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Title: Indoor Air Pollution and its Health Impacts on Females and Children (0-4yrs): A Case Study of NCT of Delhi

ABSTRACT

NCT of Delhi is one of the most rapidly growing metropolitan cities of India. Since horizontal expansion of the city is restricted by the municipal laws, the living spaces are getting more crowded and congested, which makes buildings an ideal location for high level of Indoor Air Pollution (IAP). Along with urban areas, NCT of Delhi also includes urban villages where households still rely on solid fuels or dirty fuels, which are among the chief sources of IAP. Thus to study the extent of IAP in residential areas of NCT of Delhi, primary data was generated and analysed from the selected urban areas and urban villages. Indoor air pollutants were monitored and measured for Respirable Particulate Matter (RSPM) which includes PM_{10} , $PM_{2.5}$ and PM_1 . The health impacts of these pollutants on the target group of females and children (0-4yrs) were analysed by developing an index for Sick Building Syndrome (SBS). The findings have shown that amongst the urban villages, in Katewara village and Jait Pur village use of solid fuels for cooking and heating purposes is found to be the main source of IAP. Due to high intensity of exposure to IAP it is revealed that in total 88% surveyed females of Katewara village and 92% surveyed females of Jait Pur village are suffering with SBS symptoms. Among the surveyed children (0-4yrs), 72% children in Katewara village and 90% children in Jait Pur village are suffering with SBS symptoms. In urban surveyed residential colonies, apart from the ventilation status, a direct impact of proximity to outdoor air pollution sources is seen to pollute the Indoor Air Quality (IAQ) as well. On the basis of the concentration of RSPM (PM_{10} , $PM_{2.5}$ and PM_1), worst IAQ was found in the surveyed houses of Pahari Dhiraj and best was found in Lodhi Complex. In all the surveyed residential colonies, the percentage of females and children (0-4yrs) suffering with health problems was much higher in the households residing in the close proximity to the outdoor air pollution sources specially within highly congested and crowded colonies with high traffic flow. The hypotheses generated to see the impact of IAP on health of the

target group have been confirmed at 95% confidence level. Thus on the basis of the findings of the present research it can be concluded that IAP concentration in the residential areas of NCT of Delhi, although partly related to income variation and educational levels which decides choice of location for residence of households, the lack of proper ventilation and proximity to outdoor pollution sources is also significant. Similar is the case for urban villages. Thus awareness about the health impact of IAP especially in case of females and children should be created and proper steps need to be taken from urban and architectural planning point of view to make urban villages as well as the cities a healthier place to live in.

Key Words: *indoor, pollution, urban, village, residential, fuels, health, proximity, concentration, females, children.*