

Factors Related To Lung Function In Wood Furniture Workers In Oesapa Vilage, Kelapa Lima Sub District Kupang City

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ABSTRACT

Workers of wooden furniture is the workers who are at risk for decreased lung function caused by exposure to wood dust in the working environment. Wood dust will enter the respiratory organs, thereby affecting lung function. Decreased pulmonary function can be seen by the method of Harvard Step Test. This research aims to analyse the relationship between age, working period, nutritional status, smoking habits, long exposure to dust, and use of personal protective equipment with lung function in wooden furniture workers in Oesapa Village, Kelapa Lima Sub District, Kupang City. The study was analytic survey with Cross Sectional approach. This research was conducted in the wood furniture industry in Oesapa Vilage, Kelapa Lima District, Kupang City in July 2020. The population in this study were 33 workers of wooden furniture. Data collection was done by questionnaire, weight measurement, height measurement and the Harvard Step Test to determine the level of lung fitness workers. Data analysis technique used is the Chi Square test with level of significance $\alpha = 0,05$. The results showed that there was a significant relationship between age (0.002), working period (0.023), nutritional status (0.039), and use of personal protective equipment (0.016) with lung function in workers of wooden furniture. There is no relationship smoking habits (0.093), long exposure to dust (0.057) and lung function in workers of wooden furniture. He use of personal protective equipment is related to lung function, therefore it is recommended that furniture owners provide masks and advise workers to use masks while working. In addition, doing regular exercise to maintain body fitness can increase lung function capacity. To reduce the amount of wood dust, before starting the production process, it is expected to do a wet system or watering the work environment.

Keywords: lung function; wooden furniture

INTRODUCTION

Occupational health is a specialization in the science of health and its practice which aims to ensure that workers obtain the highest degree of health (physically, mentally and socially) with preventive and curative efforts against diseases or health problems caused by occupational factors and the work environment as well as general illnesses (Suma'mur, 1996). Every workforce has the right to get protection for safety in doing work for the welfare of life and to increase production and productivity (Law, N. 1, 1970 On Work Safety').

Industrial activity is currently a sector that cannot be separated in the economic development in a country or even in the world economic globally. The progression on Indonesia industrial sector performed more increasing for years. This increasing has had various positive impacts, namely the opening of employment opportunities and the negative impacts caused, namely the decline in workers' health due to various occupational diseases and workplace conditions. One of the industrial developments that is increasing very rapidly is the furniture industry. In carrying out their daily work, furniture industry workers will be exposed to the risk of occupational diseases. It is known that every year 2.34 million people die from work-related diseases and accidents and around 2.01 million cases die related to occupational diseases (International Labour Organization, 2013). The number of occupational disease cases in Indonesia has increased from 2011 to 2013, namely in 2011 as many as 57,929 cases, 2012 increased by 4.1% (60,322 cases), 2013 increased by 61% (97,144 cases) and in 2014 decreased by 58% (40,694 cases) which represents an improvement in the quality of management and occupational health efforts (Infodatin Center for Data and Information, 2015).

The Internasional Labour Organization data showed that 34% of the causes of death related to work are cancer, 25% of accidents, 21% of respiratory diseases, 15% of cardiovascular diseases, and 5% due to other factors. Among all diseases, 10-30% are lung diseases. Other data from the ILO

show that around 40,000 new cases of pneumoconiosis (respiratory disease) caused by exposure to workplace dust occur worldwide each year (WHO, 2007). Respiratory problems are the most common health problems in the furniture industry. Apart from respiratory problems, the quantity of dust exposure is very influential on the occurrence of lung function damage. Apart from containing oxygen, the inhaled air also contains various other particles such as dust. Dust that enters the respiratory tract stimulates the lungs and creates a defense mechanism. The longer the exposure to dust, the greater the chance of damage to the lung organs. The death rate due to respiratory diseases in 2012 was 10.5% (4 million) per 100,000 population in Indonesia based on World Health Organization data in 2012 showing a figure of 34.2 in women and 85.4 in men (WHO, 2015).

