., smartphone apps and telemedicine). Each intervention's effectiveness was assessed by comparing pre- and post-intervention results, as reported in the studies, along with the level of statistical significance where available. The results were then summarized in structured tables to enhance comparability and allow for a clearer understanding of patterns across studies. This approach allowed the identification of promising non-pharmacological strategies for COPD management and highlighted areas requiring further research and clinical validation.

RESULTS

Based on the articles in the database, 19 articles were obtained that met the inclusion criteria so that an analysis was carried out, including the characteristics of the article, title, year, database, research design, number of samples, interventions, and research results, which can be seen in Table 1 as follows:

Table 1. Characteristics of Review Articles (n = 19).

Characteristic	Frequency (f)	Percentage (%)
Year		
2020	3	15
2021	2	10
2022	4	25
2023	3	15
2024	7	35
Country		
Indonesia	8	40
Turkey	3	15
China	1	10
Thailand	1	5
India	2	10
UK	1	5
Republic of Malta	1	5
Republic of Korea	1	5
Swedish	1	5
Research Design		
Pre-Experimental	1	5

Characteristic	Frequency	Percentage
	(f)	(%)
Quasi Experimental	7	35
Randomized Controlled Trial	10	55
Qualitative Studies	1	5
Data Base		
Google Scholar	5	25
Scopus	5	25
PubMed	8	45
Science Direct	1	5

The results of the article analysis based on title, author, research design, intervention, and research results in the article can be seen in Table 2. As follows:

Table 2. Summary of Articles in Review Process.

Author & Tahun	Design, Samples & Interventions	Implementation & Frequency	Result
(Tiffany & Tambunan, 2023)	Quasi Experimental 30 Samples Telerehabilitation	- Cardiorespiratory endurance exercise, with a frequency of 3-5 days/week, intensity starting at 60-70% of exercise test results and gradually increasing to 80-90%, and duration starting at 10-15 minutes and gradually increasing to 30-40 minutes. - Resistance training with weight lifting or moving against resistance. - Flexibility training to improve joint range of motion, reduce stiffness, and improve posture and vital capacity.	Telerehabilitation can be an effective and cost-effective alternative to pulmonary rehabilitation, especially for stable COPD patients who have difficulty accessing rehabilitation directly at a healthcare center. Telerehabilitation programs can improve symptoms of tightness, improve functional capacity, and quality of life. Telerehabilitation can also increase levels of compliance and satisfaction, as well as significantly lower levels of depression and anxiety.

Author & Tahun	Design, Samples & Interventions	Implementation & Frequency	Result
		4. Respiratory muscle training, including pursed lip breathing, diaphragmatic breathing, and expiratory muscle strengthening.	
(Orita, 2022)	Phenomenological studies 15 Samples Walking exercises with breathing control	1. Walking exercises: At least 2 times per week, 15 minutes per session. 2. Breathing exercises: 1-2 times per day. 3. Additional exercises: Stretching 2 times per week, breathing exercises 3 times per week.	Walking exercise with controlled breathing is effective in increasing physical activity, quality of life, meeting oxygen needs, reducing shortness of breath, anxiety, and stress, and supporting the role of the family in COPD patients.
(Ramli et al., 2023)	Pre-experiment with one group pretest and posttest design 50 Samples Clapping and Breath Relaxation Techniques	The intervention was the "Clapping Technique" (Teknik Clapping) applied to 50 COPD patients who visited the Emergency Department of the dr. H. Soemarno Sosroatmodjo Tanjung Selor Hospital.	There was a significant increase in oxygen saturation from 91.34% to 95.52% after the clapping technique was applied to COPD patients in the emergency department. The data on oxygen saturation before and after the intervention were normally distributed.
(Ceyhan & Tekinsoy Kartin, 2022)	Randomized Controlled Trial 67 Samples	1. Pursed lip breathing exercise and inhaler training (group 1). 2. Inhaler training only (group 2).	Inhaler use skills and patient quality of life improved, while the severity of dyspnea decreased, where inhaler treatment support through non-pharmacological methods can

