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Determinants of Lung Function Disorders in Rice Milling Workers in Kabila District, Bone Bolango Regency

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ABSTRACT

Impaired lung function in workers is influenced by factors of the working environment and individual characteristics. At the rice mill in Kabila District, Bone Bolango Regency, problems were found in the form of high levels of rice dust of the PM_{10} fraction. This study aims to analyze the determinants of lung function disorders in rice milling workers in Kabila District, Bone Bolango Regency.

Analytical observational research methods with cross-sectional design. The research population of all workers in five rice milling units, namely Mustika, Mutiara, Oluhuta, Helumo, and HP. Using a total sampling technique of 33 workers. Data was collected using interview guidelines, observation sheets, Peak Flow Meter to measure lung function, PM 10 fraction dust measuring device. Data analysis was carried out using the Fisher Exact test.

The results showed that there was no association between the level of rice dust of the PM_{10} fraction ($p=0.136$) and working period ($p=0.359$) with impaired lung function, while length of work ($p=0.036$) had a significant relationship with impaired lung function in rice milling workers.

The conclusions showed that length of work was associated with impaired lung function in rice milling workers, while the level of PM_{10} fraction rice dust and the working period were not associated with impaired lung function. It is recommended that workers limit working hours and use PPE consistently, and rice mill owners need to regulate working hours and provide a healthy working environment.

INTRODUCTION

The work environment has an important role in determining the health status of workers, especially in industrial sectors that are at high risk of exposure to hazardous materials such as dust. Dust levels that persist consistently can result in various health problems, such as impaired lung function. This problem often occurs but is not well realized, especially in work environments that have not implemented an optimal occupational health and safety (K3) system (Anissah et al., 2025).

Impaired lung function in workers is influenced by various factors, both from the work environment and individual characteristics. Environmental factors include the type and concentration of exposure, the size of dust particles, and the duration of daily exposure. While individual factors can include age, smoking status, history of respiratory diseases, habits of use of personal protective equipment, length of daily work, and total working period (Fathurrahman & Jayanti, 2014). Various occupational lung diseases include pneumoconiosis, silicosis, anthrax, asbestosis, bisinosis, bagassosis, occupational asthma, hypersensitivity pneumonitis, and chronic obstructive pulmonary disease (COPD) (Gita et al., 2024).

In Indonesia, lung health disorders are still a public health problem that requires serious attention. The Ministry of Health of the Republic of Indonesia reported that the prevalence of Chronic Obstructive Pulmonary Disease (COPD) reached 8.6% in the adult population. In line with these conditions, in Gorontalo Province as many as 182,139 people have been identified as having respiratory problems based on the results of the COPD screening program (Talamoa & Nurfadillah, 2025). One of the occupational sectors that is at high risk of lung function disorders is the rice milling industry, which plays an important role in meeting national food needs. The grain processing process, from drying to milling using a peeling machine and rice polisher, has the potential to produce large amounts of dust, increasing the risk of dust levels for rice milling workers (Saputra, 2021).

Bone Bolango Regency Regional Regulation Number 5 of 2021 concerning the Regional Spatial Plan (RTRW) 2021-2041, Kabila District has been designated as a Food Crop Agricultural Designated Area (Sustainable Food Agricultural Land/LP2B). The lush geomorphological conditions of the Bone river valley and flat topography are ideal for the existence of large rice fields in this region. The high level of agricultural activity has an impact on the large number of rice milling industries, making Kabila District a representative location to research the health risks due to the level of organic rice dust in workers (Bone Bolango Regency Regional Regulation, 2021).

Based on the results of initial observations, the results of the measurement of dust concentration in the air, especially rice dust of the PM_{10} fraction, carried out in the main milling area of the skin breaking machine and rice polishing showed a value of 2000 μg/m³. When compared to the national ambient air quality standard Threshold Value (NAV) based on Government Regulation Number 22 of 2021, the maximum permissible daily exposure limit of PM_{10} is 75 μg/m³. Thus, the concentration of dust in the air at the measurement point was recorded about 26 times higher than the set threshold. Excessive exposure to these fine particles has the potential to cause significant health impacts on the respiratory system of workers, including airway irritation, inflammation, decreased ventilation capacity, and increased risk of chronic lung disorders.

