

**UNIVERSITI TEKNOLOGI MARA**

**THE EFFECT OF FINE PARTICLES  
(PM<sub>2.5</sub>) ON LUNG FUNCTION  
PERFORMANCE OF STEEL FACTORY  
WORKERS**

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Project submitted in fulfillment of the requirements for the  
degree of  
**Bachelor in Environmental Health and Safety (Hons.)**

**Faculty of Health Sciences**

## DECLARATION BY STUDENT

Project entitled “The Effect of Fine Particles (PM<sub>2.5</sub>) on Lung Function Performance of Steel Factory Workers” is a presentation of my original research work. Whenever contributions of others are involved, every effort is made to indicate this clearly, with due reference to literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Project Supervisor, Dr. Abdul Mujid bin Abdullah. It has been submitted to the Faculty of Health Sciences in partial fulfilment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

Student’s signature:

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*In the name of Allah, The Most Gracious, The Most Merciful*

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## ABSTRACT

Studies have linked exposure to fine particles (PM<sub>2.5</sub>) with a variety of respiratory health effects such as deterioration of lung performance, breathing difficulties, wheezing, coughing, chest tightness and phlegm. **Objective:** This study aims to investigate the relationship between the concentrations of PM<sub>2.5</sub> and Peak Expiratory Flow Rate (PEFR) of participants in steel factory. **Methodology:** A cross-sectional study was conducted among 59 participants. Air sampling pump was used to measure the personal fine particles concentration exposed to participants while Peak Flow Meter used to measure the PEFR. Participants were interviewed using structured questionnaire from British Medical Research Council Respiratory (BMRC) regarding their respiratory symptoms. **Results:** The mean concentration of PM<sub>2.5</sub> was 2.73 mg/m<sup>3</sup> with minimum value of 0.15 mg/m<sup>3</sup> and maximum value of 14.22 mg/m<sup>3</sup>. Meanwhile, the minimum value of PEFR obtained was 200 L/min. The most prevalence of respiratory symptoms was phlegm for most days in 3 months (47.1%) followed by breathlessness when hurrying on level ground and walk up slight hill (33.9%), morning cough (28.8%) and morning phlegm (28.8%). There was no significant relationship between fine particles concentration and PEFR among the steel workers ( $r=0.106$ ,  $p=0.426$ ). **Conclusion:** Findings indicated that the fine particles concentration was complying with the permissible exposure limit value for PM<sub>2.5</sub> for 24-hour mean which is 25 mg/m<sup>3</sup>. However, preventive measures must be implemented to reduce and maintained the level of exposure by installing a general exhaust system in the factory, conduct an annual examination and providing an appropriate N95 respirator to all the steel factory workers.

**Keywords:** *Fine particles, peak expiratory flow rate, respiratory symptoms, steel factory*