

# BURDEN OF DISEASE ASSOCIATED WITH LONG-TERM AND SHORT-TERM EXPOSURES TO HIGH AMBIENT CONCENTRATIONS OF PM<sub>2.5</sub> AND PM<sub>10</sub> IN KUWAIT

Ali Al-Hemoud<sup>1</sup> and Janvier Gasana<sup>2</sup>

<sup>1</sup>Environment and Life Sciences Research Center-KISR, Kuwait

<sup>2</sup>Health Sciences Center, Kuwait University, Kuwait

Previous studies have documented the association between exposure to fine and coarse particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) and cardiopulmonary mortalities, as well as hospital admissions for cardiovascular and respiratory diseases in many parts of the world. However, most studies have estimated the risk of mortalities in terms of attributable proportions and excess number of cases with no reference to the years-of-life lost (YLL) and expected-life-remaining (ELR). The objectives of this study are two folds: to assess the impact of PM<sub>2.5</sub> on five cause-specific adult mortalities (ischaemic heart disease, stroke, lung cancer, chronic obstructive pulmonary disease, and acute lower respiratory infection) and two hospital admissions (cardiovascular and respiratory diseases), and to estimate the YLL and ELR for adult mortalities and post-neonatal infant mortalities associated with PM<sub>2.5</sub> exposure and PM<sub>10</sub> exposure, respectively. The study used the AirQ+ model for health risk assessment of air pollution developed by the World Health Organization. The model was used successfully to quantify the burden of disease in other countries including 23 European cities, South Korea and other regions. Mortality and morbidity baseline data were collected for three years (2014 -2016). Results indicate that the annual average of PM<sub>2.5</sub> and PM<sub>10</sub> concentrations were recorded as 87.9 µg/m<sup>3</sup> and 167.5 µg/m<sup>3</sup>, which are 8 times greater than the World Health Organization (WHO) air quality guidelines of 10 µg/m<sup>3</sup> and 20 µg/m<sup>3</sup>, respectively. The attributable proportions of premature adult mortalities for long- and short-term exposures were 19.91% and 4.41%, respectively. The highest excess incidence adult mortality rates were attributed to ischaemic heart diseases, followed by stroke. Although both cardiovascular and respiratory diseases have fairly equal relative risk, the hospital admissions excess incidence was two-fold for respiratory diseases. Results also indicate that adults and newborns would gain about 1.93 years and 2.65 years, respectively if the current PM<sub>2.5</sub> and PM<sub>10</sub> exposure levels were reduced to the WHO interim target level I. This study can be helpful for the assessment of poor air quality represented by PM<sub>2.5</sub> and PM<sub>10</sub> exposures in causing premature adult mortalities and postneonatal infant mortalities in developing countries with high ambient air pollution. Local governments and policy makers can streamline their efforts to reduce the detrimental health effects of PM<sub>2.5</sub> and PM<sub>10</sub> exposures and enhance public awareness.

## Biography

Ali Al-Hemoud has completed his PhD from the University of Cincinnati, OH, USA. He has over 20 years experience in Occupational and Environmental Health and Safety. He is a board certified in CIH and CSP. His research interests are in occupational and environmental health, risk assessment, and crisis management. He has published more than 20 papers in reputed journals in occupational health, environmental health, ergonomics and sustainable solution.

ahomood@kisir.edu.kw