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Changes in dyspnea scores following tripod positioning among patients with chronic obstructive pulmonary disease

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Abstract

Background: Dyspnea is a common and distressing symptom among patients with chronic obstructive pulmonary disease (COPD). The tripod position is a simple supportive posture that may ease perceived breathlessness. This study described changes in dyspnea scores before and after tripod positioning.

Purpose: To assess pre-post changes in dyspnea scores following tripod positioning among patients attending a pulmonary outpatient clinic.

Method: This pre-experimental, one-group pretest–posttest study included 35 participants recruited by consecutive sampling. Dyspnea was assessed using the Modified Borg Dyspnea Scale before and after maintaining the tripod position for 10–15 minutes. The Wilcoxon signed-rank test was used for paired comparisons.

Results: The manuscript reports a mean dyspnea score of 3.8 ± 1.6 before the intervention and 2.1 ± 1.1 afterward, a difference of 1.7 points between the reported means. Mild dyspnea was recorded in 9 participants (25.7%) before and 24 (68.6%) after the intervention; moderate dyspnea was recorded in 26 (74.3%) before and 11 (31.4%) after. The reported Wilcoxon p-value was 0.001.

Conclusion: Dyspnea scores were lower immediately after tripod positioning in this one-group study. Because there was no comparison group and the available report contains inconsistencies in participant eligibility/history, the findings should be interpreted cautiously and do not establish that the intervention alone caused the change.

Keywords: Chronic Obstructive Pulmonary Disease; Dyspnea; Modified Borg Dyspnea Scale; Non-pharmacological Intervention; Tripod Position.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a major global health problem that significantly affects quality of life and societal productivity. COPD is a progressive disease characterized by persistent airflow obstruction that is not fully reversible, accompanied by chronic inflammation of the airways (Adiana & Putra, 2023). The main clinical symptoms of COPD include chronic cough, excessive sputum production, and dyspnea, which progressively worsens over time. Dyspnea is one of the most common and distressing symptoms experienced by patients with COPD, particularly during acute exacerbations (Hasanah et al., 2023).

Globally, data from the World Health Organization (WHO) in 2021 indicated that COPD was the third leading cause of death worldwide, accounting for more than 3.23 million deaths annually. WHO also

projected that the number of people with COPD would continue to increase by 2030 due to population aging and substantial exposure to risk factors such as smoking and air pollution (Asyrofy et al., 2021). In developing countries, including Indonesia, the prevalence of COPD is estimated to be considerably higher than officially reported figures because many cases remain undiagnosed (Cioboata et al., 2025).

According to data from the 2018 Basic Health Research Survey the prevalence of chronic respiratory disorders in Indonesia reached 4.5%, while approximately 34.5% of Indonesians aged over 15 years were active smokers, representing one of the major risk factors for COPD. In Central Java Province, particularly in urban areas such as Semarang City, the incidence of COPD is relatively high. This situation is exacerbated by poor air quality

caused by motor vehicle emissions and limited public education regarding the dangers of smoking and the importance of early detection of pulmonary diseases (Ministry of Health of the Republic of Indonesia, 2018).

At hospital pulmonary outpatient clinics, including the Pulmonary Clinic of Banyumanik Hospital 2 Semarang, patients with COPD frequently attend follow-up appointments or receive further treatment after experiencing acute exacerbations accompanied by varying degrees of dyspnea. Dyspnea not only imposes a physiological burden but may also trigger anxiety and psychological stress. These conditions require appropriate management to prevent recurrence and reduce the risk of complications, such as hypoxemia and respiratory failure. In clinical practice, pharmacological therapies, including bronchodilators and corticosteroids, are commonly used. However, effective non-pharmacological interventions are also needed to support improvements in ventilation (An et al., 2025).

One relatively simple yet effective non-pharmacological intervention is the tripod position. The tripod position is a sitting posture in which patients lean forward and support their hands on their knees, a table, or another object in front of them. This technique is known to help improve respiratory mechanics, enhance lung expansion, and reduce the workload of the respiratory muscles. In this position, the diaphragm may function more effectively, potentially improving tidal volume and reducing the sensation of breathlessness. The tripod position also facilitates the recruitment of accessory respiratory muscles, such as the sternocleidomastoid and pectoral muscles, which help expand the thoracic cavity during inspiration (Devia et al., 2023).

