



# Preventable Trauma During Arba'een Procession

Shaban Mehrvarz<sup>1</sup>, Fathollah Ahmadpour<sup>1</sup>, Seyed Morteza Kamali<sup>2</sup>, Hamid Reza Rasouli<sup>1\*</sup>

<sup>1</sup> Trauma Research Center, Clinical Sciences Institute, Baqiyatallah University of Medical Sciences, Tehran, Iran.

<sup>2</sup> Student Research Committee, Qazvin University of Medical Sciences, Gazvin, Iran.

\***Corresponding Author:** Hamid Reza Rasouli, Trauma Research Center, Clinical Sciences Institute, Baqiyatallah University of Medical Sciences, Tehran, Iran, Tel: +9887559728, E-mail: hr.rasouli64@gmail.com.

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## Abstract

**Introduction:** The annual Arba'een pilgrimage is the world's largest Religious ceremony. This gathering is performed during the 20th day of "Safar" the second month of the lunar calendar. More than 20 million Pilgrims from Iraq, Iran, and other countries participate in the holy city of Karbala. Most pilgrims walk about 80 kilometers to arrive there by procession in scorching weather, and because of this bad climate, they face some physical harm and injuries. The study aims to assess the types of common injuries during this condition among the Arba'een pilgrimages. Additionally, we will give some preventive health advice for the pilgrims to reduce its prevalence.

**Methods:** In this cross-sectional study, all trauma patients were referred to one of the medical units based between Najaf and Karbala, affiliated with Baqiyatallah University of Medical Sciences, during the Arba'een pilgrimage ceremony from August 29th to September 6th, 2023. Demographic information, causes, and types of trauma were recorded. The data in the questionnaire was categorized and analyzed using SPSS-26 software.

**Results:** The study included 209 patients; 122 (58.1%) were male, and 87 (41.9%) were female. The average age of all participants was  $38.63 \pm 17.92$  years (range: 2–73 years). Patients were categorized into two groups: preventable traumatic injuries, 119 patients (56.6%), and traumatic injuries caused by various incidents, 91 patients (43.4%).

**Conclusion:** The present study showed that more than fifty percent of the injuries among the patients, including foot blisters, groin sweat rash, heat stroke, and ingrown toenails, are preventable. Training and following guidelines can prevent or reduce the incidence of these injuries in long walking.

**Keywords:** Heat Stroke, Foot Blister, Sweat Burn, Arba'een Procession.

## Introduction

The annual Arba'een pilgrimage is the world's largest Religious ceremony. Arba'een gathering is performed during the 20th day of "Safar," the second month of the lunar calendar. More than 20 million pilgrimages from Iraq, Iran, and other countries participate in the holy city of Karbala, most pilgrims walk about 80 kilometers to arrive there by walking in scorching weather, and because of this bad climate, they are facing some physical injuries<sup>1</sup>. Due to the overcrowding of participants worldwide in large ceremonies, it can be a potential location for health issues and various injuries<sup>2-7</sup>. The requirement for medical services in mass gatherings depends on the type of event, duration, attendance, weather, and

density. Mass gatherings can challenge health authorities and produce a significant burden for potential mass casualties and disease outbreaks<sup>8</sup>. In addition to the risk of various infectious diseases, participants in mass gatherings are at increased risk of injuries ranging from mild muscle cramps to severe injuries and the worsening of non-communicable diseases. Mass gatherings occur for many reasons, including religious activities, festivals, sporting events, and political rallies. The most common annual religious gatherings in the Middle East are Hajj in Mecca in Saudi Arabia and Arba'een in Iraq<sup>9-10</sup>.

In general, to reduce the prevalence of problems caused by trauma, individual training for pilgrims

before traveling in the country of origin is essential, and it is necessary to provide suitable infrastructure and treatment for injured people <sup>11</sup>.

The evidence regarding participants' health during the Arba'een pilgrimage is rare. In mass gatherings, there is always the risk of unexpected incidents. The traumas caused by overcrowding are one of the potential risks for the participants in Arba'een, and they caused casualties in religious ceremonies <sup>12-14</sup>.

Considering the long distance of the pilgrimage in the Arba'een, which usually causes pilgrims to carry significant bags in the hot weather, there is a high possibility of causing various physical injuries and heatstroke. The study aims to assess the types of common injuries during this condition among the Arba'een pilgrimages. Additionally, we will give some preventive health advice for the pilgrims to reduce its prevalence.

### Methods

This cross-sectional study was conducted to obtain information about the injuries inflicted on pilgrims during the Arba'een pilgrimage ceremony. This study included all trauma patients referred to a medical unit related to Baqiyatallah University of Medical Sciences from the 29th of August to the 6th of September of 2023. In the first stage, a questionnaire was designed to record the trauma information of Arba'een pilgrims. Then, a research colleague in the relevant medical center recorded the injured person's information, causes, and the type of injury in the prepared questionnaire. The identification information of the patients was not recorded.

