

PASSENGER EXPOSURE TO FINE PARTICULATE AND BLACK CARBON IN CITY OF COLOMBO

Nandasena Y L S, Hettiarachchi C, Abesiriwardena N, Sinhabahu R J, Piyal T

National Institute of Health Sciences, Sri Lanka

sumalnandasena@gmail.com

Abstract

The city of Colombo has expanded and traffic flow had changed over the past few years with new urban planning concepts. Number of vehicles on the roads has markedly increased. Thousands of commuters travel to their working destinations within city of Colombo. Objective of this study is to monitor the personal exposure of fine particulate matter and black carbon in non-air conditioned public buses commute in the city of Colombo

A research assistant carried a real-time fine particulate matter (PM_{2.5}) monitor, black carbon (BC) monitor and global positioning system (GPS) tracker in public buses commute in the city of Colombo. Twelve bus routes within the city were purposively selected. Average exposure for each route was calculated based on PM_{2.5} and BC concentration logged in every minute. Speed of the bus and distance were calculated from the coordinates obtained from the GPS tracker.

About 150 km were monitored for personal exposure of BC and PM_{2.5} over 800 minutes commuting in the public buses travel in city of Colombo. Median personal exposure of BC concentration was 13.58 µg/m³ (inter quartile range = 10.39 – 17.18 µg/m³). Median personal exposure of PM_{2.5} was 108.39 µg/m³ (inter quartile range = 92.54 – 176.42 µg/m³). Speed of the bus is not associated with the total PM_{2.5} concentration (Spearman's rho = 0.444). Median personal PM_{2.5} exposure concentration was higher than the WHO recommended value for 24 hours. Over 12% of PM_{2.5} proportion was BC.

Keywords: Black Carbon, Particulate Matter, Outdoor Air Pollution