World Health Organization data showed that dust that has a size of 0.1-5 or 10 microns is very dangerous for the respiratory tract. When breathing air containing dust enters the lungs, dust measuring 5-10 microns can still be held by the upper airway, while those measuring 3-5 microns are held in the middle of the airway. Particles 1-3 microns in size directly enter the surface of the tissues in the lung (Suma'mur, 1996). Dust that is inhaled by labor can cause abnormalities in lung function characterized by excessive mucus discharge which causes the main symptoms of a prolonged cough with phlegm, common disorders that often occur are coughing, shortness of breath, general fatigue and decreased body weight (Triatmo, 2006).

Impaired lung function is a disease experienced by the lungs which is caused by various causes, such as viruses, bacteria, dust and other particles that cause decreased lung function. Decreased lung function can be seen using the Harvard Step Test method, this type of test is done to determine a person's lung volume, lung capacity and heart endurance. World Health Organization data for 2000-2013 shows that pulmonary dysfunction is the third deadliest disease for the past decade. In 2012, around 3.1 million died due to Chronic Obstructive Pulmonary Disease (COPD). In 2015 Chronic Obstructive Pulmonary Disease is the 4th cause of death in the world (Al, 2015). The prevalence of Chronic Obstructive Pulmonary Disease in Indonesia is 3.7% with the highest prevalence, namely the province of East Nusa Tenggara as much as 10%. Based on the results of measurement of lung function in wood craftsmen in Petulu Gianyar Village, Bali, it shows that of the 31 respondents who worked as wood craftsmen, 13 respondents (41.94%) had normal lung function and 18 respondents (58.06%) had lung function disorders. restrictive (Purba, Adiputran, 2019). This is in line with research (Laga, Russeng, 2013) Related to the factors related to the lung capacity of workers in the furniture industrial area in Antang Makassar, the results of respondents with normal lung capacity were 18 people (46.2%), while respondents with abnormal lung capacities were 21 people (53.8%).

Disorders of lung function due to dust in the furniture industry have signs and symptoms that are similar to other lung diseases that are not caused by dust in the workplace, diagnosis needs to be done appropriately because pulmonary dysfunction usually only appears after exposure to dust for a long time. Therefore, pulmonary function examination is a means of assisting the diagnosis of pulmonary dysfunction so that it can be controlled (Khumaidah, 2009). Lung function disorders in furniture workers are influenced by three factors, namely individual characteristics, work and environment. Individual characteristics include age, gender, years of service, nutritional status, smoking habits, exercise habits, medical history. Occupational factors include the length of exposure to dust, use of Personal Protective Equipment (masks), work history and environmental factors are exposure to high levels of dust (Budiono, 2007).

Oesapa Village is one of the urban villages that has 6 wooden furniture. Based on the results of the initial survey conducted in all furniture industries in Oesapa Village, there were 24 workers, the results were that 22 workers (92%) experienced health problems and 2 workers (8%) did not experience health problems, this is because the two workers have years of service. only two months. The health problems felt by workers were different, including 19 workers (43%) experiencing coughing, 8 workers (18%) experiencing sneezing, 7 workers (16%) experiencing colds, 8 workers (18%) experiencing noticeable breathing severe, and 2 workers (5%) experienced chest pain. This is influenced by the work environment that is exposed to dust and the behavior of workers not using personal protective equipment (PPE) when working because of the inconvenience of using the personal protective equipment. Complaints in the respiratory system can reduce the vital capacity of the lungs and productivity at work.

This study aims to analyze factors related to lung function in wooden furniture workers in Oesapa Village, Kelapa Lima District, Kupang City.

METHOD

This research is a type of analytical survey research with a cross sectional approach which is carried out in the wood furniture industry in Oesapa Village, Kelapa Lima District, Kupang City, namely UD. 4 Putri, UD. Julianto, UD. Diu Jaya, UD. Ora Et Labora, UD. Putra Timor and UD. Rizky Indah Jati. The population in this study were all workers who worked in 6 wood furniture businesses in Oesapa village as many as 33 workers.

