

THE RELATIONSHIP BETWEEN THE DEGREE OF AIRWAY OBSTRUCTION AND THE DEGREE OF DYSPNEA IN COPD PATIENTS AT RSI SAKINAH

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ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD) is a chronic lung disease characterized by airway obstruction, which causes shortness of breath (dyspnea). The purpose of this study was to determine the correlation between the degree of airway obstruction and the severity of dyspnea in COPD patients at RSI Sakinah. This study employed a quantitative research design with a cross-sectional approach. The population consisted of 59 COPD patients at RSI Sakinah; consecutive sampling was used to obtain a sample of 55 participants. The variables in this study were the degree of airway obstruction and the degree of dyspnea. Data collection was conducted using standard operating procedures (SOP), observation forms, and the Dyspnea Questionnaire (D-12). Data analysis was performed using the Spearman's Rho test. The results showed that the majority of airway obstruction severity was in the moderate category, involving 30 respondents (54.5%), and the majority of dyspnea severity was also in the moderate category, involving 39 respondents (70.9%), with a p-value of 0.002 and a correlation coefficient of 0.407. Thus, H_0 was rejected, indicating that there is a relationship between the degree of airway obstruction and the degree of dyspnea in COPD patients, with a moderate strength of association and a positive result.

Keywords: *Degree of Dyspnea, Degree of Airway Obstruction, COPD*

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a chronic lung disease characterized by persistent and progressive airflow obstruction resulting from abnormalities in the airways and alveoli. The main symptoms commonly experienced by patients are shortness of breath (dyspnea), chronic cough, and excessive sputum production (Qalbiyah & Khairani, 2022). Dyspnea is the most dominant clinical manifestation and tends to become more severe as lung function declines and the degree of airway obstruction increases (Michael, 2021). If this condition is not managed optimally, patients may experience impaired gas exchange, hypoxemia, hypercapnia, respiratory failure, reduced quality of life, and an increased risk of mortality (Satriaman et al., 2021).

Globally, COPD remains a major health issue. The World Health Organization reports that COPD caused approximately 3.5 million deaths in 2021, accounting for about 5% of all deaths worldwide. In Indonesia, the prevalence of COPD, based on the 2018 Basic Health Research, reached 2.4%, while in East Java Province it stood at 3.6%, with the highest prevalence observed among the elderly (Indonesian Ministry of Health, 2018). An increase in the number of COPD patient visits has also been observed in Mojokerto Regency, indicating the significant disease burden in that region (Ginting et al., 2025).

One of the key factors contributing to the onset of dyspnea in COPD patients is the degree of airway obstruction. Airflow obstruction leads to air trapping and pulmonary hyperinflation, thereby increasing the workload on the respiratory muscles and causing progressively more severe shortness of breath (Ritonga, 2025). In addition, the severity of dyspnea is also influenced by decreased lung function, impaired gas exchange, respiratory

muscle weakness, cardiovascular disease, and other psychological and systemic factors (Roselyn et al., 2023; ATS Board, 2024).

Previous research has shown a relationship between the degree of airway obstruction and the severity of dyspnea in COPD patients. Qalbiyah and Khairani (2022) reported that most patients experienced moderate dyspnea with Peak Expiratory Flow (PEF) values in the red zone as measured by a peak flow meter. The study also found a significant correlation between the degree of airway obstruction and the severity of dyspnea ($r = 0.731$; $p = 0.000$), indicating that the more severe the airway obstruction, the more severe the dyspnea experienced by patients.

The results of a preliminary study at RSI Sakinah involving five COPD patients showed that all patients experienced moderate airway obstruction accompanied by moderate dyspnea. However, research on the relationship between the degree of airway obstruction and the degree of dyspnea using peak flow meter measurements at RSI Sakinah remains limited. Therefore, this study was conducted to analyze the correlation between the degree of airway obstruction and the degree of dyspnea in COPD patients at RSI Sakinah. The results of this study are expected to contribute scientifically to the development of medical-surgical nursing science and serve as a basis for healthcare professionals in assessing disease severity and determining appropriate interventions for COPD patients.

METHOD

This study employed a quantitative research design with a correlational-analytic approach and a cross-sectional design, aiming to analyze the relationship between the degree of airway obstruction as the independent variable and the degree of dyspnea as the dependent variable in patients with Chronic Obstructive Pulmonary Disease (COPD). A cross-sectional approach was chosen because measurements of both variables were taken at the same time, allowing the relationship between the variables to be analyzed simultaneously.

