Title

Chronic extreme heat during pregnancy in Singapore

Authors

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Background

Pregnant women and their fetuses are particularly vulnerable to the health impacts of extreme heat exposure. Previous studies have reported associations between heat exposure during pregnancy and higher risk of adverse birth outcomes. However, these studies were mainly conducted in temperate countries, which experience different climatic conditions than tropical countries. We aimed to determine the association between chronic extreme heat in a tropical country, Singapore, and risk of preterm birth (PTB), gestational diabetes (GDM), and being born small for gestational age (SGA).

Methods

Birth records from 2013 to 2020 from a large public hospital in Singapore were analyzed alongside daily climate records from the Singapore Changi Airport weather station. Multivariable logistic regression was used to estimate the association between occurrences of extreme heat across the three trimesters of pregnancy and the risk of PTB, GDM, and SGA, with stratification by maternal race according to the three main racial groups in Singapore – Chinese, Malay, and Asian Indian.

Results

We observed an association between chronic extreme heat in the second trimester and higher risk of SGA in Malay mothers (relative risk: 1.52; 95% confidence interval: 1.03, 2.20; *p*-value = 0.028). However, chronic extreme heat during the third trimester was associated with a reduced risk of PTB (0.57 [0.40, 0.80]; 0.001). We did not observe an association between chronic extreme heat during pregnancy and GDM risk.

Conclusion

Our findings on SGA are consistent with previous studies; however, our findings on PTB are in direct contrast to previous studies. We speculate that chronic extreme heat in Singapore prompts behavioral changes, such as increased air-conditioning usage, which could explain the apparent protective effect for PTB.