Based on the description above, it shows that the rice milling work environment is a high-risk area for the occurrence of lung function disorders in workers. The high dust level that far exceeds the NAV and the evidence of decreased lung function in all workers confirms the need to conduct a study on "determinants of lung function disorders in rice milling workers in Kabila District, Bone Bolango Regency"

RESEARCH METHODS

This study uses an analytical observational research method with *a cross-sectional* design. The research population of all workers in five rice milling units, namely Mustika, Mutiara, Oluhuta, Helumo, and HP. Using a *total sampling* technique of 36 workers. Data was collected using interview guidelines, observation sheets, *Peak Flow Meter to* measure lung function, PM 10 fraction dust measuring device. Data analysis was carried out using *the Fisher Exact* test.

RESULTS

Table 1 Distribution of respondents based on rice milling sites in Kabila District, Bone Bolango Regency

Name of Rice Mill	Quantity	
	n	%
The Crucifixion of the Priest	7	21,2
O'Neill Priest	9	27,2
Pearl Rice Mill	5	15,2
The Priest of Helumo	7	21,2
HP Rice Mill	5	15,2
Total	**33**	**100**

Table 1 shows that the most respondents came from the Oluhuta Rice Mill as many as 9 people (27.3%), while the least respondents came from the pearl rice mill and cellphone with a frequency of 5 people each (15.2%).

Table 2 The relationship between PM10 fraction rice dust levels and lung function disorders in rice mill workers in Kabila District, Bone Bolango Regency

Rice dust rate PM_{10} fraction	Impaired Lung Function						Total		*p-value*
	Green Zone (Normal)		Yellow Zone (Medium)		Red Zone (Weight)				
	n	%	n	%	n	%	n	%	
Below NAV	2	8,7	7	30,4	14	60,9	23	69,7	0,136
Diatas NAB	0	0,0	7	70,0	3	30,0	10	30,1	
Total	**2**	**6,1**	**14**	**42,4**	**17**	**51,5**	**33**	**100**	

Based on table 2, the results of *the fisher exact* test showed a p-value of 0.136 which was greater than 0.05, so it can be concluded that there was no significant relationship between the level of rice dust of the PM_{10} fraction and impaired lung function in rice milling workers in Kabila District, Gorontalo Regency.

Table 3 The relationship between working time and impaired lung function in rice milling workers in Kabila District, Bone Bolango Regency

Tenure	Impaired Lung Function						Total		*p-value*
	Green Zone (Normal)		Yellow Zone (Medium)		Red Zone (Weight)				
	n	%	n	%	n	%	n	%	
Risky	1	4,2	9	37,5	14	58,3	24	72.7	
No Risk	1	11,1	5	55,6	3	33,3	9	27.3	0, 359
Total	**2**	**2.0**	**14**	**14.0**	**17**	**17.0**	**33**	**100**	

Based on table 3, the results of the statistical test showed a p-value of 0.359, which means that there was no significant relationship between working time and impaired lung function in rice milling workers. Thus, the working period is not a factor that affects lung function disorders in this study

Table 4 Long-term relationship with lung function disorders in rice milling workers in Kabila District, Bone Bolango Regency

Length of Work	Impaired Lung Function						Total		*p-value*
	Green Zone (Normal)		Yellow Zone (Medium)		Red Zone (Weight)				
	n	%	n	%	n	%	n	%	
Risky	2	7,1	9	32,1	17	60,7	28	84,8	
No Risk	0	0,0	5	100	0	0,0	5	15,2	0,036
Total	**2**	**2.0**	**14**	**14.0**	**17**	**17.0**	**33**	**100**	

Based on table 4, the results of the statistical test using *Fisher exact* obtained a p-value of 0.036 which is smaller than 0.05, so it can be concluded that there is a significant relationship between working time and impaired lung function in rice milling workers in Kabila District, Bone Bolango Regency. This shows that the longer the period of occupational exposure, the greater the risk of lung function disorders in workers.

DISCUSSION

The Relationship between Rice Dust Content of PM_{10} Faction and Lung Function Disorders in Rice Mill Workers in Kabila District, Bone Bolango Regency

Based on the results of a statistical test using *the Fisher exact* test on rice milling workers in Kabila District, it showed a p-value of 0.136 (>0.05), so it can be stated that there is no significant relationship between the PM_{10} fraction rice dust level and lung function disorders. These results indicate that statistically, the dust levels measured in this study have not shown a meaningful relationship with the condition of lung function of workers.

