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Relationship between Smoking Status and Severity of Inpatient Community-Acquired Pneumonia (CAP)

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Abstract

Background: Pneumonia is an inflammation of the lung parenchyma. Pneumonia became the first lung health problem in West Lombok. Smoking is one of the main factors in CAP. This study aims to determine the relationship between smoking status and the severity of inpatient CAP patients.

Methods: Case-control study design was used with medical record measurement tools. Seventy samples were taken using a purposive sampling technique for community pneumonia patients (CAP) at Patut Patuh Patju Regional General Hospital Gerung, West Lombok, November 2021-October 2022. Calculation of the severity of CAP patients used the PSI score.

Results: The findings yielded a p-value of 0.000 (p-value 0.05) for smoker status with a degree of severity of CAP and a p-value of 0.064 (p-value> 0.05) for a smoking degree with a degree of severity of CAP. The estimated risk (OR) for smoking status with the severity of CAP is 19.33.

Conclusions: There is a significant relationship between smoking status, but not with a smoking degree, to the severity of CAP at Patut Patuh Patju Gerung Regional General Hospital, West Lombok.

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INTRODUCTION

Pneumonia is an inflammation of the lung parenchyma caused by microorganisms, gastric fluid aspiration, foreign bodies, hydrocarbons, lipoid materials, and hypersensitivity reactions[1]. Pneumonia is a health problem often encountered and impacts health worldwide, especially in the elderly population, where the incidence rate increases at the age of >65 years[2]. Deaths from pneumonia are caused mainly by severe pneumonia ranging from 7%-13%. One of the diseases that continues to cause hospitalization and death worldwide is pneumonia. In addition, in 2015, this disease was also a cause of death in countries with low incomes[3]. According to data from Basic Health Research Indonesia4, pneumonia in Indonesia is 4% of the population according to diagnosis by health workers or symptoms that household members have experienced. In the Province of NTB, 5.98% of the total is affected by pneumonia, where West Lombok ranks third highest after Dompu and Central Lombok. According to the District Health Office data for 2021, pneumonia is the first and most common health problem in the respiratory system, with 37,719 cases classified as non-specific ISPA. Based on medical record data related to pneumonia at the Patut Patuh Patju Gerung Hospital in 2022, the number of pneumonia patients at the Patut Patuh Patju Gerung Hospital in 2021 will reach 198 people, and in 2022 it will continue to increase every month, from January to June 2022 it has reached 158 people. The death rate due to pneumonia at the Tripat Gerung Hospital has also increased; in 2020, 16 people, and in 2021 increased to 28 people[5].

Community-acquired pneumonia (CAP) is known to cause morbidity and mortality in developing and low-income countries. Smoking tobacco is a risk factor that can lead to the development of CAP. It is known that tobacco is also a cause of chronic obstructive pulmonary disease, which can be a factor in the development of CAP in the respiratory tract[6]. Apart from being a cause of death and morbidity in developing countries, tobacco smoking is a major cause of increased morbidity and mortality in high-income countries, a significant risk factor for CAP[7]. Cigarette smoke is one of the biggest threats to public health; around 7 million people die each year, 1.2 million of which result from exposure to cigarette smoke. According to data *World Health Organization* (WHO) in 2017, Indonesia ranks third in the number of smokers worldwide. The proportion of smokers in the 15-year-old population grew by 2.22% in the province of NTB between 2019 and 2021.

Crisafulli's research regarding systemic inflammatory response and outcomes in community-acquired pneumonia patients categorized according to smoking habits found that current smokers compared to non-smokers and former smokers, had a higher systemic inflammatory response to CAP and a higher risk for developing CAP of the respiratory tract[8]. Fauzan's research regarding the relationship between smoking habits and the CAP severity index, the research conducted by Fauzan showed the result that there was a significant correlation between smoking status and the CAP severity index[9]. Scientific research discussing the relationship between smoking status and the severity of CAP sufferers has not been widely carried out in NTB. Based on the severity associated with

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an increased risk of death in CAP patients and the pneumonia rate, this study investigates the relationship between smoking status and the severity of CAP at Patut Patuh Patju Gerung Hospital, West Lombok. This study aims to determine the relationship between smoking status and the severity of inpatient CAP patients.

