SUMMARY

THE EXPOSURE EFFECT OF RICE MILL DUST OF LIPOPOLYSACCHARIDE (LPS) ENDOTOXIN CONTENT ON THE INCREASE OF SERUM C-REACTIVE PROTEIN (C-RP) AND THE DECREASE OF PULMONARY FUNCTION OF RICE MILL OPERATOR

In this globalization era, Indonesia will be in free trade which will be followed by the increase of the number of industry in all aspects. One of the industries which support the fulfillment of food self-sufficiency is the industry of rice mill. However, the activity in rice mill gives either positive impact or negative impact for health. At the industry of rice mill, the processes of bran peeling of dry rice, the separation of rice, rice milling, sieving, and packaging will make dust. In the process of rice milling, the dust which contained LPS endotoxin can cause negative impact for health.

The environment factor in rice milling causes negative impact for respiration. The lack of ventilation and unqualified rooms can cause health problems for workers at the rice mill.

According to previous study, it showed that the exposure of rice dust that was breathed by workers would have possibility to influence the decrease of pulmonary function. The LPS endotoxin which was one of biological agents that was from negative gram wall and as an organic dust could cause inflammation at the respiratory canal. Moreover, the previous epidemiological study suggested for further study to conduct a study about the endotoxin which was breathed could increase C-reactive protein (C-RP) and decrease pulmonary function.

In addition, the previous epidemiological study showed that LPS endotoxin that was given to healthy person through inhalation with different dosage would concern inflammation cell, respiratory epithelial cell, and the release of particular cytokine. Therefore, it would cause the decrease of the air flow that related with the neutrophil alveolitis with the result of < 0,5 µg that did not cause acute respond, 0,5 µg that caused the change of blood polymorphonuclear (PMN), 5 µg that would cause the increase of C-RP, 50 µg that caused fever and the change of pulmonary function.

The LPS endotoxin which was in rice dust with chronic exposure would cause the increase of the acidity of respiratory canal which in acute condition of exposure of LPS endotoxin in rice dust caused oxidative stress. Oxidative stress was the increase of

reactive oxygen intermediate (ROI) with toxin, that was more than the defense of endogenous antioxidant. Furthermore, this case caused the overage of free radical that would react with the fat, protein, cellular nucleic acid, hence, it could be occurred a local damage and dysfunction of particular organ. Therefore, it could cause the decrease of pulmonary function.

The purpose of this study was to analyze the effect of the increase of LPS endotoxin content toward the increase of C-RP serum and the decrease of pulmonary function of rice mill operator and also the increase of C-RP serum that decreased pulmonary function. This study was an analytical observational study by utilizing the design of longitudinal prospective study.The samples of this study were 11 operators of rice mill in PalurKebonsari village, Madiun district. In addition, the samples were taken randomly by the writer. The techniques of data collection were interviewing, measuring the personal dust, measuring the personal LPS endotoxin, measuring the lung function by utilizing spirometer and the content of C-RP before and after working. The dependent variables of this study were the content of C-RP and pulmonary function. Meanwhile, the independent variable of this study was the content of LPS endotoxin and the distractor variables were age, work time, and smoking habit.

The result of the study showed that the average of worker's age was 35,64 years old, the average of the work time was 5 years, and the 63,6% of them were medium smokers. After working in 8 hours, it was obtained the content of personal dust that was 1,47 mg/m^3.. Moreover, the content of the average of LPS endotoxin surpassed the threshold value which was 91,1 EU/ m^3. Besides, it was obtained that the content of C-RP serum increased in 45,5% with the average of 0,94 mg/L. The analysis of this study that utilized multiple regression test showed that there was an influence between the exposure of LPS endotoxin and the increase of respondent's C-RP serum which was β=0,543 and p=0,013. Therefore, it could be concluded that the increase of LPS endotoxin content would increase the content of respondent's C-RP serum. Meanwhile, the work time also influenced the increase of respondent's C-RP serum which was β=0,607 and p=0,033. In other word, the longer work time influenced toward the increase of the content of C-RP serum. Meanwhile, the variable of age and smoking habit did not influence the increase of the content of C-RP serum.

Besides, there was an influence between the LPS endotoxin content and the decrease of pulmonary function with (Δ FVC β=--0,745: p=0,104) and (Δ FEV_1 β=-

0,600: p=0,189). This case showed that the increase of LPS endotoxin content would decrease the respondent's pulmonary function. Age, work time, and smoking habit influenced toward the decrease of pulmonary function. Meanwhile, the content of C-RP serum influenced toward the decrease of pulmonary function (Δ FVC : β = -01.094: p=0,019), however, it did not influence toward (ΔFEV_1: β = -0,462: p=0,527).

Its is concluded that LPS Endotoxin containing rice mill dust leads increase of Serum C-RP and decrese of lung function in rice mill operators.

LPS endotoxin levels in rice dust at Palur village, Madison County Kebonsari effect on the increase in serum levels of C-RP rice mill operator after work (cross shift).LPS endotoxin levels in rice dust at Palur village, Madison County Kebonsari effect on pulmonary function decline in serum rice mill operator after work (cross shift).The serum levels of C-RP affects the decrease in pulmonary function after working rice mill operator (cross shift)

Therefore, in order to decrease the health problem, particularly for respiratory problem, for the workers at the rice mill that was caused by the exposure of endotoxin, it was needed for the owner of rice mill to provide some personal protective equipment such as Non-power Air PurifyingRespirator or (NAPR) N Series (Not resistant to oil) in order to protect the workers toward the exposure of LPS endotoxin and also to repair the ventilation system, lighting, and cleanliness of the room. Besides, it was also needed to check periodically for the symptoms of respiration and pulmonary function, particularly (Δ FEV_1 and ΔFVC). Hence, it could be known early for the workers who had risk of health problem, particularly respiratory problem.