Author & Tahun	Design, Samples & Interventions	Implementation & Frequency	Result
	Breathing Exercises and Inhaler Training		improve drug effectiveness and patient quality of life.
(He et al., 2022)	Randomized Controlled Trial 70 Samples Combining Acupuncture With Exercise Training	1. Real acupuncture at CV 4, CV 12, CV 17, ST 40, ST 16, and ST 25, 3 times per week for 8 weeks, totaling 24 treatments. 2. Exercise training, provided to all participants.	Physical exercise has benefits for COPD patients, but its effectiveness is limited by impaired exercise capacity and dyspnea. This study aims to evaluate whether acupuncture can enhance the effects of physical exercise in reducing dyspnea and improving quality of life in COPD patients compared with pseudo-acupuncture.
(From et al., 2021)	Randomized Controlled Trial Inspiratory Muscle Training	1. Inspiratory muscle training (IMT) was performed using the Threshold IMT device at an intensity of 30% of the maximal inspiratory pressure (MIP), adjusted weekly, for 15 minutes twice a day, 5 days a week, for 8 weeks. 2. Pseudo IMT was performed using the Threshold IMT device at a constant intensity of 15% of the initial MIP, for 15 minutes twice a day, 5 days a week, for 8 weeks. Both groups were also	This study demonstrated the presence of dyspnea-related kinesiphobia in COPD patients, with BBQ scores higher than 11 in all patients. BMI intervention was shown to reduce BBQ scores, improve respiratory function and exercise capacity, and provide additional benefits such as decreased dyspnea, anxiety, depression, and improved quality of life.

Author & Tahun	Design, Samples & Interventions	Implementation & Frequency	Result
		given recommendations to perform general physical activity.	
(Phantayuth et al., 2024)	Quasy-Experiment 24 Samples (Control and Treatment) Combining Tai Chi And Yoga	The intervention was a 12-week Tai Chi and Yoga (TY) combining program that consisted of 70-minute sessions conducted 3 times per week. The program included 20 forms of Tai Chi, 28 yoga asanas, and 3 pranayama yoga techniques, and was led by a qualified instructor.	A 12-week combined TY program was shown to be a safe, effective, and feasible adjunctive therapy for the management of COPD in elderly male patients, improving multiple dimensions of health such as pulmonary health, cardiovascular health, functional fitness, and quality of life.
(Amin et al., 2024)	Quasy-Experiment 38 Samples (Control and Treatment) Physical exercise and chicken egg white supplementation	1. Physical exercise: 3 times per week, 30 minutes per session, for 12 weeks. 2. Egg white supplementation: 10 eggs per exercise session, 3 times per week, for 12 weeks (only for the intervention group).	The combination of physical exercise with egg white supplementation may be a potential and effective non-pharmacological treatment for muscle mass recovery in COPD patients, compared with physical exercise without supplementation.
(Dua et al., 2024)	A Randomized Controlled Trial 150 Samples (Control and Treatment)	1. Tele-Yoga Therapy (T-YT): 45-minute sessions, 5 days per week for 3 months, supervised via Zoom/Google Meet. 2. Tele-Pulmonary Rehabilitation (T-PR):	The use of a validated module showed that T-YT for three months can improve exercise capacity, symptom scores, HrQoL, and reduce depression and anxiety, with similar results to T-PR. T-YT is an acceptable alternative to T-PR in the management of COPD.

