


Research Article

Epidemiology, Mechanisms and Prevention in the Etiology of Environmental Factor-Induced Cardiovascular Diseases

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Abstract

Cardiovascular diseases are a significant cause of mortality worldwide, and their prevalence can be amplified by a range of environmental factors. This review article critically evaluated the published information on the epidemiology and pathophysiological mechanisms of various environmental factors such as air indoor and outdoor air pollution, water pollution, climate change, and soil pollution. Preventative measures to mitigate these effects including public health responses are discussed with gaps in our knowledge for future studies.

Keywords: Air pollution; Climate change; Indoor air pollution; Outdoor air pollution; Soil pollution; Water pollution

Indoor Air Pollution

Background

Indoor air pollution has been categorized as a significant contributing factor to the development of cardiovascular disease (CVD). It is composed of particulate matter which is typically classified into three different sizes: ultrafine particles, fine particles (PM_{2.5}), and coarse particles (PM₁₀) [1] (Figure 1). Globally, the smoke from cooking indoors using biomass fuels such as wood and crop waste is the primary source of indoor air pollution. These indoor stoves produce high PM values and increased carbon monoxide (CO) exposure which is detrimental to an individual's health. Due to the customary nature of women tending to the needs of the household and young children being around their mothers, these population groups tend to be the most affected. In a study completed by the International Respiratory Society, it was found that developing countries in Asia produced elevated levels of indoor pollution. Over a span of 24 hours, the average PM₁₀ was between 300 to 3,000 $\mu\text{g}/\text{m}^3$, which can reach up to 30,000 $\mu\text{g}/\text{m}^3$ during periods of cooking [2]. Furthermore, over the same span, the average CO level is between 2-50 ppm and can go as high as 500 ppm during cooking [2]. According to the United States Environmental Protection Agency, a healthy average PM₁₀ and CO level over a 24-hour span is 150 $\mu\text{g}/\text{m}^3$ and 9 ppm, respectively [3], which is 200 times less than the PM₁₀ and about six times less the CO levels you would find during a cooking period in a developing country.

Environmental tobacco smoke (ETS) is another major source of indoor air pollution as well. Worldwide, approximately 40% of children, 35% of women, and 32% of men are exposed to ETS [4]. ETS is composed of toxic levels of nicotine, ammonia, and carbon monoxide; all of which have been shown to have a correlation with cardiovascular mortality.

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