Data collection techniques and instruments used to obtain data were filling out questionnaires, measuring the pulse to determine the level of lung fitness using the Harvard step test, and nutritional status measurement. Pulmonary function measurement is done by method *Harvard step test* or up and down the bench 30 cm high for 5 minutes according to the rhythm of the metronome, after that respondents were told to rest for one minute then measure the pulse frequency for 30 seconds 3 times. Then enter the results of the pulse calculation into the formula to find out the category of workers' lung function. The age variable was measured using a questionnaire, namely by asking the length of life of the workers until this research was conducted. The variable of tenure is measured using a questionnaire, namely by asking in what year the workers started working in the furniture. The nutritional status of workers was measured using a microtoice for height measurement and a weighing scale to determine the respondent's weight. Worker's smoking habit variable is measured using a questionnaire, namely by asking whether the respondent smokes, how long has the respondent smoked, how many cigarettes are consumed in a day, where do they usually smoke, if you don't smoke, have you ever smoked in the past. The variable of length of exposure to dust was measured using a questionnaire, namely by asking at what time they started working, what time they finished working, did they have a break, what work they did every day, did the work generate dust, and how long they were there. dusty environment. The habit variable of using personal protective equipment was measured using a questionnaire, namely by asking whether workers used personal protective equipment (masks) when working, whether the masks were used every day, whether they felt comfortable using these masks, whether the masks they used were purchased or provided. The variable of length of exposure to dust was measured using a questionnaire, namely by asking at what time they started working, what time they finished working, did they have a break, what work they did every day, did the work generate dust, and how long they were there. dusty environment. The habit variable of using personal protective equipment was measured using a questionnaire, namely by asking whether workers used personal protective equipment (masks) when working, whether the masks were used every day, whether they felt comfortable using these masks, whether the masks they used were purchased or provided. The variable of length of exposure to dust was measured using a questionnaire, namely by asking at what time they started working, what time they finished working, did they have a break, what work they did every day, did the work generate dust, and how long they were there. dusty environment. The habit variable of using personal protective equipment was measured using a questionnaire, namely by asking whether workers used personal protective equipment (masks) when working, whether the masks were used every day, whether they felt comfortable using these masks, whether the masks they used were purchased or provided. what jobs do they often do each day, does the work generate dust, and how long they are in dusty environments. The habit variable of using personal protective equipment was measured using a questionnaire, namely by asking whether workers used personal protective equipment (masks) when working, whether the masks were used every day, whether they felt comfortable using these masks, whether the masks they used were purchased or provided. what jobs do they often do

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RESULTS

1. Results of the Descriptive Analysis of Research Variables

The results of the descriptive analysis of the research variables wood furniture workers in Oesapa Village, Kelapa Lima District, Kupang City can be seen in the following table:

Table 1. Descriptive distribution of respondents based on lung function, age, working period, nutritional status, smoking habits, duration of dust exposure, and use of personal protective equipment (masks)

Labor Characteristics	N	%
Lung Function		
Good: > 80	17	51.5
Medium: 50-80	16	48.5
Less: <50	0	0
Age		
No Risk	22	66.7
It's risky	11	33,3
Years of service		
No Risk	16	48.5
It's risky	17	51.5
Nutritional status		
Well	26	78.8
Not good	7	21.1
Smoking habit		
Do not smoke	12	36.4
Smoke	21	63.6
Duration of Dust Exposure		
No Risk	10	30.3
It's risky	23	69.7
Use of PPE (Mask)		
Using PPE	12	36.4
Not using PPE	21	63.6
Total	33	100

Table 1 shows the characteristics of respondents from 33 wood furniture workers in Oesapa village, on average 17 workers are in the good lung function category, most of the respondents are in the non-risk age category, namely <40 years with a work period in the risk category, namely > 5 years and have a good nutritional status but have a smoking habit of 21 people and have a long exposure to dust > 8 hours / day and do not use PPE as many as 21 people with reasons of discomfort, feeling stuffy or shortness of breath and can interfere with communication with colleagues, not can smoke as well as workers' lack of understanding of the health risks of not wearing masks while working.

The older a person is, the more likely it is that lung function will decline. At the age of 40 years, the need for energy substances will decrease, the need for energy substances is reduced due to decreased physical strength and physiological function. The tenure of a worker determines the risk factors for being exposed to hazards caused by the work environment. The longer the working period of a person, the more workers are exposed to the hazards caused by the work environment. Health and workability are closely related to a person's nutritional level. If someone's nutrition is not balanced, it will easily decrease lung function. People who have a good nutritional status have a good lung function capacity. Smoking can cause changes in the structure and function of the respiratory tract and lung tissue. The longer a worker spends working in his work area, the more exposure to wood dust he receives, so the possibility of decreased lung function is also greater. Furniture workers in doing their work are always exposed to wood dust. Therefore, workers' health protection is needed, especially if the air is polluted.