The study population consisted of all 59 COPD patients receiving inpatient care at RSI Sakinah. The study sample consisted of 55 respondents selected using non-probability consecutive sampling over a six-week period in accordance with the established inclusion and exclusion criteria. Inclusion criteria included adult COPD patients experiencing dyspnea, while patients with complications leading to impaired consciousness were excluded from the study.

Data collection was conducted in April–May 2026 at RSI Sakinah after obtaining ethical approval and a research permit. The degree of airway obstruction was measured using a peak flow meter via peak expiratory flow (PEF) testing, which was recorded in an observation sheet, while the degree of dyspnea was measured using the Dyspnea-12 (D-12) questionnaire, consisting of 12 statements assessing the physical and affective aspects of shortness of breath. All participants were first given an explanation of the study's objectives and then signed a consent form before measurements were taken and the questionnaire was completed. The data obtained subsequently underwent editing, coding, scoring, and tabulation before being analyzed using SPSS. Univariate analysis was used to describe the characteristics of the respondents and the distribution of each variable, while bivariate analysis was performed using Spearman's rho correlation test with a significance level (α) of 0.05 to determine the relationship between the degree of airway obstruction and the degree of dyspnea in COPD patients.

FINDING AND DISCUSSION

RESEARCH RESULT

GENERAL DATA

Tabel 1: Frequency Distribution of Respondent Characteristics Among COPD Patients at RSI Sakinah

No	Frequency Distribution of Respondent	F	%
1	Age		
	19-25 Years	0	0
	26-30 Years	10	18,2
	31-45 Years	20	36,4
	>45 Years	25	45,5
2	Gender		
	Male	42	76,4
	Female	13	23,6
3	Job		
	Factory Worker	11	20,0
	Office Worker	5	9,1
	Business Owner	36	65,4
	Not Working	3	5,5
4	Smoking History		
	Smoking	45	81,8
	Non-Smoking	10	18,2
5	History of Lung Disease		
	Bronchitis	29	52,7
	Emphysema	20	36,4
	Pneumonia	6	10,9
6	Day of Hospitalization		
	<3 Days	31	56,4
	>3 Days	24	43,6
	Total	55	100

Source: Primary Data 2026

Table 1 shows that of the 55 respondents, nearly half—25 respondents (45.5%)—were over 45 years old. By gender, nearly all respondents—42 respondents (76.4%)—were male. By occupation, the majority—36 respondents (65.4%)—were business owners. Regarding smoking history, nearly all respondents—45 (81.8%)—had a history of smoking. Regarding history of lung disease, the majority—29 respondents (52.7%)—had a history of bronchitis. As for the duration of hospitalization, the majority—31 respondents (56.4%)—were hospitalized for fewer than 3 days.

SPESIFIC DATA

1. Deegree of Airway Obstruction in COPD Patients at RSI Sakinah

Tabel 2: Frequency Distribution of Respondent Characteristics Based on the Degree of Airway Obstruction in COPD Patients at RSI Sakinah

No	Degree of Airway Obstruction	F	%
1	Mild	6	11,0
2	Moderate	30	54,5
3	Severe	19	34,5
	Total	55	100,0

Source: Primary Data 2026

Table 2 shows that the majority of airway obstruction severity levels among COPD patients at RSI Sakinah fall into the moderate category, with 30 respondents (54.5%).

2. Degree of *Dyspnea* in COPD Patients at RSI Sakinah

Tabel 3: Frequency Distribution of Respondent Characteristics Based on the Degree of Dyspnea in COPD Patients at RSI Sakinah

No	Degree of Dyspnea	F	%
1	Mild	5	9,1
2	Moderate	39	70,9
3	Severe	11	20,0
	Total	55	100,0

Source: Primary Data 2026

Table 3 shows that the majority of COPD patients at RSI Sakinah had moderate dyspnea, with 39 respondents (70.9%) falling into this category.

