



Examining the Challenges of the Healthcare System and its Solutions in Providing Services to the Walking Pilgrims Referring to Ehsan Field Hospital on Arbaeen Walking of 2022

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Abstract

Background: The Arbaeen foot-pilgrimage in the Holy City of Karbala is one of the world's most significant religious events, attracting millions of pilgrims yearly. Health and hygienic issues in this gathering have always been a cause of concern for the communities involved.

Objectives: The study aimed to examine the challenges Ehsan Field Hospital faced in the Arbaeen of 2022 and its approach to providing services to referring pilgrims.

Methods: The present study was a cross-sectional study with a 10-day interval conducted on 19,800 patients referred to Ehsan Field Hospital between the 9th and 19th of September, 2022. The research tool was a two-part checklist; the first part included the patients' demographic information, and the second part included information about the disease (e.g., laboratory information, the disease symptoms, and the disease diagnosis). The SPSS software (version 26) was used for data analysis. Moreover, a brief qualitative investigation based on the experiences of the personnel working on-site was conducted to assess the challenges and their solutions in this foot-pilgrimage. Results: A total of 13,860 (70%) patients were male, 5,940 (30%) were female, and the majority of them were between the ages of 25-55 (63.8%). Most hospitalizations (58.5%) were related to problems caused by gastroenteritis.

Conclusion: Considering the importance of people's health and hygiene in gatherings similar to Arbaeen, the necessity of building and operating field hospitals and mobile treatment camps for serving people is crucial, starting a few days before and continuing after the gathering. Furthermore, universities of medical sciences can provide a platform to facilitate and carry out valid research projects and studies to clarify the health and treatment problems dealt with during the Arbaeen foot-pilgrimage. Furthermore, they can provide practical and efficient solutions to improve the level of health and hygiene.

Keywords: Arbaeen foot-pilgrimage, Arbaeen walk, Field hospital, Health policy, Infection disease, Public health, Travel medicine, Wing hospital

1. Background

Arbaeen walking ceremony, with over 20 million participants, is considered the largest peaceful human gathering in the contemporary world. This ceremony with the gathering of millions of people and its persistence and annual repetition can be considered one of the most important social phenomena in contemporary times. Arbaeen walk is one of the unique events in the world, which has many political, cultural, and social dimensions and can be considered a religious symbol of Shias (1). The unity of the Islamic Ummah is the most important political message of the Arbaeen walk. One of the

cultural messages of Arbaeen is the strengthening of the thought and the love of Imams, a deep connection with Imam Hosseini's statements, and the strengthening and promotion of the culture of sacrifice. We can also count the solidarity of Muslims and the manifestation of social capital among the social consequences of Arbaeen.

Regardless of the spiritual beauty of the Arbaeen walk and its lasting pictures and inspirational frames, the issue of the physical and mental health of the people who set foot on this path is essential. The contents published in news agencies, virtual space, radio, and television, and the interviews of the people who participated in the Arbaeen walk all indicate the

improvement of the spiritual level of the people. This spiritual improvement certainly positively affects mental health (3).

Despite numerous political, cultural, and social advantages, national and international events with prominent public gatherings such as Arbaeen bring with them health and medical challenges such as the spread of infectious diseases and the transmission of infectious diseases. Therefore, there is a need for health-related considerations and services during these events. The spread of infectious diseases and the health needs of participants in these events are among the challenges of large gatherings, which puts a health burden on the host country. Public health systems are under severe pressure during gatherings, even in areas with diverse health capacities and adequate resources (4).

To manage the population and also to deal with the outbreak of infectious diseases such as Ebola, AIDS, H₁N₁, H₁N₂, various types of influenza, acute respiratory syndrome (SARS), and Middle East respiratory syndrome (MERS), all available resources must be put to use, especially tools and technologies in dealing with the population (5). One of the many consequences of overcrowding is the occurrence of emergencies and disasters and possible damage to people's health and lives. The most critical need of people during accidents and disasters has always been the possibility of proper access to health services. If the distribution of trauma care facilities in collective communities is equal, complications caused by accidents can be reduced (6).

