



# THE POTENTIAL EFFECT OF DECREASED LUNG FUNCTION ON SLEEP QUALITY OF FARMERS IN KELURAHAN ANTIROGO KECAMATAN SUMBERSARI KABUPATEN JEMBER

## POTENSI PENGARUH PENURUNAN FUNGSI PARU TERHADAP KUALITAS TIDUR PETANI DI KELURAHAN ANTIROGO KECAMATAN SUMBERSARI KABUPATEN JEMBER

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### ABSTRACT

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**Introduction:** Indonesia is an agrarian country with the majority of its population working in the agricultural sector. The Indonesian agricultural sector ranks first in the number of workplace accidents, including the incidence of lung disease. The factors that most influence respiratory problems in farmers are the result of exposure to pesticides and unhealthy smoking behavior. Lung disease experienced by farmers often affects sleep quality. Poor sleep quality is caused by shortness of breath, coughing, and excessive production of secretions. Inadequate sleep causes physical disturbances. This study aims to analyze the potential effect of decreased lung function on the sleep quality of farmers.

**Methods:** This is a quantitative research that uses interviews with respondents using two questionnaires. The research sample used purposive sampling with 38 respondents in Kelurahan Antirogo, Kecamatan Sumbersari, Kabupaten Jember. The instruments used are the Lung Functioning Questionnaire and the Pittsburgh Sleep Quality Index (PSQI) and the correlation between variables was evaluated using Paired T-Test.

**Result:** The results show that there is a significant decrease in the value of Sig. (2-tailed) 0.000 ( $p < 0.05$ ). The explanation was added by linking the discussion to decreased lung function on the Lung Functioning Questionnaire indicators, such as cough intensity, additional breath sounds, shortness of breath, and duration of smoking. In addition, a discussion was also given regarding the decline in lung function by type of gender, age, education, and occupation.

**Conclusion:** An indication of decreased lung function is a factor that can affect sleep quality.

**Keywords:** Farmers; Lung Disease; Sleep Quality

### ABSTRAK

**Pendahuluan:** Indonesia merupakan negara agraris dengan mayoritas penduduknya bekerja di sektor pertanian. Sektor pertanian Indonesia menempati urutan pertama dalam jumlah kecelakaan kerja, termasuk kejadian penyakit paru-paru. Faktor yang paling mempengaruhi gangguan pernapasan pada petani adalah paparan pestisida dan perilaku merokok yang tidak sehat. Penyakit paru-paru yang dialami petani seringkali mempengaruhi kualitas tidur. Kualitas tidur yang buruk disebabkan oleh sesak napas, batuk dan produksi sekret yang berlebihan. Kurang tidur menyebabkan gangguan fisiologis. Penelitian ini bertujuan untuk menganalisis adanya potensi pengaruh kondisi penurunan fungsi paru terhadap kualitas tidur petani.

**Metode:** penelitian ini merupakan penelitian kuantitatif yang menggunakan metode wawancara terhadap



responden menggunakan dua kuesioner. Sampel penelitian menggunakan purposive sampling dengan jumlah responden 38 orang di Kelurahan Antirogo, Kecamatan Sumber Sari, Kabupaten Jember. Instrumen yang digunakan adalah Lung Functioning Questionnaire dan Pittsburgh Sleep Quality Index (PSQI) dan korelasi antar variabel dievaluasi menggunakan Paired T-Test.

**Hasil:** Hasil penelitian menunjukkan bahwa terdapat nilai yang signifikan yakni 0,000 ( $p < 0,05$ ). Ditambahkan penjelasan yang berkaitan dengan pembahasan penurunan fungsi paru pada indikator Lung Functioning Questionnaire, yakni intensitas batuk, suara napas tambahan, sesak napas, dan lamanya kebiasaan merokok. Selain itu juga diberikan pembahasan mengenai penurunan fungsi paru menurut jenis kelamin, usia, pendidikan, dan pekerjaan.