2. Bivariate Analysis Results

The results of the analysis of the relationship between age and lung function in wooden furniture workers in Oesapa Village, Kelapa Lima District, Kupang City can be seen in the following table:

Table 2. Analysis of the relationship between age, working period, nutritional status, smoking habits, duration of dust exposure, use of personal protective equipment (masks) and lung function in wood furniture workers in oesapa village, kelapa lima district, kupang city

Independent Variable	Lung Function				Total		<i>p-value</i> < 0,05
	Moderate n	%	Well n	%	N	%	
Age							
It's risky	10	90.9	1	9,1	11	100	0.002
No Risk	6	27.3	16	72,7	22	100	
Years of service							
It's risky	12	70.6	5	29.4	17	100	0.023
No Risk	4	25	12	75	16	100	
Nutritional status							
Not good	6	85.7	1	14.3	7	100	0.039
Well	10	38.5	16	61.5	26	100	
Smoking habit							
Smoke	13	61.9	8	38.1	21	100	0.093
Do not smoke	3	25	9	75	12	100	
Duration of Dust Exposure							
It's risky	14	60.9	9	39.1	23	100	0.057
No Risk	2	20	8	80	10	100	
Use of PPE (Mask)							
Not using PPE	14	66.7	7	33.3	21	100	0.016
Using PPE	2	16.7	10	83.3	12	100	

Total	16	48.5	17	51.5	33	100
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Table 2 shows that there is a relationship between age, years of service, nutritional status and the use of personal protective equipment on lung function. Meanwhile, smoking habits and long exposure to dust do not always have a significant effect on lung function because some workers are in a dust-free work environment. There are 21 workers who have a smoking habit, on average 14 are in the age range <40 years old, and 17 workers on average have a good nutritional status. In the age range <40 years, the workers' lung function is still normal so that in this study it is still not stated that there is a relationship. In this study, workers' lung function was measured using the Harvard Step Test method using a 30 cm high bench media for 5 minutes and using a short formula in calculating the pulse rate. where this calculation has drawbacks because it is not too specific when compared to a spirometer which immediately knows the lung function. In this study, there was no measurement of dust levels. The length of hours of exposure is getting bigger. The findings in the field show that although workers' working hours are generally the same between one worker and another, they have a different dose of exposure due to the division of tasks such as carpentry or assembly, sekaf, finishing, pletting and painting. In addition, workers who, despite the high working hours, are likely to have lung function still normal if they are new and do not have a smoking habit. In this study, there was no measurement of dust levels. The length of hours of exposure is getting bigger. The findings in the field show that although workers' working hours are generally the same between one worker and another, they have different exposure doses due to the division of tasks such as carpentry or assembly, sekaf, finishing, pletting and painting. In addition, workers who, despite the high working hours, may have lung function still normal if they are new and do not have a smoking habit. finishing, pleturing and painting. In addition, workers who, despite the high working hours, may have lung function still normal if they are new and do not have a smoking habit. finishing, pleturing and painting. In addition, workers who, despite the high working hours, may have lung function still normal if they are new and do not have a smoking habit.

DISCUSSION

Age is related to the aging process or increasing age, the older a person is, the more likely there is a decrease in lung function. The older a person is, the maximum muscle strength will decrease by 20% so that it has a consequence that more dust will enter and accumulate in the lungs as a result of daily inhalation (Suyono, 2001). Under normal circumstances, age also affects respiratory rate and lung capacity as well as other tissues in the body.

Physiologically, with increasing age, the ability of the organs of the body will naturally decrease, including pulmonary function disorders, in this case, lung capacity. Conditions like this will worsen with dusty environmental conditions and other factors such as smoking habits, indiscipline in wearing masks, long exposure to dust and diseases related to the respiratory tract (Oviera, 2016).

The results of the analysis using Chi-Square showed that there was a significant relationship between age and lung function. The age of furniture industry workers varies, the easiest age is 18 years and the oldest is 58 years old with an average age of workers <40 years as many as 22 people. The results showed that workers who had moderate lung function were found mostly in the

at-risk age group, namely > 40 years as many as 10 people. At the age of ≥ 40 years the body organs tend to experience decreased function of the respiratory tract such as the trachea and decreased elasticity of the bronchi so that breathing strength becomes weak, as a result the volume of air during exhalation will be less (Wulandari, 2019). Therefore, workers who have a risk age of ≥ 40 years should better maintain a pattern of work activities with attention to health, work using masks and maintain a healthy lifestyle by not smoking because according to (Mawi, 2005) can cause decreased lung function due to pulmonary obstruction.