3. The Realtionship Between The Degree of Airway Obstruction and The Degree of Dyspnea in COPD Patients at RSI Sakinah

Tabel 4: Cross-Tabulation of the Relationship Between the Degree of Airway Obstruction and the Degree of Dyspnea in COPD Patients at RSI Sakinah

Degree of Airway Obstruction	Degree of Dyspnea						Total	
	Mild		Moderate		Severe			
	f	%	f	%	f	%	f	%
Mild	2	33,3	4	66,7	0	0	6	100
Moderate	3	10,0	23	76,7	4	13,3	30	100
Severe	0	0	12	63,2	7	36,8	19	100
Total	5	9,1	39	70,9	11	20,0	55	100
r: 0,407 <i>p</i> value: 0,002 α :0,05								

Source: Primary Data 2026

Table 4 shows that of the 6 respondents with mild airway obstruction, the majority—4 (66.7%)—had moderate dyspnea. Of the 30 respondents with moderate airway obstruction, nearly all—23 (76.7%)—had moderate dyspnea. Of the 19 respondents with severe airway obstruction, the majority—12 (63.2%)—had moderate dyspnea.

The results of the Spearman's rho test showed a p-value of 0.002, which is less than the alpha level (0.05). Thus, the null hypothesis (H₀) is rejected, indicating that there is a

relationship between the degree of airway obstruction and the degree of dyspnea in COPD patients. The correlation coefficient of 0.407 indicates a moderate level of association, with a positive correlation between the two variables—meaning that the higher the degree of airway obstruction, the higher the degree of dyspnea.

DISCUSSION

1. Degree of Airway Obstruction in COPD Patients at RSI Sakinah

The study results showed that most COPD patients had moderate airway obstruction (30 respondents), followed by severe (19 respondents) and mild (6 respondents). These findings indicate that the majority of respondents have experienced a significant decline in lung function due to a chronic inflammatory process that causes airway narrowing and progressive airflow obstruction. The predominance of moderate to severe obstruction suggests that most patients sought medical care only after the disease had progressed, potentially exacerbating dyspnea, reducing physical capacity, and worsening quality of life. Furthermore, the distribution of respondent characteristics suggests that being over 45 years of age, male gender, a history of smoking, a history of bronchitis, and occupational exposure likely contribute to increased degrees of airway obstruction. These findings underscore the importance of early detection, risk factor management, and regular monitoring of lung function to slow the progression of COPD.

The results of this study are consistent with the guidelines of the Global Initiative for Chronic Obstructive Lung Disease (GOLD, 2023), which state that the degree of airway obstruction increases as lung function, as indicated by the FEV₁ value, declines. These findings are also consistent with studies by Metlay et al. (2019), Celli and Wedzicha (2019), and Barnes (2020), which explain that chronic inflammation, exposure to cigarette smoke, air pollution, and occupational factors cause airway damage and a progressive decline in lung function. Furthermore, a study by Qalbiyah and Khairani (2022) showed that the more severe the degree of airway obstruction, the more severe the dyspnea experienced by COPD patients. These consistent results reinforce the notion that the degree of airway obstruction is a key indicator in determining the severity of the disease and the clinical condition of COPD patients.

This study has several limitations. First, the cross-sectional design only describes the relationship between variables at a single point in time and therefore cannot establish a cause-and-effect relationship. Second, the study was conducted at a single hospital with a relatively limited number of respondents; therefore, the results cannot yet be generalized to the entire population of COPD patients. Third, there are other factors that could potentially influence the degree of airway obstruction and dyspnea—such as treatment adherence, nutritional status, comorbidities, and duration of exposure to risk factors—which were not analyzed in depth in this study.

The implications of this study suggest that assessing the degree of airway obstruction using a peak flow meter can serve as an initial screening tool to identify the severity of COPD and assist healthcare professionals in determining appropriate interventions (Shivany et al., 2025). The study results also underscore the importance of education on smoking cessation, controlling exposure to pollution and dust in the workplace, and periodic monitoring of lung function to slow disease progression. Future studies are recommended to use a longitudinal or cohort design with a larger sample size

and involving multiple hospitals so that the relationship between the degree of airway obstruction and the severity of dyspnea can be evaluated more comprehensively, while also accounting for other confounding factors.

