

A Comparative Study of the Concentration of Ambient Particulate Matter of Size 2.5 microns in Georgetown

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Air quality is a growing public concern in both developed and developing countries. Over the years, there has been an increase in the number of vehicles on major roadways. Vehicles release particulate matter (PM) into the atmosphere, which adversely affects air quality and, consequently, the health of the population. This study was conducted to measure ambient PM concentrations of size 2.5 microns (PM_{2.5}) along two streets in Georgetown, Guyana; namely Regent Street and Woolford Avenue. Concentrations of ambient PM_{2.5} were measured using the portable air quality sensor, *Airbeam2*. Air sampling was conducted during the periods October 2 to 14, 2019 and November 4 to 15, 2019 for two hours daily; at morning, noon, and evening. Mean daily PM_{2.5} concentrations ranged from 3.87 to 9.78 $\mu\text{g}/\text{m}^3$ in the vicinity of Regent Street, and from 2.53 to 2.57 $\mu\text{g}/\text{m}^3$ in the vicinity of Woolford Avenue. A correlation test was used to determine whether a relationship existed between the number of vehicles and PM_{2.5} levels. The Pearson correlation coefficient test showed a positive correlation of 0.358 between the number of vehicles and PM_{2.5} concentrations, at a 0.05 significance level. An exposure assessment was also conducted of vendors located along two sections of Regent Street, by calculating their mean daily dose by inhalation. The mean concentration of PM_{2.5} inhaled by vendors located between Camp and Alexander Streets was 0.00027 mg/(kg-day), while the inhalation level of vendors between Avenue of the Republic and King Streets was 0.00019 mg/(kg-day). Higher levels of PM_{2.5} were measured along the street with heavier vehicular traffic; concomitantly, this contributed to higher exposure of vendors. This study can be used to extend air quality studies and further examine its impacts on public health.

Keywords: Air quality; PM_{2.5}; public health