Author & Tahun	Design, Samples & Interventions	Implementation & Frequency	Result
	Telemedicine, Comparing Yoga Therapy and Pulmonary Rehabilitation	45-minute sessions, 5 days per week for 3 months, supervised via Zoom/Google Meet.	
(Park et al., 2024)	A Randomized Controlled Trial 40 Samples Chuna Manual Therapy (CMT)	The intervention in this study is Chuna manual therapy (CMT) performed by a Korean medicine doctor with over 3 years of experience, for 15 minutes once a week for 8 weeks, in addition to standard medical therapy. The CMT involves 10 specific techniques targeting the primary and accessory respiratory muscles.	No adverse events were observed during this trial. CMT has the potential to alleviate symptoms, improve quality of life, and delay the decline in lung function in patients with COPD. The results of this pilot study could lead to large-scale clinical trials in the future.
(Malik et al., 2022)	A Randomized Controlled Trial 60 Samples (TYT and TPR) Tele-Yoga Versus Tele-Pulmonary Rehabilitation	The intervention was a 45-minute tele-yoga therapy (T-YT) module, performed 5 days per week for 3 months under supervision.	T-YT is beneficial for COPD patients in improving exercise capacity, symptom scores, and reducing depression and anxiety, and may be a viable alternative to T-PR.
(Sohanpal et al., 2020)	A Randomized Controlled Trial 306 Samples TANDEM (Tailored	The TANDEM intervention is a tailored cognitive behavioral approach, delivered face-to-face by a trained facilitator over 6-8 weeks, with 40-60 minute sessions	The TANDEM intervention has the potential to optimize the synergy between psychological interventions and pulmonary rehabilitation by targeting anxiety, depression, and related cognitions and behaviors, to reduce

Author & Tahun	Design, Samples & Interventions	Implementation & Frequency	Result
	intervention for Anxiety and Depression Management)	per week. The facilitator also provides brief telephone support for 2 weeks after pulmonary rehabilitation to optimize the benefits of the standard pulmonary rehabilitation program.	psychological morbidity and improve self-management in COPD patients.
(Sevasta, 2024)	A Randomised Controlled Trial 108 Samples Muscle Energy Techniques (MET)	The intervention was a 4-week Muscle Energy Technique (MET) program, consisting of 30-minute MET sessions 3 times per week. The MET protocol involved a 7-second isometric contraction, 3-second relaxation, and 30-second passive stretch, repeated twice bilaterally for the accessory muscles of respiration (Upper Trapezius, Scalene, Sternocleidomastoid, Pectoralis Minor, Latissimus Dorsi, Serratus Anterior).	MET can be an effective additional non-pharmacological treatment for COPD patients in managing shortness of breath, improving respiratory function, and improving activities of daily living.
(Chen, 2024)	Randomized Controlled Trial 90 Samples Acupuncture	The intervention is acupuncture, performed 3 times per week for 8 weeks, at specific acupoints on the disease-affected meridian (DAM) or non-acupoints on the	This randomized controlled trial aims to evaluate the efficacy of acupuncture in relieving dyspnea in COPD patients through a multidimensional approach, including emotions, quality of life, and neurobiological mechanisms

Author & Tahun	Design, Samples & Interventions	Implementation & Frequency	Result
		non-affected meridian underlying the effects of (NAM). The acupuncture procedure involves needle insertion into the skin at specific locations, directions, and depths, with minor stimulation to produce the deqi sensation, for a duration of 30 minutes.	acupuncture on dyspnea, with the hope of providing strong evidence to support its use as well as new insights into its mechanisms.
(Jakobsson et al., 2024)	Randomized Controlled Trial 162 Samples Supramaximal High-Intensity Interval Training	1. Supramaximal HIIT: 10 x 6-second intervals at 60-80% of maximum mean power output for 6 seconds (MPO6), with 48-second recoveries. The total session duration is 20 minutes, including warm-up and cool-down. Performed 2-3 times per week for 12 weeks. 2. MICT: 20 minutes at 50% of maximal aerobic power (MAP), with a target cadence of 60-70 RPM. Total session duration is 30 minutes, including warm-up and cool-down. Performed 2-3	The COPD-HIIT trial aims to evaluate the effects of supramaximal HIIT compared with MICT in people with COPD and healthy controls, and to provide evidence for a novel exercise modality that may overcome the barriers associated with MICT in people with COPD. The study will also examine the effects of different intensity exercise on reducing neurodegeneration and improving the treatment of extrapulmonary manifestations of the disease.

