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A GLOBAL PERSPECTIVE ON PREVENTABLE CARDIOVASCULAR DISEASES FROM SULFUR OXIDES REDUCTION IN COAL-FIRED POWER PLANTS

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Introduction: The majority of ambient Sulfur Dioxides (SO_2) are from coal-fired power plants. Previous studies have shown the short-term effect of SO_2 on Cardio Vascular Diseases (CVD), which is the leading cause of both mortality and healthcare cost. We estimated the relative risks and incident cases of CVD and Ischemic Heart Disease (IHD) attributable to SO_2 emission from coal-fired power plants from a global perspective.

Method: National SO_2 reduction was defined as the average SO_2 reduction percentage weighted by generating capacities of individual plants in a given country. We applied a poison regression to analyze the relative risk of age-standardized CVD incidence associated with national SO_2 reduction, adjusted for behavior, economic and regional factors. CVD incident cases attributable to suboptimal emission controls are estimated in all studied countries, assuming every country can reach 95% emission reduction. We further applied subgroup analysis for IHD and rheumatic heart disease.

Results: A total of 13,581 power generating units in 79 countries that used coal as the primary energy source were included in the study. For 1% decrease in national SO_2 emission from coal-fired power plants, the adjusted age-standardized CVD incidence rate could decrease by 0.03% for males and 0.17% for females respectively. The effects on IHD are twice as strong as among males than females (0.28%, 95%CI=0.20%-0.36% vs 0.12%, 95%CI=0.02%-0.22%). The average population attribution factors due to SO_2 reduction were up to 1.43% and 8.06% for males and females respectively.

Conclusion: Reducing SO_2 emissions from coal-fired power plants has a marked association with the decrease in CVD incidence, especially IHD. Since SO_2 emission is majorly from coal combustion, enhancing regulations on SO_2 emission control presents a key target for national and international intervention to prevent CVD.

Biography

Cheng-Kuan Lin has his research interests on air pollution, power plants and related diseases, global burden of diseases at national and/or international levels and quality of life, Quality-Adjusted Life Year (QALY). After being physician for 1 year in Taiwan, He went to Arequipa, Peru as an NGO worker and wrote a first exhaustive travel guide in Mandarin in Taiwan. Now, he is currently doctoral candidate in Harvard Chan School of Public Health and conducts researches on energy policies.

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