Air Pollution and the Effects It Has on the Heart and Circulatory System

Posted on November 9, 2024

Historical Origins of Air Pollution

Pollution is not just the havoc of the 20th century but it has always existed in the world and maybe it is as old as ancient human civilization. Ancient masters of medicine not only observed the personal bodily health of the people but also linked it to the climate, environment of the particular geographical region, heredity, water supply, quality of air at a certain period of time, and seasonal variation in the world. As the world got more crowded and hotter with the passage of time, our industries, vehicles, machines, and crafts continued to pump out toxic emissions in the atmosphere that pushed the air to become dangerously polluted. Drawing on the background of air pollution from where it actually emerged, this paper argues how air pollution can potentially affect heart health while penetrating deep into our circulatory system from all around us making it really hard for us to escape serious cardiovascular diseases.

Pollution as a Weapon and Industrial By-Product

In ancient times, kings weak in power within their territories used air pollution in the form of poisonous smoke as a weapon in the way of strong kings to win battles before even going to the battlefield. Moreover, people used to burn vegetable and animal oils to provide light in and out of their houses. So indoor as well as outdoor pollution was a significant issue in olden times. However, the alarming bell of pollution started ringing in the mid-twentieth century during the industrial revolution which led to severe pollution-related illnesses around the world. The Industrial Revolution led to potential atmospheric contamination around the world due to impure emissions from the overpopulated factories and the continuing expansion of industries. During that time, in the year 1930, death bells tolled for 60 people in Meuse Valley, Belgium due to significant air pollution events in the city that first led to cough and chest pain among citizens and then caused death due to toxic emissions and smog (Candelone et al., 1995).

Major Pollution Disasters and Public Awareness

On October 1948, a small industrial town Donora in the United States fall victim to the chaos that air pollution made causing 20 deaths in the town and half of the population to become sick. The intentional ignorance killed almost 12,000 people in London due to the “Great London Smog” of the year 1952 where citizens of London mostly died due to cardiovascular diseases caused by smog,

burning of high Sulphur coal, and fog full of industrial particulates (Candelone et al., 1995). Thus, the health effects of the atmospheric pollution caused by the industries were immediate and long-lasting due to the extensive burning of fuels as well as the temperature inversions in the towns, valleys, cities, countries, and across the globe.

Air Pollution as a Cardiovascular Risk

Thus, air pollution emerged as a risk factor for cardiovascular diseases as it causes long-term damage to the heart and circulatory system. The contaminants in the air damage the blood vessels and worsen the blood supply to and from the heart which may lead to ischemic cardiovascular disease, heart attack, atherosclerosis, and even heart failure. Atherosclerosis is an example of cardiovascular disease caused due to air pollution in which the coronary artery gets blocked due to an accumulation of plaque in the coronary artery. This usually happens due to long-term exposure to nitrogen oxides and industrial particulates which prematurely age the blood vessels. The blood vessels then develop a more rapid calcium buildup that restricts blood flow to the coronary artery and the heart. This buildup damages nearby blood vessels where blood flow is restricted that increases the chances of cardiovascular events like stroke, heart attack, and heart failure.

Mortality and Global Health Evidence

According to a recent World Health Organization report, three million deaths have been reported due to worsened cardiovascular diseases every year that have their ends met in air pollution. The report quoted that more than 30 percent of cardiovascular diseases are due to air pollution and these numbers continue to rise every year. Half the world's population has no or little access to clean fuel which causes air pollution that subsequently leads to serious health issues including serious strokes and heart attacks (Anderson et al., 2012). It has also been shown by a large body of science that air pollution can worsen existing cardiovascular illnesses and further contribute to the development of diseases that may lead to heart failure.

Biological Effects on the Circulatory System

Cardiovascular and circulatory systems are the main targets of air pollution as the particulates are one-third of red blood cells' size. These polluted components enter the blood circulation and then enter into the blood vessels and heart through the lung alveoli with the potency to cause dire health effects. These particulates enter blood vessels either by translocating through macrophages or crossing the barriers in the heart directly. This crossover may increase the risk of myocardial infarction and strokes which can critically lead to heart failure. Moreover, pollution present in the air in which we breathe damages the inside walls of blood vessels. The impaired vessels then become narrower which restricts blood movement and increases blood pressure. Such a condition adds strain

on the heart which also affects the heart's normal electrical functioning. This strain causes irregular heart rhythms which can contribute to the development of new heart health problems (Hamanaka & Mutlu, 2018).

Conclusion on Cardiovascular Harm

In conclusion, air pollution is severe and is worsening the environment while being associated with myocardial infarction, strokes, heart attack, heart failure, and deaths from cardiovascular diseases. It can have negative effects on the human heart and circulatory system with the increased risk of high blood pressure, clotting, damage to the blood vessels, atherosclerosis, increased risk of heart attack, and death from severe cardiovascular disease. However, if the world makes a transition from fossil fuels to the use of clean renewable energy resources, pollution-related cardiovascular diseases can be prevented by slowing down the pace of climate change which would reflect increased economic productivity of a longer-lived and healthier world's population and thus save humanity.

References

Anderson, J. O., Thundiyil, J. G., & Stolbach, A. (2012). Clearing the air: A review of the effects of particulate matter air pollution on human health. *Journal of Medical Toxicology*, *8*, 166–175.

Candelone, J.-P., Hong, S., Pellone, C., & Boutron, C. F. (1995). Post-Industrial Revolution changes in large-scale atmospheric pollution of the northern hemisphere by heavy metals as documented in central Greenland snow and ice. *Journal of Geophysical Research: Atmospheres*, *100*(D8), 16605–16616.

Hamanaka, R. B., & Mutlu, G. M. (2018). Particulate matter air pollution: Effects on the cardiovascular system. *Frontiers in Endocrinology*, *9*, 680.