2. Degree of Dyspnea in COPD Patients at RSI Sakinah

The study results showed that most COPD patients experienced moderate dyspnea (39 respondents), followed by severe dyspnea (11 respondents) and mild dyspnea (5 respondents). These findings indicate that the majority of respondents had experienced a significant impairment in respiratory function, to the extent that shortness of breath began to limit their daily activities, although most patients were still able to perform light activities. This condition indicates that the progression of COPD has led to increased airway resistance, pulmonary hyperinflation, and impaired gas exchange, all of which increase the workload on the respiratory muscles. Furthermore, the characteristics of the respondents—who were predominantly over 45 years of age, male, and had a history of smoking, bronchitis, and occupations with potential exposure to dust or pollutants—are believed to have contributed to the increased severity of dyspnea. These findings are important because the severity of dyspnea is a clinical indicator that reflects the severity of COPD, patients' functional capacity, and quality of life, and can therefore serve as a basis for determining treatment priorities and evaluating therapy.

The results of this study are consistent with the guidelines of the Global Initiative for Chronic Obstructive Lung Disease (GOLD, 2023), which state that dyspnea is a primary symptom of COPD that becomes more severe as lung function declines and airflow obstruction progresses. These findings are also consistent with the study by O'Donnell et al. (2020), which explains that increased respiratory muscle work and pulmonary hyperinflation cause patients to experience activity limitations due to shortness of breath. Furthermore, Celli et al. (2025) reported that moderate dyspnea is the most common condition observed in COPD patients because, although their lung function has significantly declined, they are still able to perform some daily activities. These findings are further supported by Spruit et al. (2023), who state that the more severe the dyspnea, the greater the reduction in physical activity capacity and quality of life among COPD patients. Thus, these findings reinforce the evidence that the severity of dyspnea is influenced by reduced lung function as well as the accumulation of risk factors such as age, smoking, occupational exposure, and a history of lung disease.

This study has several limitations. First, the cross-sectional study design only describes the relationship between variables at a single point in time and therefore cannot establish a cause-and-effect relationship. Second, the study was conducted at a single hospital with a relatively limited number of respondents; therefore, the results cannot yet be generalized to the entire population of COPD patients. Third, several factors that may influence the severity of dyspnea—such as medication adherence, nutritional status, comorbidities, exercise capacity, and duration of COPD—were not analyzed in depth; thus, there may still be confounding factors influencing the study results.

The implications of this study suggest that assessing the severity of dyspnea using the Dyspnea-12 (D-12) questionnaire should be performed routinely as part of the clinical evaluation of COPD patients to identify the severity of symptoms and monitor the progression of the patients' condition. The study results also underscore the

importance of preventive measures—such as smoking cessation, controlling exposure to dust and pollution, pulmonary rehabilitation, and education on treatment adherence—to slow disease progression and improve patients' quality of life. Future studies are recommended to use a longitudinal or cohort design with a larger sample size and involve multiple healthcare centers to evaluate changes in dyspnea severity over time and analyze the influence of other factors that may affect the condition of COPD patients.

3. The Relationship Between The Degree of Airway Obstruction and The Degree of Dyspnea in COPD Patients at RSI Sakinah

The results of the study indicate that there is a significant association between the degree of airway obstruction and the severity of dyspnea in patients with Chronic Obstructive Pulmonary Disease (COPD) at RSI Sakinah, with a p-value of 0.002 (<0.05) and a correlation coefficient (r) of 0.407, indicating a moderate-strength positive correlation. These findings suggest that the more severe the degree of airway obstruction, the higher the degree of dyspnea experienced by patients. Clinically, these results imply that a decline in pulmonary ventilation function due to airflow obstruction contributes to increased shortness of breath in COPD patients. Nevertheless, the moderate strength of the relationship indicates that the degree of dyspnea is influenced not only by the degree of airway obstruction but also by various other factors, such as age, smoking history, duration of COPD, comorbidities, physical activity capacity, psychological condition, and the patient's ability to adapt to chronic disease. This study also found that the majority of respondents with moderate airway obstruction experienced moderate dyspnea, while some respondents with severe airway obstruction were still classified as having moderate dyspnea. This finding suggests that objective lung function test results do not always correlate with patients' subjective perceptions of shortness of breath due to physiological adaptation mechanisms and changes.