Author & Tahun	Design, Samples & Interventions	Implementation & Frequency	Result
		times per week for 12 weeks.	
(Adida et al., 2023)	Quasi-experimental 25 Samples Smartphone application	The intervention was the "Paru Sehat" smartphone application, which the participants were exposed to twice a week for four weeks.	The "Lung Sehat" smartphone application significantly increased the knowledge scores of COPD patients regarding the disease and its non-pharmacological management. The increase in knowledge was more significant in patients with a high school education or higher compared to patients with lower education.
(Khoiriyah et al., 2022)	Quasi-experimental 36 Samples Balloon therapy	The intervention was balloon therapy, where participants performed breathing exercises by blowing up a balloon with a diameter of 7 inches, 5 times per day, for 14 days.	Balloon therapy showed a significant reduction in breathlessness levels in COPD patients during the 14-day intervention, with the mean breathlessness level decreasing from 2.50 on day 1 to 1.06 on day 14. The effect of balloon therapy in reducing breathlessness was statistically significant ($p < 0.005$).
(Manurung et al., 2021)	Quasi-Experimental 50 samples Chest Physiotherapy With Tripod And Fowler Position	1. Chest physiotherapy including postural drainage, percussion, and vibration for 20 minutes. 2. Placement of the patient in either a tripod or Fowler's position for 5 minutes.	Chest physiotherapy with tripod position is more effective than the Fowler position in increasing oxygen saturation in COPD patients, with tripod position showing a significant increase from 93.40% to 97.64%, while the Fowler position increased from 92.64% to 95.52%. This study found a significant difference in mean oxygen saturation between tripod and Fowler positions.

Author & Tahun	Design, Samples & Interventions	Implementation & Frequency	Result
(Zuriati et al., 2020)	Quasi-experimental 30 Sample Active Cycle of Breathing Technique (ACBT), Pursed Lips Breathing Technique (PLBT) to tripod position	The intervention was the Active Cycle of Breathing Technique (ACBT) with Pursed Lips Breathing Technique (PLBT) performed in the tripod position.	The tripod position combined with Active Cycle Breathing Technique (ACBT) has been shown to be more effective than the tripod position with Pursed Lips Breathing Technique (PLBT) in increasing oxygen saturation in COPD patients, because ACBT helps clear the airways and improves respiratory function, which in turn reduces shortness of breath and increases oxygen saturation.

A review of various non-pharmacological intervention studies in patients with Chronic Obstructive Pulmonary Disease (COPD) shows that telerehabilitation, physical exercise, and breathing techniques can provide significant benefits in improving functional capacity, quality of life, and reducing symptoms such as shortness of breath and anxiety. Telerehabilitation, which includes cardiorespiration, resistance, and flexibility exercises, has proven effective as a cost-effective alternative to pulmonary rehabilitation, especially for stable patients who have difficulty accessing direct services (Tiffany & Tambunan, 2023). In addition, walking exercises with breathing control (Orita, 2022) and clapping techniques (Ramli et al., 2023) also showed increased oxygen saturation and a reduction in shortness of breath symptoms. Other interventions such as breathing muscle exercises (Saka et al., 2021), a combination of Tai Chi and yoga (Phantayuth et al., 2024), as well as manual Chuna therapy (Park et al., 2024), Acupuncture Therapy (He et al., 2022) also contribute to improving lung function and quality of life of COPD patients.

The studies also revealed that holistic approaches, such as a combination of physical exercise with protein supplementation (Amin et al., 2024) or cognitive-behavioral therapy-based psychological interventions (Sohanpal et al., 2020), can optimize the benefits of pulmonary rehabilitation. Techniques such as balloon therapy (Khoiriyah et al., 2022) and chest physiotherapy with a tripod position (Manurung et al., 2021) are effective in reducing shortness of breath and increasing oxygen saturation. In addition, the use of smartphone applications for education (Adida et al., 2023) and telemedicine-based interventions such as tele-yoga (Dua et al., 2024) show great potential in improving patient knowledge and compliance. Overall, these findings confirm the importance of a multimodal and personalized approach in COPD management to achieve optimal results.