Considering the importance of people's health and hygiene in gatherings similar to Arbaeen, the necessity of building and operating field hospitals and mobile treatment camps for serving people is evident, starting a few days before and continuing after the gathering (7). These hospitals and treatment camps aim to provide health facilities and respond to possible crises, coordinate and manage health system services, and continue medical services through triage, rapid diagnosis, and treatment, and prevent human disasters (5,6). Using these hospitals and treatment camps will reduce the expected length of stay in acute care hospitals and increase the ability to manage unstable and critical patients (7).

Furthermore, in preparing and operating these places, the plan's efficiency should be checked by conducting continuous exercises and preparing understandable job descriptions and simple instructions for the relief and medical personnel, reducing their confusion and making the necessary preparations to deal with the main events. As a result, knowledge of how to set up the necessary facilities and equipment and how to refer to patients and their medical needs are necessities that must be considered (8).

Most studies related to the Arbaeen pilgrimage focus on the state of health services and clinical care.

Some of these studies address issues such as waste management, risk assessment, and the like. Finally, another section of the research deals with the problems of community-acquired infections during this march. A preliminary review of the articles indicated that addressing health services and disease conditions simultaneously has been associated with fewer problems. Therefore, in this study, in addition to reporting the health conditions of patients, used medications, and so on, attention must also be paid to examining the problems.

2. Objectives

To improve the provision of medical facilities for Arbaeen walking pilgrims in the coming years, as well as to increase awareness and reduce cases of referrals to medical centers on the walking route, this research examines the challenges and provides a solution to improve care as much as possible. Moreover, providing services to inpatients and outpatients referred to Ehsan Field Hospital during the Arbaeen walk in 2022.

3. Methods

The present study was a cross-sectional study with a 10-day interval conducted on 19,800 patients referred to Ehsan Field Hospital between the 9th and 19th of September 2022. All 19,600 visited patients of Ehsan Hospital in this duration were studied as a random sample of the population of all patients referred to all medical centers related to Arbaeen walking. Ehsan Field Hospital, affiliated with the Executive Headquarters of Imam's Directive, included 70 inpatient beds, six emergency beds, two operating rooms, a delivery room, ultrasound, mammography, and radiography machines, an ambulatory clinic, a pharmacy, and was located 20 kilometers outside of Karbala from September 18th to September 28th and provided services to Arbaeen pilgrims on the Arbaeen walking route (vertical 989). The patient's demographic information, such as sex and age, along with details of the disease, including laboratory data, symptoms, medication used, and diagnosis, as well as challenges and solutions informed by the views of hospital-employed specialists, were recorded.

Three outpatient clinics visited the patients on an outpatient basis and transferred them to the inpatient department if needed. The forces working in this hospital included 63 specialist and subspecialist doctors from the fields of surgery, internal medicine, gynecology, anesthesia, and special care, nurses working in the general and special care departments, anesthesiologists, operating room technicians, and midwives. Twenty-two people were working as support and security forces. [Figure 1](#) shows a map of the hospital and the location of its different departments.

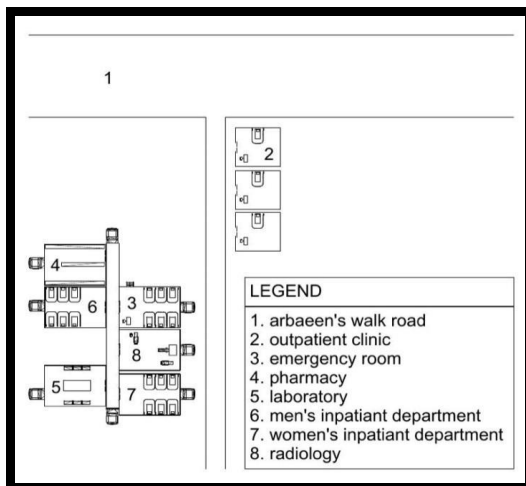


Figure 1. Map of Ehsan Field Hospital affiliated with the Executive Headquarters of Imam's Directive

3.1. Statistical Analysis

Descriptive statistics was used to summarize the collected data. The collected data was analyzed in SPSS software (version 26) using descriptive statistics, percent, and frequency tables.

