



LITERATURE REVIEW : RISK FACTORS WOOD DUST EXPOSURE ON WORKERS LUNG STATUS

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Abstract

Introduction: Health problems caused by environmental factors are still one of the main things to note. One of the dangers in the work environment is the presence of organic dust including wood dust. Organic dust flying in the air is able to interfere with the health of the workers through the respiratory tract. The resulting wood dust is at risk causing lung faal status disorders in workers. This article aims to explore risks factors for wood dust exposure to the status of lung faal in wood industry workers based on the previously performed research from published journals. **Discussion:** This research used a method of literature study with a comparative study approach. The selected research should be in appropriated with the topic and through the protocols that have been set to become secondary data. The results of data analysis indicated that almost all research use observational analytic types with cross sectional approaches. Wood dust that has entered through the respiratory tract worker is influenced by several variables. The most often used risk factors as a research variable are dust levels, age, use of PPE, and smoking habit. **Conclusion:** The research can be concluded that independent variables of selected research are less varied. The selected research variables already existed in previous research. Upcoming researchers are expected to be able display new variables that are suspected to affect the status of the lung Faal on wood industry workers.

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INTRODUCTION

International Labor Organization (ILO) mentions that every year there are 2.78 million workers who died from occupational accidents and occupational illnesses. As much as 380,000 (13.7%) the death of labor, while 2.4 million (86.3%) illness caused by work. Even every year there are a thousand times a non-fatal work accident case more than a fatal work accident. Every year there are 374 million workers who suffer from non-fatal accidents, which will affect the income of the workers families (1).

Occupational Disease (OD) is a disease arising from work and/or work area. Types of diseases that include occupational disease there are 4 diseases that are caused by exposure while doing work, based on the system target organs, cancer diseases due to work, and other specific diseases (2). OD is still often found due to lack of awareness to work in quality and adequate skills. Workers are underestimating hazards and risks in the work environment.

Human beings while working will always be in contact with danger and risk. So when work will always make a good or bad impact for everyone. Exposure that has a potential danger to the health of 10 even 1000 times greater is found in the environment of the workplace than in the other environment (3). Working in a workplace is always a potential danger so it needs proper handling and prevention (4).

One of the dangers in the working environment is the presence of air pollution. Air pollution is caused by various kinds of things such as inorganic dust and organic dust. One industry that produces dust is the timber industry. Wood industry is able to produce wood dust. Wood dust is included in the type of organic dust that is capable of causing a wood industry worker to be affected by pulmonary faal disturbance. The process of wood processing such as cutting, sawmilling and sanding can produce wood dust of various sizes. The size of this wood dust that will affect the small risks inflicted on the worker's health.

The number of timber industry in Indonesia is quite a lot as well as the timber resources in Indonesian forests. Indonesia has 56 industrial sawmills, 26 wood furniture industries, 856 furniture industry, 85 wood-processed timber industry, and 81 plywood industry (5). The needs of timber in Indonesia are filled with the Indonesian Plant Forest Company (HTI) amounting to 244 active companies spread throughout Indonesia. The land area controlled by the HTI company is 8.67 million hectares. Land controlled by HTI companies located in various islands such as Borneo Island is 3.82 million Ha and Sumatra island is 4.29 million Ha. In 2018 Indonesia was able to produce as much as 41,360.64 m³ of wood. The number of workers in the HTI in 2018 in the field

or forest as many as 25,054 thousand employees. In the year 2018 the total number of use of the company's production of HTI is 40,628,77.71 m³ (6).

The population of Indonesia, which belongs to the working age category, is 193.55 million people. A total of 133.94 million people including the labour force category of 59.61 million people, including non-working force categories. Employees working in the informal and sector forma have 127.07 million people and the number of unemployment is 6.87 million. The high number of working force in Indonesia can be an important asset to advance the nation when balanced with the quality and productivity of healthy workers. If the health of the workers is maintained optimally it will reduce the number of pain, disability, and accidents to create healthy and productive workers (7).

