

The Role of Nursing in Alleviating Heat Stress During the Hajj Seasonings

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Abstracts

Although classical heat exposure and heat stroke are the oldest known human diseases, their early treatment, natural history and complications are poorly defined. Heat stroke and heatstroke are life-threatening conditions caused by rapid increases in body temperature above 40°C and neurological changes such as delirium, seizures or coma. Heat-related illnesses such as heat stroke and heat exhaustion are one of the problems of Hajj. The Saudi Ministry of Health has established the HRI management system to ensure the safety of all travelers. This present study evaluates the scenario on the basis of secondary data, the sources of data were the previous studies conducted at different times.

Keywords: nursing, role of nursing, heat stress, Hajj.

1. Introduction

Exposure to extreme heat in particular is a natural hazard that can affect the human health and is significantly linked to the occurrence of heat illnesses. These illnesses comprise a wide range of conditions that include mild and life-threatening manifestations such as heat cramps, heat exhaustion and heatstroke. Many individual and environmental risk factors are reported to play a major role in the frequency and intensity of these illnesses. Age, comorbidities, urbanization, lack of adaptive cooling measures, relative humidity and duration of exposure to heat are some of the known risk factors. Extreme ambient temperature results in excess morbidity and mortality directly through causing new illnesses or exacerbating the pre-existing chronic diseases such as cardiovascular and respiratory diseases. Trushna et al (2022) The vulnerable populations also include elderly, children, women and those with low socioeconomic status. Moreover, patients on certain medications such as antihistamines and antidepressants are more affected by ambient

heat due to the medication's effect on the physiologic thermoregulation. Thus, public health interventions should consider implementing risk mitigation measures and target the susceptible population in particular. Beechinor et al (2022)

The Holy City of Makkah is a host of two annual Islamic rituals namely Hajj and Umrah. It is located at the western part of the Kingdom of Saudi Arabia and is characterized by a desert climate with extreme heat during daytime (despite the season) and scanty annual rainfalls. Heatstroke and heat exhaustion are leading causes of mortality and morbidity when the pilgrimage to Makkah enters in the hot cycle of the year. For example, in 2018, among the 976,000 pilgrims, 2,718 were victim of heatstroke and 15,560 suffered from heat exhaustion (251 and 1826 per 100,000, respectively). Although heat exhaustion is a mild to moderate form of heat illness due to water and/or salt depletion, its signs and symptoms require management in EMS (Emergency Medical Services), thus resulting in major strain on the medical health system. Leal Filho et al (2022)

It is not easy to work in an environment that contains a large number of patients of different ethnicities, cultures, and languages. In this situation, nurses require correct and rapid nursing interventions to save patients' lives, and this is considered to be a difficult work environment. For example, Makkah and Madinah hospitals receive thousands of patients in every Hajj season in certain places. Hajj is the fifth pillar of Islam and it is obligatory for every capable adult Muslim once in their lifetime. Therefore, the Ministry of Health in the Kingdom of Saudi Arabia is keen to organize the nomination of workers in Hajj healthcare sectors. However, every year, many registered nurses request to participate in the Hajj. Patz et al (2005) Therefore, it is important to explore the reasons for nurses claiming annually to work as staff nurse during the Hajj season. Therefore, the purpose of this study is to explore the motivations that led the Saudi nurses to participate in Hajj, as well as, to explore the Saudi nurses' challenges of working as nurses in Hajj. Consequently, this study could become beneficial to health managers in the future of nursing in Hajj. Heidari et al (2020) There are three ways for nurses to work during the Hajj season. The first one is nurses who are already working in the two holy cities, Makkah and Madinah, who often want to work in Hajj and they have the priority to apply. The second way is nurses from outside those two cities and they can apply to participate in working as a nurse in Hajj; all requests are sent to the Ministry of Health, after which the required number are nominated, and the candidates are informed of their nomination to participate in Hajj. The third category, which is the newest way for nurses to participate in Hajj, is by applying for a locum job in nursing during Hajj. This category has a system that differs from the rest, as nurses sign a temporary contract with a fixed salary and work in intensive care units or emergency departments units in hospitals, as needed.