Previous studies have demonstrated the positive effects of the tripod position in reducing dyspnea severity. One study found that maintaining the tripod position for 15 minutes significantly reduced modified Borg Scale scores ($p < 0.05$) among patients with COPD experiencing shortness of breath (Djanatunisah & Dahlia, 2021). Other researchers reported similar findings, showing that patients receiving the tripod position experienced significant reductions in dyspnea scores and improvements in oxygen saturation (SpO_2) compared with control groups receiving oxygen therapy alone (Telupere &

Wijayanti, 2025). The tripod position can also be applied to patients experiencing ineffective breathing patterns to help reduce respiratory rate, accessory muscle use, nasal flaring, and pursed-lip breathing (Nurjanah, 2024).

From a nursing perspective, proficiency in positioning techniques and related interventions is essential because nurses have frequent and sustained direct contact with patients. The tripod position can be implemented by nurses as an immediate supportive intervention in accordance with clinical protocols, without necessarily waiting for a specific physician's instruction, thereby facilitating prompt symptom management and complementing pharmacological therapy. Furthermore, this technique may serve as a supportive measure in healthcare facilities with limited access to oxygen supplies or respiratory support equipment, particularly in resource-constrained settings (Damansyah et al., 2023).

RESEARCH METHOD

This study used a pre-experimental one-group pretest–posttest design to describe changes in dyspnea scores following tripod positioning. The independent variable was tripod positioning and the outcome was the dyspnea score measured with the Modified Borg Dyspnea Scale. 35 participants were recruited during September–October 2025.

The study took place at the Pulmonary Outpatient Clinic of Banyumanik Hospital 2, Semarang, in October 2025. Consecutive sampling was used. The stated inclusion criteria were being conscious, able to perform the tripod position, having mild to moderate dyspnea according to the Modified Borg Dyspnea Scale, and being willing to participate. The stated exclusions were severe comorbidities, critical clinical conditions, or physical limitations that interfered with the intervention. The manuscript's sample-size rationale should be checked against the actual protocol because the study used a non-parametric paired analysis.

The tripod position was defined as a forward-leaning sitting posture with both hands supported on the knees or a table, following the procedure used in the study. Dyspnea was assessed with the Modified Borg Dyspnea Scale (0–10). The participant instructions and measurement conditions should be

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described according to the original standard operating procedure. Dyspnea scores were recorded immediately before the intervention, after which participants maintained the tripod position for 10–15 minutes and were reassessed. Descriptive statistics were used for participant characteristics and dyspnea

categories. The Wilcoxon signed-rank test was used for paired pre–post analysis, with statistical significance set at $p < 0.05$.

RESEARCH RESULTS

Table 1. Characteristics of Respondents (N= 35)

Variable	Results
Age (Mean±SD) (Years) (Range)	(55.71 ± 7.64) (40-65)
40-49	6/17.1
50-59	11/31.4
≥60	18/51.4
Gender	
Male	25/71.4
Female	10/28.6
Educational (n/%)	
Elementary school	10/28.6
Junior high school	9/25.7
Senior high school	13/37.1
Higher education	3/8.6
Occupation (n/%)	
Industrial workers (potential exposure to dust, smoke, or chemicals)	20/57.1
Non-industrial workers (service, informal, or non-manufacturing sectors with minimal industrial exposure)	9/25.7
Unemployed	6/17.1
Smoking History (n/%)	
Current smokers	15/42.9
Former smokers	12/34.3
Never smoked	8/22.9
History of COPD (n/%)	
Yes	14/40.0
No	21/60.0
Comorbidities (n/%)	
No comorbidities	11/31.4
Hypertension	13/37.1
Diabetes mellitus	6/17.1
Heart disease/other conditions	5/14.3

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The results showed that the respondents had an estimated mean age of 55.71 ± 7.64 years. Most respondents were male (25; 71.4%), had completed senior high school 13 (37.1%), and worked in industrial sectors (57.1%). Regarding smoking history, 15 respondents (42.9%) were current smokers, 12 (34.3%) were former smokers, and 8 (22.9%) had never smoked. Most respondents had no history of COPD (21; 60.0%), while 14 (40.0%) reported a history of COPD. Hypertension was the most common comorbidity 13 (37.1%), followed by no comorbidities 11 (31.4%), diabetes mellitus 6 (17.1%), and heart disease or other conditions 5 (14.3%).