The commodity of timber and its values of Masi occupies the fourth position of Indonesian exports (6). Demand for wood as building materials even the furniture in the market is still a lot. So it can be concluded that there are still many workers in the wood industry that potentially exposed to wood dust.

The Threshold Limit value (TLV) for soft wood dust is 5 mg/m³ with the length of exposure not exceeding 8 hours per day or 40 hours for 1 week. The TLV has been established by the government to provide secure boundaries to workers of timber industry. Wood dust that exceeds the TLV is inhalation by the worker can settle and will form deposits in the lungs so that it may interfere with normal pulmonary work.

Pulmoary function is measured using spirometer. The pulmonary Faal can be said to be normal if the spirometer calculation results in the number of FVC 80%-120%. Spirometer will present the results of the measurement of lung faal status that is obstructive, restrictive and mixed based on the calculation of FEV₁/FVC.

The study aims to identify the risk factors of wood dust exposure to the working lungs whose data was obtained from 2015-2020. The study method of literature is used in these studies to study, understand and interpret all existing studies with topics and some research questions. The literary study method is capable of reviewing and identifying journals systematically so that each electoral process has followed the established protocols.

At this time literary studies are important enough to be examined deeper because through data that is summarized able to compile the answers of a problem chosen to be a new theory. Literature studies differ from theoretical frameworks. More theoretical frameworks demonstrate support theoretically to a thought to address the problems that researchers focus on. While

the literature study interprets and summarizes about existing research on the same topic.

This makes the utility interested in summarizing and studying the results of the various studies related to the topic of the risk factor of wood dust exposure to the worker's lung faal status. The related research on the topic has been done in many academic circles. The existing research results are then selected and studied simultaneously.

Workers exposed to wood dust are at risk for health complaints and diseases, both infectious and non-infectious diseases (cancer). Infectious diseases such as Acute Upper Respiratory Infections (AURI) according to the diagnosis have a prevalence rate of 25% and the prevalence of cancer is 1.8% in Indonesia (8). Respiratory complaints are the most common health problems in the timber industry. In addition to respiratory complaints, the impact of exposure to frequent health dust is dermatitis, impaired pulmonary function, and some cancers of the respiratory tract. Wood dust exposure can also trigger the onset of occupational asthma.

DISCUSSION

Increasingly the rise of timber industry that has stood in different regions makes the utilities interested to do the research on wood dust. So that various assessment about wood dust has been done all over Indonesia and abroad. Research on wood dust in the primarily is associated with the status of pulmonary faal on workers in wood industry. The final conclusion of the various research is to see the relationship between wood dust and the status of lung faal in workers.

Researchers searched for several journals in Google Scholar using the keywords wood dust, pulmonary faal, lung disorders, and organic dust. The selected journal started in 2015 until 2020 with the criteria specified by the utility. Here is the journal selection process:

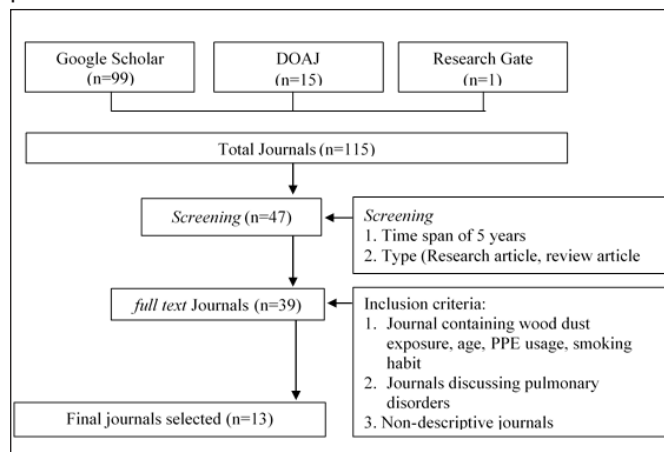


Figure 1. Journals Selection Process

In the beginning there were 115 journals selected, then re-selected based on criteria of inclusion

that are; the journal is published over the last 5 years (2015-2020); Journal type (National Accredited Level 3 or international journal); Non-descriptive journals; Journal with cross-sectional research method; Journals that are fully accessible.

