



## The Role of Hydration and Nutrition in Preventing Heat Exhaustion among Arbaeen Pilgrims

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### Dear Editor

The Arbaeen pilgrimage, one of the largest religious gatherings, exposes millions of participants to extreme physical and environmental challenges (Yousefi and Hasani, 2024). Among the most pressing health concerns is heat exhaustion, caused by prolonged exposure to high temperatures, physical exertion, and inadequate fluid intake. While environmental factors contribute to this condition, proper hydration and nutrition play a crucial role in mitigating risks (Moulaei *et al.*, 2024). This letter highlights the importance of hydration and nutrition in preventing heat exhaustion among Arbaeen pilgrims and proposes practical interventions to enhance their safety.

### Hydration and heat exhaustion

Hydration is essential for thermoregulation and endurance during long-distance walking. Many pilgrims, due to the rigorous nature of the journey, neglect adequate water intake (Lee *et al.*, 2022). Dehydration reduces sweating efficiency, leading

to increased core temperature, dizziness, muscle cramps, and even heatstroke. Additionally, dehydration impairs cognitive function, heightening risks to fatigue and confusion in crowded pilgrimage routes (Kolivand *et al.*, 2025).

To combat dehydration, hydration stations should be strategically placed along pilgrimage routes (Alfiah *et al.*, 2023). Water distribution efforts, supported by volunteers and health organizations, can significantly reduce dehydration risks. Educating pilgrims on the importance of consuming electrolyte-rich beverages, such as oral rehydration solutions, can further enhance their ability to withstand extreme heat and physical exertion (Kolivand *et al.*, 2025).

### Nutrition and heat stress management

Proper nutrition maintains optimal energy levels and minimizes physiological strain caused by heat. Many pilgrims rely on processed, high-calorie foods due to convenience, but such choices can worsen hydration status and increase

susceptibility to heat exhaustion (Moulaei *et al.*, 2024). Salty foods contribute to excessive sodium intake, leading to increased thirst and fluid imbalance. Conversely, consuming nutrient-dense foods rich in water content, such as fruits and vegetables, supports hydration and improves stamina (Alfiah *et al.*, 2023).

#### **A well-balanced diet during the pilgrimage should include**

Water-rich fruits and vegetables such as cucumbers, oranges, and watermelons (Yousefi and Hasani, 2024). Whole grains and lean proteins to maintain energy levels without excessive metabolic strain (Moulaei *et al.*, 2024). Electrolyte sources such as bananas and yogurt to support muscle function and cramps prevention (Alfiah *et al.*, 2023). Avoidance of high-sugar and caffeine-containing beverages that may contribute to dehydration (Yousefi and Hasani, 2024). Community-based food distribution programs should incorporate healthier meal options rather than relying on traditional high-fat and carbohydrate-heavy foods (Lee *et al.*, 2022). Public health initiatives should promote awareness regarding dietary choices that positively impact physical endurance and heat tolerance (Moulaei *et al.*, 2024).

#### **Implementation strategies**

Preventing heat exhaustion through hydration and nutrition requires collaboration among religious organizers, health authorities, volunteers, and local governments (Lee *et al.*, 2022). Key strategies include:

- Establishing hydration stations along

pilgrimage routes (Yousefi and Hasani, 2024).

- Distributing electrolyte-rich beverages and educating pilgrims on hydration needs (Kolivand *et al.*, 2025).
- Encouraging the availability of nutrient-dense food options (Alfiah *et al.*, 2023).
- Launching awareness campaigns on dietary choices that enhance heat tolerance (Yousefi and Hasani, 2024).

By prioritizing hydration and nutrition, Arbaeen pilgrims can significantly reduce the risk of heat exhaustion, ensuring a safer and more fulfilling spiritual journey.

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