UNIVERSITI TEKNOLOGI MARA

A CASE STUDY ON THE SOURCE APPORTIONMENT OF INDOOR AIR QUALITY (IAQ) IN SELECTED KINDERGARTEN USING CLUSTER ANALYSIS

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ABSTRACT

Indoor air quality is an important concern for kindergarteners. There is scientific evidence to suggest that children are more likely to develop respiratory problems if they spend time indoors while pollutants such as organic and inorganic chemicals can be harmful. The study's primary goal will be to determine the trend and source of pollutants inside kindergartens using descriptive analysis and cluster analysis. Air temperature (T), relative humidity (RH), air movement (AM), carbon dioxide (CO2), formaldehyde (HCHO) and particulate matter (PM) are the monitored parameters. Monitoring was carried out in the kindergarten for three consecutive days started from 8 a.m. to 12 p.m. According to this, indoor carbon dioxide readings were higher at 8 a.m. when parents drove to kindergarten to drop off their children without turning off the engine. In addition to this, the PM10 reading at 10am was high but still within the standard range according to ICOP IAQ 2010. The findings highlight the importance of indoor air quality improvement measures for kindergarten buildings in different environments, which can be used to improve indoor air quality in kindergarten environments.

Keywords: *Indoor air quality, indoor air pollutants, kindergarten, source of apportionment, descriptive analysis, cluster analysis.*

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Clean air is a necessity of life. People are spending 90% of their daylight hours indoors. To avoid health problems, indoor air quality (IAQ) must be fresh, clean, and comforting. The components of indoor air contribute to the quality of the indoor environment, which impacts the wellness and well-being of people in the space. Excessive ranges of indoor air pollutants in kindergarten surroundings can have negative impacts on children's learning performance and increase the possibility of absenteeism due to breathing troubles (Zakaria & Mahyuddin, 2022). Most activities that take part indoors are distinguished by complex chemical components in air quality. Indoor classrooms are a vital setting for young children to learn. Several studies have found that classrooms have high concentrations of these substances, which can be harmful to human health (Singh & Malarvili, 2020; Yuhe et al., 2021). For example, carbon dioxide has been linked to headaches and sleepiness and exposure to particulate matter can lead to respiratory problems such as asthma. Children are more susceptible to these pollutants than adults because their lungs are still developing and they breathe more easily than adults (Yuhe et al., 2021).

Children typically spend the majority of their time in the microenvironment of home and school. There is credible scientific evidence that spending time indoors can increase the likelihood of various respiratory illnesses caused by indoor air pollutant exposure, particularly in children (Zainudin et al., 2019). Exposure to air pollution can make children more likely to have asthma and other respiratory symptoms, even when they are exposed to low levels. Studies have been conducted over the last decade to