

## Research Paper

# Analysis of Healthcare Services in 2019 Arbaeen March: A Qualitative Study



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## ABSTRACT

**Background:** The Arbaeen march ritual stands as one of the largest congregations, attended by tens of millions every year. Given the large number of participants in this ritual, it is essential to minimize the health repercussions for pilgrims and ensure their prompt access to medical care. The present study was conducted to analyze the healthcare services during the 2019 Arbaeen march.

**Materials and Methods:** Employing a qualitative approach, this study utilized various data collection methods, including in-depth and semi-structured interviews, field observations, and document review. The target population comprised healthcare decision-makers, managers, and providers of the 2019 Arbaeen march. The interview and data collection guide were developed in accordance with the World Health Organization (WHO) guidelines. Data collection continued until data saturation. Directed content analysis was employed to analyze the data.

**Results:** Data saturation was achieved after conducting 30 personal interviews. Out of the challenges and significant factors found in healthcare deliveries during the Imam Hussein (AS) Arbaeen march, 9 main themes and categories were identified: Trauma system, disease surveillance system, health issues, health education and promotion, healthcare coordination and collaboration command in the health system, information and communication management, response planning, support and resource management, and safety and security.

**Conclusion:** This study identified the major healthcare issues in the AS Arbaeen march, serving as an evidence-based guide for policymakers and planners of this famous religious ritual. The results of this study are applicable to similar public gatherings and marches.

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## Introduction

Religious rituals provide unique opportunities for the followers of religions to manifest their distinctive identity to other faiths. It is a rare situation for the members of religions to represent and construct their cultural and social status [1]. Mass populations present challenges to healthcare systems all over the world. For example, the Kumbh Mela festival in Allahabad, India, the largest gathering in the history of humankind, poses an exciting challenge for the provision of healthcare services. It was estimated that about 120 million pilgrims visited this place over 55 days in 2013. This religious festival is celebrated on the banks of the Ganga once every 12 years [2]. Two to three million people attend the annual Hajj pilgrimage in Saudi Arabia. About 8.8 million tickets were sold for the 2012 London Olympic Games, and more than three million people participated in the 2014 Brazil FIFA World Cup [3].

However, Shiites show considerable respect for such rituals and religious ceremonies, particularly the Ashura (Hosseini) rituals. These rituals have played a unique role in the identification process of Shiites, considering a close historical relationship between the uprising of Imam Hussein (AS) and the existence of Shiites. Among these rituals, the Arbaeen march ritual has expanded significantly in recent years due to various political and cultural reasons. This march is held every year on the days leading up to Arbaeen (the 40<sup>th</sup> day after the martyrdom of AS and his companions) on the roads to Karbala City, Iraq [4].

Although such gatherings have positive cultural, economic, and social outcomes, the influx of numerous pilgrims in a limited period without preparing for possible emergencies can endanger pilgrims' safety and health [5]. This condition highlights the critical need for planning and preparation to mitigate the risks associated with these events and ensure timely access to care services [6]. The World Health Organization (WHO) states that gatherings with such a large number of people can put severe pressure on the host's resources and ability to provide care services [7]. For instance, the sheer size of the crowd can lead to traumatic injuries, complicate the transfer of patients, and create challenges in preventing and controlling infectious diseases [8].

Many pilgrims from all over the world attend this religious gathering. Participation of Iranians in these gatherings, known for their affinity to the Ahl-al-Bayt (refers to the family of the Islamic prophet Muhammad [PBUH]), remarkably affected the quality of such a great ritual. In

recent years, the Iranian provinces bordering Iraq have received such large gatherings, requiring a national response to deal with possible incidents.