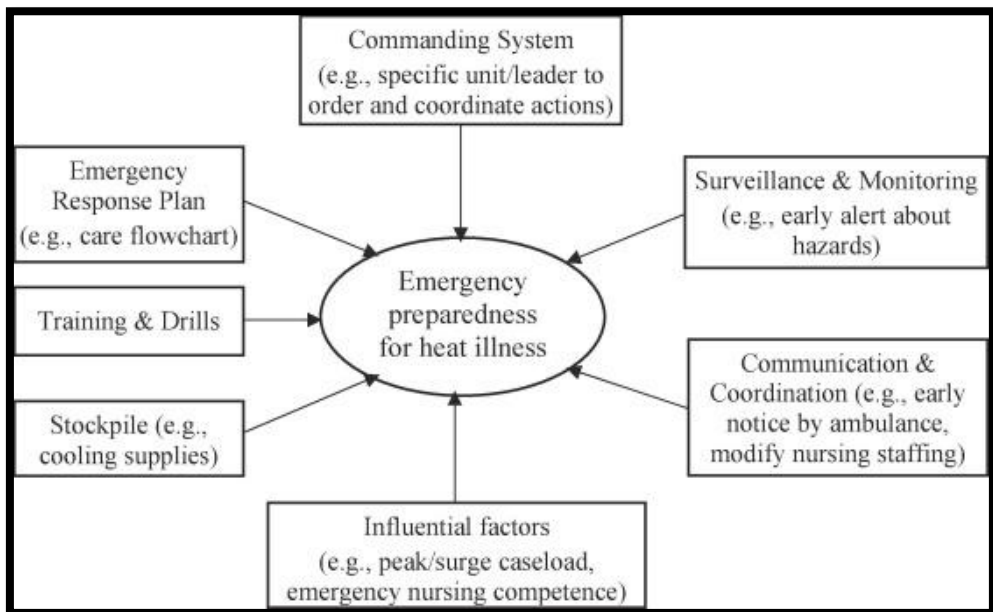


Source: [Dickie et al 2024](#)

Figure 1: Heat Stress During the Hajj

Every year, more than 9 million pilgrims perform the rituals during the Hajj, which is considered a peaceful mass gathering of pilgrims. People from 200 countries gather in Mecca, Saudi Arabia. The Hajj pilgrimage involves “arduous prayers, supplications, and rituals performed for spiritual upliftment”. Li et al (2020) Age, urbanization, obesity, comorbidities, lack of acclimatization measures, duration of exposure to heat, and relative humidity are individual and environmental risk factors that may increase the frequency and intensity of heat exposure. Heat-exposed patients can present with a variety of clinical symptoms, such as fatigue, vomiting, syncope, hyperthermia, neurological disorders, circulatory collapse, and multi-organ failure. The diagnosis of heat exposure is usually based on a history of heat exposure, clinical symptoms, and signs of dehydration. Lipman et al (2019) In Saudi Arabia’s desert climate, heat exposure and heat-related illness are endemic during the Hajj pilgrimage to Mecca. Due to the strict rituals, pilgrims have clear geographical boundaries outside the desert city, wear similar clothing, eat similar foods, and move together. As a result, pilgrims receive a considerable dose of heat and experience almost experimental conditions of severe heat stress. Furthermore, during the Hajj,