In addition to the inclusion criteria, it also takes exclusivity criteria to eliminate or issue subjects that meet the inclusion criteria (9). The exclusion criteria in this study are: the study of wood dust with asthma.

After determining the criteria inclusion and exclusion then produce 13 journals and subsequent scanning data. Selected journals have been conducted in various areas throughout Indonesia and some of the research conducted outside of Indonesia. Thus, it forms the diversity of results that are still significant and not too distant because it uses the keywords wood dust and pulmonary faal status for each journal. It will then be detailed as follows to see the research results from various journals.

The selected journal is indicated on table 1. Based on Table 1 gained that from 13 selected study journals can be seen that all the results of the study showed that the wood dust could cause a change in pulmonary faal status with symptoms such as cough phlegm, dry cough, chest tightness. The result of a study summary shows that more than 50% of workers in a wood industry are subject to changes in pulmonary faal status, when the total number of wood dust levels or wood dust is inhalation exceeding the threshold value (TLV).

In general, pulmonary disorders are classified into two namely obstructive and restrictive. Obstructive disorders occur when the narrowing of the respiratory tract diameter causes the body to be difficult to express. A restrictive disorder occurs when the body experiences a decline in inspiring the pulmonary capacity to decrease. The cause of pulmonary faal disorder there are two factors such as intenal and external factors. Internal factors are a factor related to a person's immune system such as age, PPE usage, and smoking habit. While external factors are exposure around the work environment such as dust, steam, and gas that will make a reaction when entering the human body. The reactions caused vary can be mild even weight depends on the dose of exposure received by the body. One example of exposure to wood dust can cause a change in the status of someone's lung faal.

Workers exposed to wood dust will not all undergo a change in lung faal status. For example, workers in the sanding process are exposed to the same dust levels but have internal risk factors such as age difference, smoking habit, and adherence to the PPE, thus causing not all workers to suffer from the same lung faal disorder. All depends on the risk factors received