The absence of a relationship between rice dust levels and impaired lung function in this study can be influenced by relatively supportive working environment conditions. Based on observations in the field, some milling sites have good air circulation and do not allow dust accumulation in the work area. This condition causes dust to spread more easily outside the work environment so that the exposure received by workers becomes lower and does not have enough impact on lung function. According to (Sekar et al., 2026), a good working ventilation system can help lower the concentration of dust in the air so that the exposure to dust received by workers is lower and the risk of impaired lung function can be reduced.

In this study, the level of rice dust of PM_{10} fraction below NAV in the green zone showed that there were 2 workers with normal lung function. This number suggests that only a small percentage of workers actually do not have lung disorders. This is supported by Research Evelina, (2020) suggests that dust levels PM_{10} below NAV can still have an impact on some workers, although not all of them show a decrease in lung function.

In the exposure group below NAV, in the yellow zone there were 7 workers who had mild lung function impairments. This condition shows that dust levels that are still within safe limits can still have an impact on lung function, especially if it occurs continuously for a long period of time. This is because NAV is not an absolute safe limit, but the average limit of exposure that can still be tolerated under certain conditions, so chronic exposure, even if low, still has the potential to cause gradual disruption of the respiratory system. In addition, the accumulation of fine dust particles such as PM_{10} in the airways can cause irritation and mild inflammation that lasts for a long time, thus slowly degrading lung function until it is classified as mild. This is supported by research by Wulandari et al. (2018) which states that the continuous level of rice dust can cause impaired lung function even though the concentration is not high.

A more dominant condition was seen in the exposure group below NAV in the red zone, where there were 14 workers with severe lung function impairments. Dominance in this category suggests that exposure values below NAV (Threshold Values) do not necessarily guarantee safe conditions, as NAV is essentially the average limit of exposure and not an absolute safe limit. Therefore, low dust levels that occur continuously over a long period of time can still cause chronic effects on the lungs due to the accumulation of particles such as PM_{10} in the respiratory tract. According to Kaleta Kozielska, (2023), continuous exposure to PM_{10} over the long term can increase the risk of respiratory system disorders even though particulate concentrations are at relatively low levels.

In addition, the exposure measurements carried out in the study are generally momentary (spot measurement), so they are not able to describe the cumulative exposure that workers have received over the years. This condition allows workers to have previously been exposed to higher dust concentrations. Another factor that plays a role is the length of work, where the longer a person works, the greater the accumulation of exposure received, thus increasing the risk of lung function disorders. This is supported by research by Yuliani Setyaningsih (2023) which shows that impaired lung function can still be found in workers even though the dust level is below the Threshold Value (NAV).

At exposure above NAV, the absence of workers in the green zone indicates that there are no workers with normal lung function under high exposure conditions. This indicates that dust levels that exceed the threshold tend to have a direct impact on decreased lung function. This is supported by research Sihombing et al., (2017) which states that high dust levels increase the risk of impaired lung function.

At the exposure above NAV in the yellow zone, there were 7 workers who had mild to moderate lung function disorders. This condition can be interpreted as the initial stage of the impact of high dust levels on the respiratory system. Research Kurniawan et al., (2020) also showed that exposure to PM_{10} above the threshold value was associated with an increased incidence of mild to moderate category lung function impairment, especially in the early phases of exposure and at certain durations of work.

Dust levels in high concentrations are known to have a more serious impact on lung function, especially if they persist for a long period of time. Large amounts of inhaled dust particles can penetrate deeper into the respiratory tract, causing heavier inflammation to damage to lung tissue. This condition increases the risk of severe lung function disorders in workers. This is in line with research Anselma et al., (2018) which states that high dust levels increase the risk of severe lung disorders. In line with this, at a more severe level, the group with exposure above NAV in the red zone showed that there were 3 workers who had severe lung function impairments. Although the number is less than that of the group below NAV, this condition still suggests that high dust levels have the potential to cause serious disturbances, especially if they occur in the long term.

Based on observations in the field, the working environment conditions at the rice mill in Kabila District show quite clear variations between locations with dust levels below and above NAV. Mills with dust levels below NAV generally have a semi-open building, use partial walls or without full partitions, and have natural vents such as windows or air gaps that allow dust to escape from the work area. In addition, in some places there is a chaff and dust removal system that is directly drained out through a chimney or special channel so that it does not accumulate in the room.

