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Factors Related to Occupational Diseases in Smelter Employees PT.Virtue Dragon Nickel Industry Site Morosi

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ABSTRACT

Introduction: In Indonesia, the number of cases of disease events continues to increase every year, there is no increase in PT. Virtue Dragon Nickel Industry that is one of the largest industries in Southeast Sulawesi Province where the number of cases of occupational diseases also continues to increase.

Method: Research using a cross-sectional research design. The research location is at PT. Virtue Dragon Nickel Industry Mega industrial area of Konawe district. The sample in this study was 100 employees who worked especially in the smelter unit. To find out the relationship between the dependent variable and the independent variable, it was carried out using the Chi-Square test with a significant level (α= 0.05).

Result: This study shows that There is a significant relationship between working hours and the incidence of occupational diseases in employees of PT. Virtue Dragon Nickel Industry p-value = 0.000. There is a relationship between noise and the incidence of occupational diseases in employees of PT. Virtue Dragon Nickel Industry p-value=0.000.

Conclusion: Working hours and noice have a relationship with the incidence of occupational diseases at PT. The Dragon of Virtue Nickel Industry.

Introduction

According to the International Labor Organization (ILO), about 4% of the world's total gross domestic product (GDP) is lost each year as a result of occupational accidents and diseases, health expenditures, pensions, absenteeism, and rehabilitation.[1] Data from the International Labor Organization (ILO) in 2018 states that workers in the world die every 15 seconds due to work accidents and occupational diseases every year in the Asia and Pacific region. In fact, two thirds of work-related deaths in the world occur in Asia.[2]

In Indonesia, in 2019 there were 182 thousand cases of work accidents, and this continued to increase until 2020 there were 225,000 cases of work accidents, and 53 cases of occupational diseases. Meanwhile, in 2021 there will be 82 thousand cases of work accidents and 179 cases of occupational diseases, of which 65

percent.[3] The high number of occupational diseases in Indonesia greatly affects the exposure to the health of employees at work, 30 types of occupational diseases pose a risk to the health of employees, especially in the nickel processing industry there is a unit to facilitate the nickel ore refining process (smelter unit). A smelter unit is a place that has a high risk of exposure to occupational diseases, the data shows the incidence of occupational diseases, namely high respiratory (bronchopulmonary) diseases due to inhalation of nickel powder from the nickel ore refining process, where this respiratory tract disease can pose a risk of decreased function lungs to workers in the industry.[4]

PT. Virtue Dragon Nickel Industry (PT. VDNI) is a private company engaged in the mining sector located in Morosi Village, Morosi District, Konawe Regency, Southeast Sulawesi Province. One of a series of business activities at PT. VDNI is the processing and refining of nickel, and nickel ore or referred to as a smelter. The number of local workers at PT. VDNI, which was recorded on November 1, 2021, reached 6,824 people with a proportion of 93% male and 7% female. Meanwhile, the number of foreign workers recorded as of February 18, 2019, was 1,452 workers.[5] In 2020, PT. VDNI will process 7.28 million tons of nickel ore. Currently, the production capacity reaches 1 million tons, while production only reaches 674 thousand tons of Ferronickel (FeNi). The output from the nickel smelter will be sold domestically and partly exported to China.[6]

Based on an initial survey of the health status of employees taken in the last 2 years, namely from 2020 to 2021, In 2020 there was an increase in the number of treatment cases found at PT. Virtue Dragon Nickel Industry as many as 556 cases, with the 5 highest diseases namely 137 febrile diseases, 92 gastritis, and 53 cases of toothache, 39 cases of cephalgia, 36 cases of the abscess (boils) and cases of itchy skin.[7] In 2021 there are 502 cases of the disease being treated by the company clinic with details of cases in the smelter division there are 179 cases, with the 5 highest diseases namely 180 cases of febrile disease, 79 cases of gastritis, 68 cases of muscle pain, 56 cases of toothache, 36 cases of cephalgia, and 30 cases of diarrhea.[6] Several studies explain that the high rate of occupational diseases in smelter employees is around 98% of 69 workers who have experienced work-related diseases, including respiratory disorders, falling, being pinched and exposed to sharp objects.

