

## **Indoor Air Quality and Health Risk Assessment among Preschool Children in Little Caliph Section 19, Shah Alam**

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### **Structured Abstract**

**Background:** IAQ is important to the health and well-being of preschool children, who are highly vulnerable to indoor pollutants due to prolonged exposure. Complaints reported that IAQ problems at Little Caliph in Section 19 included insufficient ventilation, dust infiltration from nearby road traffic, and elevated temperature that compromised occupant comfort and the overall learning environment. The objectives are to evaluate physical, chemical, and biological indoor air pollutants, to examine health implications through lung function tests, and to identify a health risk assessment.

**Methods:** The research methodology included obtaining evaluating ethics approval, conducting walkthrough inspections, administering questionnaire surveys, and performing IAQ assessments. Lung function tests were conducted using a peak flow meter to assess the impact of indoor pollutants on the respiratory health of preschool children. A health risk assessment evaluated carcinogenic and non-carcinogenic risks based on PM<sub>2.5</sub> and PM<sub>10</sub> concentrations.

**Results:** The results showed that temperature, RH, TVOC, fungi, and bacteria exceeded the acceptable limits by ICOP IAQ 2010 and ASHRAE Standards 62.1 (2022). Formaldehyde concentrations exceeded the acceptable limit by ICOP IAQ 2010 and WHO 2010. PM<sub>10</sub> concentration exceeded the acceptable limit by ASHRAE Standard 62.1 (2022). Such poor IAQ in the preschool environment was due to inadequate ventilation, unshaded windows, and the presence of the source of a pollutant including glue, photocopier, and dust. The lung function tests show mild respiratory severity and the association with exposure to elevated concentrations of PM<sub>10</sub> and fungal contaminants. Health risk assessments identified non-carcinogenic risks from PM<sub>10</sub> exposure and carcinogenic risks from PM<sub>2.5</sub> exposure among preschool children.

**Conclusion:** Future applications of this research include the development of a targeted plan to improve IAQ in preschools, such as enhancing ventilation systems, reducing indoor pollutant sources, and implementing effective air quality management practices. Additionally, it is recommended that the Malaysian government revise the ICOP IAQ 2010 guidelines to include PM<sub>2.5</sub> as a regulated parameter, considering its significant contribution to carcinogenic risks.

**Keywords:** Indoor Air Quality, Preschool children, Health Risk Assessment, Lung Function Test

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