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Research brief

Outdoor temperature and its effect on mortality in South Africa

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Researchers from the USA, UK, Italy and South Africa recently conducted the first long-term, nation-wide study of the association between outdoor temperature and mortality in South Africa. Overall, the authors identified a U-shaped relationship, indicating that the risk of mortality increases from exposure to both heat and cold. Mortality risks were highest in children and the elderly, whereas no relationship was found in people aged 25-44 years. Over the full study period (1997-2013), roughly 3.4% of all deaths in the country were attributable to non-optimum temperatures, with much of the burden occurring on days with relatively moderate outdoor temperatures.

Studies exploring temperature-related mortality have ballooned in recent years due in large part to concerns about climate change. Researchers from around the world have reported elevated mortality risks from high and low temperatures – as in this study – and have also suggested that the associated health burdens are likely to increase in the future. Nevertheless, there have been few studies of this type focusing on South or Southern Africa (or Africa in general), even though warming is expected to occur at a substantially faster rate compared to the global average. A key reason for the lack of research has been data availability, as this type of study requires information on the number of deaths per day in a given location, as well as daily temperatures.

In this study, the researchers combined data from three sources to conduct their analysis. The mortality dataset, provided by Statistics South Africa¹, included all reported deaths in the country from 1997 to 2013 for each of the 52 district municipalities, which amounted to about 8.8 million deaths overall. The temperature data was obtained from South Africa's Agricultural Research Council as well as the National Oceanographic and Atmospheric Association of the USA. The focus of the study was on daily maximum temperature, as this was considered the most reliable of the measures. After compiling the data, the researchers performed a two-step time-series analysis. First, temperature-mortality associations were estimated for each district. And second, the district-level results were pooled to identify an overall country-level relationship. Analyses were also conducted separately for different age groups and for different causes of death.

Understanding the temperature-mortality relationship may be particularly important in South Africa, as there are unique opportunities for intervention compared to many other places. The country is rapidly developing and there are explicit government programs that may have the ability to modify the risk of temperature-related mortality or morbidity, including through the provision of housing, water and electricity. There have also been steps towards climate change adaptation planning. However, it should be noted that the results of this study do not fully clarify whether South Africans can expect a worsening of the temperature-mortality relationship in the future; of the 3.4% of total mortality attributable to non-optimum temperatures, nearly 90% was from exposure to cold.

Reference

Scovronick N, Sera F, Acquavotta F, Garzena D, Fratianni S, Wright CY and Gasparrini A. The association between ambient temperature and mortality in South Africa: A time-series analysis. *Environmental Research* 2018;161:229-235.

¹Statistics South Africa had no role in the design, analysis or interpretation of the study.