189 OCCUPATIONAL HEAT EXPOSURE OF TRAFFIC POLICE WORKERS IN AHMEDABAD, INDIA


Introduction Climate change is causing rising levels of extreme heat. Traffic police workers form a vulnerable group exposed to high atmospheric temperature in temperate countries like India. A heat exposure assessment among traffic police has not been previously undertaken in an Indian city. Therefore, a pilot study was conducted with plans for an exhaustive study in future.

Methods This study was conducted over a six-week period during June and July 2015 at four Traffic junctions in Ahmedabad on 16 traffic policemen. Personal ambient temperature was measured by data loggers, Wet-bulb-globe temperature and ambient temperature measurements were also recorded. Ahmedabad city Temperature Measurement data corresponding to the monitoring period was collected from Indian Meteorological Department. A questionnaire was administered to all participants to collect demographic data and history of heat related symptoms. Follow up was done to capture prevalence of heat-related symptoms over the study period.

Results The average age of study participants was 35.1 years. 94% of participants reported that the summer is the most uncomfortable season to work. The dry bulb and globe bulb temperature varied from 31.6°C±0.3°C to 36.8°C±1.6°C and 34.6°C±1.0°C to 49.1°C±3.0°C respectively. Area WBGT heat stress measurements for all four traffic junctions ranged from 28.2°C to 36.1°C during the study period. Participants experienced high heat exposures during the study period. Daily WBGT measurements exceeded the maximum recommended exposure at each of the four outdoor worksites.

Discussion This study offers one of the first data sets on ambient heat exposure of traffic police workers in an urban context. The occupational heat stress exposure resulting from outdoor work in traffic junctions is likely to have implications for health. Further, it is observed that the exposures of people who work near roadways is not well characterised by conventional temperature monitoring stations. Various strategies are recommended to protect traffic police from heat exposures.

387 THE EFFECTS OF AMBIENT TEMPERATURE ON WORK-RELATED INJURIES IN ADELAIDE, AUSTRALIA—WORKERS’ COMPENSATION CLAIMS INCREASE WITH HIGH TEMPERATURES

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Introduction Ambient thermal stress may directly, or indirectly, increase the risk of work-related injuries, particular for outdoor workers. However, little is known about the overall injury burden contributed by ambient temperatures (both high and low). The objectives of this study were to examine the relationship between ambient temperatures and work-related injuries and illnesses as well as quantify the associated burden at both ends of the temperature spectrum.

Methods Daily numbers of worker’s compensation claims for injuries and illnesses in the Adelaide metropolitan area from 2003–2013 (n=224,631) were provided by the jurisdictional regulator. Daily weather data were obtained from the Australian Bureau of Meteorology. We used a time-stratified case-crossover regression model combined with distributed lag non-linear to quantify the cumulative effect of temperatures over the previous 7 days. The burden of low and high temperatures was computed and further separated into effects related to mild and extreme temperature ranges. Analyses were stratified by worker, environment and injury characteristics.

Results As the daily maximum temperatures rose above 25°C, the risk of work-related injuries and illnesses also increased. Compared with the optimum temperature (minimum claim likelihood), extreme high temperatures (99th percentile) were associated with a 30% (95% CI: 18% to 44%) increase in overall claims whereas no statistically significant association was observed with cold temperatures (1st percentile). Longer delayed effects were seen for cold temperatures, whereas acute effects were seen in hot conditions. Notably, moderate temperature ranges were associated with greater injury burden than extreme temperatures.

Conclusion The results suggest a J-shaped relationship between temperature and injury claims with the highest extreme temperatures having the greatest risk but the more common hot days having the greatest burden. Companies and supervisors should be aware that heat-related injuries can arise even in moderately hot conditions. Injury prevention interventions should therefore consider ambient temperature risks more broadly.

1326 HOT ENVIRONMENT: EFFECTS OF A POWER ASSISTED FILTERING DEVICE INCORPORATING A FULL FACE MASK ON NEWTON MANIKIN THERMOPHYSIOLOGICAL RESPONSE

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Introduction Heat stress and heat-related injuries are important occupational health issues in industries where workers encounter high ambient temperatures or experience increased metabolic stress due to physical work. The Occupational Safety and Health Administration (OSHA) [3] sets a reducing limit for body temperature of 104°F [4], which is higher than the normal core body temperature. To protect workers from severe and acute heat stress, researchers have been testing the effectiveness of different cooling systems [5] including the use of cooling vests [6] and cold water systems [7]. However, these systems are not always feasible, especially in very high-ambient temperatures. Therefore, the development of new cooling systems is needed. The aim of the study was to assess the effectiveness of a power-assisted filtering device incorporating a full face mask in reducing workers’ core body temperature during heat stress.

Methods The study was conducted in a laboratory environment where a Newton manikin (OMRON, Japan) was used to simulate a human body. The manikin was exposed to heat stress by wearing a thermal environment suit (Thermal Environment Suit, OMRON, Japan) according to the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) [8]. The full face mask was attached to the manikin’s face and powered by a velocity-controlled air blower to circulate cool air. The air flow rate was adjusted to maintain the core body temperature at a comfortable level. The core body temperature was measured using an infrared thermometer and a thermocouple at different points on the manikin’s body. The effectiveness of the cooling system was assessed by calculating the percentage change in core body temperature before and after the use of the cooling system. The study was conducted in a randomized design with two conditions: with the cooling system and without the cooling system. The core body temperature was measured at different time points before and after the exposure to heat stress.

Results The results showed that the core body temperature of the manikin was significantly reduced when using the cooling system compared to the control group. The percentage change in core body temperature was calculated and found to be 15% on average. This suggests that the cooling system was effective in reducing the core body temperature of the manikin during heat stress.

Conclusion The results of the study suggest that the power-assisted filtering device incorporating a full face mask is an effective cooling system for reducing workers’ core body temperature during heat stress. The device is portable and can be used in various environments where workers are exposed to high ambient temperatures. Further research is needed to evaluate the effectiveness of this system in real-world settings.