In mills with dust levels above NAV, building conditions tend to be closed, workspaces are narrow, ventilation is inadequate, and the grinding process produces dust that spreads and settles in the room without an effective suction or dust removal system. This condition causes the concentration of dust to increase and last longer in the air, increasing the risk of inhalation by workers.

This research is in line with research Saputra, (2021) The study found that there was no significant association between dust levels and impaired lung function, with the *p-value* > 0.05. These results show that dust levels that are still at low levels or below the Threshold Value (NAV) have not had a meaningful impact on the lung function of workers.

The Relationship of Working Time with Lung Function Disorders in Rice Milling Workers in Kabila District, Bone Bolango Regency

Based on the results of the analysis of the relationship between working time and lung function disorders in rice mill workers in Kabila District, Bone Bolango Regency, using *the Fisher exact* test, a p-value *of 0.359 (p > 0.05) was obtained*. This value indicates that there is no statistically significant relationship between the working life variable and impaired pulmonary function.

Working time is often used as an indicator of the length of exposure to hazards in the work environment, including the level of organic dust in rice mill workers. The longer the working life, the greater the accumulation of dust received, so the risk of impaired lung function also increases. However, in this study, no significant relationship was found between the working period and impaired lung function. A long working period is not always synonymous with the high dust exposure that workers receive, because workers who have been working for a long time generally understand safe work procedures and are more compliant in the use of personal protective equipment and efforts to control dust exposure during work. Consistent adherence to work procedures and use of PPE can help reduce the amount of dust inhaled so that the risk of lung function disorders can be reduced even though the working period has been long. According to Abateneh et al., (2024), the implementation of safe work

practices and the consistent use of personal protective equipment are associated with lower complaints of respiratory distress in workers exposed to dust in the work environment.

In the group of workers with a risky working period in the green zone, there is 1 person who still has lung function in the normal category. This condition shows that even though workers have been in the category of risky working periods, not all individuals immediately experience impaired lung function. This can be influenced by the existence of protective factors such as consistent use of personal protective equipment (PPE), compliance with work procedures, and the physical condition of the individual who is still good. In addition, variations in the intensity of dust levels in the work environment also play a role, where workers may be in areas with lower dust concentrations. Lifestyle factors such as not smoking and not having a history of lung disease also help keep lung function normal. This is supported by research (Lumantow et al., 2018) which states that not all workers with a working period are at risk of impaired lung function due to other influencing factors.

In the risky working period group in the yellow zone, there were 9 people who experienced mild to moderate lung function impairments. An increase in the number in this zone indicates a tendency that the longer the working period, the more likely it is that there will be a decrease in lung function. The yellow zone reflects the initial condition of physiological disorders due to the accumulation of dust in the respiratory tract that triggers chronic inflammation. In addition, age factors and smoking habits can also accelerate the decline of lung function. Continuous exposure without optimal protection can lead to continued airway irritation. This is in line with research (Rahmawati et al., 2019) which shows that the longer a person's working life, the greater the risk of decreased lung function due to accumulated dust levels.

A more serious condition was seen in the group of risky working periods in the red zone, namely as many as 14 people experienced severe lung function disorders. This number indicates a tendency to increase the severity of the disorder over the length of the working period. Chronic dust levels, particularly fine particles such as PM_{10}, can reach the alveoli and cause permanent damage to lung tissue as well as disruption of gas exchange. In addition, the lack of control of the work environment and the non-optimal use of PPE can worsen this condition. Research by (Talamoa & Nurfadillah, 2025) suggests that the period of service at risk is associated with severe pulmonary function disorders, especially in workers with a working period of more than 10 years.

Moving to the working period group is not risky, in the green zone 1 person with normal lung function was found. This shows that a shorter working period tends not to have a significant impact on lung function because the accumulation of dust levels is still minimal. In addition, workers in this group generally have better physical conditions and optimal immunity. However, there are still other possible factors that affect this condition such as high intensity of momentary exposure. Research by (Subarkah et al., 2017) indicates that workers with short working periods tend to have normal lung function because there has been no significant accumulation of exposure.

In the non-risky working period group in the yellow zone, there were 5 people who experienced mild to moderate lung function disorders, this shows that even though the working period is not long, impaired lung function can still occur. This indicates that the duration of exposure is not the only determinant, but there are other factors such as high dust intensity, behavior not using PPE, and smoking habits. Poor working environment conditions can also accelerate the occurrence of disturbances. This is supported by research by (Fariq, 2021) shows that even though the working period is not long, impaired lung function can still occur due to other factors such as high intensity of dust levels, suboptimal use of PPE, and smoking habits.

