

Analysis of Fatigue and Dehydration Risk Factors Among Hajj Pilgrims During Long Distance Travel: A Study on Hajj Pilgrims in 2025

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ABSTRACT

Indonesian Hajj pilgrims face significant health risks due to fatigue and dehydration, particularly during the return phase (debarkation), which involves long distance travel, time zone changes, and extreme environmental conditions. This study aims to identify and explain the risk factors of fatigue and dehydration experienced by Hajj pilgrims during long distance travel, as well as their impact on pilgrims' health, especially among the elderly. The results show that major risk factors include advanced age, prolonged travel duration, inadequate fluid intake, dry airplane cabin environment, non-ergonomic seating, comorbid diseases, sleep disturbances, and psychological and physical stress during transportation. Fatigue and dehydration are interrelated health problems that significantly affect the physical condition of pilgrims. Therefore, structured promotive and preventive efforts such as pre-departure education, proper hydration and rest management during travel, and logistical preparedness during the return phase are essential to reduce health risks and improve the well being of Hajj pilgrims.

Key words: Debarkation, dehydration, fatigue, hajj pilgrims, long distance travel



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INTRODUCTION

Hajj is one of the pillars of Islam and is obligatory for Muslims who are physically, mentally, and financially capable (Noor et al., 2018). The pilgrimage consists of a series of rituals including ihram, tawaf, sa'i, wukuf at Arafah, mabit in Muzdalifah and Mina, The stoning of the Jamarat, and tahallul (Ananda et al., 2024). This act of worship requires not only spiritual readiness but also physical endurance, as millions of pilgrims from around the world, including Indonesia, that must travel long distances to and from Saudi Arabia (Farid et al., 2019).

The return phase is particularly demanding, involving long flights, transit periods, and time zone shifts that disrupt circadian rhythms (Suestiawati & Aminudin, 2022; Susetyo, 2025). The aircraft cabin environment, with its low humidity (10–20%), increases dehydration risk, especially since many pilgrims intentionally reduce water intake to avoid frequent restroom visits (Silverman et al., 2019; Rachiotis et al., 2015). The combination of fatigue and dehydration may exacerbate existing conditions, particularly among those with hypertension, diabetes mellitus, or chronic kidney disease (Alzahrani et al., 2012; Bustan et al., 2025).

According to the Indonesian Ministry of Health, most medical emergencies during the debarkation phase are related to fatigue, hypotension, hypoglycemia, and electrolyte disturbances linked to dehydration. If not promptly recognized and treated, these conditions may lead to severe complications such as loss of consciousness, coordination impairment, or acute kidney failure (Ramadhanti, 2020). Therefore, early detection and rapid intervention of fatigue and dehydration symptoms are crucial to prevent emergencies and strengthen Hajj health services during the return phase (Detaliani et al., 2024; Ananda et al., 2024).

MATERIALS AND METHODS

This case report is a report on the Risk Factors for Fatigue and Dehydration in Hajj Pilgrims During Long-Distance Travel which was carried out during the return of the Hajj pilgrims.

CASE REPORT

Mrs. B was a Hajj pilgrim from Sampang who returned to Indonesia as part of Flight Group 26 aboard Saudia Airlines flight SV 4334, traveling from King Abdulaziz International Airport to Juanda International Airport. The group consisted of 379 pilgrims, 177 men and 202 women with approximately 40% categorized as elderly (Kemenkes RI, 2023). Upon arrival at the airport, a screening was conducted to monitor whether any pilgrims required medical assistance. The health team included physicians, nurses, and officers from Balai Besar Kekarantinaan Kesehatan (BBKK) Surabaya, supported by medical interns from UIN Maulana Malik Ibrahim Malang, divided into several teams to monitor high risk pilgrims.

During the screening and debarkation process, pilgrims were initially crowded but remained manageable under supervision. Approximately 15 minutes after evacuation began, Mrs. B fainted while descending the aircraft stairs and collapsed on the runway. Fortunately, another pilgrim was able to support her fall, preventing significant injury. On site medical personnel immediately provided emergency care and transported the patient to an ambulance for further treatment.

