Association of Exposure to Saudi Sandstorm Dust with Increased Risk of Asthma Hospitalization: Role of Dust Particles Components in Asthma Pathogenesis

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Abstract:

We conducted a retrospective study to analyze the correlation between asthma hospitalizations and sandstorm events over the past four years. Patient data was gathered from King Khalid University Hospital in Riyadh, focusing on individuals admitted to the emergency unit for asthma during sandstorm occurrences. Additionally, sandstorm data from national agencies detailing particle levels and sizes was collected to investigate the relationship between asthma admissions and dust particle sizes.

First, the impact of particulate matter (PM) from sandstorms on hospital admissions in Riyadh, Saudi Arabia was examined. Monthly data on sand PM concentrations, as well as hospital and ICU admissions for both adults and pediatric patients, were collected from 2010 to 2014. Our analysis revealed a significant negative association between mean PM levels and the number of hospital and ICU admissions in pediatric patients. However, this association was not statistically significant in the adult population. This may highlight the greater susceptibility of pediatric patients to PM exposure compared to adults.

Sandstorm particulate matter (PM) poses significant health risks, particularly for vulnerable populations. This study investigated the impact of PM from sandstorms on hospital admissions in Riyadh, Saudi Arabia, using data collected from 2010 to 2014. Analysis revealed a significant association between elevated PM levels and increased hospital and ICU admissions in pediatric patients, highlighting their heightened susceptibility to PM exposure. In contrast, no statistically significant association was observed in the adult population, emphasizing the need for targeted interventions to protect children from sandstorm-related health risks. Silica exposure, a major component of sandstorm PM, is a well-known environmental hazard linked to lung inflammation, fibrosis, and respiratory diseases. Using in-silico analysis of publicly available transcriptomic datasets (GSE250537 and GSE142446) from silica-exposed Fischer 344 rats, we identified key fibro-inflammatory and aging pathways activated