#### Statistical analysis

The data was analyzed using SPSS-26 software. Chi-square and independent t-tests were used to assess the relationship between the type of trauma and demographic variables. The significance level of tests was considered to be 0.05.

### Results

The study included 209 patients; 122 (58.1%) were male, and 87 (41.9%) were female.

The average age of patients was 38.63±17.92 (range 2–73) years, indicating a wide range of ages, from children to aging adults, in the Arba'een pilgrimage

ceremony. The average age in men was 36.49±17.83 (range 3-70) years, and in women was 41.57±17.73 (range 2-73) years (P = 0.023). The mean age of women was significantly higher than men, a finding that may surprise some (Table 1).

Table 1: Distribution of demographic information in patients.

Items		N=209
	Male	122 (58.1%)
	Female	87 (41.9%)
<b>age</b>	17.83±36.49(2-73)	
<b>Heart disease</b>	3.3%	
<b>Diabetics</b>	10.0%	
<b>Hypertensin</b>	0.9%	

Foot blisters were observed in 51 (24.4%) cases, and groin sweat rash occurred in 41 (19.6%) cases, which included most of the injuries in all patients. The ingrown toenail rate was significantly higher in men than women (P<0.05).

The average age of patients with head and face trauma was lower than others, and 90% of them were men (P = 0.008). Knee pain was reported in only 37.5% of men, significantly less than women (P = 0.001). Upper limb trauma and maxillofacial trauma were reported significantly more in men than in women (P<0.05) (Table 2).

Table 2 :Distribution of traumatic injuries in patients.

	Items	N (%)	Mean±SD (Min-Max)	% of male
Preventable traumatic injuries (person-centered)	Foot blister	51 (24.4%)	42.74±18.94 (8-70)	49%
	Groin sweat rash (intertrigo)	41 (19.6%)	36.46±14.77 (9-64)	61%
	Heat strock	18 (8.6%)	39.50±17.91 (10-73)	50%
	Ingrown toenail	8 (3.8%)	30.75±18.52 (5-55)	75%*
Distribution of traumatic injuries caused by different accidents	soles of the feet	18 (8.6%)	43.70±16.79 (6-65)	49%
	Upper limb trauma	18 (8.6%)	40.13±18.86 (6-72)	80%
	Lower limb trauma	15 (7.1%)	41.50±16.73 (13-70)	66.7%
	Burning organs with boiling water	14 (6.7%)	29.92±21.28 (2-62)	57.1%
	Maxillofacial trauma	10 (4.8%)	19.20±11.96** (3-40)	90%
	ankle sprain	8 (3.8%)	35.25±16.14 (3-58)	50%
	Kneel pain	8 (3.8%)	49.57±14.28 (27-70)	37.5%
	<b>Total</b>	209 (100%)	38.63±17.92 (2-73)	58.1%
*P-value<0.05				
** P-value<0.01				

## Discussion

The results of this study showed that most of the injuries during the included the following items:

1. Unsuitable shoes and insufficient foot care can cause foot blisters and ingrown toenails during long standing walking, and it can be prevented by wearing suitable shoes and following some additional cares.

2: Groin sweat rash is also an irritating health issue, and it happens more often in obese cases. Considerations health recommendations can prevent this issue.

3: Heatstroke is frequent because the Arba'een pilgrimage ceremony coincides with the summer season; overcrowding can increase the risk of heatstroke this ceremony. During the Hajj, a similar situation caused heatstroke and stampede in pilgrims<sup>3</sup>. Besides individual care and preparing treatment facilities such as cold tunnels and suitable places to rest, there should be sufficient training in the current situation. Therefore, training people and health guidelines that include health-related dimensions from the beginning of the pilgrimage to the end is essential to prevent these injuries.

Lami et al. (2019) reported that joint pain related to prolonged walking was the most common injury at the Arba'een ceremony in Iraq in 2015. Traveling to Karbala for the Arba'een ceremony requires several days of walking and causes pain and musculoskeletal

injuries<sup>12</sup>. The study by Hantoosh et al. (2019) aimed to estimate the diseases of pilgrims passing through the provinces of Thaqar, Mushani, and Diwaniyah on the way to Karbala for the Arba'een ceremony. They reported that musculoskeletal disorders were the most frequent. Also, they reported that vigorous physical activity during mass gatherings, such as long-distance walking, can exacerbate cardiovascular disease and can cause death<sup>13</sup>. A study investigated the description of temporary health centers set up by the local community to provide health care services to the Arba'een pilgrimage in Karbala, Iraq. They showed that about 97% of health centers provided services for musculoskeletal disorders, and only 16.7% provided services for other injuries. The drugs available in the clinic were painkillers, drugs for gastrointestinal and respiratory diseases, and antibiotics, with an availability range of 13.3% to 100.0%<sup>14</sup>.