However, these provinces rank among the country's high-risk areas for accidents and disasters due to their particular climatic, geographical, and geological conditions, coupled with other destructive natural factors, such as the region's particular strategic and border location [9]. Also, these provinces contend with insufficient infrastructure, including hospital beds, specialized beds, medical expertise, ground relief due to heavy road traffic, resources of pre-hospital emergency centers, and restricted air relief with a ban on flying at night. Additionally, there is the danger of hostile groups, as well as the inappropriateness of the security and healthcare infrastructure of Iraq. All of these issues have endangered this tremendous and important religious event. In this context, the essential factors that undermine the health of pilgrims can be the following: The emergence and spread of fatal infectious diseases, an increase in accidents resulting in physical injuries and trauma, heightened cardiovascular diseases in older adults, the possibility of suffocation due to overcrowding at the border or long-term marching, and the pressing issues of terrorism and bioterrorism. These concerns can occur almost in all the provinces bordering Iraq during the massive Arbaeen march.

It is evident that to prepare the necessary care for this number of pilgrims, the existing situation must be initially analyzed [10]. Then, the planners can leverage the results to strengthen their preparation for holding this religious ritual more safely. As a result, this study aimed to analyze the state of health services during the 2019 Arbaeen march.

## Materials and Methods

The present study is qualitative, and the study settings comprise the facilities providing health services on the route where the Arbaeen marching ritual of the martyrdom of AS was performed. These settings inside the country included clinics, health-treatment centers, and sites situated at the three border terminals of Mehran, Chazzaba, and Shalamcheh, through which pilgrims entered Iraq. The research environment in Iraq included health treatment centers, areas in Najaf and Karbala, and the walking paths connecting these two cities.

## Research population and sampling

The research community comprised managers and policymakers of the health system, as well as health, medical, and paraclinical experts, in the 2019 Arbaeen event. Since this is a qualitative study, the participants were selected using a purpose-based sampling approach, which used the “maximum variation” method [11, 12]. This method helps researchers investigate a subject comprehensively from all angles. The goal of researchers is to achieve a wide range of views toward healthcare in Arbaeen march; thus, sampling was done with maximum variation in the two countries of Iran and Iraq, focusing on the border provinces of Khuzestan and Ilam in Iran, as well as in the cities of Najaf and Karbala in Iraq and the walking paths between these two cities. The participants were selected from different levels of managers and policymakers of the health system and medical and paraclinical experts.

This method helps researchers look at a subject from all perspectives and thus gain more understanding. As a result, the participants were selected among the medical, nursing, health, and paraclinical staff working in the centers providing healthcare services during the Arbaeen ritual in Iran and Iraq, patients and other visitors to the health centers in Arbaeen (such as the patient’s companions), managers, executive staff and policymakers, as well as the employees of cooperating and supporting organizations of the health system. The interviews continued until the data saturation, where no new topics were raised in the subsequent interviews.

## Data collection tools

Given the qualitative nature of the study, the primary research tool was the researchers themselves [13-15]. However, study tools such as interview instructions, audio recorders, cameras, and the like were also used during the data collection. The current research was based on the six structural building blocks introduced by the WHO in the evaluation of health services and the seven items contained in the instructions of this organization regarding the provision of health services in mass gatherings. Afterward, the research group agreed upon a principal framework for evaluating health services during 2019 Arbaeen, comprising 9 categories. Researchers focused their interviews and observations within this framework [16, 17].

Different qualitative data collection methods were used based on the agreed-upon components, encompassing interviews, observations, and text analysis. “Deep, semi-structured interview” was used in this study. The interviewers referenced the interview guide and the mentioned components to prepare the instructions. Interviews were conducted individually. At first, the researchers explained the purpose of the study to the participants, and if they consented, they would complete the interview. All interviews were recorded with the permission of the participants. The questions started based on the purpose of the study and the focused areas. Then, follow-up questions were asked in each interview to clarify the participant’s perspectives. At the end, the participants were asked to state any explanation or comment left. The location of the interview was determined according to the participants’ preferences.

