

UNIVERSITI TEKNOLOGI MARA

**PM₁₀ LEVELS AND THE ASSOCIATION WITH
RESPIRATORY PROBLEMS AMONG CHILDREN
LIVING NEAR QUARRY AT PANCHOR JAYA
SEREMBAN**

NUR FADZIEATUL BINTI ABD SAMAH

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ABSTRACT

Introduction: This study was conducted among school going children (n=96) ages ranging from 10 to 12 years old at Panchor Jaya Seremban. The main objective is to determine the association of lung function and respiratory health with PM₁₀ concentration. The study children were divided into a study (exposed) group (n=48) and a control (unexposed) group (n=48). They were selected based on inclusive criteria: Malay, staying more than 4 years within the study area, undiagnosed for respiratory problems and staying in terrace house.

Methodology: It is a cross sectional study design with an exposed (study) respondents who were selected by stratified random sampling and by matching for the unexposed (control) group. Gilair air sampling pump (Sensodyne®) was used to measure PM₁₀ concentration for 12 hours sampling from 8pm to 8am. Chestgraph spirometer (Translab®) was used to measure respondents' lung function. A pre-tested, modified standardized questionnaire was used to obtain socio-demographic and respiratory problems among respondents.

Result: The results demonstrate that PM₁₀ concentration in study groups' house (n=48) when compared to control homes (n=48) was significantly higher (t=3.646, p<0.01). There was a significant difference for FEV₁ (t= - 2.440, p=0.021) and FEV₁/FVC (t= -2.292, p=0.005) among female respondents in the study group (n=18) when compared to the control group (n=18). There was a significant difference for FVC (t= - 2.972, p<0.05) among study group males (n=30) when compared with control group (n=30). Cross tabulation tests on symptoms between the study groups revealed significant differences where sore throat (X²= 32.77, p<0.01), phlegm (X²= 13.503, p<0.01), shortness of breath (X²= 13.353, p<0.01), and cough (X²= 22.128, p<0.01). There was a significant difference of lung function status (X²= 6.918, p=0.009) between study group compared to control group respondents. High PM₁₀ level also showed a significant association with lung function status (X²= 8.269, p<0.004), and phlegm (X²= 7.92, p<0.005) as well as sore throat (X²= 11.748, p=0.04) and not taking food supplement has association with unhealthy lung function status (X²=4.321, p=0.029). Regression analysis using Enter method showed that the duration of staying at the area influenced FVC (R² =0.056, p=0.067), FEV₁ (R² =0.063, p=0.05) and FEV₁/FVC (R² =0.103, p=0.006) predicted values .

Conclusion: The prediction made from this study would be as the respirable quarry dust of PM₁₀ level rises, the lung function status gets worse among the study school going children living near the quarry. PM₁₀ significantly influenced the lung function of these children.

Keywords; PM₁₀, lung function, school children, granite quarry

CHAPTER 1

INTRODUCTION

1.1 Background

Clean air is very important towards better quality of life for all living thing. Human can only live without air for about 4 minutes. Contaminated air will impair the health condition of human as well as other living thing. There are many anthropogenic activities that reduce the air quality such as open burning, forest fire, discharge from industrial areas, vehicles and natural sources such as volcanoemissions. (DOE, 2006)

According to the Glossary of Atmospheric Chemistry Terms by IUPAC (WHO, 1999) Dust means small, dry, solid particles projected into the air by natural forces, such as wind, volcanic eruption, and by mechanical or man-made processes such as crushing, grinding, milling, drilling, demolition, shoveling, conveying, screening, bagging, and sweeping. Dust particles are usually in the size range from about 1 to 100 μ m in diameter, and they settle slowly under the influence of gravity.

Airborne dusts are of particular concern because they are well known to be associated with classical widespread occupational lung diseases such as the pneumoconioses, as well as with systemic intoxications such as lead poisoning, especially at higher levels of exposure. But, in the modern era, there is also increasing interest in other dust-related diseases, such as cancer, asthma, allergic alveolitis, and irritation, as well as a whole range of non-respiratory illnesses, which may occur at much lower exposure levels (WHO,1999).Dust generated by quarry becomes occupational concern as well as environmental health concern since the dust particles easily distribute to nearby residential area and may affect public health.