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Short-Term Effects of Extreme Temperatures on Cause Specific Cardiovascular Admissions in Beijing, China

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Abstract : Extreme temperature-related cardiovascular diseases (CVDs) have become a growing public health concern. However, the impact of temperature on the cause of specific CVDs has not been well studied in the study area. The objective of this study was to assess the impact of temperature on cause-specific cardiovascular hospital admissions in Beijing, China. We obtained data from 172 large general hospitals from the Beijing Public Health Information Center Cardiovascular Case Database and China. Meteorological Administration covering 16 districts in Beijing from 2013 to 2017. We used a time-stratified case crossover design with a distributed lag nonlinear model (DLNM) to derive the impact of temperature on CVD in hospitals back to 27 days on CVD admissions. The temperature data were stratified as cold (extreme and moderate) and hot (moderate and extreme). Within five years (January 2013-December 2017), a total of 460,938 (male 54.9% and female 45.1%) CVD admission cases were reported. The exposure-response relationship for hospitalization was described by a "J" shape for the total and cause-specific. An increase in the six-day moving average temperature from moderate hot (30.2 °C) to extreme hot (36.9 °C) resulted in a significant increase in CVD admissions of 16.1%(95% CI = 12.8%-28.9%). However, the effect of cold temperature exposure on CVD admissions over a lag time of 0-27 days was found to be non significant, with a relative risk of 0.45 (95% CI = 0.378-0.55) for extreme cold (-8.5 °C)and 0.53 (95% CI = 0.47-0.60) for moderate cold (-5.6 °C). The results of this study indicate that exposure to extremely high temperatures is highly associated with an increase in cause-specific CVD admissions. These finding may guide to create and raise awareness of the general population, government and private sectors regarding on the effects of current weather conditions on CVD.

Keywords : admission, Beijing, cardiovascular diseases, distributed lag non linear model, temperature
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