NEW DIMENSION SERIES

Sustainable Development Goals (SDGs) for Hypertension Zero in the era of Anthropocene.

CATEGORY A: HYPERTENSION AND LIFE ENVIRONMENT

Air pollution: A proven risk factor of hypertension and cardiovascular diseases

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Air pollution is considered to be the world's greatest environmental health threat, with 99% of the world's population living in areas where air quality does not meet the World Health Organization (WHO)'s Air Quality Guidelines (AQG).[1] Addressing this issue is an urgent matter as it contributes to the death of approximately 7 million individuals, 3.1 million premature deaths, and 3.2% of the global disease burden,[2] with vulnerable groups being disproportionately affected. Contrary to what the public might think, air pollution does not only cause respiratory adverse health outcomes. It is linked to five main outcomes: strokes, heart disease, lung cancer and both chronic and acute respiratory diseases, including asthma.

This report aims to highlight the association between air pollution and cardiovascular (CV) health effects. According to the US Environmental Protection Agency (EPA), both short- and long-term exposure to air pollution (Particulate Matter 2.5 or PM2.5) cause adverse cardiovascular health outcomes.[3] There is a growing body of evidence that air pollution is an environmental risk factor for hypertension and a determining factor for its prognosis.[4] Numerous studies have been conducted to elucidate the pathophysiological mechanisms of blood pressure (BP) elevation and increased CV risk due to pollution.[5]

The global air quality situation, like in the Eastern Mediterranean Region (EMR), is characterized by a deteriorating air quality due to several factors like the emissions coming from transportation, production, waste burning, cooking, heating, etc.[6] in addition to the arid nature of our region coupled with dust storms, excessive heat, and harsh geography.[7] Air quality monitoring shows that air quality management in the EMR region faces challenges such as poor commitment, duplication of effort, lack of coordination, and weak health surveillance systems. In Lebanon several studies were conducted focusing on air pollution and its impacts on the human health. Since 2012, the Beirut Air pollution and Health Effects (BAPHE) study documented high levels of air pollution and significant health effects. At the time, Lebanon lacked a national strategy, and the air pollution was greatly visible to the naked eye with Particulate Matter (PM) and Nitrogen dioxide (NO_2) levels exceeding the WHO standards at the time. Our study aimed at researching the association between high levels of air pollution and daily emergency hospital admissions for specific causes: respiratory, cardiovascular, cerebrovascular and skin diseases. Descriptive results of the short-term relationships between CVD and PM air pollution in 2012 showed an annual average of 51 µg/m3 (151% above the WHO levels) of Particulate Matter

10 (PM10) level and an annual average of 30 µg/m3 (200% above the WHO levels) of PM2.5. These numbers were accompanied by hospital admission data from 2012 for cardiopulmonary conditions with a total of 10,811 admissions. In addition, we found a significant association between the increase in air pollution levels and cardiovascular admissions among several age groups. The study has also found an association from 2012 to 2014, between levels of PM10 and PM2.5 and admissions for cardiovascular conditions, after recording environmental data for three years and collecting the admissions data.

Air pollution is considered to be one of the modifiable cardiovascular risk factors. Improving air quality needs the involvement of several stakeholders. Knowing that hypertension results from both genetic predisposition and environmental factors and that air pollution is proven to be a modifiable cardiovascular factor, physicians have an important role in preventing hypertension. We cannot modify our genes, but we are able to address modifiable and controllable factors such as sedentary lifestyles, weight gain, sodium intake, unhealthy diets, and exposure to pro-hypertensive substances. Cardiologists should raise awareness about the impact of the environment on human health, educate their patients, and advocate for cleaner environments to improve cardiovascular health.[8] The long-term goal would be integrating environmental exposure assessment in the diagnosis of cardiovascular diseases.

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