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Heat Stress Exposure and Heat-Related Health Effects Among Night Market Street Vendors in Shah Alam, Malaysia

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Structured Abstract

Background: Climate change has increased ambient temperatures worldwide, intensifying heat exposure among outdoor workers. Street vendors at night markets are particularly vulnerable due to cooking activities, high humidity, and limited ventilation. In Malaysia, informal workers often lack adequate heat protection despite existing guidelines. Therefore, this study focuses on assessing environmental heat stress and heat strain among street vendors at the Seksyen 7 night market, Shah Alam.

Methods: This study employs a quantitative cross-sectional design to evaluate heat stress among 103 street vendors at the night market. It integrates environmental monitoring using a WBGT meter with a survey-based approach utilizing the Heat Strain Score Index (HSSI). Pearson correlation and Chi-square tests were used to determine the statistical association between ambient heat levels and the vendors' physiological strain.

Results: Night market street vendors are exposed to substantial environmental heat stress, particularly during peak operating hours and within the central night market area. WBGT values frequently exceeded DOSH and ACGIH threshold limits, reaching a maximum of 33.0°C, indicating a high risk of heat exhaustion, especially for vendors performing moderate workloads near grills, stoves, or fryers. Elevated wet-bulb and dry-bulb temperatures, combined with high globe temperatures, highlight the compounded effects of humidity, radiant heat, and anthropogenic heat sources in densely packed stalls. The HSSI analysis revealed that vendors with moderate workloads experienced significantly higher physiological strain, with nearly one-third (29.3%) classified in the high-risk zone. The strong positive correlation between WBGT and HSSI ($r = 0.974$, $p < 0.001$) confirms that environmental heat is the primary driver of heat strain. The frequent reporting of weakness and muscle pain further supports the physiological impact of sustained heat exposure. These findings emphasise the urgent need for targeted heat mitigation strategies to protect informal workers' health and safety.

Conclusion: In conclusion, night market vendors face significant heat stress, with WBGT frequently exceeding safety limits Guidelines on Heat Stress Management at Workplace 2016. Moderate workloads, cooking-related heat, and high BMI increase heat strain, while the strong WBGT and HSSI correlation highlights the urgent need for targeted heat management interventions.

Keywords: Heat stress, night market street vendors, WBGT, HSSI

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