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Respiratory Health of School Children in Relation to Their Body Mass Index (BMI) During Crop Residue Burning Events in North Western India

S. Gupta[1], S. K. Mittal[2]* and R. Agarwal[1]
[1]Department of Electrical and Instrumentation Engineering, Thapar University, Patiala, Punjab 147004, India
[2]School of Chemistry and Biochemistry, Thapar University, Patiala, Punjab 147004, India
*Corresponding author, E-mail: smittal@thapar.edu

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Abstract: Particulate matter levels and physiological parameters of 150 school going children were monitored continually for 3 years (2013–2016) at three agriculturally active sites. Percent changes in physiological parameters like forced vital capacity, peak expiratory flow, etc. were estimated using mixed effect model with adjustment of covariates such as BMI. Results show that the increase in fine PM levels were much more in rice seasons than in wheat seasons. During the burning episodes, severe adverse effects on physiological parameters of the selected subjects were observed due to enhanced PM2.5 levels. Significant changes were observed in FVC (- 5.27 to - 7.53%) and PEF (- 4.89 to - 7.12%) in comparison to FEV1 and FEF25–75%. Respiratory health in terms of FVC and PEF corresponded very well with the body mass indices of the human subjects for different PM levels in the ambient air. The subjects having lower BMI level were affected more than those with normal and high BMI on exposure to same level of fine particulate matter. It has been concluded that the trends of fall in respiratory parameters were alarming especially for the subjects with lower and higher BMI during crop residue burning episodes.

Keywords: Crop residue burning; Physiological parameters; Ambient particulate matter; Wheat and rice crops; Body mass index