



Investigating the Correlation between Heat Stress and Preterm Birth among Outdoor Market Vendors in Bamako, Mali: A Research Protocol

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Published: 04 April 2011 | **Received:** 19 November 2010 | **Accepted:** 04 March 2011

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DOI: [10.5281/zenodo.18529687](https://doi.org/10.5281/zenodo.18529687)

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Abstract

Pregnant women in low-resource, hot-climate settings are vulnerable to occupational heat exposure. Outdoor market vendors in West Africa represent a high-risk group, yet evidence linking their heat stress to adverse birth outcomes, such as preterm birth, in urban Mali is limited. This protocol describes a study to investigate the correlation between heat stress and preterm birth among outdoor market vendors in Bamako, Mali. The primary objectives are to: 1) quantify heat exposure levels using physiological and environmental metrics; 2) determine the incidence of preterm birth in this cohort; and 3) analyse the association between heat stress indicators and preterm birth risk. A prospective cohort study will be conducted with approximately 400 pregnant vendors from major markets in Bamako. Participants will be enrolled during their first or second trimester and followed until delivery. Heat exposure will be assessed via personal monitoring (wet-bulb globe temperature, heart rate, core temperature). Data on pregnancy outcomes will be obtained from health records. Logistic regression will analyse the correlation, controlling for confounders including maternal age and socioeconomic status. As this is a protocol, no empirical findings are available. The anticipated primary outcome is the direction and strength of the correlation between heat stress indices and preterm birth. A key analysis will examine whether vendors experiencing core temperatures exceeding 38.5°C have a higher proportion of preterm births. The study is expected to generate evidence on occupational health risks related to heat exposure for pregnant women in the informal urban economy of the Sahel. Findings will inform targeted workplace health interventions and advocacy for protective policies for pregnant workers in hot climates. Further research into specific mitigation strategies will be recommended. Heat stress, preterm birth, occupational health, maternal health, Sahel, cohort study This protocol outlines a novel investigation into an under-researched environmental occupational hazard for a vulnerable population in Mali, aiming to contribute localised data to the fields of public health and climate adaptation.

Keywords: *Heat stress, Preterm birth, Occupational exposure, West Africa, Environmental epidemiology, Vulnerable populations, Low-resource settings*

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