Due to the particular situation in the borders and high traffic routes of the Arbaeen march, finding a suitable and ideal interview place was one of the researchers’ challenges. The sounds of visitors’ conversations and the crowd’s cheers and loudspeakers, passing cars, generators, etc. were some of the limitations of choosing the interview location. Nevertheless, the places that were more suitable for the interview were selected with the consent or suggestion of the participants, and the interview was conducted. Because it was impossible to transcribe the interview content on the site, it was deferred until returning from the interview place. After returning and coordinating among the research members, data analysis began. The standard method of field notes derived from field observation was also used during the data collection process. Additionally, the researchers took pictures of the studied locations and services, which were analyzed like other data sources. Finally, several official reports of the responsible agencies were also obtained and used.

## Data analysis

This study employed the ‘directed content analysis’ method to analyze the data [18]. In this approach, the generalities of the study classes are formed based on the existing theory, and only the subclasses and codes are obtained from the qualitative study. Of course, new styles or types may emerge, contributing to the evolution of previous theories [19, 20].

Verbatim translation was impossible in the field, so transcription was done upon returning. The data analyses started after returning from Iraq and cooperation between research members. To analyze the data, the interviews were listened to recorded interviews several times

through a recording apparatus to gain a deep understanding of the data. Then, the interviews were transcribed verbatim using Microsoft Word software, version 2016. The critical themes extracted from each interview were briefly recorded in a summary sheet. The researchers read the revised text several times for overall comprehension. Finally, each interview was analyzed based on content analysis according to the method suggested by Elo and Kyngas [21]. In the data analysis, open coding was done after carefully reading the text of each interview several times. In this stage, in addition to analyzing the content of the interviews, other data sources such as notes, official reports, and images were incorporated into the analysis and coding process. Then, in the meetings with the researchers, subcategories were formed by putting similar codes together (in terms of dimensions or characteristics), and the analysis continued by considering these subcategories related to each of the previous 9 categories. After the preliminary findings were presented to the research team members, the subsequent steps were outlined, and the results were concluded.

To increase the validity of the study findings, we used methods such as prolonged engagement and persistent observation in the field of research, triangulation, detailed thick descriptions of data, assessment or saturation of data sufficiency, peer review or peer debriefing, and multiple reviews by members of the analyzing team. Also, to enhance the findings' reliability, approaches such as transferability, external audit, and confirmability were used [22, 23].

Data saturation in the present study was achieved by conducting 30 individual interviews lasting between 20 and 60 minutes. Most participants in this study were male (n=26, 87%). The mean age of the participants was 40 years. The participants were from different healthcare stakeholder groups; the majority (n=25, 67%) were healthcare providers. Care providers included general practitioners, dentists, surgeons, emergency physicians, nurses, and medical and health experts. Other participants were executive and disciplinary agents of the marching ritual.

Upon careful reading of the interviews and extracting the conceptual units, the codes were arranged into 47 subcategories. Then, they were classified into 9 main categories: Trauma system, disease surveillance system, health issues, health education and promotion, healthcare coordination, and collaboration command in the health system, information and communication management, response planning, support and resource management, and safety and security (Table 1).

## Results

### Trauma system

Considering the large number of people turnout at the Arbaeen march, participants highlighted trauma and its injuries as the most significant issues. In this respect, lack of planning to prevent trauma risk and management emerged as the essential issue. Furthermore, overlooking trauma risk assessment, inadequate available infrastructures, and missing plans to deal with trauma are some concerns. The participants pointed to traffic accidents as one of the leading causes of trauma among pilgrims. They cited various contributing factors, such as using non-standard and unconventional vehicles, exceeding vehicle capacity, and risky driving, leading to increased accidents. Not surprisingly, most participants believed that the medical centers on the marching routes faced a shortage of trauma management supplies and equipment.

### Disease surveillance system

The participants in the present study believed that due to the rotation of the Arbaeen ceremony in different seasons of the year, the outbreak of various diseases is possible, highlighting the importance of a disease surveillance system. Screening was one of the most essential subcategories emphasized in this domain. Mass gatherings inherently prevent the implementation of a systematic screening system, exacerbated by the lack of a disease registration system, usually resulting in people's self-reports. In addition, no human resources, suitable screening equipment, and establishing screening centers at the entrance points of the borders compound these challenges.