Risk of Bias

The risk of bias was assessed independently by two reviewers using JBI. Any disagreements were resolved through consensus or by consulting a third reviewer. Some of the risks of bias that may arise in these journals include selection bias due to the use of quasi-experimental and non-randomized controlled trials (RCTs) designs that can affect the generalization of outcomes, performance bias due to lack of blinding to interventions such as physical exercise, manual therapy, or breathing techniques that are difficult to disguise, and detection bias because outcome measures such as oxygen saturation or quality of life often depend on subjective assessment of the patient or the researcher. In addition, attrition bias can occur in long-duration studies, where participants may drop out, especially in control groups or more intensive interventions. Some studies also have small sample sizes, which can reduce statistical strength and increase the risk of random error. Finally, reporting bias may occur if only statistically significant outcomes are reported, while negative or insignificant findings are ignored. In assessing bias and methodological quality, this systematic review used the Joanna Briggs Institute (JBI) critical appraisal checklist tool. The risk of internal bias from each study, after a critical appraisal is carried out with an average value of $> 80\%$, shows that the study is worthy of being used as a systematic review in making this systematic review article. The following is a table of the risk of bias for the 19 selected articles:

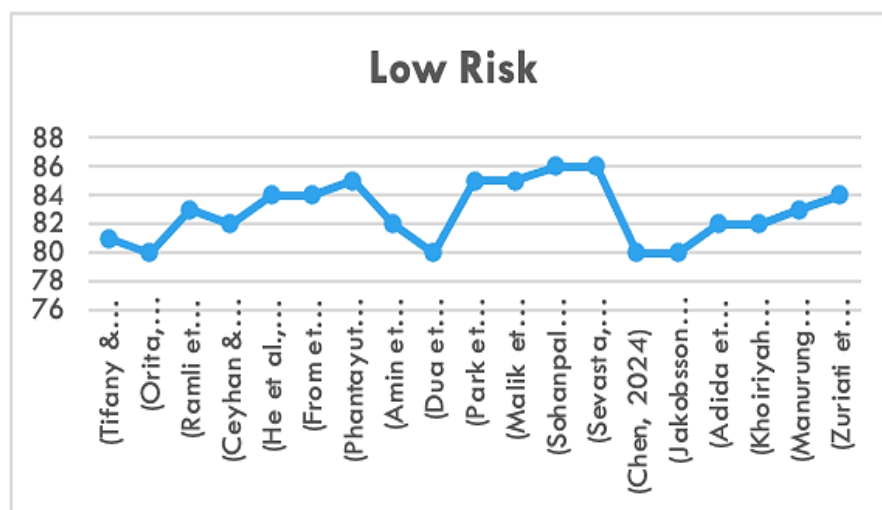


Figure 2. Joanna Briggs Institute (JBI) Critical Appraisal Checklist Tool.

DISCUSSION

The search results in the article database found 19 scientific articles explaining the many non-pharmacological additional therapies for COPD patients that can affect the quality of life and others. Based on the results of studies that have been conducted, various non-pharmacological interventions have shown significant results in improving the condition of patients with Chronic Obstructive Pulmonary Disease (COPD). Telerehabilitation, physical exercise, and breathing techniques have been shown to help improve functional capacity, reduce symptoms such as shortness of breath, as well as

reduce anxiety. Telerehabilitation, which includes cardiorespiratory, resistance, and flexibility exercises, is an effective and cost-effective alternative, especially for patients who have difficulty accessing in-person services. In addition, breathing techniques such as breathing control, walking exercises, and clapping also showed increased oxygen saturation, which is important for the improvement of lung function in COPD patients. However, several previous studies mention that herbal therapy methods and other methods, such as acupuncture and homeopathy, are also not effective for the treatment of COPD (Arto Yuwono Soeroto, 2019).

In general, nonpharmacological interventions are based on strong evidence (Janssens & Verleden, 2023). The approach applied in non-pharmacological interventions focuses on the basic principles of the physiology of the human body, where physical exercise can improve the capacity of the lungs and respiratory muscles, while breathing techniques are designed to optimize the body's oxygenation function. Telerehabilitation, as a form of rehabilitation performed remotely, is based on the theory that structured and monitored physical exercise can provide results similar to in-person rehabilitation, but is more accessible to patients living far from health facilities (Tiffany & Tambunan, 2023). The multimodal approach, which combines various techniques such as Tai Chi, yoga, and manual therapy, follows holistic principles in medicine, which considers that the balance between body and mind is the main key to recovery from chronic diseases such as COPD (Phantayuth et al., 2024). The management of COPD involves a comprehensive approach, including pharmacology, education, lifestyle changes, and non-pharmacological interventions (Fadhilah, 2024). Education about the condition, treatment, and strategies for managing dyspnea and indications for seeking medical help is essential. Quitting smoking is a crucial step, with the support of nicotine replacement therapy. Influenza and pneumococcal vaccinations are recommended to reduce the risk of respiratory tract infections. Physical activity needs to be encouraged, with the support of technology to increase motivation. Pulmonary rehabilitation plays an important role in improving symptoms, quality of life, and physical participation, especially in patients with severe symptoms and a high risk of exacerbations (Fadhilah, 2024).

