

Heat wave Impacts on mortality in Nanjing , China

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Abstract

A variety of research has linked extreme heat to heightened levels of daily mortality. Heat waves will be exacerbated with the global warming and will have the potential to negatively influence on the health and welfare of urban residents. In this paper, we analysed the relationship between mortality and heat wave (the duration of high temperature above 35°C is more than 3 days) in Nanjing ,China. Daily mortality in Nanjing was analysed by cause, from January 2005 to December 2008. When the daily maximum temperature is above 35°C , it is defined as a hot day (heat day). Extra mortality was calculated by $EM=(D-D_{No-heat})/D_{No-heat}$, here EM refers to the extra mortality, D is daily death cases, $D_{No-heat}$ means the average of death cases in no-heat days (the daily maximum temperature is lower than 35°C) in summer time of July to August.

The inter-annual changes of temperatures showed that the maximum temperature, the minimum temperature and the average temperature were obviously increasing. There were 9 heat waves during 2005-2008. Hot days had a sudden change in 1993. The average of hot days during 1981-1993 was 9.8d/yr. It was 16.8d/yr for 1993-2010. Heat waves occurred with high temperature and high humidity. Our results showed that impact of heat waves on mortality in all causes. Order of causes in Nanjing is Circulatory, Neoplasm, Respiratory, Endocrine, Digestive, Genitourinary, Nervous, Mental, Infectious, Blood and other diseases. Circulatory cause accounted for 37.44%. Second one was Neoplasm, occupying 30.02%. The third was Respiratory, taking by 12.99%. Three causes attributed about 80.05%. Heat waves had impacts on the order of causes and extra mortality. During the heat wave on 7/25-8/2, 2007, some orders of the death causes changed. Among them, the orders of digestive, mental and blood increased, but the orders of endocrine, urinary and nervous decreased. Extra death occurred during heat waves. The top five of the maximum extra death in 9 heat waves

were Nervous, Infectious , Mental ,Endocrine and Urinary systems, accounting for 355.45%, 293.22% and 230.05%, 148.08%% and 132.56%. The top three of average extra death were Nervous, Mental and Infectious, taking by 94.12%, 91.26% and 65.52%, respectively.

Key words: Global warming; Heat wave; Mortality; High temperature.