

Assessment of Air Pollution and Its Health Effects in Tema (Ghana)

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ABSTRACT

Air pollution is common throughout Ghana as a result of bush fires, emission from motor exhausts, as well as emission from both domestic and industrial activities. The pollutants can injure health, harm the environment and cause damage to properties. The following pollutants were considered in this study: smoke, sulphur dioxide, lead, total particulate matter and PM₁₀. Their concentration and distribution of the ambient air were measured. The study focused on the concentration of these air pollutants in Tema since the city has the largest number of industries in Ghana (about 60 – 80 %) as well as a harbour, which serves also as a transit point for many African countries that are land locked. The study also compiled health data on respiratory tract infection over a 5 year period from three hospitals in Tema. It provides a summary of the association between the pollutants concentration and prevalence of disease in Tema (Ghana). Sulphur dioxide gas, smoke and PM₁₀ samples were collected from Tema General Hospital (TGH) and Tema west coast using sulphur dioxide and PM₁₀ sampler. Total suspended particles were collected from western and eastern gates of Tema main harbour, Tema Lube oil Company Ltd TLOC), Tema Oil refinery (TOR) and TGH). The samples were digested using NHO₃ and analysed using graphite furnace AAS to obtain concentration of lead.

The research work research showed that the level of lead was higher than EPA standards of 0.1µg/m³ for Ghana. The results indicated that respiratory tract infection was high among children below five years as well as women. The research work had indicated high level of the Respiratory Tract Infect among people living in densely populated area such as Ashaiman.

In Ghana a lot of people live and work in highly populated areas where the cost of living is low and are likely to suffer from ill health and disease. Most of them because of lack of finance have less access to health care. In the poor communities, majority of households use unprocessed fuel (biomass and charcoal) for cooking. These fuels are often not burnt completely. Under this condition, high amount of a number of health damaging airborne pollutants are generated which result in high exposure, especially among women who do the cooking and children who stay with their mothers.

Correlation between incidence of respiratory tract infection and pollutants concentration were assessed using Pearson's correlation coefficient. Statistical significant level of 5% was adopted in the analysis. In general, increasing respiratory tract infection was observed with increasing concentration of air pollutants. Smoke and PM₁₀ were the pollutants that presented the highest correlation with respiratory tract infection. The pH values obtained were quite below 0.05 ($r=0.006$, $r=0.01$). The results obtained suggest that there is statistical association between the pollutants and respiratory tract infection.

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