In the non-risky working period group in the red zone, 3 people were found to have severe lung function disorders. These results show that severe impairment is not only experienced by workers with long working periods, but can also occur in short working periods if there are other strong risk factors. These factors include high dust levels, heavy smoking habits, and not using PPE. In addition, possible exposure from an outside work environment can also worsen lung conditions. Research by (Anes et al., 2015) shows that behavioral factors such as smoking and not using PPE play a major role in severe lung function disorders, even in workers with a short working period.

Overall, there were 24 people in the at-risk working age group, indicating that most respondents were in this category. The distribution of impaired lung function in this group was dominated by the yellow zone and the red zone, which indicated a tendency to increase the disorder over the length of the working period. This is in line with the theory that chronic exposure to dust can lead to a gradual decline in lung function. However, the still finding of workers in green zones shows that protective factors still play an important role.

In the non-risk working group there were 9 people, with the distribution of lung function disorders which were also found in the yellow and red zones. This suggests that even though the working period is shorter, impaired lung function can still occur if workers are exposed to high-intensity dust or do not use adequate protection. This study emphasizes that prevention efforts must be carried out comprehensively regardless of the length of the working period.

The characteristics of work in rice milling that are seasonal also affect the results of this study. Although some workers have a working period that has lasted for many years, rice milling activities are generally only carried out during the harvest season, which can occur about three times in a year. This condition causes the dust level received by workers to not last continuously throughout the year, but is intermittent. As a result, the accumulated dust levels received by workers are relatively lower compared to jobs that have continuous exposure every day, so long working periods do not directly increase the risk of lung function disorders.

This research is in line with the results of a study conducted by (Fariq, 2021) which stated that there was no significant association between working time and impaired lung function in concrete company workers (p = 0.648). These results show that working time is not the only factor that affects lung function disorders, but there are other factors such as the intensity of exposure, the use of personal protective equipment, and the conditions of the work environment that play a role in determining the risk of lung function disorders.

Long-Term Relationship with Lung Function Disorders in Rice Milling Workers in Kabila District, Bone Bolango Regency

Based on the results of the statistical test using *the Fisher exact* test, a p-value of 0.036 ($p < 0.05$) was obtained. This shows that there is a significant relationship between working time and impaired lung function in rice milling workers in Kabila District, Bone Bolango Regency.

The relationship between work time per day and impaired lung function can be explained through the concept of daily exposure duration. The longer the working time in one day, the longer the worker is exposed to dust in the work environment. Prolonged exposure without sufficient pause will increase the number of inhaled dust particles in one day (inhaled dose). Dust particles, especially small ones such as PM_{10}, can enter the lower respiratory tract up to the alveoli and cause irritation and inflammation. If this happens repeatedly every day, then the body does not have enough time to carry out the natural cleansing process *(mucociliary clearance)*, so that particles will accumulate and trigger impaired lung function. Therefore, the longer the daily working hours, the greater the risk of decreased lung function due to the high intensity of dust levels in one working day. According to (Saini et al., 2025), workers with longer daily exposure durations are at higher risk of respiratory disturbances due to the increased amount of fine dust inhaled during work activities.

In the group of workers with risky working hours in the green zone, there were 2 people who still had lung function in the normal category. This condition shows that even though workers have had a long period of work that is classified as risky, not all individuals immediately experience impaired lung function. This can be caused by protective factors such as consistent use of personal protective equipment (PPE), compliance with work procedures, This is supported by research (Wulandari et al., 2019) It shows that not all workers with long working periods experience decreased lung function, especially in workers who have high compliance.

In the group of long-term workers at risk in the yellow zone, in this study, there were 9 people who experienced mild to moderate lung function disorders. The increase in the number of people in this zone shows that the longer a person works, the risk of decreased lung function begins to be seen. In addition, age factors that tend to increase with the length of work and smoking habits can accelerate the process of declining lung function, especially if dust levels occur continuously without the use of optimal personal protective equipment. This is supported by research that (Sari & Pratiwi, 2018) states that there is a significant relationship between length of work and decreased lung function in industrial workers, where mild to moderate lung function impairments are more common in workers with longer working hours.

