

Fine particle air pollution due to secondhand smoke in selected public places in Colombo

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Introduction

Globally, about five million deaths per year are attributed to tobacco smoke. Secondhand smoke accounts for a substantial proportion of these deaths. Most countries including Sri Lanka have legislation banning smoking in indoor workplaces and public places. Certain public places such as entertainment venues continue to permit smoking. Particulate matter (PM_{2.5}) is a widely accepted indicator to evaluate secondhand smoke levels.

Objective

To determine PM_{2.5} concentrations in selected public places (defined as a space which can be visited without permission) in Colombo, Sri Lanka.

Methods

Using convenient sampling technique, we measured PM_{2.5} concentration levels in four types of public places (restaurants: n=6; bars: n=6; cafes: n=4; pubs and entertainment venues: n=4) during January to March, 2009. A particulate matter monitor (Model AM510 - SIDEPAK Personal Aerosol Monitor) was used to measure indoor air quality for 40 minutes and the immediate outdoors for 10 minutes before and after the indoor measurement.

Results

The mean indoor PM_{2.5} concentration was 124.9 ug/m³ (SD± 81.0) [range 33 ug/m³ - 299 ug/m³; median, 97.0 ug/m³]. The mean outdoor PM_{2.5} concentration was 39.7 ug/m³ (±14.3) [range 18 ug/m³ - 83 ug/m³; median, 37.5 ug/m³]. Indoor to outdoor (I/O) PM_{2.5} ratio ranged from 1.1 to 14.9. The highest PM_{2.5} concentration was recorded in a bar and the highest I/O ratio in an entertainment venue. Smoking density (number of burning cigarettes divided by volume of the public place) was not correlated with average indoor PM_{2.5} concentration (Pearson correlation = 0.36, p=0.12) or with I/O PM_{2.5} ratio (Pearson correlation = 0.07, p=0.76). The reported values are equal or above, compared to such venues in other countries.

Conclusion

The authorities should take steps in enforcing the smoking ban in public places. Areas where smoking is permitted, proper ventilation should be ensured.