**Kesimpulan:** Indikasi penurunan fungsi paru merupakan faktor yang dapat mempengaruhi kualitas tidur.

**Kata kunci:** Kualitas Tidur; Petani; Penyakit Paru

## INTRODUCTION

One of the health problems that often arise and affect the health of farmers is respiratory problems in the form of decreased lung quality. The factors that most influence respiratory problems in farmers are the result of exposure to pesticides and unhealthy smoking behavior.<sup>17,22</sup> Smoking habits and exposure to pesticides through the respiratory tract are known to cause a decrease in lung function, in the form of decreased lung function, respiratory tract irritation, COPD, narrowing of the respiratory tract, and asthma.<sup>17</sup> COPD cases can occur due to smoking habits which can damage the bronchial epithelial tissue in the cilia, goblet, and club cells. Smokers have the highest prevalence of respiratory disorders and decreased lung function, but not all smokers can experience COPD. In addition, at the age above 50 years, the cardiorespiratory system will experience a decrease in function. Increasing age causes the elasticity of the lung tissue and chest wall to decrease, making breathing difficult.<sup>14</sup>

Lung problems, such as COPD, can cause sleep disturbances, including an increased prevalence of insomnia, increased use of sleeping pills, and excessive daytime sleepiness that can reduce productivity.<sup>21</sup> A descriptive study reported that in patients with respiratory disorders, there was a decrease in sleep quality in 74.8% of COPD patients.<sup>5</sup> Decreased lung function, one of which is caused by smoking among farmers, can cause symptoms in the form of changes in ventilation at night, coughing and wheezing. These symptoms can cause farmers to have difficulty initiating and maintaining sleep with consequences in the form of decreased productivity due to daytime sleepiness, cognitive changes, and decreased immunity so that they predispose to acute COPD exacerbations.<sup>21</sup>

Indonesia is an agrarian country with the majority of its population working in the agricultural sector. This is also supported by data from the Badan Pusat Statistik (Indonesian central statistics

agency) in 2017 which noted that the number of Indonesians working in the agricultural sector reached 39.68 million people.<sup>17</sup> As an agricultural country, the agricultural sector is also one of the jobs with the most workers. In Kabupaten Jember, Jawa Timur, until August 2018 it was recorded that 43% of the population worked in agriculture.<sup>3</sup> Despite being the sector that dominates employment in Indonesia, PUSDATIN (Data and Information Center of Indonesian Health Ministry), the agricultural sector ranks first in the number of workplace accidents, which reached 29.27%.<sup>16</sup>

Now, cigarettes are still a problem in Indonesia. Even the WHO noted that Indonesia became the third country with the highest number of active smokers in the world, after China and India. According to data from the Indonesian Ministry of Health, in 2013, the number of smokers in Indonesia reached 24.3%.<sup>1</sup> Meanwhile, the Global Adults Tobacco Survey in 2011 noted that based on geographic area position, the number of smokers was mostly found in rural areas, namely 37.7%. This number is slightly higher than the number of smokers in urban areas (31.9%). Smoking behavior among farmers in Jember has become a daily habit and has become a lifestyle. According to previous research, out of 179 farmers, 97 farmers (54.2%) in Jember Regency are active smokers.<sup>23</sup>

Nurses have an important role in increasing knowledge through health education. In addition, healthcare facilities can be used to treat symptoms or diseases that arise. From this background, the authors conducted a study to determine the relationship between the potential effect of decreased lung function on the sleep quality of farmers in Kelurahan Antirogo, Sumber Sari, Jember. This study aims to determine the potential effect of decreased lung function on the sleep quality of farmers.



## RESEARCH METHOD

### Design

A descriptive cross-sectional design was used in conducting the study. Farmers were asked to complete a questionnaire regarding lung function and sleep quality.

### Setting

The study was conducted in Kecamatan Summersari, Kabupaten Jember on June 10, 2022.

### Sample

The sample of this study is 38 farmers working in the field. Data were collected by purposive sampling.