Mismanagement of infectious diseases in crowded spaces and the possibility of an epidemic are other challenges related to the disease surveillance system. Another vital subcategory in the surveillance system was the inability to track patients; the most important aspects were the lack of an intelligent system for recording and documenting epidemiology, a suitable mechanism for patient referrals, and the impossibility of recognizing repeated referrals. The participants believed that due to the changing seasons of the Arbaeen ceremony, the pattern of diseases changed in different years, which should be noticed by the authorities and continuously monitored. Besides, there are inadequacies in the host country's health system, such as the lack of a surveillance system in health facilities and public organizations like the [Red Crescent](#).

In the conducted interviews, the risk factors related to health were also mentioned, the most important of which were heatstroke and blisters, catching underlying diseases, distribution of unhealthy food, inappropriate accommodation and resting places, eating without observing health tips, and wearing unsuitable footwear.

### Health issues

According to the interviewees, health issues needed special consideration. On top of that, they pointed out the poor attention to maternal and child health, which was generally associated with the lack of appropriate health systems and equipment for children and women and inadequate training before disposition. In addition, a low-risk perception of personal hygiene was noticed, with particular emphasis on the hygiene of the place of accommodation, not having personal sanitary items and the lack of hygienic facilities along the marching route.

Also, the lack of environmental health monitoring was mentioned due to the proximity of the accommodation to the garbage site, the flow of wastewater from the sites, the lack of appropriate public health equipment, and the lack of sanitization. In addition, the lack of attention to the hygiene of food and drinks, considering that they are mostly served mobile, also noted the importance of using sanitary containers and serving places. Some points were also mentioned in line with the need to improve health culture, emphasizing the preparation and distribution of educational materials and provision of suitable disposable containers and equipment along the walking paths. Lastly, inappropriate supervision in health matters was highlighted as an essential factor, resulting in inadequate equipment and healthcare.

### Education and health promotion

One of the most important categories related to healthcare in the Arbaeen ceremony is education and health promotion, drawing considerable attention from the participants in the present study. One of the subcategories of this category pertains to the limited awareness of the marchers about health issues, indicating their improper training. In addition to the people who participated in the ceremony, the insufficient training of the healthcare team was also investigated, including their lack of familiarity with different types of care and the “last minute” preparation of human resources. The interviewees mentioned that the lack of committed supervisors resulted in poor training, which is a serious challenge, showing officials’ insufficient attention to training and uncoordinated measures. Finally, several solutions regarding health educa-

tion were presented, encompassing various methods, such as continuing education in different languages, designing and distributing educational resources, and using available audio-visual technologies.

### Command, coordination, and cooperation

Non-integrated management due to improper healthcare command stands out as one of the main subcategories of this category. It can be related to the inappropriate organization of healthcare officials, the inefficient supervision of the managers of these areas, and the unclear role of the [Ministry of Health and Medical Education](#) in healthcare management. These issues can lead to a lack of integrity and order in providing care. The interviewees believed that personal and independent decisions, multiple repetitive facilities, and the lack of fundamental division of duties could fuel this problem. Additionally, the pursuit of visibility by other organizations was another critical issue flagged in line with this category. Considering some political biases that can affect the acceptability of care provision, these factors spoil healthcare management. In addition, the uncoordinated and unorganized establishment of command sites further complicates managing and delivering healthcare and wastes resources. The participants also pointed out the awkward presence of other groups, including military medicine. Despite recognizing the strengths of the army force, they expressed concern about the inconsistency between different organizations. All these challenges, along with insufficient attention to legal supervision and inspection, such as uncoordinated visits, lack of control by the [Ministry of Health and Medical Education](#), and the need to coordinate with Iraqi organizations to provide healthcare, make the unified command a multifactorial challenge.

