SPATIAL ANALYSIS OF INDOOR AND OUTDOOR POLLUTION AND WORLD ASTHMA MORTALITY RATES USING GEOGRAPHIC INFORMATION SYSTEMS

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Background: Asthma deaths are an increasing public health problem in lower income countries. Exposure to indoor and outdoor pollution has been known to increase the risk of asthma; by analyzing this association globally, the death rate could be decreased.

Aims: Using Geographic Information System (GIS) analysis, the study objective was to perform an ecological investigation to determine if there is a positive correlation between countries' asthma mortality rates (AMR) and two exposures: indoor and outdoor air pollution. A secondary objective was to compare the strength of the associations between AMR and the two exposures.

Methods: Relevant articles and country data on indoor pollution (percentage of solid fuel usage), outdoor pollution (annual particulate matter less than ten microns), and AMR were researched using PubMed and World Health Organization databases. Exposure data was matched to outcome data and layered on their respective countries using a GIS software tool.

Results: AMR, indoor pollution, and outdoor pollution were highest in Africa and Southeast Asia. Linear regression was used to determine that indoor pollution (r^2=.42, df=170, p=.000) and outdoor pollution (r^2=.04, df=173, p=.011) were significantly associated with AMR, though indoor air pollution had a stronger association.

Conclusions: AMR and indoor pollution percentages were strongly associated and prominent in Africa and Southeast Asia. Further epidemiological studies could focus on hypothesized "social justice" confounders such as lack of proper healthcare or lack of resources in these regions.