Tabel 1. Selected Journal

Researcher	Title	Popuation	Method	Result	Conclusion
Laili Maratus MS, Suroto, Ekawati (2018)	Hubungan Paparan Debu Kayu Dengan Kapasitas Vital Paru Pekerja Pemetong Kayu Di PT. X Mranggen Jawa Tengah	30 workers sampled 30 workers (total sampling)	Observational methods with cross sectional approaches	Vital Lung capacity Retriksi = 46.7% (14 workers) Obstruction = 3.3% (1 worker) Normal = 50.0% (15 workers) 1. The worker who was exposed to dust total > NAB = 80% (8 workers) experienced KVP interference 2. Workers who are exposed to total dust ≤ NAB = 35% (7 workers) experiencing KVP interference	1. Vital Lung (KVP) worker of PT. X experienced as much as 50% interference from all workers 2. There is a correlation between the dust content and use of the APD against KVP interference
Nafisa Rr. S. F., Joko T., Setiani O. (2016)	Hubungan Paparan Debu Kayu di Lingkungan Kerja terhadap Gangguan Fungsi Paru pada Pekerja Di PT. Arumbai Kasembadan, Banyumas	Population = 128 with a proportion of 54 men, and 74 women. Samples = 35 workers (puposived sampling)	Observational methods	1. Workers exposed to total > NAB dust = 86.7% (26 workers) have respiratory distress 2. Employees who are exposed to total dust, < NAB = 13.3% (4 workers) have respiratory problems.	1. The high exposure of wood dust will then be at risk of impaired pulmonary function. 2. There is a correlation between wood dust level, APD with pulmonary function disorders.
Putri R. K., Darundiati Y. H., Dewanti N. A. Y. (2017)	Hubungan Paparan Debu Kayu Terhirup dengan Gangguan Fungsi Paru Pada Pekerja di Industri Mebel CV. Citra Jepara Furniture Kabupaten Semarang	30 samples used for 30 people (total population)	Cross sectional Approach	1. Workers exposed to dust > NAB = 73.7% (14 workers) experiencing respiratory distress 2. Workers exposed to dust inhalation < NAB = 27.3% (3 workers) experiencing interference Pernafsan	A total of 17 respondents (56.7%) Experiencing impaired function Lung.
Rismandha R., Disrinima A. M., Dewi T. U. (2017)	Analisis Pengaruh Faktor-Faktor Risiko Gangguan Fungsi Paru pada Pekerja Area Produksi Industri Kayu	Population = 30	Analytical observational methods. Cross approach Sectional	1. 60% (18 workers) experiencing pulmonary dysfunction 2. 40% (12 workers) suffered pulmonary impairment	1. There is a connection between wood dust and pulmonary dysfunction. 2. No correlation between age, use of PPE, and smoking habit against lung interference.
Permatasari L. O., Raharjo R., Joko T. (2017)	Hubungan Antara Kadar Debu Total Dan Personal Hygiene dengan Gangguan Fungsi Paru pada Pekerja Pengolahan Kayu di CV Indo Jati Utama Semarang	Sample = 30 (total population)	Quantitative research methods with approaches Cross Sectional.	1. Workers exposed to dust > NAB = 85.7% (24 workers) experiencing respiratory distress 2. Workers exposed to dust inhalation < NAB = 50% (5 workers) affected by respiratory disorders	There is a correlation of total dust levels, dust inhalation, and the use of APD with impaired pulmonary function.
Anjani N. R., Raharjo M., Budiyo (2018)	Hubungan Kadar Debu Terhirup dengan Gangguan Fungsi Paru pada Pekerja Industri Mebel PT Marleny Jepara	Population = 42	Observrational method with an across sectional approach	1. Dust-exposed worker > NAB = 82.6% (19 workers) affected pulmonary impairment 2. Dust-exposed worker < NAB = 28.6% (2worker) impaired pulmonary function	1. 70% responden experiencing functional disorders. 2. The most type of functional disorder is the most light restriction Yaitusemany 85.71%
Wulansari D. T. (2019)	Analisis Hubungan Karakteristik Pekerja dan Paparan Debu Kayu dengan Status Faal Paru Pekerja Bagian Jumping Saw Industri Kayu Di Banyuwangi	Sample = 30 (random sampling)	Observational methods with cross sectional approaches	1. 25.87% (2 exposed workers) affected by pulmonary Faal 2. As much as 0% (control group) No one is exposed to interference	1. No connection between dust, age, use of PPE, and smoking habit, with pulmonary faal status 2. No difference in measurement results% FEV ₁ and% FVC significant between study groups with control groups
Hikmayanti U. (2018)	Studi Faal Paru dan Faktor Determinannya pada Pekerja Di Industri Sawmill	36 people (total population)	Observational methods	1. 52.8% (19 workers) abnormal pulmonary Faal status 2. Types of interference 3. Restriction = 42.1% (8 workers) 4. Obstruction = 10.5% (2 workers) 5. Mix = 47.4% (9 jobs)	1. Workers who are exposed to wood dust > 5 mg/m ³ prone to impaired pulmonary faal 2. There is a relationship between the age, the use of PPE, and the habit of smoking with workers ' pulmonary status
Sholihah M., Tualeka A. R. (2015)	Studi Faal Paru dan Kebiasaan Merokok pada Pekerja yang Terpapar Debu pada Perusahaan Konstruksi di Surabaya	Population = 45 workers	Observational with a sectional approach.	1. Dust content at point A = 1.6865 mg/m ³ , point B = 1.3227 mg/m ³ and point C = 1.0625 mg/m ³ . 2. Minor obstruction disorders = 4 workers 3. Mild Restriction disorders = 2 workers	1. 6 workers have impaired obstruction and restriction despite dust levels under the NAB 2. The worker who has impaired lung Faal is influenced by smoking habit.
Davood K. Hosseini, Vahab M a l e k s h a h i Nejad, Haiying Sun, Hanieh K. Hosseini, Seyyed Hassan Adeli ² , Tian Wang (2020)	Prevalence of Respiratory Symptoms and Spirometric Changes among Non Smoker Male Wood Workers	Sample = 18 Workers (puposived sampling)	Observational study Cross-sectional	1. The calculated value of FEV ₁ and FEV ₁ /FVC ratios on low-end workers compared to the control group.	Respiratory symptoms related to work, more occurring in wood workers than Office workers.