A study among Iranian Hajj pilgrims hospitalized for two consecutive years showed that one-third of surgical hospitalizations were for traumatic injuries, and 56% of these were leg injuries<sup>15</sup>. A study reported that heatstroke, dehydration, and bruises were the most common causes of patient admission<sup>3</sup>, which shows the importance of the temperature conditions of pilgrimage. As a result, cooling equipment and sanitary water supply should be considered in advance<sup>16</sup>. Some believe that physical and engineering infrastructure is

one of the most essential preventive measures to reduce these cases<sup>17</sup>. Glaser et al. state the importance of rapid cooling in overcrowding events and suggest that rapid cooling is essential in reducing mortality<sup>16</sup>. Another factor is that religious ceremonies are usually very physically demanding for pilgrims, and pilgrims must travel long distances, which may exceed their usual physical activity levels<sup>12</sup>. The study showed a relationship between occupations or activities with high physical demands and musculoskeletal pain in different populations. Examined much physical activity and reported an increased risk of skeletal pain, especially in the lower limbs<sup>18</sup>.

The high prevalence of musculoskeletal pain is consistent with the findings of previous studies<sup>12-15</sup>. Moreover, it shows that musculoskeletal pain is more prevalent among pilgrims than the general population. In the present study, knee pain in women was significantly higher than in men. Also, some studies showed that gender and age are risk factors for musculoskeletal pain. These studies reported a higher prevalence of musculoskeletal pain in women than men and in older people than young people<sup>19</sup>. In these ceremonies, held on various occasions and sometimes lasting for many days, people of different ages, including children, young people, middle-aged adults, and older adults, are exposed to various injuries from certain aspects. In the current study, the average age was 38.63 (range: 2-73) years, which indicates that a wide range of ages, from children to older adults, participate in the Arba'een ceremony, unlike other religious gatherings where most of the elderly people participate<sup>3</sup>. In a study on Hajj, high age was reported as one of the influential factors in the high prevalence of traumas in religious gatherings. Most of the studies showed that the injured patients in the Arba'een pilgrimage ceremony were mostly young, which is consistent with the evidence of trauma injuries in young people<sup>20</sup>.

Consideration of health principles and controlling harmful environmental factors can prevent injuries. Moreover, it is necessary to identify, predict, and deal with these factors and take individual and collective health measures. Safety and comfort in religious and non-religious mass gatherings cannot be achieved only by providing medical services. Based on the results of the current study and similar studies, the formulation and implementation of the educational programs of

different branches help to improve the health and comfort of pilgrims. Various studies have considered the existence of comprehensive guidelines that include all dimensions related to health from before the trip to the end and after that as one of the essential pillars of health to increase collective and individual health. However, these programs can have benefits for the design of the protocol for the Arba'een ceremony, but considering the political, economic, and social conditions of Iraq, as well as the incomparable number of participants in a short time and the rituals of pilgrimage in Arba'een, the use of similar protocols for Arba'een ceremony is inappropriate. Moreover, the design of guidelines requires conducting studies and considering all the dimensions of the existing infrastructure in the countries involved in this ceremony<sup>11</sup>.

## Conclusion

Extensive research with more details can lead to the design of guidelines for the Arba'een pilgrimage ceremony. Establishing strict order and arrangements to design and implement effective healthcare programs during the pilgrimage is imperative. Offering relevant training courses prior to the journey for pilgrims can reduce the incidence of injuries in prolonged walking. The following recommendations are suggested to minimize the occurrence of three common preventable injuries in this study.

### Prevention of heatstroke

1. Avoid long and fast walks in hot weather and under the sun.
- 2: Try to rest in hot weather around noon and afternoon.
3. Drink enough cool liquids during the journey.
- 4: It is better to wear lighter, relatively loose, and white clothes.

### Prevention of Groin sweat rash

1. Wear underwear of the right size with soft material.
2. The material and texture of the pants should not be thick and rough and should not be tight so that air can flow under the clothes.
- 3: Washing the area and changing underwear daily can help.
- 4: It is recommended to use sanitary powders, especially for susceptible people.

### Prevention of foot blisters and ingrown toenails

- 1- Do not wear tight and new shoes.
- 2- The material of the shoes should have proper ventilation and soft soles.
- 3- For susceptible people, using shoes with open toes is better.
- 4- The socks should not be thin and have a soft (towel) material.
- 5- Wash feet and change socks daily.

### Limitations

It is important to note that this is a cross-sectional study about the injuries caused during the Arba'een ceremony, and the study sample is among the people who referred to the medical center for "health problems caused by the pilgrimage." It does not include traumas caused by road accidents, accidents caused by crowding, terrorist incidents, etc. Injuries in such incidents are usually more severe and vital. According to the official reports, the health authorities of Iraq, in cooperation with our country's medical organizations, provide the necessary arrangements to deal with the incidents and provide treatment for injured cases.

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### Conflict of Interest Disclosures

We confirmed that there is no conflict of interest.

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None.

### Authors' Contributions

Concepts, data gathering, data analysis, writing and editing: Shaban Mehrvarz, Fathollah Ahmadpour, Seyed Morteza Kamali, Hamid Reza Rasouli

### Ethical Statement

The Baqiyatallah University of Medical Sciences Ethics Committee confirmed the study's proposal with the code IR.BMSU.BAQ.REC.1401.044.

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