

Thermal Influence on the Heart: The Impact of Hot Weather on Cardiovascular Conditions

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Dear Editor, We are cognisant of the fact that cardiovascular diseases (CVDs) have a considerable impact on public healthcare systems. Cardiovascular disorders rank as the primary global reason of fatality, claiming an estimated 17.9 million lives in 2019, which equates to 32% of all global fatalities. The majority of these deaths, around 85 percent, result from heart attacks and strokes. Low- and middle-income countries tolerate the brunt of heart-related fatalities, accounting for over three quarters of all deaths attributed to these conditions. Additionally, out of the 17 million premature deaths caused by noncommunicable diseases in 2019, CVDs were responsible for 38 percent.¹ The prevailing cardiovascular risk factors encompass increasing age, hypertension (commonly referred to as a double-edged sword), diabetes mellitus, tobacco use, obesity, dyslipidaemia, and stress.^{1,2} A sedentary lifestyle together with poor eating habits have also led to an increased rate of CVS-related illnesses.¹

Often overlooked as a risk factor, experiencing high temperatures significantly adds to the increased occurrence of cardiovascular diseases. Multiple studies support the connection between extreme temperatures and heightened cardiovascular risks.²⁻⁵ Being exposed to higher temperatures can lead to intravascular volume depletion, haemoconcentration, a hypercoagulable state, electrolyte imbalance, and raised sympathetic activity, placing substantial stress on the heart, especially in individuals with pre-existing cardiovascular disease.³

To investigate cardiovascular mortality associations with extremes of temperatures, Barrak Alahmad et al. assembled daily counts of specific cardiovascular causes of death from 567 cities across 5 continents in overlapping periods ranging from 1979 to 2019, and the city-specific daily ambient temperatures were noted. The findings indicated that higher temperature extremes (99th percentile for heat and 1st percentile for cold) were linked to an increased probability of mortality from various cardiovascular conditions, including ischaemic heart disease, stroke, and

heart failure.⁴ In a case-crossover study conducted using the England and Wales MINAP database, involving 24,861 participants (hospital admissions for myocardial infarction) during the warmest months (June to August) from 2003 to 2009, it was found that each 1-degree Celsius increase in temperature beyond the established threshold of 20°C temporarily increased the risk of heart attack by 1.9 percent.⁵

The cardiovascular-related illness and fatalities are quite prevalent in Pakistan. Pakistan due to the geographical location, usually encounters summer temperatures ranging from 45 to 55 degrees Celsius across most areas of the country. In addition, factors such as load shedding, poverty preventing access to cooling house appliances, insufficient housing ventilation systems, overpopulation, substandard healthcare facilities, and a lack of awareness contribute to an increased likelihood of morbidity associated with cardiovascular diseases, especially among Pakistani individuals with pre-existing cardiovascular conditions. Hence, people (CVD patients and the elderly population in particular) should take care not to expose themselves to very high temperatures. Cardiologists and other health professionals are supposed to conduct targeted research to determine the relationship between high temperature and cardiovascular mortality risk. Also, the health department and government need to adopt strategies to improve healthcare quality, foster employment, raise public awareness—particularly during the summer, address climate change, implement measures to counter global warming and its detrimental health effects and ensure economic stability. These efforts aim to reduce the influence of high temperatures and thermal waves on human health, consequently lowering the net incidence of cardiovascular disease-related morbidity and mortality.

Disclaimer: None.

Conflict of Interest: None.

Funding Source: None.

DOI: <https://doi.org/10.47391/JPMA.20446>

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Submission complete: 25-04-2024

Review began: 28-04-2024

Acceptance: 06-05-2024

Review end: 02-05-2024

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Author Contribution:

AIB, MJA: Concept, design, data acquisition, interpretation, drafting, revision, final approval and agreed to be accountable for all aspects of work.