4. Results

During the establishment of the Hospital, 19,600 patients visited in the outpatient clinic, 473 patients were referred to the inpatient center, received further monitoring and care, and were discharged by the doctor after their general condition improved. Eight patients required surgery and were operated on by a general and gynecological surgeon (Table 1).

Table 1. Description of patients referred to Ehsan Field Hospital

Item	Patients	
	n=19,600	%
	0	
Outpatient clinic	19140	97.7
Hospitalized	473	2.3
Gastroenteritis*	270	58.7
Hyperthermia*	43	9.1
Asthma Attack or Dyspnea*	43	9.1
General weakness and muscle cramps*	23	5.0
Chest Pain*	80	17.3
Cesarean*	1	0.2
Car accident and multiple trauma	1	0.2
Abortion and Bleeding	1	0.2
Electrical Shock	1	0.2

*: The percent was presented in the hospitalized category

Of 473 patients hospitalized in the ward, 270 suffered from gastroenteritis; they were treated with serum therapy and supportive treatments and discharged in less than a day. Forty-three patients were admitted to the ward due to heat stroke and were discharged after serum therapy and necessary measures. Among the hospitalized patients, 43 were

suffering from asthma attacks, and they have all been considered as one group, not two separate groups. Twenty-three patients were admitted with lethargy, muscle cramps, and general weakness.

Eighty patients had chest pain with the possibility of heart pain; they underwent cardiac monitoring after taking ECG and performing related tests (e.g., troponin). They were discharged in less than 48 hours after their general condition improved. Out of these 80 people, three patients were referred by ambulance to hospitals in Karbala due to atypical chest pain and increased heart enzymes.

Ten patients had superficial cuts due to trauma-related incidents and were discharged after stitching and dressing. A patient had suffered multiple traumas and injuries to his head, chest, abdomen, and pelvis due to a car accident. He was transferred to an inpatient center, and his radiographs were taken; a double-sided chest tube was applied to the patient due to pneumothorax, because of decreased level of consciousness, the patient was connected to the ventilator after intubation. Due to the patient's excessive bleeding, a Central Venous (CV) line was inserted into the femoral vein. This medical procedure entails the placement of a specialized catheter into a large vein to facilitate the rapid administration of fluids, blood products, and medications directly into the central circulation. The femoral vein, located in the groin, is often chosen for its accessibility, especially in emergency situations where other veins may not be viable for quick access. The CV line provides crucial, life-saving intervention in managing the patient's critical condition by allowing immediate and efficient treatment. The patient required neurosurgery and was transferred to a neurosurgery hospital in Karbala.

In addition, one of the clients was a pregnant mother who was in the 40th week of pregnancy and underwent cesarean surgery. Another pregnant mother underwent curettage surgery and blood transfusion due to miscarriage and bleeding. A patient was also referred to the hospital due to electrocution. After performing the basic life support measures, he was hospitalized for three days and was discharged after his general condition improved.

5. Discussion

As the deployment of military forces provides protection and security for the walk, the physical health of the people should be guaranteed during the Arbaeen ceremony. So that every year, we witness a more magnificent and fresh presence while also caring for the physical and mental health of the people in the Arbaeen walk. In the Arbaeen procession, like any other human gathering, the spread of infectious and contagious diseases increases due to the population's density and the non-observance of basic hygiene (4). Respiratory

diseases are caused and increased due to contagiousness and the dust from the walking path. Gastrointestinal diseases are witnessed because of cultural differences in countries' eating habits (5).

In a qualitative research project led by Karam Pourian et al. in 2018, the preparedness of the Iranian healthcare system to service the requirements of pilgrims was examined, along with identifying the operational challenges and suggesting potential strategies for improvement. A notable difficulty identified during the Arbaeen religious observance was the healthcare system's insufficiency in handling infection outbreaks, which posed significant health-related challenges for those involved. The study also offered recommendations to help curb the spread of infectious diseases. Moreover, the present study provides some suggestions concerning the prevention of communicable diseases. A total of 17 participants were recruited for this study, including 13 executives and four health policy-makers. The data for this study was collected using semi-structured interviews and then analyzed after face-to-face interviews. Therefore, four main issues and 11 sub-issues were found. Four main issues are the weakness of health infrastructure in Iraq, weak control of factors causing infectious diseases, lack of awareness among pilgrims, and inefficiency of health education (4).

