

Hajj in sweltering summer season and heat stroke

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Dear Madam, Hajj is one of the world's largest gatherings. Hajj dates are based on the lunar calendar, and this year, the dates fell in the summer season from June 14-18, 2024. We are writing to highlight the climate conditions, soaring temperatures, heat stroke, heat stress, the health situation of Hajj pilgrims, and efforts by Saudi Arabia in managing this monumental pilgrimage. Hajj, one of the five pillars of Islam, holds profound spiritual significance for Muslims worldwide. This year, over 1.83 million Muslims across the world gathered in Makkah, Saudi Arabia to perform the holy pilgrimage.¹ The challenging issue in managing this world's largest religious gathering during the sweltering summer season is dry and harsh weather conditions, with rising temperatures of around 46-47 degrees Celsius (114.8-116.6 degrees Fahrenheit) (Figure 1).²

As the custodian of the two holy mosques, Saudi Arabia makes tremendous preparations to ensure all the global pilgrims' safety, comfort, and spiritual fulfilment. The Saudi authorities have issued health guidelines about rising temperatures, advising the pilgrims to use umbrellas for shade, staying hydrated, and taking regular breaks to avoid exhaustion during rituals. Saudi Arabia has developed advanced and technology-based steps to mitigate the expected heat in Mecca and has been equipped with misting systems and portable water stations. Moreover, the floor of the Great Mosque in Mecca, as well as the surrounding tents in Arafat, Mina, and Muzdalifa, have been provided with air-conditioned, cooling air sprays, and mist-covered walkways, to minimize temperatures and increase cooling efficiency. The cooling system expands over 10 km, with more than 750 columns of cooling spray water supplied. The volume of the cooling spray was 235 m³ per hour, which continuously worked throughout the period of Hajj in Mina, Muzdalifa, and Jamarat zones (Figure 2) to reduce the risks associated with hot temperatures.³

Despite these efforts, the temperature reached up to 51.8 degrees Celsius (125.2 Fahrenheit). Due to this excessive

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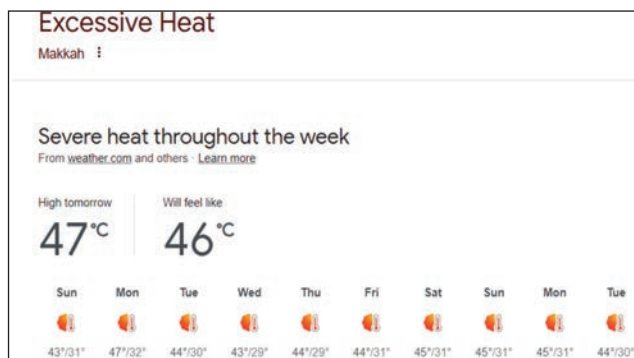


Figure-1: The temperature in Makkah Saudi Arabia during the Hajj period in mid-June 2024.²



Figure-2: Cooling sprays, floor and road cooling systems to reduce temperatures.

heat, about 1301 pilgrims died, while thousands more suffered from heat-related illnesses.⁴

Heat stroke is a life-threatening, multiple-organ failure condition caused by a hot environment. It occurs when body temperature regulation fails due to prolonged exposure to elevated temperatures, often coupled with dehydration and loss of electrolytes. It is characterized by the body temperature exceeding 104°F (40°C), and thus the body can no longer maintain the usual cardiac output to meet the demands of skin blood flow for thermoregulation and blood flow for metabolic requirements, resulting in organ failure. Clinical features include hot and dry skin, fatigue, muscle cramps, headache, hyperventilation, nausea, ataxia, dizziness, confusion, loss of consciousness, seizures, coma, and death.^{5,6}

Saudi Arabia has provided immense support and taken incredible measures to ease the journey of the pilgrims.

They have provided free health facilities to Hajj pilgrims. The government established dozens of health care units, subunits, and mobile units which were digitally linked with main hospitals. All of these healthcare units were well equipped with modern investigation and diagnostic laboratories, and with highly qualified physicians, surgeons, general practitioners (GPs), emergency and trauma specialists, and paramedical staff. The healthcare staff is available around the clock to manage any emergencies and combat heat stress and sunstroke situations.

Nevertheless, the weather in the Middle East in mid-June and the worsening climate conditions due to global warming are not favourable, causing frequent heat waves and associated health problems.⁷

However, the mitigation strategies implemented did cause a significant reduction in heat stroke cases (74.6%), and (47.6%) in case fatality rate.⁷ Moreover, the government pointed out that 83% of the deaths were those of unregistered pilgrims, who had walked longer distances in unsheltered areas without sufficient protection from the heat. This only added up to the risks of being susceptible to poor health conditions.

Overall, managing Hajj, the world's largest gathering, is not an easy task. Saudi Arabia has indeed earned a commendation for its meticulous and highly efficient management of Hajj in the sweltering summer season this year.

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References

1. Saudi Gazette report. Over 1.83 million pilgrims perform Hajj this year. News release. The Saudi Gazette Media Centre. [Online] 2024 [Cited 2024 June 16]. Available from URL: <https://www.saudigazette.com.sa/article/643622>
2. Excessive heat Makkah. Severe heat throughout the week. [Online] 2024 [Cited 2024 June 15]. Available from URL: <https://www.google.com/search?q=excessive+heat+makkah&rlz>
3. Al Amir K. 14 Jordanians, 5 Iranians dead, 17 missing during Hajj in Saudi Arabia: Ministry coordinating with Saudi authorities for repatriation of deceased to Jordan. News release. The Gulf News Media Centre. [Online] 2024 [Cited 2024 June 16]. Available from URL: <https://gulfnews.com/world/gulf/saudi/14-jordanians-5-iranians-dead-17-missing-during-hajj-in-saudi-arabia-1.103139041>
4. Agence France-Presse in Riyadh. More than 550 hajj pilgrims die in Mecca as temperatures exceed 50C: At least 320 of the dead are from Egypt and Saudi officials report treating more than 2,000 people for heat stress. News release. The Guardian News Media Centre. [Online] 2024 [Cited 2024 June 19]. Available from URL: <https://www.theguardian.com/world/article/2024/jun/18/hundreds-of-hajj-pilgrims-die-in-mecca-from-heat-related-illness>
5. Bouchama A, Knochel JP. Heat stroke. *N Engl J Med* 2002;346:1978-88. doi: 10.1056/NEJMra011089.
6. Hifumi T, Kondo Y, Shimizu K, Miyake Y. Heat stroke. *J Intensive Care* 2018;6:30. doi: 10.1186/s40560-018-0298-4.
7. Yezli S, Ehaideb S, Yassin Y, Alotaibi B, Bouchama A. Escalating climate-related health risks for Hajj pilgrims to Mecca. *J Travel Med* 2024;31:taae042. doi: 10.1093/jtm/taae042.

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MOSM: Literature review, writing, editing and agreed to be accountable for all aspects of the work.

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