### Information and communication management

The interviewees underscored the critical role of information and communication management in providing care-related issues, especially in ritual ceremonies. They noticed the lack of a comprehensive information registration system as a significant challenge. In such instances, obtaining the information is incomplete and recorded manually; there is no online and integrated patient information system. The participants emphasized the necessity of such systems and their synchronization with national smart identification cards. This system can also prevent the storage of information among multiple providers. Also, the lack of communication between the ambulance fleet was another critical issue under heavy road traffic and lack of internet access.

The other gaps in the management of providing care comprised the absence of new approaches to call volunteers, such as text messages and obtaining information from medical mobilization systems in cooperation with organizations such as the [Red Crescent](#) and incident management centers.

### Response planning

In the present study, several factors were mentioned in line with planning the response regarding healthcare provision in the Arbaeen ritual. The interviewees considered the presence of experienced providers as a positive point. On the other hand, the presence of specialists without appropriate medical equipment makes care delivery a significant difficulty. Medicines are also among the essential requirements, and there is a particular need to define the drug pharmacopeia for ritual gatherings. The interviewees also pointed to the imbalance between supply and demand and highlighted further evaluations regarding allocating human resources. In addition to human resources, the inappropriateness of medicine and equipment with the existing needs was also discussed, with the shortage of some drugs and medical equipment, but excess quantities of some other medication.

Another issue in this category is the lack of standard care protocols in the Arbaeen ritual, which often leads to symptomatic treatments, exacerbation of underlying diseases, and provision of non-standard care. In addition, the interviewees in this study called for establishing a triage system suitable for the Arbaeen march ritual. Observers expressed that effective methods have not been foreseen in this regard, making managing care provision challenging.

The experts in this study considered providing various health services for a large population a fundamental challenge. People from different countries with various genders, races, and groups with different health problems are present in the ritual, making it challenging to plan for care and response, and sometimes, the provision of care may fall into the hands of non-specialist groups.

The participants of the current study appreciated the readiness of the military sector in this ritual and believed that this opportunity should be used properly. However, the inconsistency between the increasing number of pilgrims and the development of infrastructure has caused the inappropriate placement of different levels of health services. The interviewees believed that the rise in expectations with the provision of luxury care (such as dental care) has resulted in neglecting the condition of essential healthcare packages.

Another deficiency is the lack of addressing the challenge of transferring special patients, which is caused by insufficient access to emergency medical systems. According to experts, field hospitals should be considered for Arbaeen, equipped with the most necessities and medical equipment to meet the health needs of pilgrims.

### Resource support and management

The stakeholders paid particular attention to resource support and management, one of the most essential categories in healthcare provision in the Arbaeen march. In this regard, various subcategories were mentioned. Unfair allocation of amenities between health sites was one of these subcategories. In the meantime, a unique opportunity has arisen: Low expectations for financial compensation from health service providers, reducing the cost of care. On the other hand, the inadequacy of vital infrastructure in tandem with the population has led to the lack of access to water and electricity at these sites, posing obstacles to care provision. There are also significant challenges related to the improper storage of medicine and equipment, which leads to unprincipled and inappropriate storage of medicine and medical supplies. Regarding this critical subject, the disproportionate quantity and quality of staff in the service field is closely related to the lack of team selection and membership criteria. The participants stressed the importance of stabilizing groups as the key to improving the quality of the sites in this field. Besides the challenges in support and resource management, the participants mentioned deficiencies in air emergency systems. They emphasized the need to prioritize health economics across all areas of health services during the Arbaeen ceremony.

### Safety and security

Several issues regarding safety and security were raised during the Arbaeen march ritual. One of the most critical issues is the absence of accident insurance and professional responsibilities, causing concerns among healthcare providers. The topic of increased risk management among vulnerable groups, such as older adults, special patients, and pregnant mothers, was raised in the interviews, which require special attention in care provision. Besides these factors, the interviewees revealed that the low-risk perception, especially among high-risk groups, contributes to the neglect of self-care. On the other hand, the lack of quantity and quality of personal protective equipment leads to difficulties in the personal protection of healthcare providers.