Another qualitative study by Yamin et al. (2019) explored some solutions related to crowds and gatherings in Hajj and Kumbh Mela. This study presented an international standard for managing crowds and minimizing the chances of occurrence of stampedes, fires, and other disasters and also to deal with outbreaks of communicable diseases, such as EBOLA, HIV Aids, Swine Influenza H1N1, H1N2, various strands of flu, severe acute respiratory syndrome (SARS), and Middle Eastern Respiratory Syndrome (MERS). In this research, Hajj, which has witnessed several stampedes, was selected as the case study; however, most findings could be applicable to other events such as the Kumbh Mela. Moreover, this study investigated different kinds of crowds and technologies for their management (6).

Another case study conducted by khonke et al. (2018) explored different experiences after the occurrence of accidents and disasters, which are considered a threat to human health and life, with an emphasis on the fact that people's most urgent need after the occurrence of accidents and natural disasters, especially earthquakes, is health service. The main purpose of this study was to examine the experiences and what health and treatment working groups learned in response to the 7.3 magnitude earthquake in Kermanshah province. This study employed the triangulation method, including interviews, participant observation, and expert panel in emergency medical services to evaluate the performance of the medical center and healthcare centers. The information

obtained from the observation was recorded by the researchers, and the reports related to the Kermanshah Emergency Center and also expert evaluators' reports were examined. Moreover, interviews were conducted with experts, managers, commanders, and responsible officials in the region, and finally, the collected data was analyzed (7).

One of the health challenges in large communities, such as the Arbaeen pilgrimage, is the prevalence of communicable diseases and the participants' healthcare needs. An excellent way to provide healthcare facilities and reduce these threats is to establish field hospitals and treatment camps during and after the gathering. The role of these hospitals and treatment camps in primary care and prevention of humanitarian disasters is vital. In a cross-sectional and retrospective study conducted by Farhmand et al. in 2019, treatment camps and patients were investigated during the Arbaeen pilgrimage, and data on patients and medications used by the medical team were collected from all patients referred to the Saheb Al-Zaman treatment Camp affiliated with Shiraz University of Medical Sciences. The data were then analyzed, and the organization of the pilgrimage was also described. In this study, a total of 3,477 patients were examined, with an average age of 33.77 ± 6.19 years, 62.8% of whom were male. The highest frequency of male patients was in the age group under 26 years, and among female patients, it was in the age group of 36-50. According to the findings of this study, upper respiratory tract infections, back pain, muscle stiffness, diarrhea, and the need for bandages were the most common medical complaints among patients. The most prescribed medications for adults were cold tablets [2-4], acetaminophen (325 mg), and cetirizine (10 mg). Although the data used in this study were not sufficient due to the lack of a pre-established information recording system, the results demonstrated the importance of considering healthcare issues and facilities in addition to the significance and necessity of such ceremonies. Equipment, facilities, and specialized personnel should be provided on-site based on the assessed needs and studies conducted (10).

Table 2. Demographic information of referring patients

Variable	Groups	Frequency (Percentage)
Gender	Female	3528- 18%
	Male	16072- 82%
Age	Below 18	2842 - 14.5%
	18 to 60	12446 - 63.5%
	Above 60	4312 -22%

In a descriptive, cross-sectional case study

conducted in 2014 by Ajam et al., the quality of healthcare services was evaluated in a field hospital using the SERVQUAL model. A total of 311 patients visiting Shahid Alami Zabol Desert Hospital were randomly selected and included in the study. The data were collected using the standardized SERVQUAL questionnaire. This study was carried out by obtaining the opinions of patients visiting the hospital. Since patient satisfaction and their opinions about the quality of services in hospitals are valid indicators for measuring service quality and provide opportunities for improving the quality of services offered in field hospitals, the results of the research can lead to the identification of shortcomings and the provision of targeted solutions to reduce observed quality gaps in the services provided in field hospitals. The findings of this study indicated that overall, the field hospital under study exceeded the expectations of the receiving community in terms of

services. However, despite this, the mentioned hospital failed to meet the expectations of patients in terms of responsiveness, service assurance, and some other issues (11).

