Heatwaves and health: reflections on the El Niño phenomenon in Piura, Peru

Golpes de calor y salud: reflexiones a propósito del fenómeno El Niño en Piura, Perú

Ondas de calor e saúde: reflexões sobre o fenômeno El Niño em Piura, Peru

The report of eight deaths of children less two years of age, in early March 2016, in Piura, a region in the North of Peru, has called the attention of health authorities, who have attributed the deaths to high temperatures associated with the El Niño-Southern Oscillation (ENSO). All the children presented hyperthermia, diarrhea, dehydration, and seizures, with a fatal outcome despite rigorous treatment and life support measures. The hypothesis raised by local attending physicians indicates a heatwave as the principal cause of the deaths.

This position is based partly on the high temperatures reported by the Peruvian National Meteorology and Hydrology Service (SENAMHI), exceeding 35ºC and with the heat index reaching a peak of 46ºC.

In Peru, ENSO affects people differently according to demographics; on the Northern Coast, which includes Piura, it increases the ocean and surface water temperatures, leading to major evaporation that extends across the Andes, causing persistent rains, unlike the Southern Sierra, where drought prevails, protected by a layer of dry air that blocks the entry of easterly winds. The effects of ENSO in 1997-1998 in Piura consisted of floods, damage to infrastructure and transportation, crop destruction, and deaths, besides favoring various pests due to changes in the ecosystem; Suárez-Ognio et al. had already warned of the presence of “heatwaves” in the context of El Niño, a relationship seen in the impact on the Peruvian Coast in 1998.

Heatwaves, or simply periods of extreme heat, generally emerge as extreme temperatures exceeding the 95th percentile and sustained for two or more days, with repercussions on human health. Heatwaves are currently considered an emerging public health problem, with evidence based on the high mortality recorded during such phenomena in Chicago (USA) in 1995, Europe in 2003, and Russia in 2010.

The pathophysiology involves disturbance of the body’s own thermal regulation, which decreases the sweating rate. Sweating allows cooling the body in relation to ordinary temperature, but if the temperature increases, sweat is excreted more slowly, preventing the body from cooling adequately; thus, when 40ºC is reached, organ damage begins. According to pediatric experts, this direct compromise can even lead to altered level of consciousness.

Overheating in infants can lead to dehydration and associated manifestations such as exhaustion, cramps, fainting, edema, and fever. When severe dehydration occurs it causes acute stroke, clot formation, aggravation of chronic lung conditions, cardiac complications, renal dysfunction, and psychiatric disorders. The pathophysiology lies in dehydration, which decreases the sweating rate; this is a common cause of hyperthermia and death in both age extremes, that is, in children under four years (especially
One solution to the future problem is the implementation of a Heat Health Warning System (HHWS), deployed in other countries such as Australia. HHWSs are designed to warn people of the imminent danger of heat, besides serving as a source of advice on how to avoid adverse health outcomes. Identification of the vulnerable population, interaction with various stakeholders, design and deployment of intervention strategies, application of long-term heat mitigation procedures, and public awareness-raising and urban planning are the system’s components. HHWSs can thus be seen as an important strategy for adaptation that can help mitigate the impacts of future heatwaves. Thus far there is no indication that Peru wants such a system. The document National Strategy on Climate Change of the Peruvian Ministry of the Environment contains no measures or concrete proposals to deal with heatwaves in light of the country’s climatic vulnerability, given recognition of the application of weather services as a health sector priority.

Given the above, it is essential to include measures to deal with heatwaves when planning health and environmental strategies, including the deployment of a HHWS as an excellent initiative by government, including other institutions such as SENAMHI, social services, and the health sector. Importantly, the ENSO phenomenon and its unfortunate consequences are merely a warning of something much bigger that merit immediate and careful attention.

Contributors

P. Aguilar-León and F. Solano-Zapata made substantial contributions to the article’s concept; participated in writing the manuscript and critical revision, contributing to its intellectual content; and approved the final version.


