

Review of Management Flow and Risk Factors of Dehydration in Hajj Pilgrims at the Surabaya Debarkation Hajj Dormitory: a case report

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Abstract This study evaluates the management protocols and risk factors for dehydration among Hajj pilgrims at the Surabaya Hajj Debarkation Dormitory, Indonesia, where extreme heat, physical exertion, and logistical challenges heighten health risks. Through observational data, medical records, a case analysis of a 98-year-old pilgrim with severe dehydration, the research identifies key risk factors: advanced age, chronic diseases (e.g., diabetes, hypertension), environmental extremes, inadequate fluid intake, and limited health literacy. The study outlines a structured management flow, emphasizing early screening upon arrival, rapid intravenous rehydration (normal saline/Ringer's lactate) for critical cases, and oral rehydration therapy (ORS) for stabilization. Medical staff play a critical role in symptom detection, emergency interventions, and educating pilgrims on hydration practices. Challenges such as delayed symptom recognition, vascular access difficulties in dehydrated patients, and resource limitations underscore the need for standardized protocols and enhanced training. Recommendations include improving pre-departure education on hydration, strengthening medical response capabilities, and ensuring accessible rehydration resources. These measures aim to reduce dehydration-related complications, optimize care during debarkation, and safeguard pilgrim health in high-risk environments. The findings highlight the urgency of interdisciplinary collaboration and systemic improvements to address dehydration risks effectively in large-scale religious gatherings.



Keywords Dehydration, Hajj pilgrims, intravenous rehydration, logistical challenges, oral rehydration therapy (ORS)

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1. Introduction

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Hajj, a religious obligation for physically and financially capable Muslims, poses significant health challenges due to extreme environmental conditions in Saudi Arabia, where temperatures often exceed 40°C. These conditions heighten the risk of severe dehydration, which can lead to organ dysfunction or death if untreated. Effective management during and after the pilgrimage—particularly at transit points like the Surabaya Debarkation Hajj Dormitory—is critical to safeguard pilgrims' health. Timely interventions, including early symptom detection and medical care, are essential to mitigate risks associated with dehydration, especially for vulnerable individuals returning to Indonesia¹.

Key risk factors for dehydration among Hajj pilgrims include advanced age, chronic diseases (e.g., diabetes, hypertension), inadequate awareness of hydration needs, and limited access to clean water and healthcare facilities. Upon arrival at the Surabaya Debarkation Hajj Dormitory, pilgrims undergo health screenings to identify high-risk cases. Management protocols emphasize oral or intravenous rehydration and continuous vital sign monitoring, supported by trained medical staff. These measures aim to address dehydration promptly, though logistical constraints and resource limitations often hinder optimal care delivery².

Challenges in managing dehydration extend beyond medical interventions, encompassing logistical bottlenecks, insufficient healthcare infrastructure, and pilgrims' lack of awareness about early dehydration signs. This study reviews the management flow and risk factors for severe dehydration at the Surabaya Debarkation Hajj Dormitory, highlighting the need for improved pre-departure education, enhanced medical training, and better resource allocation. The findings aim to refine healthcare services, reduce complications, and ensure safer transitions for pilgrims, ultimately strengthening systemic responses to dehydration in high-risk religious gatherings.

2. Case Description

Mr. S, a 98-year-old pilgrim from Jombang in group 63, was transported by ambulance to the Polyclinic at the Sukolilo Hajj Dormitory in Surabaya. Upon observation, the patient appeared weak. He had no prior complaints, but before departing for Indonesia, he was extremely happy, causing him to skip meals and fluids and get insufficient rest. The patient's companion stated that he was eager to reunite with his family in Indonesia, spending a lot of time preparing for his return and arranging gifts for his family.

Upon screening at the airport, the patient received immediate treatment and was directly taken to the polyclinic. His vital signs were as follows:

- Blood pressure (BP): 139/100 mmHg
- Heart rate (HR): 110 bpm, regular
- Respiratory rate (RR): 26 breaths per minute, irregular
- Temperature: 36°C
- Oxygen saturation: 93% on room air (RA)

The patient was then given nasal cannula (NC) oxygen at 4 LPM, which increased his oxygen saturation to 99%.

On physical examination, the patient exhibited dyspnea, cold extremities, and slow skin turgor, indicating dehydration.

Supportive diagnostic tests were conducted, including a rapid antigen swab (non-reactive) and PCR test (negative). The patient was given IV fluid therapy with 0.9% NaCl as a loading dose. However, there were challenges in inserting an IV line due to difficulty locating the patient's veins, as he was severely dehydrated. Consequently, the patient was encouraged to drink fluids first.