The temperature in the workplace is related to the temperature conditions in the smelter area, where the raw material production site has a higher risk level than those located in the office, due to the temperature in the production site being hotter than the office unit. The length of time an employee is at work is the duration in units of hours used to carry out work obligations that are the worker's duties. Where the factor of the length of time a person works has the potential risk for someone to get an occupational disease who works in a smelter unit > 1 year with a maximum length of time a person works < 8 hours / day.[8]

Noise is part of the factors that contribute to occupational diseases. This is because the high noise generated from any activity in the industrial area will have side effects on the hearing system if it exceeds the threshold value of human hearing. Where the permissible noise threshold value according to the Decree of the Minister of Manpower No. 13 of 2011 is 85 dBA with a maximum time of 8 hours per day. If continuous exposure to noise in the workplace is 85 dBA, it will cause various health complaints and hearing loss. From the high noise, a further review of the use of safety tools or personal protective equipment was carried out to minimize the occurrence of diseases in the work environment. Based on the study of the problems described above, researchers are interested in conducting research with the title "Factors Related To Occupational Diseases In Smelter Employees PT. Virtue Dragon Nickel Industry Site Morosi".

Method

This research using a cross-sectional research design. The research location is at PT. Virtue Dragon Nickel Industry Mega industrial area of Konawe district. The sample in this study was 100 employees who worked especially in the smelter unit. To find out the relationship between the dependent variable and the independent variable, it was carried out using the Chi-Square test with a significant level ($\alpha = 0.05$).

Result

Table 1 shows that of the total respondents who have a working length of < 8 hours/day as many as 65 respondents (100%), most of them do not experience occupational diseases as many as 51 respondents (78.5%), and the rest there are respondents who experience occupational diseases. work as many as 14 respondents (21.5%). Meanwhile, of the total respondents who have worked longer than 8 hours/day, 35 respondents (100%), most of the respondents experienced occupational diseases, namely 25 respondents (71.4%) and the rest there were 10 respondents who did not experience occupational diseases. respondents (28.6%).

Table 2 shows that of the total respondents who were exposed to noise <85 dBA as many as 66 respondents (100%), most of them did not experience occupational diseases as many as 54 respondents (81.8%), and the rest there were respondents who experienced occupational diseases as many as 12 respondents (18.2%). Meanwhile, of the total respondents who were exposed to noise > 85 dBA, 34 respondents (100%), most of the respondents experienced occupational diseases, namely 27 respondents (79.4%) and the remaining respondents who did not experience occupational diseases were 7 respondents (20 ,6%).

Table 1
The Relationship Between Working Hours and the Incidence of Occupational Diseases in Smelter Employees at PT. Virtue Dragon Nickel Industry

Working Hours	Occupational Diseases				Total		*P Value*	OR 95% Cl
	Healthy		Sick					
	n	%	n	%	n	%		
< 8 Hours/day	29	87.9	4	12.1	33	100	0,000	7,930
> 8 Hours/day	32	47.8	35	52.2	67	100		
Total	61	61.0	39	39.0	100	100		

Table 2
The Relationship Between Noise and the Incidence of Occupational Diseases in Smelter Employees at PT. Virtue Dragon Nickel Industry

Noise	Occupational Diseases				Total		*P Value*	OR 95% Cl
	Healthy		Sick					
	n	%	n	%	n	%		
< 85 dBA	54	81.8	12	18.2	66	100	0,000	17.357
> 85 dBA	7	20.6	27	79.4	34	100		
Total	61	61.0	39	39.0	100	100		

