Analysis Body Mass Index in COPD Patients at Pirngadi Regional General Hospital Medan
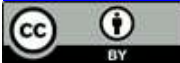
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Article Info	ABSTRACT
  Corresponding Author: Syahrianti Rizky Azzahra Siregar, Universitas Islam Sumatera Utara, Indonesia Email: siregarrizky693@gmail.com	Chronic obstructive pulmonary disease (COPD) is a non-communicable disease (NCD) that is a global problem with high incidence, especially in developing countries. COPD is described as a respiratory disease with restricted airflow due to alveolar obstruction or lameness. This study aims to analyze the relationship between body mass index and the degree of COPD. The design of this study was cross-sectional. A total of 67 respondents were taken using the sample size formula. COPD patients at Pirngadi Hospital Medan, totaling 67 people, were taken as respondents in this study. Data collection was carried out using secondary data, namely medical records. The results of the research data were analyzed using the Spearman Test. The results showed that the degree of severe COPD was 25 respondents (37.3%). All respondents had a body mass index classified as underweight, namely 28 respondents (41.8). The correlation test of body mass index with COPD found a significant correlation between BMI and COPD degree -0.789 (p<0.05). Suggestions for further researchers could include other variables that may affect COPD, such as the effect of pharmacological and non-pharmacological therapies on the degree of COPD ***Keywords:*** *Chronic Obstructive Pulmonary Disease, Body Mass Index, Underweight*

1. INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is associated with the development of malnutrition and muscle wasting which negatively impacts quality of life and increases mortality rates (Furulund et al., 2021). COPD patients have a low Body Mass Index (BMI) because it is associated with low lean body tissue mass and also lower activity capacity. In addition, the causative factor of this malnutrition is the inability to eat more due to shortness of breath and fatigue. Nutritional status in COPD patients must be considered because malnutrition has a direct effect on lung function, respiratory muscles, and lung parenchyma (Keogh & Mark Williams, 2021)

PPOK is a disease that experiences structural changes in the lungs due to chronic inflammation, resulting in narrowing of the airways which results in reduced lung recoil (Agarwal et al., 2023). Characterized by persistent respiratory symptoms and airflow limitation caused by abnormalities of the respiratory tract or alveoli due to exposure to free radicals and noxious gases (GOLD., 2023). Lung irritation is caused by cigarette smoke or chemicals that cause damage to the lungs and airways. Long-term exposure to COPD can lead to chronic bronchitis and emphysema (ALA., n.d.).

IMT is a statistic using weight and height to estimate body fat in men and women of all ages with the result of calculating body weight (kilograms) divided by height (meters squared). In addition, BMI is also used as a measuring tool to define someone as underweight, normal, or overweight (Weir & A., 2023).

This study aims to analyze the relationship between body mass index and COPD. This analysis includes a description of the relationship between body mass index and the degree of COPD. Researchers hope that the results of this study can provide explanations and input to health circles to pay attention to and improve the nutritional status of COPD patients so that they can maintain body mass index.

2. METHOD

This study uses observational analytics with a cross-sectional design. A cross-sectional design is a measurement of variables at a certain time that examines the correlation between independent variables (risk factors) and dependent variables (effects) (Sastroasmoro & Ismael, 2014). The population in this study amounted to 204 medical records of Chronic Obstructive Pulmonary Disease (COPD) patients at Pirngadi Medan Regional Hospital. The sampling technique used in this study was the Slovin Formula in accordance with the inclusion and exclusion criteria determined by the researcher. Data collection was carried out by using medical records of COPD patients throughout the period from January 2022 to December 2022. Researchers categorized each patient's body mass index with the degree of COPD experienced by the patient.

Data analysis used the Spearman correlation test because the data were not normally distributed. The researcher has obtained ethical approval from the Health Research Ethics Committee (KEPK) of the Faculty of Medicine, UISU with the number 438/EC/KEPK.UISU/X/2023.

3. RESULTS AND DISCUSSION

Univariate data analysis was conducted on each research variable in this study to describe these variables

Table 1. Frequency Distribution and Percentage of Respondent Characteristics.

Respondent Characteristics	Frequency	Percentage (%)
Age category		
Middle Age (45-59 years)	24	35.8%
Elderly (60-74 years)	34	50.7%
Old (>90 years)	9	13.4%
Gender Category		
Man	42	62.7%
women	25	37.3%
BMI category		
Underweight	28	41.8%
Normal	19	28.4%
Overweight	8	11.9%
Obesity	12	17.9%
COPD Category		
Light	23	34.3%
Medium	19	28.4%
Heavy	25	37.3%
Sangat Weight	0	0%

Table 1 above shows the characteristics of COPD patients at Pirngadi Medan Regional Hospital based on age, the most common category is the elderly (60-74 years) with 34 samples (50.7%). The most common category of gender is the male category with 42 samples (62.7%). The most common category of BMI is the underweight category with 28 samples (41.8%). The most common category of COPD degree is the severe category with 25 people (37.3%).