all conditions are in place for early detection of heat stress and heat-related illness. This includes that most pilgrims are aware of the risk of heat stress and heat-related illness and know how to recognize their early warning signs and symptoms. Gauer et al (2019) In addition, there are public health protocols for detection and immediate cooling treatment in field hospitals within walking distance to minimize heat-related organ damage and maximize the chance of survival Mecca is located in the western part of the Kingdom of Saudi Arabia (KSA) and is characterized by a desert climate with extremely hot daytime temperatures. As the Hajj season enters the hottest part of the year, heat exposure and heat-related illness are the most common causes of morbidity and mortality. The Saudi Arabian government attaches great importance to providing adequate and free health services to pilgrims during their stay at the Hajj sites (Mekkah Al-Mukarramah, Mina, Muzdalifah, and Arafat). These services are primarily provided and coordinated by the Ministry of Health (MOH). One of the major breakthroughs in heat stroke treatment was the introduction of the Makkah Al- Mukarramah Body Cooling Unit (MMBCU). The MMBCU, which was put into use during the Hajj in 1979, is a specially designed bed that provides rapid cooling and protection of vital organs for heat stroke victims. In recent years, the MMBCU has become the device of choice, and specially designed heat stroke centres have been established at pilgrimage sites. In addition, 64 MMBCUs have been installed in three hospitals in and around Hajj. Hondula et al (2021)



Source: Lijuan et al (2021)

Figure 2: Preparedness for Heat Illness

2. Some previous Studies:

Higgins et al. (2022) reported that excessive loss of water, salt, or both may increase the risk of heat stroke. A previous study reported that oral hydration on site is an important step in the patient's treatment process. However, the lowest compliance scores were observed when oral fluid administration was initiated and the patient was in the supine position with the hips and legs elevated. There may be several reasons for these low compliance scores: Lack of adequate knowledge among caregivers about the importance of adequate hydration during heat exposure and heat-related illness episodes may be an important reason for poor compliance. Environmental factors, including the presence of other critically ill patients who require more attention. Another study by James et al. (2020); Sadeghi et al (2021) reported that the elderly are generally at higher risk. Most of them belonged to the older age group in their country of origin. Increased mortality due to heat exposure and heat-related illnesses has been reported during the Hajj, and these deaths may be caused by heat. Excessive hot weather may also increase mortality from heat illnesses. Saudi Arabia has an excess number of deaths due to heat exposure and heat-related illnesses during heatwave years. In another study, Alqahtani et al. (2019); Almuzaini et al (2022) reported that diarrhea and food poisoning (traveler's diarrhea) were common during the Hajj, especially among the elderly, although few studies have documented their frequency and causes. A recent study in 2020 showed that heat exposure and heat illness were the third most common cause of hospitalization during the Hajj, including among the elderly. Cholera, heat exposure, and heat illness (an acute bacterial enteric disease caused by *Vibrio cholerae*) have been the cause of several outbreaks after the Hajj. Heat exposure and heat-related illness are frequently reported during the Hajj, resulting in significant morbidity and mortality among pilgrims. Another study found that an important factor that increases the risk of heat stroke among pilgrims is the high prevalence of chronic disabling diseases. Arafat (2022); Khadijah et al (2022) Of particular note here is diabetes. 70% of patients had abnormally high blood sugar levels, while only 30% of those with hyperglycemia had sugar in their urine. Most had no history of diabetes. Diabetic patients responded least well to cooling, and all deaths occurred in these patients. The link between heat stress and hyperglycemia requires further study. Jamil et al (2022) While the primary treatment for heat exposure and heat-related illness is simple and consists primarily of adequate cooling and hydration, inadequate treatment of heat exposure and heat-related illness can result in devastating consequences such as heat exposure and heat-related illness, multi-organ failure, and death. In the case of heat exposure and heat-related illness, the first step in treating the patient is to move the patient to a cool environment, such as the shade or an air-conditioned car, while lightening the patient's clothing. Quandt et al. (2020); Hassan et al (2022) reported that for most patients, moving the patient to a cooler location was the only treatment step for which medical staff compliance was above average, as it was the simplest and quickest step. Compliance with whitening clothing was average, as the type of clothing worn by male pilgrims (ordained men) is two loose-fitting garments worn during the ceremony. On the other hand, previous studies have highlighted the importance of initiating external cooling at the scene and continuing cooling during transport to the medical facility. Continuous cooling significantly improves the treatment of heat exposure and heat-related illness in the pre hospital setting. Other studies have shown average compliance throughout the prehospital cooling process. Compliance with both immediate and sustained cooling was below average; however,

