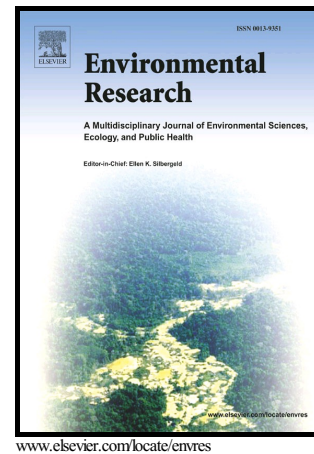


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Comparison of health risks by heat wave definition: applicability of wet-bulb globe temperature for heat wave criteria

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Abstract

Despite the active applications of thermal comfort indices for heat wave definitions, there is lack of evaluation for the impact of extended days of high temperature on health outcomes using many of the indices. This study compared the impact of heat waves on health outcomes among different heat wave definitions based on thermal comfort and air temperature. We compared heat waves in South Korea (cities and provinces) for the warm season for 2011-2014, using air temperature, heat index (HI), and wet-bulb globe temperature (WBGT). Heat waves were defined as days with daily maximum values of each index at a specified threshold (literature-based, the 90th and 95th percentiles) or above. Distributed lag non-linear models and meta-analysis were used to estimate risk of mortality and hospitalization for all-causes, cardiovascular causes, respiratory causes and heat disorders during heat wave days compared to non-heat wave days. WBGT identified 1.15 times longer maximum heat wave duration for the study periods than air temperature when the thresholds were based on 90th and 95th percentiles. Over the study period, for heat waves defined by WBGT and HI, the Southwestern region showed the highest total number of heat wave days, whereas for air temperature the longest heat wave days were identified in the southeastern region. The highest and most significant impact of heat waves were found by WBGT for hospitalization from heat disorders (Relative risk=2.959, 95% CI: 1.566 – 5.594). In sensitivity analyses

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