METHODS

The type of research used is quantitative analytic research design case-control, where the case group was compared to the control group based on exposure. The approach used is retrospective. This research was conducted at Patut Patuh Patju Gerung Regional General Hospital, West Lombok. The time of research was conducted in September-October 2022. The population in this study was CAP, who was hospitalized at the Patut Patuh Patju Regional General Hospital, West Lombok, from November 2021-October 2022.

This study had a population of 198 pneumonia patients in 2021. So, based on the Slovin formula, the sample used is 70 people. This study consisted of 2 groups: the case and control groups. The case group in this study was the Moderate-Severe CAP group, while the control group was the Low CAP group.

The sample selected in this study were pulmonary disease patients who were hospitalized with a diagnosis of Community-Acquired Pneumonia (CAP); a definite diagnosis of community pneumonia is enforced if the chest X-ray shows a new infiltrate or progressive infiltrate plus two or more symptoms, such as increased coughing, changes in phlegm/purulent characteristics, body temperature >38ºC (axillae)/history of fever, on physical examination: signs found, signs of consolidation, bronchial breath sounds and crackles, and leukocyte results >10,000 or <4500. Researchers used a purposive sampling technique to take samples. Samples were selected according to the criteria used (inclusion criteria) and those not used (exclusion criteria). The inclusion criteria in this study were inpatient CAP patients, adult CAP patients, male CAP patients, CAP patients smoking at least five years with a Brinkman Index <200->600, and CAP patients not smoking, while the exclusion criteria in this study were COVID-19 patients, CAP patients are ex-smokers, and medical records are incomplete.

Smoker status is known through medical records, and smoking degree is measured by the Brinkman index (<200 is said to be a light smoker, 201-600 is said to be a moderate smoker, and >600 is said to be a heavy smoker), while the severity of CAP is identified using the PSI score based on the results of the patient's physical examination and support. A PSI score of 71-90 indicates low risk, and a PSI score of 91->130 indicates moderate-severe risk. This research was approved by the ethical committee of the Al-Azhar Islamic University Medical Faculty, No.67/EC-04/FK-06/UNIZAR/IX/2022. Data were analyzed using the Spearman correlation test and odds ratio.

RESULTS

Table 1 shows the characteristics of the sample. Based on age, most age in this study was <45-54 years, namely 24 samples (34.3%). Based on the status of smokers, the number of smokers is the same as the number of non-

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smokers, namely 35 samples (50%) each. Based on the severity of CAP patients, the risk of Moderate-Severe CAP severity was the highest, namely 36 samples (51.4%).

In Table 2, it was found that the number of cigarettes consumed the most per day by smokers was 11-20 cigarettes, namely 18 samples (51.4%), and there were no smokers who consumed ≥21 cigarettes (0%). Smoking duration (in years) in this study found that smoking ≥21 years was the highest in 20 samples (57.1%) and the lowest was smoking ≤10 years, namely 1 sample (2.9%). While the degree of smoking calculated by the Brinkman Index in this study found similarities between light smokers and moderate smokers, namely 17 samples (48.6%), and only 1 sample was a heavy smoker (2.9%).

Table 3 shows the results of the correlation analysis of 2 variables regarding smoking status and the severity of CAP. It was found that the number of samples that were smokers with moderate-severe CAP severity was 29 people (80.6%), and the low CAP severity was six people (17.6%). Samples of non-smokers with moderate-severe CAP severity were seven people (19.4%), and with low CAP severity were 28 people (82.4%).

Table 1. Sample Characteristics

Sample Characteristics		Amount	
		N	%
Age	<45-54	24	34.3
	55-64	21	30.0
	65-75	14	20.0
	>75	11	15.7
Smoker Status	Smoker	35	50.0
	Non-Smoker	35	50.0
CAP Severity Level	Moderate-Severe Risk	36	51.4
	Low Risk	34	48.6
Total		70	100.0

Table 2. Characteristics of Smokers

Characteristics of Smokers		Amount	
		N	%
Number of cigarettes (per day)	≤ 10 cigarettes	17	48.6
	11-20 cigarettes	18	51.4
	≥21 cigarettes	0	0.0
Duration of smoking (years)	≤ 10 years	1	2.9
	11-20 years	14	40.0
	≥21 years	20	57.1
Smoking Degree (Brinkman Index)	Light	17	48.6
	Moderate	17	48.6
	Heavy	1	2.9
Total		35	100.0

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From the correlation test analysis, the *Spearman rank* value obtained a *p-value* of 0.000 (*p-value* <0.05) and a correlation coefficient of 0.629 with a positive value. This analysis also shows that H0 is not accepted, which means there is a significant correlation (p-value <0.05) between smoking status and the severity of inpatient CAP patients at Patut Patuh Patju Gerung Regional General Hospital, West Lombok.