healthcare professionals adhered to the immediate transfer and cooling methods. These differences in pre hospital cooling compliance may reflect the need for more healthcare education on the importance of cooling. Factors such as distance from heat exposure and heat-related illness units, availability of transportation, access to cooling equipment, and crowded environments may affect proper adherence to cooling procedures. Litwiller et al (2022); Higgins (2022)

3. Discussion:

Heat and heat-related illnesses during Hajj have been reported to cause serious illness and death among pilgrims. Appropriate healthcare and pre-hospital and in-hospital management are the cornerstones of achieving good outcomes for patients with burns and burn injuries. Lipman et al (2019); Dow et al (2019) The Saudi Ministry of Health has developed guidelines for care to inform travelers visiting hospitals and critical healthcare facilities about the risks of heat exposure and heat-related illness. Health center during Hajj. However, it is difficult for healthcare professionals to follow instructions, especially during large events such as the Hajj celebration. Healthcare professionals should act on this information and make the necessary changes to improve the quality of healthcare and protect travelers. The aim of this study was to investigate nursing staff awareness of the dangers of heat and its impact on the occurrence of heat-related illnesses among travelers. See the health center in Mecca, Saudi Arabia. On the other hand, in terms of knowledge about heat exposure and heat stroke, excessive dehydration, salt, or both have been shown to increase the risk of stroke. James et al (2018) A previous study reported that oral irrigation was an important step in the patient's treatment. The results were similar to our study. Adherence scores were lowest in patients who were started on oral fluid therapy and had their hips and legs in a supine position. There may be several reasons for the low adherence scores: Lack of awareness among caregivers about the importance of adequate water use during hot and cold seasons may be the first important reason for poor performance. Alqahtani et al (2017); Abdelmoety et al (2018) Environmental factors such as the presence of other critically ill patients who require more care, cultural differences, and the presence of more than one language may make it difficult for caregivers to obtain all the information. Other patient special circumstances include the fact that most patients' conditions stabilize or improve after the first step of treatment. These circumstances may also lead to noncompliance with the acute conditions of emergency management, including referral of patients to medical facilities and evaluation of other diagnostic tests if their condition is unwell. We also noted that data on compliance with intravenous fluids in patients with nausea are lacking. In contrast, other studies have shown higher compliance rates for heat exposure and heat-related illness in prehospital and inpatient care. Esmaeilzadeh et al (2022); Hanna et al (2015) Increased awareness among physicians of the serious risks and complications of burnout may account for the difference in compliance. Average adherence to prehospital decision-making reflects caregivers' adequate planning and knowledge of the relevant medical history of burn and acute burn patients. One of the benefits of this study is the high level of awareness and adherence in identifying heat exposure and heat stress situations. Before initiating cooling therapy, all physicians should do everything possible to stabilize the patient's breathing, respiratory rate, and circulation (ABC). In assessing

healthcare personnel's adherence to the ABC guidelines, nursing staff agreed to follow the guidelines with most of the appropriate challenges being met. Staff agreed to adhere to a safety protocol and maintain oxygen saturation above 40°C even after admission. This high level of compliance may be due to adequate training and preparation of healthcare personnel for emergencies involving heat exposure and heat stress. Quandt et al (2020)

4. Conclusion:

Although Saudi Arabian government officials are conducting research and forming groups to prevent health problems during Hajj, the mortality rate from heat exposure is high, and the majority of patients suffer from heat and heat injuries. The plan calls for more information on how to educate travelers to prevent violence before they arrive in Saudi Arabia. It is also hoped that the upcoming Hajj season will be better and safer with better service at Hajj centers and timely first aid.

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