As a result of existing studies, it can be concluded that non-pharmacological interventions are very important in the management of COPD and have great potential to reduce the burden of treatment and improve the quality of life of patients. A multimodal approach that combines physical exercises, breathing techniques, and psychological therapy provides a more holistic solution, paying attention to not only the physical but also the emotional aspects of the patient. I argue that using technology such as smartphone apps and tele-yoga could also pave the way for more patients to access quality care. Therefore, the integration of physical, psychological, and technological therapies needs to be continuously improved to provide more personalized and effective care for COPD patients.

Clinical Implications

Non-pharmacological interventions in COPD patients have significant implications in clinical practice, especially in improving quality of life and reducing disease symptoms. Telerehabilitation and structured physical exercise can be an important alternative for patients living in remote areas or who have limited access to traditional pulmonary rehabilitation facilities. This approach allows for remote monitoring and support, ensuring that patients can continue to undergo rehabilitation programs more flexibly and cost-effectively. Breathing techniques, such as breathing control walking exercises, as well as other therapies such as Tai Chi, yoga, and manual therapy, can be integrated into the daily care of COPD patients to improve the functional capacity of the lungs and reduce the symptoms of shortness of breath. In addition, telemedicine-based interventions, such as tele-yoga or educational apps, show great potential in improving patient knowledge and adherence to treatment programs. All of this shows the importance of a holistic and multimodal approach to the management of COPD for optimal results. While non-pharmacological therapies offer promising outcomes for COPD management, the heterogeneity in findings underscores the importance of considering patient-specific factors and study characteristics when interpreting the evidence. Future research should address these sources of variability through more rigorous, standardized methodologies and by examining the interactions between non-pharmacological therapies and other treatment strategies. An improved understanding of these factors will help refine clinical practice and guide the design of personalized interventions for COPD patients.

Research Limitations

Although many studies have shown significant benefits of non-pharmacological interventions, some limitations need to be considered. First, many studies are conducted with small samples or in limited durations, which can affect the generalization of research results for a broader population. In addition, variations in implementation methods, such as differences in the intensity of physical exercise or breathing techniques used, can produce mixed results, making it difficult to determine which interventions are most effective. Another limitation is the lack of direct supervision of patients during the rehabilitation program, which can affect compliance rates and outcomes. In addition, although technologies such as telerehabilitation and smartphone apps show potential, there has not been enough research to assess their long-term impact on the quality of life of COPD patients. Finally, the psychological and social aspects of the patient, which also play a significant role in the management of COPD, may not always be fully accommodated in technology-based interventions or more physical programs.

CONCLUSION

Non-pharmacological interventions, such as telerehabilitation, physical exercise, and breathing techniques, have been shown to improve the functional capacity and quality of life of COPD patients.

A multimodal approach that combines various physical and psychological therapies provides optimal results, especially with the support of technology. However, more research is needed to evaluate its long-term effectiveness and ensure broader and targeted implementation.

AUTHOR CONTRIBUTION

Authors' contributions: All the authors contributed equally to the study.

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CONFLICT OF INTEREST

This article's authors state that there is no conflict of interest can affect the results and interpretation of the research conducted. Nonetheless, all authors revealed potential involvement in related research that might affect objectivity, but there was no significant influence on the conclusions drawn in this review.

ACKNOWLEDGEMENT

We would like to express our deepest gratitude to all the researchers whose work has contributed to this systematic review. We also appreciate our colleagues and reviewers for the insights and valuable support provided throughout this process.

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