Table 2. Frequency Distribution of COPD Patient Description Based on BMI in RSUD Dr. Pirngadi Medan 2022

Degree	IMT								Total	
	Underweight		Normal		Overweight		Obesity			
PPOK	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Low	0	0,0	9	47,4	3	37,5	11	91,7	23	34,3
Medium	5	17,9	9	47,4	4	50,0	1	8,3	19	28,4
Heavy	23	82,1	1	5,3	1	12,5	0	0,0	25	37,3
Total	28	100	19	100	8	100	12	100	67	100

Table 2 above states that of the 23 people with mild COPD, 11 people (91.7%) were in the obesity group, 3 people (37.5%) in the overweight group, 9 people (47.4%) in the normal group, 0 (0.0%) in the underweight group. Of the 19 people with moderate COPD, 1 person (8.3%) was in the obesity group, 4 people (50.0%) in the overweight group, 9 people (47.4%) in the normal group, 5 people (17.9%) in the underweight group. While of the 25 people with severe COPD, 0 people (0.0%) were in the obesity group, 1 person (12.5%) in the overweight group, 1 person (5.3%) in the normal group, 23 people (82.1%) were in the underweight group.

Table 3. Spearman Correlation

			IMT	Derajat PPOK
Spearman's rho	IMT	Corellation	1.000	-0.789**
		Coefficient		
		Sig. (2-tailed)	.	.000
		N	67	67
	Derajat PPOK	Correlation	-0.789**	1.000
		Coefficient		
		Sig. (2 -tailed)	0.000	.
		N	67	67

The correlation test from the above study found that the correlation of chronic obstructive pulmonary disease with body mass index has a p-value = 0.000. This shows that there is a relationship between COPD and BMI with a data correlation value of -0.789 (strong correlation) with a negative correlation value, meaning that the lower the body mass index, the more severe the degree of COPD experienced by the patient

Discussion
Based on research conducted by Najihah et al (2023) Najihah et al (2023) that the most age category is the elderly category as many as 35 people (92.2%) (Najihah, Theovena EM, et al., 2023). In addition, it is also supported by research conducted by El Naser et al (2016) that the highest age is the age group 60 years and over as many as 11 people (55%) (El Naser et al., 2016). These results are in line with research conducted by researchers that the most age category is the elderly category (60-74 years) as many as 34 people (50.74%). This happens because COPD is often considered prevalent in the elderly with a high impact on quality of life, morbidity, and mortality. The diagnosis of COPD is based on spirometry values that support the presence of airflow obstruction but often goes undiagnosed and is associated with premature aging and several other medical conditions (Cortopassi et al., 2017).

The results of research conducted by Enderina et al (2016) showed that the highest body mass index category was underweight as many as 23 people (Enderina et al., 2023). The most body mass index category is under weight as many as 23 people (54.76%). These results are in line with the results of the researcher's study that the most BMI category is under weight as many as 28 people (41.8%). This occurs because it is suspected that there is a lack of fluid and food intake caused by loss of appetite and increased energy expenditure due to increased respiratory work which can cause malnutrition.

The largest gender category in the study of Fattah et al (2022) that the sex of the most COPD patients was male as many as 49 people (92.5%) (Fattah et al., 2022). These results are in line with the results of the researcher's study that the most sex who suffered from COPD was male as many as 42 people (62.7%) (Itoh et al., 2013). This happens because most cigarette users are men. There is a relationship between cigarette exposure and COPD, cigarette smoke contains a very high concentration of oxidants that cause inflammation of the lungs and respiratory tract. In addition to active smokers, passive smokers are also affected because they accidentally inhale cigarette smoke (Hartina et al., 2021).

The highest category of COPD degree in the study of Najihah et al (2023) was the severe category as many as 25 people (37.3%) (Najihah, Theovena, et al., 2023). This study is in line with the results of the researchers, namely the most COPD degree category is the severe category as many as 25 people (37.3%).

This can occur when a person's BMI is low, the lower the forced vital capacity so that the more severe the degree of COPD suffered.

In contrast to research conducted by Gestia Septiana et al (2021) that of the 32 samples found that 20 people (62.5%) had normal BMI (Septiana et al., 2021). This can happen because the sample having a normal BMI does not affect the increase in the work ability of the respiratory system so that problems occur in the airway can be resolved (Fattah et al., 2022).

Based on research conducted by researchers, the results of the spearmen correlation of body mass index with COPD disease obtained a value of 0-value = 0.00 and a coefficient of -0.789. So that the conclusion is obtained that there is a relationship between BMI and COPD at Pirngadi Hospital in 2022 with a strong correlation strength. These results are in line with the research of Soemarwoto et al (2017) using the spearmen correlation test obtained the results of p-value = 0.005 and a large coefficient of 0.217 (Soemarwoto et al., 2017). So it is concluded that there is a relationship between BMI and COPD. It can be interpreted that the lower a person's BMI, the more severe the degree of COPD suffered by the patient. What distinguishes this study from the researcher's research is the ranking of COPD degree data on SPSS during data processing, where researchers classify the degree of COPD from low to very severe, while Soemarwoto's research classifies from very severe to low, so that there is a difference in the direction of correlation with the same conclusion. the same conclusion.

The results of this study are not in line with the research of Fattah et al (2022) using the chi-square test between body mass index and chronic obstructive pulmonary disease, with a p-value: 0.934 (P>0.005) (Fattah et al., 2022). It can be concluded that there is no relationship between BMI and COPD. This happened because the results of the IMT study of the majority of patients were normal so that it did not show a significant relationship because there was no change (decrease) in body weight.

4. CONCLUSION

Body mass index has been shown to have a significant correlation with patients with chronic obstructive pulmonary disease. If someone has a low BMI, then they have a higher potential to develop severe COPD. This study found a relatively strong relationship between BMI and COPD. Further research can analyze the relationship between the degree of COPD and non-pharmacological therapy in COPD patients. This is useful for describing the effectiveness of non-pharmacological therapy, namely improving nutritional status in COPD patients.

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