Researcher	Title	Population	Method	Result	Conclusion
Muhammad Zubir Yusof, Rozita Hod, Azimatun Noor Aizuddin, Niza Samsuddin (2019)	Health Effects of Hevea Brasiliensis Wood Dust Exposure Among Furniture Factory Workers	276 Men's timber workers are not smokers	Cross sectional	1. Groups that are exposed to high and workers who work for ten years or more indicate decreased pulmonary function.	There are significant results between exposed and unexposed groups
Håkan Löfstedt, Katja Hagström, Ing-Liss Bryngelsson, Mats Holmström & Anna Rask-Andersen (2017)	Respiratory symptoms and lung function in Relation to Wood Dust and Monoterpene Exposure in the Wood Pellet Industry	The Study group was 38	Cross sectional	1. Wood industry workers are more risky to experience asthma and dry cough than with the general population. 2. Wood dust content at Work area = 0.16 – 19mg/m3	Dust level exceeds NAB Wood pellet workers have FVC and lower FEV ₁ than expected. No correlation between the exposure of wood dust with acute pulmonary function
Masoud Neghab, Zeinab Jabari, Fatemeh Kargar Shouroki (2018)	Functional disorders of the lung and symptoms of respiratory disease associated with occupational inhalation exposure to wood dust in Iran	The control group is 118	Cross sectional	1. The average concentration of the can be inhalation and the inhalation of the particles is 2.44 and 6.76 mg/m3, 2. The results of spirometry indicate that the lung function of the group is lower than the unexposed wood dust.	Exposure to wood dust with a significantly higher prevalence of pernapasansecara symptoms

by the individual so that there is a difference in each outcome of the research.

An independent variable that affects the status of the pulmonary faal is shown in table 2. Table 2 shows the results that 13 selected research shows that the study linked to risk factors affecting the occurrence of pulmonary faal status disorders. The risk factors affecting them are dust level, age, PPE usage, and smoking habit. Risk factors are also examined to see what can be worsening the occurrence of lung faal status so that the future can be done proper intervention to minimize.

Table 2. Independent Variables Affecting Pulmonary Faal Status

Risk Factors	Related	Unrelated
Wood Dust Levels	12 Research	1 Research
Worker's Age	1 Research	2 Research
Use of PPE	4 Research	2 Research
Habit of Smoking	4 Research	2 Research

Wood Dust Levels

In the process of processing raw materials into raw materials in timber industries, the dust content produced in the production and assembly is very high because it produces wood grain of various sizes. Wood powder is produced in the cutting process even at the sanding process in the wood processing industry. The wood sanding process produces smaller and softer wood dust sizes than in timber cutting processes using sawing machines. The room used for wood processing should be open ventilation so the air can go out to make the wood dust does not accumulate in the room only. Waste disposal of wood dust in the form of shavings or sanding should be separated to a special place so as not to pollute the working area in the wood industry (11).

