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Research letter

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Shafayet Ahmed Siddiqui, Md Jakaria, Mohammad Nurul Amin, Abdullah Al Mahmud, David Gozal

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Chronic air pollution and health burden in Dhaka city

Shafayet Ahmed Siddiqui[1,3], Md. Jakaria[2], Mohammad Nurul Amin[1], Abdullah Al Mahmud[3], [*]David Gozal[4]

[1]Department of Pharmacy, Atish Dipankar University of Science and Technology, Dhaka-1230, Bangladesh

[2] The Florey Institute of Neuroscience and Mental Health, The University of Melbourne, Parkville, VIC 3052, Australia

[3]Department of Pharmacy, Noakhali Science and Technology University, Noakhali-3814, Bangladesh

[4]Department of Child Health, University of Missouri, Columbia. MO 65201, USA

To the Editor:

Air quality is usually evaluated by the concentrations of particulate matter and gaseous substances that are present in the air we breathe. Thousands of pollutants are responsible for environmental air pollution, with $PM_{2.5}$, PM_{10}, CO, O_3, SO_2, and NO_x being those most frequently evaluated. In developing countries such as Bangladesh, awareness to air pollution is virtually non-existent and most of the time ignored even when air quality becomes unbearable to most citizens. Among the sources of particulate matter in Dhaka, the large metropolis that serves as capital of Bangladesh, road dust, textile and dying businesses, tanneries, chemical and cement factories, and brick kilns emerge as the most polluting offenders. Substantial evidence has shown that $PM_{2.5}$ is independently implicated in cardiovascular and respiratory diseases and cancer in light of its ability to reach terminal bronchioles and alveolar structures, and even reach the bloodstream[1].

Air pollution alone accounts for 17.6% of the risk of death and disability in Bangladesh. The annual economic burden of air pollution in Dhaka has been estimated at $192 million[2], and few if any effective measures to counteract this serious problem are being taken by the government or any other agency. With approximately 20.6 million people living in an area of 306.38 km^2, Dhaka is not only one of the largest megacities in the world but also one of the most polluted cities (air quality index (AQI) of 215 on December 21, 2019). A report ranked Dhaka as the 3rd least livable city in the world, immediately after Damascus and Lagos[3]. It has been estimated that 92% of the global population are nowadays exposed to levels of $PM_{2.5}$ that are above air quality guidelines[4]. A report by the WHO estimated an annual mortality of 4.2 million as being attributable to outdoor air pollution, with over 2 million deaths occurring in the South-East Asia region[5]. It is clear that uncontrolled industrial growth and persistent disregard of regulations aimed at air quality underlie the fast progression of Dhaka one of the top polluted cities in the world[4]. In fact, all cities in the Middle East and more than 95% of all cities in Asia exceeded the upper limits of AQI[6].

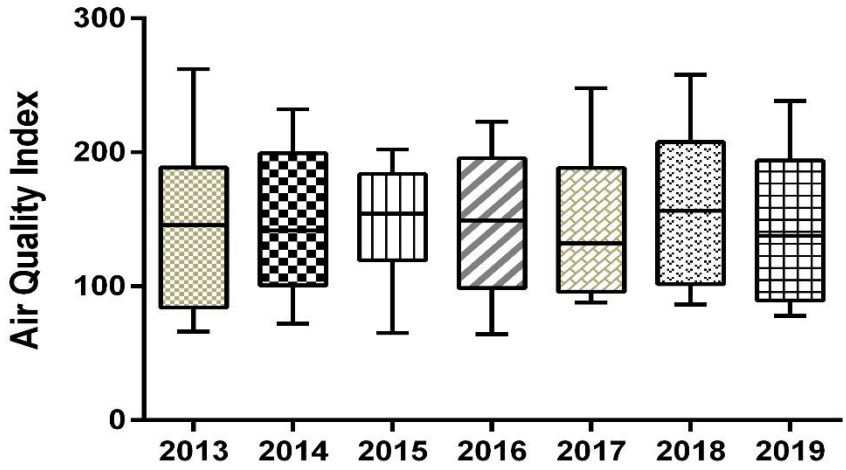

Figure: Air Quality Index of Dhaka city for 2013- 2019.

Using available software (AirQ+; http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/activities/airq-software-tool-for-health-risk-assessment-of-air-pollution), we calculated the accrued burden of disease imposed by the current and long-lasting pollution levels in Dakha city. These estimates showed that the mean and 95% CI increase in prevalence due to the detrimental Air Quality Index would be 36% for stroke (16.8-46.2%), 40.5% for ischemic hear disease (26.2-60.5%), 35% for COPD (22.1-48.1%), and 38.6% for acute lower respiratory tract infections in children (30.4-46.3%). In light of the recent infectious epidemics that are already taking a major health toll in Dhaka, if proper measures to effectively reduce the overwhelming ambient pollution are not urgently implemented, major surges in cardiovascular and respiratory mortality and morbidity will impose additional tolls on an already overwhelmed and decompensated healthcare system and economy in Bangladesh. Thus, collaborative, inclusive and immediate environmental policies and action are critically needed for the Asia Pacific region[7].

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