Table 2. Distribution of Dyspnea Levels Among Patients with COPD Before and After the Tripod Position Intervention (N= 35)

Dyspnea Level	Score	Before Intervention (n/%)	After Intervention (n/%)
Mild Dyspnea	1-3	9/25.7	24/68.6
Moderate Dyspnea	4-6	26/74.3	11/31.4
Severe Dyspnea	7-10	0/0.0	0/0.0

The results showed a change in dyspnea levels among the 35 respondents after the tripod position intervention. Before the intervention, most respondents experienced moderate dyspnea (26; 74.3%), while 9 respondents (25.7%) experienced mild dyspnea. No respondents experienced severe dyspnea. After the intervention, the proportion of respondents with mild dyspnea increased to 24 (68.6%), whereas the proportion experiencing moderate dyspnea decreased to 11 (31.4%). No respondents experienced severe dyspnea after the intervention. These findings indicate an improvement in dyspnea levels following the tripod position intervention, as reflected by the increase in mild dyspnea and the decrease in moderate dyspnea.

Table 3. Wilcoxon Signed-Rank Test Results for Dyspnea Scores Before and After the Tripod Position Intervention

Variable	Mean $\pm$ SD	p-value
Scores Dyspnea Before	3.8 $\pm$ 1.6	0.001
Scores Dyspnea After	2.1 $\pm$ 1.1	

The manuscript's Table 3 reports a p-value of 0.001 for the paired comparison. This value is reported consistently here as $p = 0.001$, but it must be verified against the original Wilcoxon output before submission. The observed decrease in the reported mean score is descriptive; the one-group design cannot rule out other explanations for the change.

DISCUSSION

The characteristics of respondents showed that the majority were aged ≥ 60 years (51.4%), male (71.4%), and employed in the industrial sector (57.1%). In addition, 42.9% were active smokers and 34.3% were former smokers. These findings reflect several established risk factors for chronic obstructive pulmonary disease (COPD), including aging,

smoking, and prolonged occupational exposure to dust, smoke, and chemical irritants. These exposures can contribute to chronic airway inflammation, airflow obstruction, and progressive deterioration of lung function. Furthermore, hypertension (37.1%) and diabetes mellitus (17.1%) were the most frequently reported comorbidities. These conditions may increase the overall clinical burden and complicate symptom management in patients with COPD. A history of COPD was reported by 40.0% of respondents, indicating that disease duration and severity may also influence their response to non-pharmacological interventions. Therefore, these characteristics provide important context for interpreting the effects of the tripod position on dyspnea.

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The findings demonstrated an improvement in dyspnea following the tripod position intervention. The mean dyspnea score decreased from 3.8 ± 1.6 before the intervention to 2.1 ± 1.1 afterward. The Wilcoxon Signed-Rank Test indicated a statistically significant difference ($p < 0.001$), suggesting that the intervention was associated with reduced perceived breathlessness among patients with COPD.

The reduction in reported dyspnea scores may be compatible with the proposed supportive role of a forward-leaning posture. However, the Modified Borg Dyspnea Scale measures perceived breathlessness, and this study did not include a control group or physiological outcomes sufficient to determine the mechanism. The results should therefore be interpreted as an immediate pre-post association rather than proof of causation.

During the intervention, most patients were able to follow the instructions and reported greater breathing comfort. The position was also relatively easy to perform, required no specialized equipment, and could be practiced independently after appropriate instruction. These practical advantages support its potential use as a complementary nursing intervention in outpatient respiratory care. However, individual responses may vary according to disease severity, physical condition, and comorbidities (Matsunaga et al., 2020).

These findings are consistent with previous studies reporting that forward-leaning positions can improve respiratory comfort and reduce dyspnea in patients with COPD. Another study described the benefits of forward-leaning positioning in supporting accessory respiratory muscle activity and reducing breathing effort (Wiratama et al., 2024). Similarly, there are reports of improvement in dyspnea following the implementation of positional interventions in patients with COPD. These findings further support the potential value of the "tripod" position as a simple, accessible, and low-cost complementary intervention for managing breathlessness (Aini et al., 2024; Putri, & Fadhani, 2025; Devia et al., 2023).

Nevertheless, because the study assessed changes before and after the intervention, the results should be interpreted within the study design. The reduction in dyspnea scores supports a beneficial association with the tripod position, but the extent to which the improvement can be attributed exclusively

to the intervention depends on the study design and control of other influencing factors. Further studies with appropriate comparison groups and longer follow-up are recommended to evaluate the persistence of these benefits.

CONCLUSION

Among the 35 participants, the proportion reporting mild dyspnea increased from 25.7% before the intervention to 68.6% afterward, while the proportion reporting moderate dyspnea decreased from 74.3% to 31.4%. The mean dyspnea score decreased from 3.8 ± 1.6 to 2.1 ± 1.1 , with a statistically significant paired difference ($p = 0.001$). The tripod position may be used as a supportive nursing measure, but the findings should be interpreted cautiously because the study had no control group and assessed outcomes immediately after the intervention.

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