

## **Increased chromosomal damage among children in proximity to industrial zone**

### **ABSTRACT**

This study aimed to investigate air pollutant exposure at five primary schools in Terengganu, Malaysia and to assess chromosomal damage among primary school children. The study involved 176 children aged 10–11 years living close to industries (the exposed group) and those living far away from the industries (the comparative group). The parameters for the indoor air monitoring included suspended particulate matter, gaseous pollutants (NO<sub>2</sub> and SO<sub>2</sub>), and physical variables (temperature, relative humidity, and air velocity). Respiratory symptoms were assessed through questionnaires (n = 176), and a micronucleus assay was conducted on the buccal epithelial cells of 91 children. The findings showed that the levels of air pollutants at the schools of the exposed group were significantly higher ( $p < 0.05$ ) than those of the comparative group. The highest concentration of PM<sub>1</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> recorded at the exposed schools were 43.30, 44.83, and 60.83  $\mu\text{g m}^{-3}$ , respectively. Cough is the most significant recurring respiratory symptom among children with 2.52 odd ratio ( $p < 0.05$ ). Children in the exposed group had an average micronuclei frequency of  $5.02 \pm 3.43$  per 1000 cells, while those in the comparative group had  $2.00 \pm 1.56$ . This study strongly suggests that exposure to industrial air pollutants significantly influence micronuclei formation and increase the prevalence of respiratory symptom among children living in proximity to the industrial area after controlling all possible confounding factors. This study serves as baseline data for genotoxic damage among children in the vicinity of industrial area in South East Asia specifically.

**Keyword:** Air pollutants; Chromosomal damage; Respiratory symptom; Children