In another study titled "Implementation of field hospital pharmacy services during the COVID-19 pandemic" conducted by Wallis et al., the main exhibition hall of the conference center was transformed into an acute care center for patients with positive SARS-CoV-2 symptoms in less than a week. The National Guard equipped the field hospital (FH) with 216 beds, including six intensive care units. Five FH units, Alpha, Bravo, Charlie, Delta, and Echo, were assembled, each with approximately 40 beds. Around 32 locations in the Alpha unit were equipped with oxygen regulators. The heating, ventilation, and air conditioning systems of the conference center were

Table 3. Medicines available in Ehsan Field Hospital

Pharmaceutical Category	Medicinal Items	Pharmaceutical Category	Medicinal Items
Serums	Normal Saline, Ringer Lactate, Water Dextrose, Half Saline, 1/3-2/3	Anticoagulants	Heparin, Aspirin, Warfarin, Streptokinase, Clopidogrel
Antibiotics	Penicillin, Ciprofloxacin, Levofloxacin, Gentamicin, Vancomycin, Meropenem, Doxycycline, Rifampin, Sulfamethoxazole, Ampicillin, Azithromycin, Ceftriaxone, Metronidazole, Cefazolin, Sulbactam, Imipenem, Erythromycin, Cephalexin	Trolley Code Drugs	Epinephrine, Atropine, Calcium Chloride, Hydrocortisone, Lidocaine, Magnesium Sulphate, Midazolam, Amiodarone, Potassium Chloride, Sodium Bicarbonate, TNG, Salbutamol, Flumazenil, Aspirin, Adenosine, Chlorphenamine, Diazepam, Naloxone
Pain Killers	Ketorolac, Apotel, Diclofenac, Piroxicam, Naproxen, Mefenamic Acid, Ibuprofen, Indomethacin, Morphine Sulfate, Pethidine	Burn Creams	Mupirocin, Silver Sulfadiazine, Zinc Oxide, Nitrofurazone, Mafenide, Calendula, Calamine, Benzocaine, Lidocaine, Bacitracin, Polyprion
Anticonvulsants	Phenytoin, Carbamazepine, Gabapentin, Phenobarbital, Pregabalin, Clonazepam, Diazepam, Oxazepam, Alprazolam	Anti-Nausea Drugs	Ondansetron, Metoclopramide, Vit B6, Hyoscine
Blood Sugar Medications	Insulin, Metformin, Repaglinide	Injectable Vitamins	Vitamin C, B-Complex
Anti-Arrhythmic Drugs	Quinidine, Metoprolol, Amiodarone, Diltiazem, Verapamil, Digoxin, Adenosine, Lidocaine, Carvedilol, Bisoprolol, Atropine, Dofetilide, Nicorandil, Propafenone	Anti-Hypertensive Drugs	Losartan, Valsartan, Amlodipine, Atenolol, Enalapril, Perindopril, Captopril, Nifedipine, Diltiazem, Verapamil, Bendroflumethiazide, Furosemide

Table 4. Challenges and Solutions

Lesson	Challenge	Solution
Selection of experienced and qualified staff	Limitations of the hospital in the selection of employees	The best of the medical staff in the hospital was selected to give the training necessary for providing service in their absence to experienced and skilled people in their field.
Update employees about changes	In some cases, the floating and changing colleagues in the shifts are not aware of executive and administrative changes, and this causes delays in the implementation of emergency cases and necessary measures.	We used doctors and supervisors to guide and lead the team, who played a role in management decisions and communicated this to colleagues on every shift.
Integration of communication system	Lack of pager system or staff notification for emergency cases or in required areas	We implemented a system of wireless telephones that work based on the radio in emergency cases, and the efficiency of this system was also checked in each shift.
Training employees on the optimal and primary use	Limited resources and facilities	Paying attention to the conditions and limitations of the country of Iraq in the field of health and treatment facilities, we taught the principles of using the equipment