The results of this study are in line with the results of the study (Pinugroho B, 2017). Conducted on furniture workers in Kalijambe District, Sragen, which states that there is a significant relationship between age and lung function capacity. Research result (Mengkidid, 2006) shows a significant relationship between age and lung function. This shows that age is a risk factor for decreased lung function in workers.

The tenure of a worker determines the risk factors for being exposed to hazards caused by the work environment. The longer the working period of a person at work, the more workers are exposed to the dangers posed by the work environment (Suma'mur, 1996).

The mechanism of dust accumulation in the lungs begins when a person inhales, air containing dust enters the lungs. What happens to the dust depends on the size of the dust that enters the lungs. Dust between 5-10 microns in size will be held back by the upper respiratory tract, while those measuring 3-5 microns will be held back by the middle airway. Particles between 1-3 microns in size will proceed to the surface of the alveoli of the lungs and particles measuring 0.1-1 microns settle on the surface of the alveoli. Dust that is <0.1 micron in size is too small so it does not land on the surface of the alveoli or mucous membranes due to brown motion, this dust moves in and out of the alveoli (Suma'mur, 2009).

The results of analysis using Chi-Square showed that there was a significant relationship between tenure and lung function. The longer a person is exposed to dust, the more likely it is that there will be damage to the lung organs and the wood dust exposure period with a period of > 5 years will result in lung abnormalities due to wood dust deposits in the lung tissue which can pose a risk of pulmonary function disorders. As a result of inhalation of dust, the immediate impact is shortness of breath, sneezing and coughing due to respiratory problems. Every additional working period in one year, there will be a decrease in lung capacity by 35.3907 ml (Budiono, 2007).

The results of this study are in line with the results of the study (Isnaini, Setyoko, 2015) which was carried out on antique furniture workers in Jepara stated that there was a relationship between tenure and pulmonary function disorders in antique furniture workers in Jepara. Research result (Khumaidah, 2009) also stated that there is a relationship between the work period of workers and lung function disorders in furniture workers of PT Kota Jati Furnindo, Jepara Regency. This shows that working tenure is a risk factor for decreased lung function in workers.

The role of health and safety in Occupational Health Sciences greatly contributes to the protection of workers' health by means of health promotion, health monitoring and efforts to increase the worker's immunity and fitness so as to avoid the risk of accidents and diseases caused by work.

Health and workability are closely related to a person's nutritional level. If someone's nutrition is not balanced, it will easily decrease lung function. People who have a good nutritional status have a good lung function capacity. Physiologically, a person with less or more nutritional status can experience a decrease in lung function capacity which in turn will affect the occurrence of lung function disorders (Budiono, 2007).

An important relationship between nutrition and lung function is through the effect of catabolism, namely by looking at nutritional status. If the calorie intake is reduced, the body will break down the protein contained in the respiratory muscles. The loss of lean body mass in each muscle will have an impact on the muscle function. The condition of a fat body can cause lung function disorders because the contents of the stomach tend to press up on the diaphragm as well as an increase in the volume of blood of the lungs while at the same time decreasing the space available for lung air so that the vital capacity of the lungs is less when compared to tall thin people or in obese people will inhibit the movement of the chest wall, thus blocking the flow of air in breathing (Almatsier, 2009).

The results of analysis using Chi-Square showed that there was a significant relationship between nutritional status and lung function. Another close link between nutrition and lung function is that malnutrition reduces resistance to infection. In a state of malnutrition, the body's production of antibodies will decrease. Excess weight also has a bad impact on lung function. Excess upper body fat has been found to be associated with impaired thoracic movement, thus disrupting the mechanical properties of the chest and diaphragm and indicating changes in lung function. This will decrease lung volume and change the ventilation profile with each respiration (Nyoman, 2002)

The results of this study are in line with the results of the study (Wulandari, 2019) with the title analysis of the relationship between worker characteristics and exposure to wood dust with pulmonary function status in the Jumpisan Saw Wood Industry section in Banyuwangi, it was stated that there was a relationship between nutritional status and lung function. Research result (Anugrah, 2013) about the factors related to the Vital Capacity of the White Stone Mill Workers at PT. Sinar Utama Karya stated that there is a relationship between nutritional status and vital lung capacity.

