Heat Exposure and the Risk of Postpartum Acute Kidney Injury in Pregnant Women: A Nationwide Cohort Study in South Korea

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Abstract

Heat exposure during pregnancy is an emerging maternal risk factor, but its effect on postpartum acute kidney injury (AKI) remains unclear. This study assessed the link between prenatal heat exposure and postpartum AKI in South Korea. We used Korean National Health Insurance Service data (2013–2019) in a retrospective cohort of 1,121,716 first pregnancies in seven major cities. Women with kidney disease, autoimmune disorders, in-hospital death, or missing data were excluded. Heat exposure was estimated from meteorological data by residence. Postpartum AKI was identified from delivery to follow-up. Cox proportional hazards models adjusted for sociodemographic and clinical factors. Sensitivity analyses applied alternative exposure definitions and follow-up periods (≤3 months, ≤1 year, long-term). Higher prenatal heat exposure significantly increased AKI risk. Each unit rise in mean heat hours over 10 days raised risk (HR: 1.341; 95% CI: 1.262–1.425). Compared with unexposed women, those with high exposure had markedly elevated risk (HR: 2.147; 95% CI: 1.798–2.563). Comorbid hypertension, diabetes, hyperlipidemia, and urban residence further heightened vulnerability. Sensitivity analyses showed consistent results. Prenatal heat exposure is a strong risk factor for postpartum AKI. Targeted interventions and early monitoring are warranted to protect maternal kidney health under rising global temperatures.