### Data Collection and Tools

Inclusion criteria include: 1) Male farmers, 2) Farmers who are willing to participate in the study, 3) Farmers who have a smoking habit, 4) domiciled in Summersari, Jember. Exception Criteria include: 1) Female farmers, 2) Farmers who are not willing to become respondents.

There are two instruments used in this study. Lung function was assessed using the item Lung Functioning Questionnaire.<sup>9</sup> It consisted of five item questions (age; smoking history; the presence of wheeze, dyspnea, and phlegm).

The Pittsburgh Sleep Quality Index was used to assess farmers' sleep quality. It consisted of 19 self-rated questions assessing a wide variety of factors relating to sleep quality, including estimates of sleep duration, latency, and the frequency and severity of specific sleep-related problems.<sup>4</sup>

### Data Analysis

A compatible personal computer was used to store and analyze data. The Statistical Package for Social Studies (SPSS) was used. Correlation between variables was evaluated using Paired T-Test. Test Significance was adopted at  $p < 0.05$  for interpretation of results of tests of significance.

## RESULT

### General Data

The characteristics of respondents include gender, age, and education in farmer groups in Kecamatan Summersari, Kabupaten Jember on June 10, 2022.

**Table 1.** Characteristics of Farmers

Characteristics of Respondents	Frequency	Percent
Gender		
Male	38	100
Female	0	0
Total	38	100
Age		
< 40 years	10	26,3
40-49 years	9	23,7
50-59 years	9	23,7
60-69 years	9	23,7
≥ 70 years	1	2,6
Total	38	100
Level of Education		
No school	4	10,5
ES	20	52,6
JHS	4	10,5
SHS	9	23,7
Bachelor	1	6,7
Total	38	100

In this study, all respondents were male as many as 38 respondents (100%). Based on age in the farmer group showed the majority of respondents were in the age range <40 years as many as 10 respondents (26.3%). In addition, the characteristics of respondents based on education showed that most of the farmer groups only received education at the elementary level as many as 20 respondents (52,6%). This treatment was chosen based on the author's decision to use the data in the analysis.

### Farmer's Lung Function

**Table 2.** Result of The LFQ

Characteristics of Respondents	Frequency	Percent
Phlegm Coughing		
Very often	8	21,1
Often	8	21,1
Seldom	6	15,8
Very rarely	8	21,1
Never	8	21,1
Total	38	100
Additional Breath Sounds		
Very often	4	10,5
Often	7	18,4
Seldom	4	10,5
Very rarely	9	23,7
Never	14	36,8
Total	38	100
Shortness of Breath		
Very often	2	5,3
Often	7	18,4
Seldom	6	15,8
Very rarely	11	28,9
Never	12	31,6



Total	38	100
Length of Smoking		
≤ 10 years	9	23,7
11-20 years	6	15,8
21-30 years	5	13,2
>30 years	18	47,4
Total	38	100

Characteristics of respondents based on the intensity of coughing up phlegm in farmers' groups showed that the majority of farmers' groups very rarely experienced phlegm coughing as many as 8 respondents (21.1%) and second place in the category often as many as 8 respondents (21.1%). Based on the intensity of additional breathing sounds in farmers' groups show that the majority of farmers' groups have never experienced additional breathing sounds as many as 14 respondents (36.8%) and in the category very often as many as 4 respondents (10.5%).

Characteristics of respondents based on the frequency of shortness of breath in farmers' groups show that the minority of farmers' groups is very often experiencing shortness of breath as many as 2 respondents (5.3%) and based on the frequency of smoking lengths in farmers' groups show that the majority of farmers smoking groups for >30 years as many as 18 respondents (47.4%).

### Farmer's Sleep Quality

**Table 3.** Result of The PSQI

Total Sleep Quality	Frequency	Percent
Very good	5	13,2
Fairly good	25	65,8
Fairly bad	4	10,5
Very bad	4	10,5
Total	38	100

Characteristics of respondents based on sleep quality variables in farmers' groups show that the majority of farmers' groups have a good enough sleep quality as many as 25 respondents (65.8%) and the lowest categories are the very bad categories of 4 respondents (8.9%).

