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LOCKDOWN INCREASED EXPOSURE TO INDOOR AIR POLLUTION

Relevant for: Developmental Issues | Topic: Health & Sanitation and related issues

The shifting of outdoor time to indoor during the lockdown resulted in increased exposures to biomass-fuel emissions. Image for representational purposes only. | Photo Credit: Kamal Narang

During COVID-19 lockdowns, many countries observed historic improvements in ambient air quality. Our new study shows that despite the historic improvements in ambient air quality, PM2.5 exposures increased for 65% of Indians and a third of the global population during the lockdown, largely attributed to biomass cooking activity.

Nearly 65% of Indians use biomass as an exclusive or secondary cooking fuel, and they were exposed to higher PM2.5 levels during the lockdown. Another element of our study was presenting India's most comprehensive PM2.5 exposure disparity and environmental justice analysis – this allowed us to assess which demographic groups have the highest PM2.5 exposures. Rural women have the highest levels of air pollution exposure, however, during the lockdown working-age men and school-going children observed the largest exposure increases.

Given the prevalence of biomass-fueled cookstoves — cow dung, firewood, coal — and that people were now confined to stay indoors, it reasons that air pollution exposure must have increased for any biomass using household. Even though the penetration of cleaner cooking fuel such as LPG has increased during the last few years due to interventions (Ujjwala Yojna), a significant proportion of Indian households still use biomass as primary cooking or secondary cooking fuel.

We introduced and utilised a novel exposure framework that incorporated nationwide time-use data (i.e., how much time people spend doing various activities) with representative microenvironment (e.g., kitchen area, living area, work/school, ambient) PM2.5 concentrations to quantify exposure increases and estimated that 65% of Indians had increased exposures during the lockdown, with average nationwide exposures increasing by 13%, from 116 µg m-3 to 131 µg m-3. On average Indian women spend 87-89% of their time indoors, whereas men spend 71-73%. The indoor PM2.5 concentration for biomass-user households is 2-20 times higher than their respective outdoor concentration in different Indian states. Before the lockdown, the time-weighted average exposure was comparatively lower as people were spending some of their time in outdoor environments. The shifting of outdoor time to indoor during the lockdown resulted in increased exposures to biomass-fuel emissions.

During baseline conditions, working-age rural women have the highest PM2.5 exposures of any demographic, with average exposures of 175 µg m-3, due mainly to exposure to biomass cooking-related emissions. During the lockdown, despite everyone being mandated to stay at home, we still found that working-age women continued to maintain the highest exposures (185 µg m-3). The other demographic groups that had the highest exposure were working-age men and school-age children, whose average modeled exposures increased by 24% (from 88 µg m-3 to 108 µg m-3) and 18% (from 98 µg m-3 to 115 µg m-3), respectively.

Given that households globally who use biomass cookstoves will have observed increased exposures during lockdown, we extended the framework globally and conservatively estimated that 35% of the global population will have observed increased exposures during the lockdown.

This occurred largely in developing economies (Africa, South East Asia) where biomass use is prevalent.

There have been a number of cleaner-cooking initiatives introduced to replace biomass cookstoves. But the finding that PM2.5 exposures increased for the 65% of Indians and a third of the global population during a period of historically clean ambient air quality, re-emphasises the urgent need to further address clean cooking interventions to reduce PM2.5 exposures and in turn improve health outcomes.

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