Based on the estimated risk assessment (Odd Ratio) in Table 4, it was found that a smoker has a 19.33 times greater risk of experiencing moderate-severe CAP severity than a non-smoker, with a *p*-value of 0.000 indicating a significant result.

Table 5 shows the results of the correlation analysis of the two variable degrees of smoking and the severity of CAP, and it was found that the number of samples that were heavy smokers with moderate-severe CAP severity was one person (3.4%) but with low CAP severity was 0 (0.0%). The number of samples that were moderate smokers with moderate-severe CAP severity was 16 people (55.2%) but with low CAP severity was one person (16.7%). The number of light smokers with moderate-severe CAP severity was 12 (41.4%), but five people with low CAP severity (83.3%).

From the analysis results using the correlation test, the Spearman rank value is obtained with a *p*-value of 0.064 (*p*-value > 0.05) and a correlation coefficient of 0.316 with a positive value. This result shows no significant correlation between the two variables tested with a weak correlation strength. This analysis means no significant relationship (p-value >0.05) exists between the degree and severity of inpatient CAP patients at Patut Patuh Patju Gerung Regional General Hospital, West Lombok.

Table 3. Relationship between Smoking Status and CAP severity

Smoker Status	CAP Severity Level				Total	*p*-value	r
	Moderate-Heavy		Low				
	N	%	N	%			
Smoker	29	80.6	6	17.6	35		
Non-Smoker	7	19.4	28	82.4	35	0.000	0.629
Total	36	100.0	34	100.0	70		

Table 4. Estimated Risk of Smoker Status with Severity of CAP

Smoker Status	CAP Severity Level		Total	OR	95% CI		*p*-value
	Moderate-Heavy	Low			Lower	Upper	
Smoker	29	6	35				
Non-Smoker	7	28	35	19.33	5.778	64.689	0.000
Total	36	34	70				

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Table 5. Relationship between Smoking Degree and CAP Severity

Smoking Degree	CAP Severity Level				Total	*p*-value	r
	Moderate-Heavy		Low				
	N	%	N	%			
Heavy Smoker	1	3.4	0	0.0	1		
Moderate Smoker	16	55.2	1	16.7	17	0.064	0.316
Light Smoker	12	41.4	5	83.3	17		
Total	29	100.0	6	100.0	35		

DISCUSSION

Pneumonia is a lower respiratory tract disease usually caused by an infectious agent that results in inflammation of one or both lung tissues[10]. Pneumonia is broadly divided into community-acquired pneumonia (CAP) and hospital-acquired pneumonia (HAP, which includes ventilation-associated pneumonia (VAP)). Community-acquired pneumonia is a lower respiratory tract infection acquired outside the hospital environment[3]. One of the factors that can cause CAP is smoking. In this case, smoking can cause an increase in the level of oxidative stress in all tissues, especially in the lung tissue, which results in aggravation of lesions in the lung epithelium, connective tissue, and vascular endothelium, and causes an increased response to the inflammatory cascade of infections and even at lower smoke intensities. This condition also causes tobacco smoke to be considered a potential hazard of CAP in smokers[8].

According to Table 1, the number of smokers in this study was the same as that of non-smokers (50.0%). This condition was because, in this study, researchers wanted to analyze the relationship between smoker status and the exposure level of inpatient CAP patients with severe CAP, moderate or low. Therefore, the researchers equated the number of samples for the 2-factor groups so that they could be normally distributed.

Table 1 also shows that the highest level of CAP severity is in the moderate-severe CAP group (51.4%). These results indicate that this research is strengthened by the results of research conducted by Surjanto et al., which stated that degrees IV (moderate risk) and degrees V (severe risk) (53.6%) are more than degrees I-III (low risk) (46.4%) followed by a higher in-hospital mortality rate, namely 54.5% at moderate risk and 40.9% at severe risk[11]. This condition is because the severity of community pneumonia is influenced by the patient's age, comorbidities, and the results of investigations[12]. The age of the most significant sample in this study was <45-54 years. This study was inconsistent with research conducted by Eshwara et al. and Ferreira-Coimbra et al., which stated that the severity of CAP developed in the elderly (≥65 years)[13,14]. This condition is because the elderly sample (≥65 years) in this study contained more exclusion criteria. After all, the sample was a former smoker (ex-smoker).

