Abstract: P1943

Ambient temperature and seasonal effects on blood pressure in 2.6 million Australians

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Background: There is evidence that blood pressure (BP) levels vary considerably from season to season, due principally to variation in ambient temperature. This gives the potential for both under- and over-treatment if BP lowering medications are not varied seasonally, but is not acknowledged in clinical guidelines. We will describe the seasonal variation in BP and assess the association between systolic blood pressure (SBP) and outdoor maximum ambient temperature in Australia.

Methods: The primary care data is an extract from MedicineInsight, a national general practice data program developed and managed by NPS MedicineWise, which extracts deidentified data from almost 10% of all Australian general practices. We included patients aged 30-90 years with at least one BP measure recorded from 1 Jan 2010 to 1 Aug 2017. Australian Bureau of Meteorology daily max temperature is linked by matching observation dates and location to nearest weather station. Decomposition of the mean will determine seasonal variation. Multiple linear regression was used to estimate the associations between max temperature and SBP with adjustment for age, sex, socioeconomic index, current smoking, comorbidities, BP lowering medication use, lipid lowering medication use and year of BP measurement.

Results: The study population includes 2.6 million people, mean age 55 years (standard deviation [SD] 16.3). Fifty-five percent are female, over a third of the cohort reside in New South Wales, and 62.4% reside in major Australian cities. The mean (SD) temperature was 23°C (6.6).

There was a mean (SD) of 7(11.4) BP measurements per person over the study period, median 3 measures (interquartile range 1-8). A quarter had a history of hypertension, 8% had a history of cardiovascular disease, and 8% had a history of diabetes. Twenty-six percent had at least one prescription for BP lowering therapy.

The average monthly SBP for the cohort demonstrated strong seasonal variation with higher values in winter. The population mean varies by 3mmHg SBP between seasons across Australia, ranging from 1.7mmHg in the Northern Territory to 3.5mmHg in South Australia (range of mean maximum temperature 3°C [30-33] and 14°C [15-29] for the capital cities respectively). Each 10°C increase in max outdoor temperature was associated with a 1.8mmHg [95%CI 1.80-1.83] lower mean SBP. The proportion of people with SBP>140mmHg varied by season, irrespective of age, sex and use of BP lowering treatment. For example, among those treated control rates varied between 70 and 81%, and among those not treated between 78 and 85% (Figure).

Conclusions: BP control rates vary considerably by season. These findings have implications for the reliable diagnosis of hypertension, and suggest seasonal adjustments in treatment should be considered for some patients. The clinical and public health relevance of this phenomenon is expected to increase with increasing climate variability.
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