The findings of this study are consistent with the pathophysiological theory of COPD, which states that chronic inflammation causes airway remodeling, increased mucus production, and alveolar destruction, leading to airflow obstruction, particularly during exhalation. These conditions trigger air trapping and pulmonary hyperinflation, thereby increasing the workload on the respiratory muscles and ultimately causing a sensation of dyspnea (Alsagaff et al., 2021; Satria, 2022). Alishapour et al. (2025) also explain that pulmonary hyperinflation causes the diaphragm to lose its mechanical efficiency, resulting in a mismatch between ventilatory demand and the lungs' ability to meet the body's oxygen needs—a condition perceived as shortness of breath. The results of this study also support the guidelines of the Global Initiative for Chronic Obstructive Lung Disease (GOLD, 2023), which state that the more severe the degree of airway obstruction, the greater the ventilatory limitations and respiratory symptoms experienced by patients. However, the results of this study also show that some patients with severe obstruction experience only moderate dyspnea. These findings are consistent with the research by Steer et al. (2020) and Yorke et al. (2021), which explains that patients with chronic COPD may undergo physiological and behavioral adaptation processes, such as limiting physical activity, implementing energy-conservation techniques (pacing), and using specific breathing techniques, resulting in a perception of dyspnea that is lower than the actual degree of lung damage experienced. Conversely, patients with mild obstruction

who experience moderate dyspnea are likely influenced by other factors, such as high levels of physical activity, exposure to dust and pollution, anxiety levels, and individual sensitivity to changes in lung function, as described by O'Donnell et al. (2020).

Although this study successfully demonstrated a significant association between the degree of airway obstruction and the severity of dyspnea in COPD patients, there are several limitations that should be noted. The study used a cross-sectional design, which only describes the relationship between variables at a single point in time and cannot establish a cause-and-effect relationship. Furthermore, the study was conducted at only one hospital with a relatively limited number of participants; therefore, the results cannot yet be generalized to a broader population of COPD patients. This study also did not account for several confounding factors that could potentially influence the severity of dyspnea, such as nutritional status, comorbidities, anxiety levels, adherence to treatment, exercise capacity, and duration of COPD.

The results of this study have important implications for healthcare practice, particularly in medical-surgical nursing. Assessing the degree of airway obstruction using a peak flow meter and the degree of dyspnea using the Dyspnea-12 questionnaire can be incorporated into routine evaluations to identify the severity of COPD and determine appropriate intervention priorities. In addition to pharmacological therapy, pulmonary rehabilitation, breathing exercises such as pursed-lip breathing, smoking cessation education, activity management, and control of exposure to pollutants need to be integrated into patient management to reduce the severity of dyspnea and improve quality of life. Further research is recommended using a longitudinal or prospective design with a larger sample size and involving multiple hospitals so that the relationship between the degree of airway obstruction and the degree of dyspnea can be evaluated more comprehensively, taking into account various factors that may influence the clinical condition of COPD patients.

CONCLUSION

Based on the results of a study of 55 patients with Chronic Obstructive Pulmonary Disease (COPD) at RSI Sakinah, the majority of respondents had moderate airway obstruction (30 respondents, 54.5%), followed by severe airway obstruction (19 respondents, 34.5%), and mild airway obstruction in 6 respondents (10.9%). Meanwhile, the majority of respondents experienced moderate dyspnea (39 respondents, 70.9%), followed by severe dyspnea in 11 respondents (20.0%), and mild dyspnea in 5 respondents (9.1%). Analysis using Spearman's rho test yielded a p-value of 0.002 ($p < 0.05$) with a correlation coefficient of 0.407, indicating a moderate positive correlation between the degree of airway obstruction and the degree of dyspnea. These findings suggest that the higher the degree of airway obstruction, the more severe the dyspnea experienced by COPD patients.

The results of this study indicate that the degree of airway obstruction is one of the factors associated with the severity of dyspnea in COPD patients. However, the moderate strength of the association suggests that dyspnea is influenced not only by the degree of airway obstruction but also by other factors such as age, smoking status, comorbidities, physical activity, psychological status, and duration of COPD. Therefore, the management of COPD patients should not only focus on improving lung function but also take into account other factors that contribute to the onset of dyspnea.

The findings of this study are expected to serve as a basis for healthcare professionals to conduct routine assessments of the degree of airway obstruction and the severity of dyspnea as part of the evaluation of patients with COPD. In addition, education regarding smoking cessation, breathing exercises, pulmonary rehabilitation, activity management, and control of exposure to pollutants needs to be continuously improved to prevent symptom exacerbation and enhance patients' quality of life. Future studies are recommended to involve a larger sample size, use a longitudinal or prospective study design, and include additional variables that may influence the severity of dyspnea, thereby providing a more comprehensive understanding of the factors associated with the clinical condition of COPD patients.

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