

Respirable Dust Monitoring and Risk Assessment Among Cleaners at Mawar College, UiTM Shah Alam

Nik Uzma Nik Muhammad^a & Nor Azura Sulong^{a*}

Structured Abstract

Background: Respirable dust is composed of fine particles that are capable of penetrating deep into the lungs and is a known contributor to various respiratory illnesses, particularly in occupational settings. Cleaners, due to their routine tasks such as sweeping and dusting, are at higher risk of repeated exposure to dust. At Mawar College, UiTM Shah Alam, cleaners have reported symptoms such as coughing and nasal irritation, yet no prior environmental monitoring or health risk assessment has been carried out. This study aims to fill that gap by quantifying respirable dust levels and evaluating associated health symptoms and risks among the cleaning staff.

Methods: A quantitative cross-sectional study design was employed. Personal air sampling was conducted using the NIOSH 0600 method across nine working days. Each sample was collected using a Gilian Air Plus sampling pump with filter cassettes attached to the cleaners during their normal duties. Of the 10 cleaners selected, 9 were used for active sampling, and 1 served as a blank control. Environmental variables such as temperature and humidity were also recorded. Additionally, a structured respiratory symptom questionnaire (adapted from ATS-DLD-78-A) was distributed to assess health outcomes. Carcinogenic and non-carcinogenic risks were evaluated using standardized risk assessment equations, including Lifetime Average Daily Dose (LADD) and Hazard Quotient (HQ).

Results: Dust concentrations ranged from 0.6 mg/m³ to 1.5 mg/m³, all below the DOSH permissible exposure limit of 5 mg/m³. However, 68.8% of respondents reported coughing, 59.4% nasal irritation, 53.1% throat discomfort, and 46.9% breathing difficulties. Carcinogenic risk values (ELCR) and HQ were within acceptable safety thresholds, indicating minimal long-term risk. However, reported symptoms suggest discomfort even at low exposure levels.

Conclusion: Although respirable dust levels remained within safe limits, reported respiratory symptoms highlight a need for preventive actions. The study calls for improved ventilation, regular monitoring, PPE compliance, and further research across multiple institutions and timeframes.

Keywords: respirable dust, air sampling, health risk assessment, cleaners, occupational exposure

*Correspondence: azurasulong@uitm.edu.my

^aSchool of Chemistry & Environment, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia