UNIVERSITI TEKNOLOGI MARA

STUDY OF FINE PARTICULATE MATTER ($PM_{2.5}$) AND THE HEALTH EFFECTS AMONG FACTORY WORKERS

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Abstract

STUDY OF FINE PARTICULATE MATTER ($PM_{2.5}$) AND HEALTH THE EFFECTS AMONG FACTORY WORKERS

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Introduction: Sources of indoor air pollution that release gases or other particles into the air are the primary cause of indoor air quality problems in homes. Lack of ventilation system can cause the increasing indoor pollutant levels because there is no exchange process occurs between outdoor airs to dilute emission from indoor sources. Building material and furnishing, asbestos, wet and damp carpet, cabinetry or any formaldehyde made up from woods products, household cleaning product, personal care, central heating and cooling system, and humidification devices, and outdoor sources such as Radon, pesticides and outdoor air pollution.

Methodology: The study was conducted in the factory which consists of 5 departments according to their functioning process. The location of the factory is at SKF Bearing (M) Sdn. Bhd, kawasan perindustrian Nilai. The study is a cross-sectional study .It was done by comparing the lung function performance and the health effect among less exposed group and exposed group with the exposure to the $PM_{2.5}$. Human health risk assessment of each worker has been calculated by using Louvar F. Joseph and Louvar B. Diane (1995) method. Analytical and descriptive statistical analysis was determined using SPSS version 17.

Results: The study found that most of the workers exposed group get health effect due to the presence of high level concentration of $PM_{2.5}$ ($0.223 mg/m^3$). From the analysis showed, the result for lung function performances for the exposed workers is below the normal average for the adults. Since the p value < 0.01, there are significant health effects such as irritated eyes, headache, chess tightness, irritated throat and coughing among these two groups. Inhalation rate for Human Health Risk assessment approximately 0.020 mg/ kg^{-day}.

Conclusion: In conclusion, from the findings of the study high reading of $PM_{2.5}$ detected during the air sampling. From the analysis there were significant health effects with the $PM_{2.5}$ exposure.

Keywords: Indoor Air Quality, Fine Particulate Matter ($PM_{2.5}$), Human Health Risk Assessment.

CHAPTER 1

INTRODUCTION

1.1 Background Information

Air is one of basic of human needs. Peoples cannot survive without fresh air within a period of time. Fresh air contains oxygen which is source for human to breath. Large numbers of brain cells begin to die after about 4 to 6 minutes without oxygen and results in death (Myers, 2006). To get fresh air is not difficult, we can directly get from atmosphere, but the major problem is the composition of air we breathe in into our lungs. The composition of fresh air consist of 78% of Nitrogen, 21% of Oxygen, 1% of Argon, 0.03% of Carbon Dioxide, 0.01% of Neon, 0.0005% of Helium 0.0001% of Krypton, 0.00005% of Hydrogen and 0.0000087% of Xenon (David, 1997).

Our air was polluted with the other chemical substance which is come from other source pollutant either natural sources or anthropogenic sources. There are outdoor and indoor sources of fine particles (Department Of Health New York, 2011). Nowadays, it was development activities everywhere to fulfilled economic demanding. Most of these developments will produce pollutant products originally from combustion, evaporation, composition and other processes that using energy.

Air pollution is divided into two categories; which is indoor air pollution and outdoor air pollution. Different type's pollution depends on how the pollutants are formed (U.S EPA, 2008). Current studies show that most dangerous to human health is pollutants from indoor. Sources of indoor pollution that release gases or other particles into the air are the primary cause of indoor air quality problems in homes (U.S EPA, 2010).

Lack of ventilation system can cause the increasing indoor pollutant levels because there is no exchange process occurs between outdoor airs to dilute emission from