Lung function decline is not only caused by work factors and a dusty work environment, but there are other factors such as smoking. Smoking can cause changes in the structure and function of the airways and lung tissue. Smoking habits will accelerate the decline in lung function. In the large airways, the mucosal cells enlarge (hypertrophy) and the mucus glands multiply (hyperplasia). In the small airways there is mild inflammation to narrowing due to increased cells and mucus buildup. In the lung tissue there is an increase in the number of inflammatory cells and damage to the alveoli. As a result of changes in the anatomy of the airways in smokers, there will be changes in lung function with all kinds of clinical symptoms (Tarwaka, 2004)

The results of analysis using Chi-Square showed that there was no significant relationship between smoking habits and lung function. This is because workers who have smoking and non-smoking habits have the same risk of experiencing lung function problems because they are in a dusty work environment. There are 21 workers who have a smoking habit, on average 14 are in the age range <40 years old, and 17 workers on average have a good nutritional status. In the age range <40, the workers' lung function is still normal so that in this study there is still no relationship.

Of the 21 workers who have a smoking habit with smoking frequency stated for the length of smoking in years, namely 1-5 years, 5 people, 6-10 years as many as 9 people, 11-15 years as many as 3 people and > 15 years as many as 4 people. The average worker smokes over a span of 6-10 years. Although statistically there is no relationship, in theory from this study, smoking is a risk factor for decreased lung function. Smoking habits can reduce lung capacity, so that the ability to consume oxygen decreases, as a result, the level of body fitness also decreases (Tarwaka, 2004).

The results of this study are in line with (Putra, 2012) With the title of the relationship between age, length of work, smoking habits and lung function in parking attendants on Jalan Pandanaran Semarang, it was found that there was no correlation between smoking habits and the CVP value. This is not in accordance with the theory that smoking can reduce lung function. This discrepancy, according to researchers, is due to the lack of accuracy of data regarding the number of cigarettes smoked in one day. In addition, researchers did not take into account other aspects such as the type of cigarette smoked, how to smoke cigarettes, and the length of time the respondents had a smoking habit.

Duration of exposure to dust is the length of time a furniture worker is in a work environment that allows exposure. The longer a worker spends working in his work area, the more exposure to wood dust he receives, so the possibility of decreased lung function is also greater. The length of time a person works generally ranges from 6-8 hours a day, if the working time is extended it will cause high inefficiency and even cause illness due to the length of time a person is exposed to pollutants such as dust in the work environment (Suma'mur, 1996).

The results of the analysis using Chi-Square showed that there was no significant relationship between the length of dust exposure and lung function. The length of exposure was categorized into 2, namely ≤ 8 hours a day and > 8 hours a day. Workers start working from 08.00 WITA-17.00 WITA with a one hour break, namely from 12.00-13.00 WITA. There are also those who work

until 21.00 WITA depending on orders from the community if their work has not been completed. The work day is six days (Monday-Saturday), but workers also work on Sundays if there are lots of orders and are counted as overtime.

The results of this study differ from the theory that the longer the worker is exposed to dust exposure, the greater the risk of pulmonary dysfunction. The results showed that not only workers with prolonged exposure to dust > 8 hours a day experienced pulmonary function disorders, but workers with prolonged exposure to dust ≤ 8 hours a day also experienced lung function disorders. Then because dust levels were not measured in this study and the length of working hours did not mean that the exposure was getting bigger. The findings in the field show that although workers' working hours are generally the same between one worker and another, they have different exposure doses due to the division of tasks such as carpentry or assembly, sekaf, finishing, pletting and painting. Apart from that workers who despite the high working hours, the possibility of lung function is still normal if the work period is new and does not have a smoking habit. The results of observations show that the conditions of the open work environment allow for air exchange so as to reduce exposure to dust in the work environment then the behavior of workers who like to go in and out of the room so that it is not always in contact with dust.

The results of this study are in line with those conducted by (Rantung, Umboh, 2013) with the title of the relationship between exposure to wood dust and smoking habits with lung function disorders in furniture workers in CV. Mariska and CV. Mercusuar Leilem, Sonder Subdistrict, Minahasa Regency, stated that there was no relationship between the length of exposure to wood dust and pulmonary function disorders. There is no relationship between length of exposure and impaired lung function because the length of working hours does not mean that the exposure is greater.

