Rising heat stress poses grave occupational health risks for workers, study finds

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Credit: Petr Ganaj from Pexels

As global temperatures continue to soar due to anthropogenic climate change, a new study has highlighted the alarming consequences of heat stress on outdoor workers. The research, published in *Kidney International Reports*, was conducted among salt pan workers in Tamil

Nadu, India, and reveals the urgent need for adaptation strategies and improved health care access to protect vulnerable individuals.

Between 2017 and 2020, 352 workers were studied in seven salt pans in Tamil Nadu. The workload for different job roles and classified heat stress levels were evaluated. Key indicators such as pre- and post-shift heart rates, Core Body Temperatures, urine characteristics, sweat rates, and kidney function parameters were measured.

The study found that every participant had either a heavy or moderate workload, and an alarmingly close to 90% of workers were found to be working above the recommended limits of heat exposure. International regulations advise implementing regular break periods under such circumstances, but none of the salt pans examined had such breaks in place.

The wet-bulb globe temperature (WBGT), a composite measure of environmental factors affecting human thermal comfort, consistently surpassed safe levels in the saltpans, particularly during summer months. The workers reported symptoms of heat strain, dehydration, and urinary tract infection symptoms, likely due to excessive sweating, lack of toilet access and limited water consumption during their shifts.

Of particular concern is the impact of heat stress on kidney health. The study revealed a prevalence of low estimated glomerular filtration rate (eGFR), a marker of kidney function, in 7% of workers. Heat stress has been linked to various kidney-related issues, including acute kidney injury, kidney stones, chronic kidney disease, and urinary tract infections.

The study was conducted by a team led by Dr. Vidhya Venugopal of Sri Ramchandra Institute of Higher Education and Research, who is also a co-Investigator of the Global Health Research Center that is focusing on

the intersection of non-communicable diseases and environmental change.

"We have compelling evidence that heat stress poses significant health risks for these workers. Urgent action is needed to implement adaptation strategies and improve health care, sanitation access and welfare facilities to protect the vulnerable individuals. Failure to address this issue will result in increased heat-related illnesses, particularly chronic kidney diseases, worsened by pre-existing medical conditions, and potentially devastating health consequences for workers around the world," said Vidhya Venugopal, professor of occupational and environmental health, Sri Ramachandra Institute of Higher Education and Research.

The study underscores the fact that these workers, experience prolonged exposure to high temperatures without sufficient access to adaptation strategies such as shade, rehydration, and rest breaks. Furthermore, many are hesitant to report symptoms of heat stress due to fear of job loss or retaliation. The risk is further magnified for undocumented workers who lack access to health care.

Approximately 40% of the global population is exposed to consistently high ambient temperatures above 30°C throughout the year. India, in particular, faces significant risks, with the mean temperature having risen by 0.7°C between 1901 and 2018. Projections indicate a staggering increase of 4.4°C by the end of the century, exacerbating the health impact on its population.

According to *The Lancet Countdown*, heat-related deaths increased by 55% between 2000–2004 and 2017–2021, and 167.2 billion potential labor hours were lost because of heat exposure in India alone.

The study highlights the urgent need for comprehensive measures to

address heat-related risks for vulnerable workers. Employers must ensure access to shade, water, and rest breaks, as well as provide training on recognizing and reporting heat stress symptoms.

Health care workers must be trained to recognize the HRI symptoms and health care providers should be aware of the increased risk of heat-related kidney injury and educate workers on the importance of staying hydrated and avoiding prolonged exposure to high temperatures.

Government agencies play a crucial role in mitigating these risks. Guidelines and recommendations, such as those developed by India's National Disaster Management Authority and National Action Plan on Climate Change, exist but need to be effectively implemented. Enforcing labor laws that protect workers' rights, promoting public awareness, and enhancing public health infrastructure are key steps towards minimizing the impact of heat stress on vulnerable populations.

"As temperatures continue to rise, the well-being and safety of workers in a warming world must be prioritized. Adapting to the risks posed by heat stress demands collaborative efforts from employers, policymakers, and public health officials. Only through concerted action can we safeguard the health and livelihoods of those on the frontlines of heat-exposed labor," said Prof Vivekanand Jha, executive director, The George Institute for Global Health India and co-lead of the UK NIHR Global Health Research Center for Non-Communicable Diseases and Environmental Change.

More information: Priyadarshini John et al, Heat Stress: A Hazardous Occupational Risk for Vulnerable Workers, *Kidney International Reports* (2023). DOI: 10.1016/j.ekir.2023.05.024

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