Inside the ambulance, Mrs. B was administered Ringer Lactate infusion and oxygen via nasal cannula at 3 L/min, with continuous monitoring of oxygen saturation and blood pressure. She regained consciousness during the 20 minute transfer to the Hajj Dormitory Clinic for continued observation and supportive management.

Upon arrival at the clinic, intravenous fluids and oxygen therapy were maintained, and the patient's condition remained stable. Her family was informed about her clinical condition and educated on warning signs requiring immediate medical attention. After evaluation, Mrs. B was discharged to return home with Dinas Kesehatan Kabupaten Sampang ambulance, with advice to seek hospital care promptly if her condition worsened.

DISCUSSION

The case of Mrs B, an 85 year old female Hajj pilgrim, illustrates a common clinical condition during the debarkation phase, severe fatigue and dehydration leading to loss of consciousness. The patient had endured a long journey with inadequate food and fluid intake, combined with crowding and long queues that caused physical and mental stress. Symptoms such as dizziness, nausea, weakness, and fainting indicated volume depletion and orthostatic intolerance, exacerbated by underlying hypertension (Alamri et al., 2025; Yezli & Khan, 2020). Her volume depletion was due to decreased intravascular fluid volume caused by inadequate intake and insensible losses through perspiration and activity. Reduced plasma volume led to decreased cardiac preload and output, diminishing cerebral perfusion and precipitating syncope (Hooper et al., 2015; Khan et al., 2021).

This reduction in perfusion directly contributed to orthostatic intolerance, the body's inability to maintain blood pressure upon postural change. In Mrs B, prolonged standing while queuing to disembark caused venous blood pooling in the legs. Age related weakening of baroreceptor-mediated vasoconstriction, compounded by fluid deficit, further reduced venous return and cardiac output, triggering hypotension and transient cerebral hypoperfusion (Freeman et al., 2011; Ricci et al., 2015).

Advancing age significantly impairs the body's ability to regulate fluid balance. Older adults exhibit reduced hypothalamic osmoreceptor sensitivity, so thirst is triggered only under more severe dehydration. Additionally, the antidiuretic hormone (ADH) response and renal concentrating ability decline due to nephron loss and reduced glomerular filtration rate (Begum & Johnson, 2016; Weinberg & Minaker, 2020).

Elderly individuals also possess diminished homeostatic reserves. Baroreceptor responses to blood pressure changes are blunted, limiting adaptive cardiovascular adjustments during stress or positional change. This predisposes them to orthostatic hypotension and inadequate cerebral perfusion during fluid depletion (Freeman et al., 2011; Ricci et al., 2015). Environmental and travel related stress further aggravated the condition. Hot weather increased sweat related fluid loss, while anxiety, fatigue, and crowding elevated catecholamine release and metabolic demand. Prolonged sitting in cramped aircraft seats promoted venous pooling and reduced calf-muscle pump activity, hindering venous return (Alamri et al., 2025; Yezli & Khan, 2020).

In elderly hypertensive patients, sympathetic and renin, angiotensin, aldosterone system activation leads to systemic vasoconstriction and relative hypertension despite plasma volume loss. This "dehydration-induced hypertension" increases cardiac workload. The patient's improvement following intravenous rehydration and oxygen therapy underscores the importance of early fluid correction and stabilization to prevent organ hypoperfusion and recurrent syncope (Khan et al., 2021; Weinberg & Minaker, 2020).

CONCLUSION

The conclusion of this study indicates that fatigue and dehydration are the two most common health problems experienced by Hajj pilgrims, particularly during the return or

debarkation phase. Factors such as advanced age, long travel duration, inadequate fluid and food intake, dry cabin conditions, and comorbidities such as hypertension play a significant role in increasing the risk of these health issues. The case of Mrs. B demonstrates that such conditions can lead to decreased consciousness and fainting if not promptly and properly managed. Early interventions, including fluid rehydration and oxygen therapy, proved effective in stabilizing the patient's condition without the need for hospital referral. Therefore, serious attention to the health management of Hajj pilgrims during the return phase is essential, including education, monitoring, and readiness of healthcare systems to respond to acute disturbances caused by fatigue and dehydration.

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