Personal protective equipment is one way to prevent occupational accidents and occupational diseases. Furniture workers in doing their work are always exposed to wood dust. Therefore, workers' health protection is needed, especially if the air is polluted. Efforts to prevent occupational diseases and occupational accidents need to be controlled technically and administratively. The use of personal protective equipment is one of the efforts to protect wooden furniture workers. The use of masks by workers in work areas where the air contains a lot of dust is intended as an effort to reduce the entry of dust particles into the respiratory tract. With the disciplined use of personal protective equipment, it can reduce the possibility of experiencing health problems in the lungs (Suma'mur, 2013).

The results of the analysis using Chi-Square showed that there was a significant relationship between the use of Personal Protective Equipment masks and lung function. This is because workers with moderate pulmonary function are mostly found in the risk group, namely not wearing personal protective equipment mask so that the potential for decreased lung function is higher.

The use of Personal Protective Equipment masks to protect the respiratory tract from dust exposure is actually very practical in its implementation. However, practice in the field is very difficult to implement, this lies in the workforce itself which is closely related to the human factor. In addition, the behavioral aspects of workers lack discipline in using masks when working with reasons of discomfort, feeling stuffy or short of breath when using masks and can also interfere with communication with their coworkers, workers cannot smoke when using masks and workers' lack of understanding regarding health risks due to not use a mask while working.

The results of this study are in line with the results of the study (Ida, 2019) which was carried out on furniture workers in Oesapa Village, Kupang City, which stated that there was a significant relationship between the use of personal protective equipment and health problems. The use of personal protective equipment must be considered.

CONCLUSION

Factors of age, years of service, nutritional status and use of personal protective equipment (masks) have an influence on the capacity of lung function. Age is related to the aging process or increasing age, the older a person is, the more likely there is a decrease in lung function. The longer the working period of a person at work, the more workers are exposed to the dangers posed by the work environment. A good nutritional status can reduce the risk of lung function disorders

in wood furniture workers who are exposed to dust and the habit of using Personal Protective Equipment (PPE) in the form of masks, can reduce the risk of lung function disorders. Therefore it is recommended that furniture owners provide masks and advise workers to use masks while working. Other than that, do regular exercise to maintain body fitness so that it can increase lung function capacity. To reduce the amount of wood dust in the furniture working environment, before starting the production process it is expected to do a wet system or watering the work environment. Smoking can exacerbate pulmonary function disorders in workers who are exposed to dust, but in this study smoking habits have no effect on lung function because workers who have smoking and non-smoking habits have the same risk of experiencing lung function disorders because they are in a dusty work environment. Workers who have a smoking habit on average are in the age range <40 years and have a good nutritional status, where in the age range < 40 where the pulmonary function of workers is still normal so that in this study it is still not stated that there is a relationship. The old factor of dust exposure does not have an effect on lung function because even though the working hours of workers are generally the same from one worker to another, they have different exposure doses due to the division of tasks such as carpentry or assembly, sekaf, finishing, pleturing and painting.

CONFLICT OF INTEREST

This article is absolutely guaranteed not to contain a conflict of interest, collaboration or other interest with any party.

THANK-YOU NOTE

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REFERENCE

- Al, D. et (2015) 'Af-A-Glance Outpatient Management Reference for Chronic Obstructive Pulmonary Disease (COPD).'
- Almatsier, S. (2009) Basic Principles of Nutrition. Jakarta: PT. Gramedia Pustaka Publishers, pp. 9-12.
- Anugrah, Y. (2013) Factors Related to the Vital Capacity of the Lung in the White Stone Division Mill Workers at PT. Sinar Utama Karya. Semarang, p. 5.
- Budiono, I. (2007) Risk of Lung Function Disorders in Car Painting Workers (Study at Car Painting Workshops in Semarang City), pp. 60-73.
- Ida, M. (2019) 'Factors Associated with Health Problems in Wood Furniture Workers in Oesapa Village, Kelapa Lima District, Kupang City', Journal of public health, 1 (2), pp. 69-78. Available at: <http://ojsfkmundana.science/index.php/t> (Accessed: 1 December 2019).
- Infodatin Center for Data and Information, Ministry of Health of the Republic of Indonesia (2015) 'Occupational Health Situation'. Available at: <http://www.depkes.go.id/resources/download/pusdatin/infodatin/infodatin-kesja.pdf>.
- International Labor Organization (2013) Occupational Health and Safety. Jakarta: ILO.
- Isnaini, Setyoko, and B. (2015) 'The Relationship between Wood Dust Exposure Period and Smoking Habits and Lung Function in Antique Furniture Workers at LHO in Jepara', Muhammadiyah Medical Journal, 2 (1), pp. 16-19.
- Khumaidah (2009) Analysis of Factors Associated with Impaired Lung Function in Furniture Workers