Wood industry always produces wood dust every processing process around the work area, so it has the potential to be inhalation by workers. The inhalation of wood that has been inhalation will settle in the lung organ, depending on the size of the wood dust (12). The build up of wood dust in the respiratory tract can cause inflammatory reactions so that the airway obstruction occurs and will interfere with pulmonary faal (13).

Some of the research that is done there is a difference, there are only the total dust, but some of the research is measuring the affected by the worker. But basically it is more effective to measure the dust of the inhalation so that it shows more specific results. The level of wood dust that is in the workplace or called the total wood dust or wood-inhalation dust affects the status of the worker's lung faal. A very small size of the dust of the wood will be very harmful to the condition of the individual lung, as the smaller it becomes easier to enter the respiratory tract and end up settlers in the pulmonary organs. Wood dust particulate measuring 0.1-10 micron is very harmful for individuals who are exposed (14).

The results of the research summary show that more than 50% of workers in a wooden industry are affected by pulmonary faal, while the total amount of wood dust levels and wood dust is inhalation above the TLV. The research conducted at PT. Arumbai Kasembadan Banyumas shows that workers who have been exposed to the wood dust above the TLV as much as 86.7% suffer from lung faal status, while workers who are exposed to wood dust less than TLV only 13.3% are experiencing impaired lung status. So it can be said that the increase of exposure to wood dust levels is comparable to the risk of the worker affected by pulmonary status disorder (15).

Based on 13 selected studies, there are one different research that is done in the Jumping Saw section of wood industry Banyuwangi. The different research shows a p-value of 0.46 between the wood dust level and the worker's lung status. There is no significant difference in the results of the % FEV₁ and % FVC measurements between study groups and control groups. However, in the study, there have been workers who have impaired lung faal on exposed workers. Therefore, there is a tendency for workers exposed to wood dust disturbance faal lung, although the effect of exposure is still slight (10). So it can be said that the level of wood dust has a significant concentration of the status of the lung faal wood industry workers.

The industry that has stood must implement a sustainable development concept and environmentally sound. This means that the industry is obliged to maintain stability and environmental sustainability around the industry. Maintaining cleanliness in the work environment is by the way the application of the principle (housekeeping) will make the environment cleanliness of the work awake and comfort for the workers. In addition, there needs to be a special place to accommodate timber processing emissions to be well managed (16).

Worker's Age

Age has a direct and indirect influence on the occurrence of diseases experienced by individuals (17). The function of breathing and blood circulation in the human body will reach its peak at the age of 20-30 years, and will decrease as the age increases. This is in line with the research done in Sawmill industry stating that 60% of workers over 44 years old suffer from pulmonary faal disorder (18)

The respiration process has three phases: ventilation, diffusion, and continuous perfusion. One stage is experiencing problems, there will be interference in the gas exchange during respiration. When ventilation, diffusion and perfusion work properly eat the status of a person's lung faal in a normal state so that the lungs work without such a heavy burden (19).

Normal pulmonary capacity in adults is 6 liters. However, everyone will differ, depending on the influence of age, gender, and activities that are often done daily. An athlete has more lung capacity than the workers in the Office (20)

The human immunity will diminish as you age, so that the elderly are vulnerable to various ailments. A person will experience a change in lung capacity at the age of 30-40 years (21). This occurs because the body has undergone biological and physiological changes due

to cell damage. The increasing lifespan will increase the vulnerability of the respiratory system to interference or disease especially if coupled with a large chance of exposure to particles (22). However, different from the research done in one of the timber industry in Banyuwangi showed the results that 15.38% of workers who are less than 25 years old suffer from lung faal (23).

The research has been conducted against 30 respondents in the furniture CV. Citra Jepara mentioned that FVC and FEV₁ workers will decline as age (23). FVC and FEV₁ in women will increase up to the age of 20 years while in men aged 27 years will continue to decrease in the elderly. The decline of FVC and FEV₁ can occur sooner at the time over usia60 years and will be stable throughout 60-90 years. Changes in pulmonary faal status as a result of increasing age and the effect of such changes can be minimized by means of quitting smoking, treatment that is suitable for chronic diseases, physical exercise, influenza vaccination and pneumonia (25).