Apart from age, the incidence of CAP is also influenced by comorbidities[14]. Comorbidities found in this study were that 1 sample had malignancy (Ca prostate), seven samples had heart disease, three had kidney disease, two had mental status changes, and 1 sample had

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liver disease. Based on data from medical records of CAP patients at Patut Patuh Patju Gerung Regional General Hospital, West Lombok, this study found 14 samples with comorbidities from 70 samples. Abnormalities in the sample supporting examination in this study found abnormalities in the results of vital signs examination, blood gas analysis, complete blood count, electrolyte examination, GDS examination, and radiological examination. The results of this investigation are strengthened by research conducted by Eshwara et al., which showed that the diagnosis and assessment of the severity of CAP also showed abnormalities in the results of vital signs, biomarkers, and radiological examinations[13].

Table 2 shows the smoker consumes 11-20 cigarettes daily (51.4%) and over 21 years (57.1%). In the Brinkman index indicated 48.6% (light and moderate smokers). This result is in line with Ng et al., smokers in Indonesia are classified as medium-class (moderate) smokers[15]. Although the smoking duration of the sample patients in this study was the majority ≥21 years with mild and moderate smoking results, these results were in line with a study conducted by Sundari et al., which stated that the number of cigarettes consumed had a low correlation with the smoking duration with results (r= 0.219, *p*-value= 0.237), the more prolonged smoking, the more cigarettes consumed[16]. However, because it has a low correlation, it can also be interpreted that someone new to smoking does not mean that he will consume fewer cigarettes, or vice versa. Those who have smoked for a long time will also consume more cigarettes.

Table 3 shows a significant relationship between smoking status and the severity of CAP in inpatient CAP patients at the Patut Patuh Patju Gerung Regional General Hospital, West Lombok, with a Spearman rank test of 0.000 with a strong correlation strength of 0.629. This result is supported by research conducted by Fauzan, which shows a relationship between smoking habits and the severity of CAP based on the PSI score[9,] and research conducted by Heo et al., which stated that someone who was exposed to cigarette smoke (smokers) showed a higher risk of pneumonia than those who were not exposed to cigarette smoke with a log-rank value of p= 0.0117. Patients who were former smokers or currently smoked showed a median overall survival or shorter overall survival than those who had never smoked or were exposed to secondhand smoke, with a log-rank result of p<0.001[17].

Baskaran also strengthened this research by stating that smoking is known to be one of the most common causes of morbidity and mortality in high-income countries and is a risk factor that needs attention in the development of CAP. This condition is because smoking tobacco can damage one of the protections of the respiratory tract, namely by damaging the mucociliary clearance, which causes an increase in mucus production and an abnormal number of cilia in addition to a decrease in the frequency of ciliary beats. In addition, smoking can also change the shape of the buccal epithelial surface, which results in increased adherence to the pneumococci compared to those who have never smoked. Increased bacterial adherence may lead to more significant colonization of the orophar-

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ynx and a more increased risk for the development of CAP[7].

The respiratory epithelium is the body's first line of defense in the respiratory tract against pollutants and pathogens that enter the lungs. Cigarette smoke can directly damage the airway epithelial barrier and ciliated cells, goblet cells, basal cells, and submucosal secretory glands. Chemical substances present in cigarette smoke can also interfere with the continuity of ciliary movement, which can cause mucus hypersecretion and delay mucociliary clearance to facilitate the colonization and reproduction of pathogens. In addition, cigarette smoke disrupts basal stem/progenitor cell metabolism in the human airway and can affect the mucociliary epithelium. Apart from damaging the basal metabolism of the airways and mucociliary epithelium, smoking can also cause a decrease in the cough reflex in humans, which is one of the human body's protective mechanisms in preventing pathogens from entering the respiratory tract. [18,19].

Research conducted by Lan et al. showed that ciliated epithelial cells of the ciliated piston were then exposed to various concentrations of cigarette extracts, which showed a decrease in cell survival time correlated with the length of exposure and the concentration of the extract. These cells morphologically show signs of apoptosis. One well-known study often used as reference material is Stanley et al., conducted in 1986[20]. This research became the basis for other studies, such as by Tamrin, which described in detail the effects of cigarette smoking on mucociliary transport (TMS) and ciliary beat frequency. The results of this study indicate that when examining TMS using the Saccharin method modified by Rutland and Cole in subjects who have smoked for a long time (at least five years, more than ten cigarettes per day), there is a significant difference in TMS compared to patients who have not actively smoked throughout their lives[20]. Therefore, this study used a sample of smokers who had been actively smoking for at least five years.