### The Normality Test

Shapiro Wilk Normality Test Based on Variable Data Indications for Lung Function Decreased (X1.1) on Sleep Quality (Y1.1).

**Table 4.** Tests of Normality

	X1.1	Shapiro Wilk Sig.
Y1.1	13,00	
	14,00	,463
	15,00	,418

	16,00	,146
	17,00	,317
	18,00	,071
	19,00	
	20,00	,421
	24,00	

Based on the significance value ( $p > 0.05$ ) the data above shows that the normality test results use Shapiro Wilk and that the data is normally distributed because of the value of  $p > 0.05$ .

### The Decreased Lung Function on The Sleep Quality of Farmers

Paired T-Test Test Based on variable data X1.1 (decreased pulmonary physiology function) against Y1.1 (sleep quality).

**Table 5** Tests of Study

Paired Samples Test	
Pair	Sig. (2-tailed)
X1.1 - Y1.1	,000

Based on Table 5 shows the significant value of Sig. (2-tailed) 0,000 ( $p < 0.05$ ), which means that there is a sign of decreased lung function in the sleep quality of farmers.

## DISCUSSION

### Characteristics of Farmers Related to Decreased Lung Function on Sleep Quality

Based on the decrease in lung function according to gender, the characteristics of respondents based on gender showed that the majority of respondents were male as many as 38 respondents (100%). Labor at the maintenance stage by gender, men have an average outpouring labor 68.63 hours in a season, while women have an average labor outpouring of 6.51. This is because at the time of irrigating farmers have to turn on the diesel, cut and thresh rice which is commonly done by men.<sup>15</sup> Men have a higher risk factor for lung disease.<sup>18</sup> According to the ASEAN Tobacco Control Report Card in Indonesia there were 56.6 million active smokers in 2009, as many as 57% of men and 3.6% of Indonesian women are active smokers. The difference in these figures is related to the existence of a moral stigma in Indonesia. So that respondents who can meet the criteria in large numbers are men.

Characteristics of respondents based on age in farmer groups showed that the majority of respondents were in the age range <40 years as many as 10 respondents (26.3%). The results showed that there were various ages in farmers. However, most of the farmers who became respondents were farmers with ages < 40 years.



The anatomical respiratory system will gradually change with age. At the age of 30-40 years, the body's organs will experience a decrease in function, causing disturbances in the respiratory tract which triggers a decrease in a person's lung function.<sup>2</sup> The age of 22-24 years, a person's lung function experiences a maximum value. However, entering the age of 30 years, lung function would survive and even decrease.<sup>25</sup> This is what causes at the age of <40 years some farmers will feel a decrease in lung function which gradually worsens.

Meanwhile, the decrease in lung function according to the educational characteristics of respondents based on education shows that most of the farmer groups only received education at the elementary level as many as 20 respondents (52.6%). It can be said that most of the farmers are people with low education, meaning that they did not finish elementary, junior high, and high school. One of the factors that influence human behavior or society according to the level of knowledge. Where the higher a person's knowledge, the easier it is to receive information about disease prevention.<sup>8</sup> However, according to research that has been done, lack of education in farmers can be a factor in decreasing lung function due to lack of knowledge in its prevention.

For the decrease in lung function based on the type of work, it shows that most of the groups studied have jobs as farmers as many as 33 respondents (86.8%). This is because the area and place of our research are around the rice fields of the Summersari sub-district so the majority of respondents obtained are farmers. We examined the lung function of farmers because farmers are more often exposed to pesticides that trigger respiratory diseases. The work environment with people who work directly and are often exposed to pesticides are the group with the highest risk of exposure.<sup>24</sup> In this case, farmers are people who are directly and often exposed to pesticides and who are very at risk of having lung function disorders.

