Air pollutants exposure with respiratory symptoms and lung function among primary school children nearby heavy traffic area in Kajang

ABSTRACT

The high loading of air pollutants in heavy traffic area has urged researcher to pay greater attention as it frequently associated with significant health impact particularly among children. This study aims to determine the association between traffic-related air pollutants and respiratory health among Malay primary school children in heavy traffic area and low traffic area. A cross-sectional comparative study was carried out among Malay children in heavy traffic area (N=69, Kajang) and low traffic area (N=69, Hulu Langat) areas. Air quality monitoring was conducted in 6 primary schools which include parameters of PM10, PM2.5, ultrafine particles(UFP), nitrogen dioxide (NO2), sulphur dioxide (SO2), carbon monoxide (CO) and carbon dioxide (CO2). A set of standardized questionnaire was distributed to obtain respondents' background information, exposure history and respiratory health symptoms. Spirometry test was carried out to determine the lung function of the respondents. Traffic count survey was conducted at two time intervals per day (7.00- 7.30 am and 1.00-1.30 pm). The result showed that there is a significant difference between concentration of PM10 [t=22.37; $p \leq 0.001$], PM2.5 [t=9.73; $p \leq 0.001$], UFP [Z= -3.36; p=0.001], NO2 [t=5.73; p=0.001], SO2 [t=6.88; $p \leq 0.001$] and CO2 [t=15.67; $p \leq 0.001$] in school in exposed and comparative area. Lung function abnormalities found in children in exposed area was 3 times higher than comparative area. All respiratory symptoms show significant difference between both exposed and comparative groups. All pollutants show a significant association with lung function abnormality among the respondents. The finding indicated that higher PM10 and PM2.5 will increase the FVC abnormality by 4 and 6 times of getting FVC abnormality and increase the FVC abnormality by 2 and 3 times of getting FEV1 abnormality. The finding concluded that exposures to traffic-related air pollutants, especially PM10, PM2.5 increase the risk of getting lung function abnormality and respiratory health symptoms among respondents.

Keyword: Traffic related air pollutants; Heavy traffic area; School children; Lung function; Respiratory symptoms