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Title: Gendered Impacts of Household and Ambient Air Pollution on Child Health: Evidence from Household and Satellite-based Data in Bangladesh

Reducing health risks from household air pollution (HAP) and ambient air pollution (AAP) is a critical issue in achieving sustainable development worldwide, especially in low income countries. Children are particularly at high risk because their respiratory and immune systems are not fully developed. Previous studies have identified the adverse impacts of air pollution on child health; most of them, however, have focused on either HAP or AAP without considering differences in the timing and magnitude of prenatal and postnatal exposure across genders.

This article estimates the impacts of prenatal and postnatal exposure to ambient PM2.5 and household use of solid fuels (a main cause of HAP) on child health in Bangladesh. We combine individual-level data from nationally representative surveys and satellite-based high-resolution data on ambient PM2.5. We show that: (1) the use of solid fuels is associated with respiratory illness among girls, but not boys; (2) prenatal exposure to ambient PM2.5 adversely affects child underdevelopment (stunting and underweight), without any clear evidence on gender differences; and (3) postnatal exposure consistently increases the risk of both child underdevelopment and respiratory illness for both genders. Our findings are robust even after addressing seasonal variations of AAP, potential endogeneity of HAP, and a possibility of selection bias due to migration.

These results provide new evidence on heterogeneous impacts of AAP and HAP in terms of gender and the timing of exposure. The main policy implications are that intervention against HAP would become more effective by targeting girls and that intervention against AAP should cover not only born children but also pregnant mothers. In sum, our findings highlight the importance of duly focusing on women to protect them from air pollution and achieve the global target, exemplified by Target 3.9 of the Sustainable Development Goals.