### **Indications of Decreased Lung Function of Farmers**

Characteristics of respondents based on the intensity of coughing up phlegm in the farmer group showed that most of the farmer groups experienced coughing with phlegm very often as many as 8 respondents (21.1%) and in the second place the intensity of coughing up phlegm in the farmer group. Frequent category as many as 8 respondents (21.1%). From the results of other studies, it was revealed that cough is one aspect of sleep disorders in clients with high levels of sleep disorders. Cough also has a significant effect on physical and psychosocial health which will affect the quality of life. Poor sleep quality can be a major

determining factor in determining a patient's quality of life.<sup>10</sup>

Characteristics of respondents based on the intensity of additional breath sounds in farmer groups showed that the majority of farmer groups never experienced an increase in breath sounds as many as 14 respondents (36.8%) and in the very frequent category as many as 4 respondents (10.5%). In previous studies, breath sounds were an indicator of sleep disturbances. Complaints of shortness of breath are often accompanied by an unnatural sound when breathing, causing the patient to be restless or uncomfortable and disrupting the sleep quality of farmers.<sup>19</sup> Sleep disorders in the form of abnormal breathing can cause a decrease in the quality of a person's sleep and affect his health.

Characteristics of respondents based on the frequency of shortness of breath in farmer groups showed that minority farmer groups very often experienced shortness of breath with as many as 2 respondents (5.3%). From previous studies, shortness of breath also affects the sleep quality of farmers. The most common sleep disturbances experienced by lung disease patients in their research were waking up at night, coughing, and being unable to breathe comfortably.<sup>10</sup> These disturbances cause anxiety in farmers so that they are easy to wake up.

The complaints of coughing while sleeping are often associated with farmers' daily habits and respiratory health conditions where most farmers ignore pesticide exposure in the respiratory tract.<sup>26</sup> Farmers are also less likely to wear PPE, which exacerbates lung disease. The Indonesian Ministry of Health states that if pesticides are inhaled, then inhaled and inhaled through the nose and mouth, toxic substances can enter the lungs and damage them, repeated exposure can also quickly enter the blood and spread toxins throughout the body and can cause death.<sup>14</sup> It was concluded that the presence of shortness of breath can cause anxiety in farmers and will increase at night will disrupt the sleep quality of farmers.

Characteristics of respondents based on the frequency of smoking duration in farmer groups showed that the majority of farmer groups smoked for > 30 years as many as 18 respondents (47.4%). From previous research, smokers showed more poor sleep quality and sleep disturbances than nonsmokers.<sup>13</sup> Farmers' smoking habits affect farmers sleep quality because of the nicotine content in cigarettes. Sleep disturbances in male smokers are caused by the direct influence of nicotine on cyclical neurons that causes awakening during sleep.<sup>7</sup> Cigarette use has a significant negative impact on mental health and also reduces a person's sleep quality.<sup>11</sup>



In addition, the habit of smoking can also be a trigger for coughing complaints at night. After a day of smoking a smoker inhales cigarette smoke, and the production of mucus and dirt in the respiratory tract increases, so the body will try to expel dirt and mucus to clear the respiratory tract by activating the cough reflex and causing the patient to become restless or uncomfortable and disturb the sleep quality of farmers.<sup>6</sup> So, it can be concluded that the length of time farmers smoke can interfere with the sleep quality of farmers because of the influence of nicotine which causes awakening during sleep and also the cough reflex due to the release of existing secrets.

### Limitations of Research

This research has been attempted and carried out by scientific procedures, but still has limitations and obstacles in the documentation. There are research limitations in the use of questionnaires since some respondents provide answers that cannot be accounted for, so the resulting data may not be able to measure the actual situation. However, in practice, the researcher explains and conveys things that are not understood by the respondents.

### CONCLUSION

Based on research conducted in Desa Antirogo, Kecamatan Sumpersari, Kabupaten Jember, it was found that there was a potential effect of decreasing lung function on sleep quality in farmers.

### SUGGESTION

The role of health workers is needed to provide education about maintaining the health of farmers and risk factors for lung disease, to minimize the number of cases of the disease in an area.

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