

Wet T-shirts provide effective cooling for older adults during heat waves

April 3 2020

Research suggests that wearing water-soaked clothing in hot, humid weather may be an inexpensive and effective way to provide cooling and reduce the risk of heat strain in older adults. The first-of-its-kind study, which also provides counterintuitive results regarding the use of electric fans for cooling, is published in the *Journal of Applied Physiology*. It was chosen as an APS select article for April.

Older adults are more susceptible than their younger counterparts to heat-related illness and cardiovascular strain in the summer, especially during extreme heat waves. This is in part due to the reduced ability to sweat that affects many seniors as a normal part of aging. Older people may also be more likely to experience heat strain if they do not have access to air conditioning either on a regular basis or temporarily, such as because of a power outage. Previous research has explored the effectiveness of cooling through simple and affordable means, including water-soaked clothing and the use of electric fans. However, the use of these methods in a condition "representative of [a] very hot and moderately humid heat wave" have not yet been studied.

Researchers observed a group of adults with an average age of 68 in three separate heat exposure sessions. Volunteers sat on a breathable mesh reclining chair for two hours in a room with an ambient temperature of 108 degrees F and a relative humidity of 34%. Each volunteer participated in:

- a "dry" session where they wore a dry cotton T-shirt,

- a "wet" session where they wore a cotton T-shirt soaked in 500 milliliters (ml) of water (about two cups), and
- a "wet + fan" session where they wore a cotton T-shirt soaked in 500 ml of water and sat in front of an electric fan.

The volunteers had unlimited access to lukewarm drinking water throughout the heat exposure sessions. The research team measured the volunteers' heart rate, blood pressure, core body temperature and changes in body mass every 30 minutes. They weighed the wet shirts before and after each heat exposure to determine how much fluid had evaporated from the shirt. As expected, the wet + fan session resulted in the greatest amount of fluid evaporation, both from sweat and water. Total evaporation was also higher in the wet condition than in the dry condition.

The wet shirt alone lessened the increase of heat strain, which was assessed by changes in core body temperature. However, heat strain levels did not differ between the dry and wet + fan conditions, "which suggests that fan use with supplemental skin wetting was neither beneficial nor detrimental in [lessening] heat strain in older individuals," the researchers wrote. "In contrast, wearing a water-soaked T-shirt without electric fan use in the wet trial significantly [reduced] the rise in heat strain throughout most of the [two-hour] heat exposure in the wet compared with the dry and wet + fan condition," they added. This may be because the added heat gain from blowing hot air over the skin was offset by added evaporation from the combination of the fan and the wet T-shirt.

"These findings suggest that wearing a water-soaked T-shirt in heat wave conditions can [lessen] heat strain, while electric fan use in combination with a water-soaked T-shirt has no effect on heat strain compared to wearing a dry T-shirt alone," the researchers wrote. "This information should be incorporated into [public health](#) messaging regarding effective

cooling strategies to reduce the risk of heat-related health problems during extreme [heat](#) events."

The article, "Keeping older individuals cool in hot and moderately humid conditions: wetted clothing with and without an electric fan," is published in the *Journal of Applied Physiology*.

More information: Matthew N. Cramer et al. Keeping older individuals cool in hot and moderately humid conditions: wetted clothing with and without an electric fan, *Journal of Applied Physiology* (2020). [DOI: 10.1152/jappphysiol.00786.2019](https://doi.org/10.1152/jappphysiol.00786.2019)

Provided by American Physiological Society

Citation: Wet T-shirts provide effective cooling for older adults during heat waves (2020, April 3) retrieved 5 May 2024 from <https://medicalxpress.com/news/2020-04-t-shirts-effective-cooling-older-adults.html>

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