

Abstract of Master's Dissertation

No.1

Course	International Health Development (Master of Public Health)	Name	Hironori Nishikawa
Thesis Title	Association between short-term exposure to PM _{2.5} and daily respiratory hospital admission among children in Bhaktapur, Nepal		

Background:

Air pollution in Nepal has become a significant public health issue according to its rapid urbanization. However, there are very limited studies which linked ambient air pollution to its health impacts among vulnerable population such as children although they are particularly at risk of air pollution due to the immaturity of their respiratory organ systems. Nepal Health Research Council conducted situation analysis to find out a year-round situation of the ambient air pollution in Kathmandu Valley. Further investigations are needed to identify the possible high-health burden associated with high-level air pollution.

Objectives:

The primary objective is to quantify the association between short-term exposure to fine particulate matter (PM_{2.5}) and hospital admissions due to pneumonia and other ARIs among children under 15 years old in Bhaktapur district, Nepal.

The secondary objective is to investigate if patients' nutritional status and seasonality by monsoon or non-monsoon modify the relationship between short-term exposure to PM_{2.5} and respiratory diseases among children in Bhaktapur district, Nepal.

Methods:

The study subjects were 493 children admitted to the inpatient department of Siddhi Memorial Hospital due to pneumonia and acute respiratory infection (ARI) other than pneumonia throughout one year from 13 February 2014 to 12 February 2015. The time-stratified case-crossover (TSCCO) design with conditional Poisson regression analysis was employed to estimate the relative risks (RRs) and 95% confidence intervals (CIs) of respiratory hospital admission while adjusting for temperature and other meteorological factors. Stratification was performed by diagnosis, nutritional status and seasonality.

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<p>Results:</p> <p>There was evidence for the increased risk of ARI hospital admissions approximately 18% (95% CI: 4-34) for 10 $\mu\text{g}/\text{m}^3$ increase in ambient $\text{PM}_{2.5}$ levels one day earlier. The estimated effects of $\text{PM}_{2.5}$ were consistent during the non-monsoon season, but not statistically significant in the monsoon season. The increased risk of underweighted children was estimated at approximately 30% (95% CI: 11-53) for the full year and 33% (95% CI: 12-58) in non-monsoon season. These results suggest that young children in Bhaktapur district were at higher risk of respiratory diseases with an increased level of ambient $\text{PM}_{2.5}$ concentration.</p> <p>Conclusion:</p> <p>This study is the first to estimate the adverse health effects of ambient air pollution in Nepal using time-series data of $\text{PM}_{2.5}$ and daily respiratory hospital admission. Further investigation is recommended to confirm the estimate of the health burden of air pollution in this area using newly collected $\text{PM}_{2.5}$ data and centralized hospital data which could provide more representative samples of Kathmandu Valley. Studies should also explore the health burden of other diseases and long-term trends of health impacts associated with particulate air pollution.</p> <p>This study suggests that local evidence is necessitated especially for the region suffering from high-level air pollution in a developing country to present locally specific information for decision-makers and the public so that more strategic policy intervention can be planned, and public awareness can be improved.</p>			