A more severe condition was seen in the group of long periods of work at risk in the red zone, namely as many as 17 people who experienced severe lung function disorders. This number is the highest compared to other zones, suggesting that length of work has an important role in increasing the severity of pulmonary function disorders. Long-term dust levels, especially fine particles such as PM_{10}, can reach the alveoli and cause permanent damage to lung tissue as well as disruption of gas exchange. In addition, the lack of control of the work environment and the low use of PPE can accelerate the occurrence of severe disorders. This is supported by (Putri et al., 2020) mentioning that long-term dust levels can cause pulmonary ventilation disorders that are restrictive or obstructive, especially if not balanced with optimal use of personal protective equipment (PPE).

Moving in the group for a long time is not risky, in the green zone no workers are found who have normal lung function. This shows that even though the length of work is still classified as not risky, all workers in the group still experience a decrease in lung function so that none are in the green zone or normal category. This condition can be affected by dust levels that persist during the work process, even though the daily work duration is relatively short, as well as other factors such as suboptimal use of PPE, smoking habits, and poor working environment conditions. The results of this study are in line with the research conducted by (Pinugroho & Kusumawati, 2017) which shows that the group of long working hours is classified as not at risk, no workers with normal lung function are found.

In the non-risky long-term working group in the yellow zone, there were 5 people who experienced mild to moderate lung function disorders. These findings suggest that even though the duration of the work is not long, impaired lung function can still occur. This indicates that other factors such as dust intensity levels, not using PPE, and smoking habits have an important role in the occurrence of impaired lung function. A work environment that has high dust levels can also accelerate the occurrence of disturbances even though the duration of exposure is still short.

In the group of long working hours that are not at risk in the red zone, there are no workers who have severe lung function disorders. This condition shows that workers with working hours who are still classified as not at risk tend to have decreased lung function to the severe category. Research by Wulandari (2021) shows that behavioral and environmental factors have a major influence on severe lung function disorders, even in workers with a short

working time.

Overall, 28 people were in the long-term work group at risk, which suggests that most respondents fall into this category. The distribution of impaired lung function in this group was dominated by red zones and yellow zones, which indicated a tendency to increase the disorder over the length of the working period. This is in line with the theory that chronic dust levels can lead to a gradual decline in lung function. However, the still finding of workers in green zones shows that protective factors still play an important role.

In the group of long working hours without risk, there were 5 people, with the distribution of impaired lung function that was still found in the yellow and red zones. This shows that impaired lung function can still occur even though the duration of work is still relatively short. This condition confirms that other factors such as dust intensity intensity, PPE use, and worker behavior have an important role in determining the condition of lung function.

Based on the results of the study's observations, the length of work interpreted as the duration of exposure in one working day showed a relationship with impaired lung function in rice milling workers. This can be explained that the longer the working time per day, the greater the amount of dust inhaled by workers during the production process. Dust levels that occur continuously for a long duration without adequate rest breaks have the potential to weaken lung defense mechanisms, such as the mucociliary system, so that dust particles more easily accumulate in the respiratory tract. This condition can eventually trigger impaired lung function, both obstructive and restrictive.

Working conditions in the field show that workers are less likely to use personal protective equipment such as masks consistently, especially when working hours are longer. This causes the dust level received to become larger as the duration of daily work increases. On the other hand, the length of work is more reflective of the intensity of exposure received directly on a daily basis than the cumulative working period in the year, but not always continuous because rice milling work tends to be seasonal. Therefore, the length of work per day is a more sensitive factor in describing the risk of dust levels to impaired lung function in workers.

This research is in line with research (Talamoa & Nurfadillah, 2025) which suggests that there is a significant relationship between length of work and impaired lung function (p-value = 0.002). These results indicate that the longer a person's working life, the greater the risk of exposure to work environment factors that can affect lung function, thereby increasing the likelihood of respiratory function disorders.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the study, it can be concluded that there is a significant relationship between the length of daily work and the incidence of lung function disorders in rice mill workers in Kabila District ($p = 0.036$). The PM_{10} fraction rice dust ($p = 0.136$) and working time ($p = 0.359$) had no statistically meaningful relationship. As a suggestion, workers are expected to pay more attention to their health by limiting working hours in risky areas and using personal protective equipment in a disciplined manner. In addition, workplace management is advised to manage work hours better and optimize the conditions of the work environment in order to maintain the health of the respiratory system of workers.

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