

RELATIONSHIPS BETWEEN ESTIMATED AMBIENT TEMPERATURE VARIATIONS AND MORTALITY IN THE ELDERLY

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Background and Aims: The elderly may not have the effective thermoregulatory responses to heat stress, and are therefore less adapt to sudden changes in ambient temperature. This study aimed to evaluate the relationship between variations in ambient temperature from 1994 through 2008 and overall daily mortality as well as cardiovascular and respiratory mortality in the elder population of Taiwan.

Methods: Meteorological data provided by the Central Weather Bureau (CWB) of Taiwan were interpolated to create representative estimates of diurnal temperature variation of 352 townships by the kriging methods. Daily mortality data were retrieved from the Taiwan Death Registry, Department of Health. The generalized linear models and Poisson regression were used to analyze the impact of variations in mean difference of diurnal temperature on overall, cardiovascular and respiratory mortality, controlling for calendar month and demographic regions.

Results: The increasing percentiles of diurnal temperature variation appeared to be associated with mortality risk compared with 0–4th and presented a rising trend. Risk ratios of daily mortality for temperature variations of 10.5°C and 12.2°C (95th and 99th percentiles) were significantly elevated for both genders, especially in cold weather. These risks seemed to increase to a greater scale among a sub-metropolitan city, an isolated island and mountain areas. After performing stratified analyses by gender, elderly women were found to be more susceptible to extremely high temperature variations at the 99th percentiles and more likely to die of cardiovascular and respiratory diseases.

Conclusions: A positive correlation was detected between temperature variation and mortality in the elderly. The increase in death events correlated with higher percentiles of temperature variations suggests that the increasing dynamics of temperature are a valid reflection of greater risk, highlighting the need for precautionary measures.