		to the employees.
Optimal use of available space	Inappropriate physical space	The capacity of the hospital was increased. We prevented the 24/7 stay of patients in the emergency department and referred the patients to Karbala city. We changed the pattern of admitting patients in terms of time compression in the emergency room. Also, auxiliary forces, nurses, and doctor's assistants were used to prevent overcrowding.
Review cases and past cases to improve performance	The need to provide similar or higher standards of medical care to patients	Before going to the place of deployment, the employees were trained by the experienced forces present in the previous years.
Application of safety principles and infection control	Employee stress due to lack of full safety deployment	Sufficient resources were provided to the staff in each shift to control infection and provide safe services to patients. Training was given on ways to reduce stress and strengthen team work to provide safe patient care.
Choosing two employees in each field and not giving them leave at the same time	Time limit for pilgrimage and participation in the procession	In order to prevent the hospital from being empty, there must be a specialist in every work shift from every required field, such as gynecologist, surgery, anesthesia, and special care.

modified, and barrier areas were created at two entrances to convert the entire facility into a negative pressure environment, eliminating the circulation of air and reducing the risk of virus transmission. The FH staff were equipped with complete personal protective equipment, including gloves, gowns, N95 masks, and face shields. Moreover, multiple services were provided to the patients.

During the 6-weeks of FH's activity, over 4,000 medication orders were confirmed, and more than 5,000 medications were distributed from the pharmacy. The pharmacy staff played a crucial role in developing treatment programs and providing necessary medications to stabilize patients before transferring them to University of Massachusetts Memorial Medical Center (UMMMC) for advanced care of the disease. This study revealed that pharmaceutical services are vital for the success of FH, ultimately leading to the provision of optimal care to all hospitalized patients in a safe, caring, and healing environment (13).

During religious gatherings, such as Arbaeen, intermediate care centers or mobile and field hospitals need to increase medical capacity and the ability to assess the spread of infectious diseases and provide care for a significant number of patients. The increase in the number of people visiting mobile hospitals during religious gatherings challenges or exceeds the capacity of normal operations, so they must have admission criteria and relevant clinical care programs per local resources (14).

6. Conclusion

Findings of previous studies and current research suggested several solutions to provide better services in field hospitals, such as considering and establishing necessary infrastructures in compliance with environmental standards for all age groups, especially the elderly, providing suitable offices and spaces for pilgrims, establishing temporary pilgrim shelters, creating communication infrastructure, providing necessary facilities for patient traffic (e.g., escalators and moving walkways), acquiring and

providing facilities and equipment such as wheelchairs, foldable chairs, temporary seating in open spaces, umbrellas, canes, appropriate clothing, pilgrim transport vehicles, training staff in service delivery, developing technology for waste management, providing sanitary facilities such as toilets and ablution areas, and ensuring the presence of ventilation, adequate lighting, and brightness to improve the quality of medical services.

Suggestions for future research and studies include practical topics such as examining the prevalence of respiratory, gastrointestinal, and skin diseases during the Arbaeen pilgrimage, health interventions to prevent the occurrence and spread of these diseases, the effectiveness of educating the public with basic hygiene principals, reasons for non-compliance with basic hygiene principles by some individuals and the potential solutions, assessing people's satisfaction with the provided medical services, and evaluating the impact of health drills on improving the quality of medical services. Although participating in the Arbaeen foot-pilgrimage is perceived as a significant spiritual achievement for the participants, the occurrence of certain diseases and even mild and short-term physical disorders cannot be overlooked. Medical universities throughout the country, especially those located in west and southwestern border cities, can train their researchers through targeted education to conduct various scientific studies related to the Arba'een Pilgrimage. This way, credible scientific findings can serve as the basis for decision-making by officials and policymakers and contribute to the promotion of public health and hygiene during this magnificent event. Therefore, all interested researchers are invited to engage in studies in this field so that their findings can be used to improve the health of the people during the Arba'een Pilgrimage and achieve the prospect of a healthy and vibrant pilgrimage. Just as the peaceful nature of the grand Arba'een Pilgrimage is evident to all, its health aspect should also be realized in terms of healthcare and treatment so that individuals returning from this glorious event not only benefit spiritually but also enjoy complete

physical health and are not exposed to the mentioned diseases. Hence, the health sector of the country should assist in the health and well-being of the people in this magnificent gathering by conducting scientific and credible research, thereby helping to promote the health of individuals both physically and spiritually during this event.

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Footnotes

Conflicts of Interest: The authors declare that they have no conflict of interest regarding the publication of the present article.

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