Based on 13 studies selected, there are two different ones. Research in one of the timber industry in Sidoarjo shows the results that umurno effect on the disturbance of pulmonary status in workers with the value of P-value of 0.999 and research in the Jumping Saw wood industry Banyuwangi shows that workers aged < 25 as much as 13 Reponden 2 (15.38%) With mild and moderate restrictions. This means there is no strong influence between the age and the status of a worker's lung Faal in the timber industry. Because there are young workers who have suffered from lung Faal, as well as the elderly workers.

Personal Protective Equipment (PPE)

There are only two studies with others related to the influence of PPE on the status of workers lung faal. The research conducted in one of the timber industry mentioned that the use of protective equipment (PPE) with the value p-value of 0.633 (26) and the study carried out section of wood industry Jumping Saw in Banyuwangi PPE with a value of p-value of 1.00 (10).

PPE tools are required to be used by any industry that generates risks in their work environment. Respirator is one of the PPE that can be used when working by workers in the working environment of wood processing industry. Masks are capable of protecting the lungs health optimally when appropriate to the type of dust, and the mask material. The dust has a different size so it should match the type of mask used. A cloth mask cannot prevent the entry of very small dust to enter into the worker's respiratory tract.

The habit of sneezing when working usually occurs due to the level of dust that is too high in the workplace. When there are foreign particles that are inhaled through the respiratory tract, reflexes will then send the signal to the brain to sneeze as a form of protection of the body. So naturally the body will try to remove it to clean up the upper respiratory tract. Sneezing is an inhalation of dust and particles that are inhaled through the respiratory tract (27).

PPE is the final stage in controlling risk but does not close the possibility that the use of the PPE is effective to do and can be the appropriate solution to prevent the inclusion of wood dust into the body of workers (28). PPE is capable of being used as a barrier to prevent the optimal number of contacts, because in principle the PPE is not able to eliminate the dangers that exist in the working environment but only able to reduce. There are several factors that can increase the effectiveness of the PPE, which is the behavior of labor, proper training, storage and maintenance. If it is done properly it will be able to prevent good in preventing the exposure of wood dust (29)

Wood industry workers have the risk of experiencing illness due to the work caused by exposure long enough to source allergens that are wood dust. Appropriate action to prevent such problems can be done in a simple way such as the use of appropriate masks. The use of masks in accordance with the function can minimize the exposure of wood dust to the workers of wood industry while they work (30)

Habit of Smoking

There are only two different studies with the other regarding the influence of smoking habits on the status of a worker's pulmonary faal. The research done in one wood industry mentioned that the habit of smoking with p-value value of 0.138 (26) and the study carried out part of Jumping Saw Timber Industry in Banyuwangi PPE with a value of p-value of 1.00 (10). The difference in the results of the study can be caused by several factors including the number of cigarettes, the duration of smoking, the number of smoke inhalation, and the type of cigarettes also affect the difference of the outcome. Previous studies have shown that smoking causes a decrease in the values of vital capacity parameters (VC), tidal volume (TV), and forced expiratory volume ratio in one second (FEV_1) to a vital capacity (FEV_1/VC), indicating a decrease in pulmonary faal (31).