Discussion

Working Hours with Occupational Diseases

The working hours is the time or length of the workforce working in a place. Working hours can affect performance both positively and negatively. Give a positive influence on performance when more experienced in carrying out their duties. On the other hand, it will have a negative effect if the longer you work, the habits will arise in the workforce. Extending working time more than the ability to work long hours is usually inefficient, optimal work effectiveness and productivity, even usually seen a decrease in quality and work results as well as working for a long time, there is a tendency for fatigue, health problems, illness, and accidents as well as a dissatisfaction to occur. In addition, if many workers do not use PPE during overtime at work, it will exacerbate the risk of occupational diseases in the work environment.[9]

The relationship between the working hours and the incidence of occupational diseases in smelter employees at PT. Virtue Dragon Nickel Industry using the Chi-Square statistical test obtained p = 0.000 (p <0.05), so Ha is accepted, it

can be interpreted that there is a relationship between the working hours and the incidence of occupational diseases in smelter employees at PT. Virtue Dragon Nickel Industry. The value of OR = 7,930 (CI: 95% 2,511-25,045) (OR>1) indicates that respondents who have a working hours > 8 hours/day have a chance of 7,930 times more at risk of occupational diseases.

The relationship between the working hours and the occurrence of occupational diseases in the spine. Length of time in work is a factor that triggers disease for workers, so workers who do the same job repeatedly with a duration of work that exceeds the body's work capacity will be at risk of disease and interfere with the health of workers.[10] The working hours is categorized into three, namely work duration < 6 hours, moderate work duration between 6-8 hours, and work duration > 10 hours.[11]

Working hours exceed these provisions, there will be things such as a decrease in work speed, health problems, and an increase in absenteeism due to illness, which results in low work productivity. Therefore, the Industry should make rules for working hours for workers so that they can be monitored by making SOP and suppressing the occurrence of occupational diseases for workers so that the work of workers can be maximized. In addition, another way that can be done by the industry is to refresh again by holding counseling or other approaches such as safety campaigns, namely giving safety messages every day to remind workers to carry out safe work and bring back an attitude of concern for work safety.[12]

Noise and the Incidence of Occupational Diseases

Noise is an unwanted sound for humans. Noise in the workplace can affect workers because noise can cause feelings of disturbance, communication disorders causing misunderstanding, and not hearing the signals given, this can result in accidents due to work besides noise can also cause temporary or permanent hearing loss resulting in disease due to work.[13]

The relationship between noise and the incidence of occupational diseases in smelter employees at PT. Virtue Dragon Nickel Industry using the Chi-Square statistical test obtained p = 0.000 (p <0.05), so Ha is accepted, it can be interpreted that there is a relationship between noise and the incidence of occupational diseases in smelter employees at PT. Virtue Dragon Nickel Industry. The value of OR = 17,357 (CI: 95% 6,133-49,124) (OR>1) indicates that respondents who are exposed to noise >85 dBA have a 17.357 times greater risk of occupational diseases.

Significant relationship between noise exposure and occupational diseases. In general, the effect of noise exposure depends on the level of noise intensity and the length of exposure time.[14] The effect of high-intensity noise (above NAV) in the mining business causes damage to the ears that can reduce hearing quality both temporarily and permanently from mining machinery and lifting equipment. Physiologically, high-intensity noise causes health problems including increased blood pressure (±10 mmHg), increased pulse rate, risk of heart attack, sensory disturbances, constriction of peripheral blood vessels in the hands and feet, and impaired balance of organs and digestive disorders. In addition to health effects, noise also has an impact on operational activities which can cause public reactions that can protest mining activities due to noise caused by mining equipment and activities.[15]

Conclusion

Based on the results of research conducted on "Factors Related To Occupational Diseases In Smelter Employees PT. Virtue Dragon Nickel Industry Site Morosi" obtained the following conclusions are there is a significant relationship between working hours and noise with the incidence of occupational diseases in employees of PT. Virtue Dragon Nickel Industry.

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