- at PT Kota Jati Furnindo, Suwawal Village, Mlonggo District, Jepara Regency, pp. 99-100
- Laga, Russeng, and W. (2013) 'Factors Related to Lung Capacity of Workers in the Antang Makasar Furniture Industrial Area', (1-9).
- Mawi, M. (2005) Spirometric Reference Value for Healthy Elderly, , p. 126.
- Mengkidi, D. (2006) Impaired Lung Function and Factors Affecting Employees of PT Semen Tonasa Pangkep, South Sulawesi, pp. 59-64.
- Nyoman, I. (2002) Factors Related to the Vital Capacity of the Lungs of the Wood Industry Workers at PT. X Jepara.
- Oviera, A. (2016) 'Factors Related to the Vital Capacity of the Lung in Wood Processing Industry Workers at PT. X Jepara ', *Journal of Public Health*, 4 (1), pp. 270-271.
- Pinugroho B (2017) 'Relationship between Age, Duration of Dust Exposure, Use of PPE, Smoking Habits and Impaired Lung Function in Furniture Workers in Kec. Kalijambe Sragen. ', *Journal of Health*, 5 (2), pp. 37-46.
- Purba, Adiputran, and M. (2019) 'Overview of Lung Functions of Wood Craftsmen in Petulu Gianyar Village, Bali Indonesia.', 10 (3), pp. 702-706. Available at: url: <https://isainsmedis.id/index.php/ism/article/viewFile/464/408>.
- Putra, et al (2012) 'Relationship between Age, Length of Work, and Smoking Habits with Lung Function in Parker Juru on Jalan Pandanaran Semarang', *Muhammadiyah Medical Journal*, 1 (3), pp. 1-12.
- Rantung, Umboh, and L. (2013) 'Long Relationship between Wood Dust Exposure and Smoking Habits with Impaired Lung Function in Furniture Workers at CV. Leilem Village Lighthouse, Sonder District, Minahasa Regency, p. 4.
- Suma'mur (1996) *Company Hygiene and Occupational Health*. cet. 13th. Jakarta: Sagung Seto, p. 68.
- Suma'mur (2009) *Company Hygiene and Work Safety*. Jakarta: Sagung Seto, p. 15.
- Suma'mur (2013) *Company Hygiene and Occupational Health*. Jakarta: Sagung Seto, p. 28.
- Suyono, J. (2001) *Early Detection of Occupational Diseases*. Jakarta: EGC, pp. 260-271.
- Tarwaka (2004) *Ergonomics*. Surakarta: Uniba Pres.
- Triatmo (2006) 'Exposure to Wood Dust and Impaired Lung Function in Furniture Workers (Study at PT Alis Ciptatama).', *Indonesian Environmental Health Journal*, 5 (2), pp. 69-76.
- Law, N. 1 (1970) 'On Work Safety', p. 1. Available at: <https://jdih.esdm.go.id/storage/document/uu-01-1970.pdf>.
- WHO (2007) 'Global Burden of Stroke'. Available at: http://www.who.int/cardiovascular_disease/en/cvd_atlas_15_burden_stroke.pdf (Accessed: 28 October 2019).
- WHO (2015) 'mortality and morbidity'. Available at: https://www.who.int/gho/publications/world_health_statistics/WHS2015_IndicatorCompendium.pdf (Accessed: 28 October 2019).
- Wulandari, D. (2019) 'Analysis of the Relationship between Worker Characteristics and Wood Dust Exposure to the Pulmonary Status of Workers in the Jumping Saw Section of the Wood Industry in Banyuwangi', *Journal of Environmental Health*, 11 (2), pp. 100-107.