

Work-related injury risks in hot weather: An examination of risks and susceptibility

Blesson Varghese¹, Alana Hansen¹, Susan Williams¹, Peng Bi¹, Dino Pisaniello¹

¹School of Public Health, University of Adelaide

Objectives

Hot working conditions can lead to heat-related illness and in severe cases, deaths. Besides these direct effects, workplace heat may also increase the risk of physical injuries. The heat-injury phenomenon is poorly understood, and it may have a different distribution amongst industries, compared with illness. Therefore, the aim of this study was to better understand the heat-injury phenomenon to inform evidence based adaptive strategies, practical guidelines, and tailored interventions to reduce the risk of injury in hot weather.

Methods

A mixed-methods research was undertaken to explore the nature and determinants of heat-related work injuries. The quantitative phase investigated the effects of heat (measured by maximum temperature and heatwaves) on the occurrence of workplace injuries in four Australian cities (Adelaide, Brisbane, Melbourne, and Perth) using workers' compensation claims data. Three national online surveys were undertaken investigating perceptions of key stakeholders (workers, health and safety professionals and representatives) on heat-related work injuries, their determinants, management, and prevention. Lastly, the qualitative component comprised of analysing data collected from different sources including telephone complaints database, and interviews and surveys with workers.

Results

This paper integrates the findings into a conceptual model of psycho-behavioural and physiological changes in workers induced by heat stress. Injury risk factors relate to work, worker and workplace. The qualitative evidence indicates limited awareness of injury mechanisms in hot weather. In contrast to traditional risk factors for heat-related illness, risk factors for injury include interacting hazards in particular tasks; altered work practices, vigilance and reduced use of personal protective equipment (PPE) as a result of heat exposure, dehydration and fatigue; and moderately hot conditions rather than extreme heat representing the greatest injury burden, in indoor as well as outdoor environments. Injuries, themselves, are diverse including traumatic injury and chemical-related injury, leading to extensive misclassification in current injury reporting systems. Importantly, heat-related injuries, such as falls from height or hand injuries, can occur before the onset of frank heat illness. The Excess Heat Factor (EHF), as a measure of heatwave severity is consistent with the model and is a better predictor of injury than daily maximum temperature. The EHF is available from the Bureau of Meteorology and can be applied in various climate zones.

Conclusions

Overall, the multiple lines of evidence suggests that the underlying heat-injury mechanisms are complex and multi-factorial. Injury prevention efforts at the worker, work and work environment levels should be applied in conjunction with traditional heat illness prevention approaches in order to reduce excess

morbidity and mortality observed in hot conditions. This is particularly important in light of warmer conditions predicted due to climate change.

Keywords

Workplace heat exposure

Work-related injuries

Worker safety

Hot weather