Once his condition improved, the patient was referred to Jombang Hospital at the request of his family, accompanied by the Jombang Health Department.

3. Results and Discussion

Dehydration is a common condition among Hajj pilgrims, especially in vulnerable groups such as the elderly. The long journey and extreme environmental conditions, such as the high temperatures in Mecca, can lead to significant fluid loss. The case of Mr. S, a 98-year-old pilgrim, illustrates how dehydration risk factors can contribute to serious health conditions after performing Hajj.

On July 9-10, 2024, Mr. S arrived at the Sukolilo Hajj Dormitory Polyclinic in Surabaya after a long journey from Mecca. During health monitoring, he was found to be weak. Although he had no prior complaints, history-taking revealed that he had skipped meals and fluids before departing for Indonesia due to his excitement about returning home. This emotional involvement, combined with his preoccupation with preparing gifts for his family, led to inadequate fluid intake.

Mr. S's case highlights several major risk factors for dehydration:

1. **Advanced Age**
Elderly individuals are more susceptible to dehydration due to physiological changes that affect their ability to maintain fluid balance. Additionally, the sense of thirst tends to diminish with age, increasing the risk of fluid deficiency.
2. **Inadequate Fluid Intake**
Mr. S's decision to skip meals and fluids for personal reasons contributed to dehydration. During Hajj, where physical activity is high and heat exposure significantly affects fluid needs, maintaining adequate hydration is crucial.
3. **Excessive Physical Activity**
The intense schedule and physical exertion during Hajj increase fluid requirements. In this case, Mr. S was highly engaged in preparing for his return, leading to inadequate rest and insufficient fluid intake.
4. **Environmental Conditions**

The high temperatures in Mecca and the extreme weather during Hajj can accelerate fluid loss. Pilgrims must be reminded of the importance of proper hydration, especially in such harsh conditions.

Upon examination at the Hajj Dormitory Polyclinic, Mr. S exhibited unstable vital signs:

- Blood pressure: 139/100 mmHg
- Heart rate: 110 bpm
- Respiratory rate: 26 breaths per minute

Symptoms such as dyspnea and slow skin turgor confirmed that Mr. S was experiencing moderate dehydration. Further assessments indicated that dehydration could impair vital organ function, increasing the risk of serious complications if not promptly treated.

After observation, Mr. S received the necessary medical interventions. Nasal cannula (NC) oxygen therapy helped improve his oxygen saturation from 93% to 99%, indicating a positive response to initial treatment. Intravenous fluid therapy (IVFD NaCl 0.9%) was administered, although difficulties were encountered in finding a suitable vein due to severe dehydration. This challenge underscores the importance of rapid medical intervention to manage critical conditions that could escalate if left untreated.

Once stabilized, Mr. S was referred to a hospital for further treatment at his family's request. This case highlights the importance of strict health monitoring for Hajj pilgrims, particularly for vulnerable groups. Education on adequate fluid intake and dehydration symptoms is crucial to prevent similar incidents in the future.

Medical personnel at Hajj locations and debarkation centers play a vital role in monitoring, managing, and educating pilgrims about dehydration. Key measures include:

- Early detection of dehydration signs
- Intravenous fluid administration when necessary
- Educating pilgrims on proper hydration and recognizing early symptoms of dehydration

Providing education ensures that pilgrims can identify early signs of dehydration and understand how to prevent it, particularly during the long and physically demanding pilgrimage. By improving awareness and prevention efforts, Hajj can be performed safely and healthily, reducing the risk of serious complications related to dehydration.

4. Conclusion

The Hajj pilgrims' debarkation process from Saudi Arabia to their home countries involves multiple stages, including health screenings at airports and Hajj dormitories, with special attention to high-risk individuals requiring further medical evaluation. Dehydration risks arise from factors such as advanced age, chronic diseases, physical exertion, extreme environments, and acute infections. Severe cases demand prompt interventions like intravenous isotonic fluid replacement to restore

electrolyte balance, while oral rehydration solutions (ORS) aid in recovery and prevention. Medical personnel play a critical role in early detection, treatment, and educating pilgrims on maintaining hydration, particularly in extreme conditions. To mitigate risks, recommendations include enhancing education on fluid intake for high-risk groups, training medical staff in rapid dehydration protocols, standardizing intravenous and ORS usage, and providing caregivers with guidance on early dehydration signs. These measures aim to reduce dehydration incidence, improve treatment efficacy, and safeguard the health of vulnerable pilgrims.

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