A wood industry worker who has quit smoking proved to have no disturbance of pulmonary faal. This is evident in the research done at UD. Sinar Abadi that the workers who do not experience the disturbance of the lung Faal have long not smoked for 2 to 5 years (18). Smoking habits are measured using Brinkman index. Smoking habits are mild, moderate, heavy. Cigarette types used by workers also need to be analyzed further in order to understand the type that can increase the risk factors of pulmonary Faal disorder (32)

Basically, the human body will do repairs in the past when it is not inhaled cigarette smoke, but it can not fix the trigger for some body organs, depending on the length of smoking (18). The research carried out in one of the Surabaya construction companies shows that the condition of the lung of non-smoking workers is under normal conditions, but is different from the lung condition of the worker who is in the case of pulmonary faal disorder (13)

Every cigarette smoked is proven that contains chemical compounds that are harmful to the human body, both for active smokers and passive smokers. One of the compounds contained in cigarette rods is Total Aerosol Residue (TAR). TAR is able to destroy or paralyze cilia (33). In addition, smoking can cause the lungs to produce excessive mucus so that the cilia are damaged and unable to move. It causes persistent cough reactions as a lung defence to rid itself of particles, and makes smokers more susceptible to respiratory diseases (34).

Apart from cigarette TAR, also contains nicotine compounds that are able to risk increasing inflammation of the pulmonary organs and are able to damage pulmonary protective tissues. Nicotine can transmit signals to the brain releasing the dopamine hormone, thereby causing a dependency effect on cigarette rods. Nicotine addiction in a cigarette turns out to involve many biological functions, such as nerve disorders, neurotransmitter, and metabolic processes inside one's body (35)

Smoker cannot afford to rely on the body's ability to cleanse toxins naturally. Because later can be fatal in the future. This has been outside the control of the industry, but the timber industry must also ensure that the habit of smoking and exposure to wood dust does not exceed the TLV. Cigarette habits can be suspended while still in contact with the environment that has high levels of wood dust. At least the habit of smoking can be reduced the number of rods consumed so that it can give effect that at least not worsened the condition of the

lungs workers in the wood industry. Smoking habits may be difficult to stop but can at least be reduced slowly by not supplying cigarettes while working (36).

Prevention of Worker Health Problems

In principle, dust control needs to be done to reduce the amount of dust levels in the wood industrial environment. The first control is administratively, which makes SOP about the handling of wood dust. Engineering or design controls by installing precise air ventilation at several predefined points. Local exhaust ventilation is able to suck wood dust particulates in the process of timber industry, so as to prevent wood dust flying in the air around the working environment through this tool. Then the last is the use of the PPE that after and complete must be used (37). But in fact still uncommon industries that use the local exhaust ventilation tool in the work environment.

Healthy workers are the focus of government to be realized thoroughly through various efforts of implementing occupational health throughout the workplace in Indonesia. The Directorate of Occupational Health and Sports of Ministry of Health Republic Indonesia seeks this through occupational health programs such as improving workers health capacity, improving the quality of occupational health services, and the control of Occupational Health and Safety (OSH) risk factors in the working environment. The increase in capacity of workers is supported by the existence of a movement for the most productive and prolific women workers as well as the post of occupational health work (Pos UKK). Improving the quality of occupational health services through strengthening the competency of resources owned by the Puskesmas and the skit house in the field of occupational health and the diagnosis of disease from work. Health care facilities are able to serve the health complaints of the workers comprehensive, both promotive, preventive, curative, and rehabilitative. OSH risk factors control in the working environment is manifested through occupational safety and health efforts in the health facilities and safety and work health in office. The improvement of occupational health will be increased by the Government in order to realize the safety and health of workers for all workers in Indonesia (38).

In a study with literature this review only interprets and identifies the influence of dust levels, worker characteristics such as age, and behavior of

workers such as smoking habits and use of PPE against the status of the workers lung faal. The penitence has not seen the influence of environmental factors such as temperature, humidity and wind speed in the working environment. So this can be a material for other researchers to be examined further in the future.

CONCLUSION

The most common risk factors used as research variables and the influence of wood dust exposure to pulmonary faal status are dust levels, PPE usage, and smoking habit. Essentially independent variables of selected research are less varied. The selected study variables already existed in previous studies. The forthcoming utilities are expected to be able to display new variables that are suspected to affect the status of the lung faal on wood industry workers.

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