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Schoolchildren Panel Study of Air Pollution from Biomass Burning in Amazon: Results by Gender and Age

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Background:

In the Amazon region several studies show that biomass burning plumes seem to have an important impact on human health.

Objective:

To evaluate the effects of $PM_{2.5}$ from biomass burning on lung function in schoolchildren in the Brazilian Amazon region by gender and age.

Methods:

A panel study with a sample of 309 schoolchildren from 6 to 15 years old. Daily measurements of $PM_{2.5}$, temperature, humidity, respiratory symptoms and peak expiratory flow (PEF) were recorded during the dry season of 2006. Random effects models were used to estimate the effects by gender and age groups. The exposure variable was the air pollution level on the current day.

Results:

Children-specific temporal trends and exposures to temperature and humidity lagged by 2-days were regarded in the model. Moreover, height, weight, asthma diagnosis, gender, and age of the child were also adjusted for. The effect of air pollution on lung function was significant for boys from 12 to 15 years old. For every 10 $\mu g/m^3$ increase of $PM_{2.5}$, the PEF average decreased 0,62 l/min. For only asthmatic children, the effect was significant for girls aged 6 to 11 years. For every 10 $\mu g/m^3$ increase of $PM_{2.5}$, the PEF average increased 1,59 l/min. For only non-asthmatic children, the effect was significant for both boys and girls aged 12 to 15 years. For girls every 10 $\mu g/m^3$ increase of $PM_{2.5}$, the PEF average decreased 0,70 l/min whilst for boys every 10 $\mu g/m^3$ increase of $PM_{2.5}$, the PEF average decreased 0,73 l/min.

Conclusion:

Exposure to fine particulate matter in the Brazilian Amazon region decreases the lung function of boys from 12 to 15 years old. However, for only non-asthmatic children exposure to air pollution decreases the lung function for boys and girls in the same age group.