Smoking can also increase the risk of systemic infection through changes in the function of the cellular and humoral immune systems. In addition, smoking also interferes with the function of polymorphonuclear leukocytes, which in this case play an essential role in host defense against bacterial infection, reducing the number of CD4+ T cells resulting in a decrease in antibody-secreting B (thus reducing serum immunoglobulin levels by about 10%), causing an increase in CD8+ T cells, and the secretion of proinflammatory cytokines such as IL-1 and IL-6 is decreased[7].

Tobacco smoking exposure may increase susceptibility to CAP through several mechanisms that promote respiratory infection by suppressing normal defense functions. This condition is related to the presence of lung lesions and changes in innate and adaptive immune responses because of smoking which causes the colonization of pathogenic microorganisms in the bronchi of the lungs. Also, smoking can increase oxidative stress in all tissues, especially lung tissue, thereby exacerbating lesions in the lung epithelium, connective tissue, and vascular endothelium, leading to an increased response to the inflammatory cascade of infection, even at low levels of cigarette smoke[8].

The presence of reactive oxygen species (ROS) in cigarette smoke can disrupt mito-

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chondrial function in airway epithelial cells by reducing the ability of mitochondria to produce ATP resulting in mitochondrial dysfunction. Mitochondrial dysfunction results in progressive cellular necrosis and inflammation in the lung, increasing susceptibility to infection. Free airborne nitric oxide is released endogenously by nitric oxide synthase and interacts with ROS and oxygen free radicals to form other reactive nitrogen species (RNS) after inhaling cigarette smoke. Increased levels of ROS and RNS due to smoking can interfere with cell function by damaging DNA, lipids, proteins, and carbohydrates, inducing several pathological conditions such as apoptosis and necrosis. In cigarette smoke, free radicals in large quantities can damage the integrity of the respiratory tract and alveolar epithelial cells, thus increasing the possibility of infection[21,22]. This condition also causes tobacco smoke to be considered a potential hazard of CAP in smokers.

The research design used is case-control, with estimated relative risk expressed by calculating the Odd Ratio (OR) and a confidence interval (*confidence interval*). In Table 4, the OR calculation results in the sample case group (moderate-severe CAP) and the control group (low CAP) in smokers and non-smokers obtained OR= 19.33 with a confidence interval (95% CI) 5.778-64.689, which means that a smoker has a 19.33 times greater risk of experiencing moderate-severe CAP severity than a non-smoker. This result is reinforced by research conducted by Jiang et al., which stated that research conducted by Baik et al. showed that the risk of CAP in smokers is approximately 1.5 times that of non-smokers with a 95% confidence interval: 1.00-2.14, not bound of every gender. In addition to the study by Jiang et al. at, the study conducted by Nourtie et al. also confirmed that smoking is one of the primary and most substantial independent risk factors for the development of invasive pneumococcal disease, and the morbidity of CAP in smokers is 4.1 times that of non-smokers with 95% CI intervals: 2.4-7.3.[23].

Table 5 displays the results of the study of the degree of smoking on the severity of CAP, together with the correlation test findings' significant value. There was no association between the degree of smoking and the severity of CAP in inpatient CAP patients at Patut Patuh Hospital, Patju Gerung, West Lombok, according to a Spearman rank of 0.064 and a weak correlation strength of 0.316. This result is in line with research conducted by Fauzan, which states that there is no significant relationship between the degree of smoking and the severity of pneumonia[9], besides the research conducted by Salsabila & Yuniarti showed that the *p*-value was 0.921. The *p*-value in this study is greater than 0.05, so it can be concluded that there is no statistically significant relationship between the degree of smoking (during smoking and the number of cigarettes consumed) and symptoms of respiratory system disorders.[24]

In this study, there were no samples who consumed more than 20 cigarettes per day, so this study was not in line with the results of a study conducted by Jiang et al. according to this study, for male smokers who smoke more than 25 cigarettes per day, the development of CAP severity can increase 2.54 times compared to non-smokers[23]. Also, the results of this study are not in line with research conducted by Almirall et al., which showed that for smokers who smoked more than 20 ciga-

