Indoor TVOCs, RSPM and Fine Particulate matter: Health impact on young women of a rapidly growing urban city of Northern India

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Total volatile organic compounds and particulate matter (PM_{10}, $PM_{2.5}$ and PM_1) have negative effects on the heart and lungs, and even cause cancer on prolong exposure. As young women in this part of world spends most of their time indoor doing their various studies and households' activities. This study was conducted to see effect know of toxic indoor air pollutants on them. The present study, was conducted from November 2022 to February 2023 in six urban households of Lucknow, which is a growing mega metropolitan city and capital of most polluted state of world. Envirotech (APM 550 and 577) sampler and portable sensors were used to measure PMs and TVOCs respectively. The mean average concentrations of PM_{10}, $PM_{2.5}$, PM_1 and TVOCs were found to be 236.6933 µg/m^3, 116.5596 µg/m^3, 17.596 µg/m^3 and 618.833 µg/m^3 respectively. The highest $PM_{2.5}/PM_{10}$, $PM_1/PM_{2.5}$ and PM_1/PM_{10} mass ratio was found to be 0.562, 0.22 and 0.11 respectively. The ratio was indicating the distribution of fine and ultrafine particulate dominance in different areas. The young women dwellers were classified in three categories pre-teenage, teenage, post-teenage and they were asked to till questionnaire related to their health. The health risk of exposure to PM_{10}, $PM_{2.5}$, PM_1, and TVOCs was determined using the US Environmental Protection Agency prescription of average daily dose calculation. The results showed that the carcinogenic values for $PM_{2.5}$ and TVOCs in 20-21 year were 0.165µg kg-1day-1 ,0.87µg kg-1day-1. The dose-concentration was used to assess health risks employing the ICRP and MPPD modelling approaches. The results suggested that both PM and TVOCs concentrations were primarily connected to the experiments respondents' activities within their homes. According to the data collected, the results are very alarming and exposure to PM_{10}, $PM_{2.5}$, PM_1 and TVOCs from indoor air may raise risk of developing lung cancers in young women in near future.

[1] Dwivedi, S., Taushiba, A., Zehra, F., Gupta, S. K., & Lawrence, A. (2023). *Hygiene and Environmental Health Advances*, *5*, 100038