

Occupational Heat Stress Related Adverse Pregnancy Outcome: A Pilot Study in South India Workplaces

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Abstract : Introduction: Pregnant women's occupational heat exposure has been linked to foetal abnormalities and pregnancy complications. The presence of heat in the workplace is expected to lead to Adverse Pregnancy Outcomes (APO), especially in tropical countries where temperatures are rising and workplace cooling interventions are minimal. For effective interventions, in-depth understanding and evidence about occupational heat stress and APO are required. Methodology: Approximately 800 pregnant women in and around Chennai who were employed in jobs requiring moderate to hard labour participated in the cohort research. During the study period (2014-2019), environmental heat exposures were measured using a Questemp WBGT monitor, and heat strain markers, such as Core Body Temperature (CBT) and Urine Specific Gravity (USG), were evaluated using an Infrared Thermometer and a refractometer, respectively. Using a valid HOTHAPS questionnaire, self-reported health symptoms were collected. In addition, a postpartum follow-up with the mothers was done to collect APO-related data. Major findings of the study: Approximately 47.3% of pregnant workers have workplace WBGTs over the safe manual work threshold value for moderate/heavy employment (Average WBGT of $26.6^{\circ}\text{C}\pm 1.0^{\circ}\text{C}$). About 12.5% of the workers had CBT levels above the usual range, and 24.8% had USG levels above 1.020, both of which suggested mild dehydration. Miscarriages (3%), stillbirths/preterm births (3.5%), and low birth weights (8.8%) were the most common unfavorable outcomes among pregnant employees. In addition, WBGT exposures above TLVs during all trimesters were associated with a 2.3-fold increased risk of adverse fetal/maternal outcomes (95% CI: 1.4-3.8), after adjusting for potential confounding variables including age, education, socioeconomic status, abortion history, stillbirth, preterm, LBW, and BMI. The study determined that WBGTs in the workplace had direct short- and long-term effects on the health of both the mother and the foetus. Despite the study's limited scope, the findings provided valuable insights and highlighted the need for future comprehensive cohort studies and extensive data in order to establish effective policies to protect vulnerable pregnant women from the dangers of heat stress and to promote reproductive health.

Keywords : adverse outcome, heat stress, interventions, physiological strain, pregnant women

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