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rettes per day, the risk of developing CAP increased by 3.89 times[25]. However, the correlation analysis of smoking degrees with the severity of CAP in this study was strengthened by research conducted by Tanzila et al., which stated that there was no significant relationship between smoking duration and several cigarettes and respiratory frequency. In that study, more smokers consumed 11-20 cigarettes[26]. According to research conducted by Pitaloka & Wibisono, increased respiratory frequency indicates a decrease in compliance or lung function, which will also affect the availability of oxygen in the blood, which can increase the mortality rate of community pneumonia patients[27]. Therefore, this study shows no relationship between the degree of smoking and the severity of CAP. The absence of a bivariate analysis relationship between the degree of smoking and the severity of CAP could be because, in this study, the number of sample smokers was small; namely, 35 samples and the samples were not evenly distributed. After all, one column had a value of 0, so the data was not normally distributed.

In Table 5, it can also be seen that the number of smokers, both heavy, moderate, and light smokers, who experience moderate-severe CAP severity is more than the number of smokers (light, moderate, and heavy) in the low CAP severity group, with each numbering 29 and 6 samples. This result shows that in this study, although the results of the bivariate analysis of the degree of smoking and the severity of CAP did not have a significant relationship, each smoker (mild, moderate, and heavy) was found to have more severe CAP (moderate-severe) than low CAP severity. This condition is comparable to a study conducted by Salsabila & Yuniarti, which examined the smoking degree of both low, moderate, and heavy smokers, and found more in patients with abnormal respiratory system disorders. However, these results did not show any specific relationship. In this study, 16 samples were obtained from low, moderate, heavy, and non-smokers with a normal respiratory system, while 61 samples were found for low, moderate, heavy smokers and non-smokers with an abnormal respiratory system[24].

This study correlates smoking status with the severity of CAP and links it with the degree of smoking. This condition is based on smoking can increase SIR (Systemic Inflammatory Response), which impacts the presence of complications in the pleura and increases the severity of CAP, according to a study conducted by Crisafuli[8]. The results of this study indicate that someone who actively smokes is at risk of experiencing moderate-severe CAP severity. The results of this study are reinforced by a study conducted by Baskaran which showed that there is strong evidence that active smokers and former smokers are at significantly higher risk of developing CAP[7]. However, the causality relationship between smoking status and the severity of CAP based on the current PSI score still requires further evidence and theory. This result is because other factors can also exacerbate CAP, such as age and comorbidities[14]. The more frequent smoking and the more significant number of cigarettes consumed daily by this study sample do not indicate that someone has moderate-severe CAP. This condition is because this study has limitations, showing insignificant results. It should be remembered that even though there is no significant relationship, reducing consumption of the number of cigarettes per

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day and duration of smoking is necessary. This result is because everyone who actively smokes in this study is at risk of experiencing moderate-severe CAP severity regardless of the smoker's smoking degree. Therefore, further research is needed regarding the degree of smoking and other factors that can increase the severity of CAP.

The researchers did not differentiate samples of non-ICU inpatients and ICU inpatients, the number of samples in this study was relatively small; namely, 70 samples for the entire sample and 35 samples of smokers, and the researchers did not examine and link several other risks that can affect the severity of CAP, such as age, comorbidities, and medical history. So, it is suggested for further research to group patients into moderate CAP patients (controls) and severe CAP (cases) based on the PSI score, distinguish non-ICU inpatients from ICU inpatients, increase the number of samples in future studies to get maximum results, and examined other factors that could lead to the severity of CAP in hospitalized patients. Therefore, from the limitations of this study, further research is needed regarding the degree of smoking and other factors that can increase the severity of CAP.

The advice that can be given to health workers is to carry out outreach and education activities to increase public knowledge regarding the relationship between smoking status and the severity of CAP, as well as educate the public regarding efforts to stop smoking to prevent CAP from occurring and increasing the severity of CAP.

CONCLUSION

The conclusions that can be given from the problems that exist in this research are that there is a significant relationship between smoker status and the severity of CAP in inpatients at Patut Patuh Patju Gerung Regional General Hospital, West Lombok, with an estimated risk of 19.33, which means that a smoker has a risk of 19.33 times more significant to experience moderate-heavy CAP weight than a non-smoker. In addition, there was no significant relationship between the degree of smoking and the severity of CAP in hospitalized patients at Patut Patuh Patju Gerung Regional General Hospital, West Lombok.

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