**Table 1.** Categories and subcategories extracted from the qualitative study

Main Category	Subcategory	Main Category	Subcategory
Trauma system	<ul style="list-style-type: none"> <li>- Lack of trauma risk management program</li> <li>- Traffic accidents, the leading cause of trauma</li> <li>- Lack of trauma management equipment</li> </ul>	Information and communication management	<ul style="list-style-type: none"> <li>- Need for a comprehensive information registration system</li> <li>- Communication defect between the ambulance fleet</li> <li>- Non- sharing of information between facilities</li> <li>- Calling for volunteers with creative solutions</li> </ul>
Disease care system	<ul style="list-style-type: none"> <li>- Screening, a challenging matter</li> <li>- Screening process inside the country</li> <li>- Poor attention to the spread of infectious diseases</li> <li>- Inability to track patients</li> <li>- Changing the pattern of diseases, a remarkable consideration</li> <li>- Defects of the health system of the host country</li> <li>- Causes of health problems</li> </ul>	Response planning	<ul style="list-style-type: none"> <li>- Experienced members: Efficient and reliable</li> <li>- Presence of an expert: Without proper equipment</li> <li>- Imbalance between demand and supply</li> <li>- Incompatibility of medicine and equipment with diverse needs</li> <li>- Lack of Arbaeen standard care protocol</li> <li>- The need for a triage pattern suitable for Arbaeen marching</li> <li>- Providing health services in a broad spectrum</li> <li>- Preparedness of the military sector</li> <li>- Improper placement of different levels of providing health services</li> <li>- Creating expectations with luxury and expensive service</li> <li>- Challenge in transferring special patients</li> <li>- Field hospital: A facility for Arbaeen</li> <li>- Providing non- standard services in informal and small sites</li> </ul>
Health issues	<ul style="list-style-type: none"> <li>- Lack of attention to mother and child health</li> <li>- Low- risk perception of the personal hygiene</li> <li>- Low environmental health monitoring</li> <li>- Poor attention to food hygiene</li> <li>- Challenges related to water sanitation</li> <li>- Improvement of health culture over time</li> <li>- Weakness of supervision in public health</li> </ul>		
Education and health promotion	<ul style="list-style-type: none"> <li>- Negligence of marchers to maintain health during Arbaeen days</li> <li>- Inadequate training of the healthcare team</li> <li>- Ineffective training as a result of the lack of a sensitive supervisor</li> <li>- Health education with diverse and understandable methods</li> </ul>	Resource and support management	<ul style="list-style-type: none"> <li>- Unfair allocation of amenities between health sites</li> <li>- Low expectations for financial compensation</li> <li>- Inadequacy of critical infrastructure with the population</li> <li>- Improper storage of medicine and equipment</li> <li>- Participation regardless of nationality and religion</li> <li>- The quantity and quality of members being unproportioned to the field of service</li> <li>- Lack of criteria for selection and membership in health teams</li> <li>- Stabilizing the team: The secret of success of teams</li> <li>- Weakness of the air emergency system</li> <li>- Necessity of paying attention to the health economy</li> </ul>
Command, coordination, and cooperation in the health system	<ul style="list-style-type: none"> <li>- Weak command, the reason for uncoordinated management</li> <li>- Lack of integrity and order in the operation process</li> <li>- Trying to be seen by organizations</li> <li>- Political biases</li> <li>- Uncoordinated and unorganized presence of sites</li> <li>- Active military medicine</li> <li>- Legal supervision and inspection</li> </ul>	Safety and security	<ul style="list-style-type: none"> <li>- Neglecting accident and professional liability insurance</li> <li>- Increased risk among vulnerable populations</li> <li>- Understanding the low risk of self- care</li> <li>- Lack of quantity and quality of personal protective equipment</li> <li>- Lack of comprehensive risk assessment before the operation</li> <li>- Lack of awareness of passive defense measures</li> </ul>

A lack of comprehensive risk assessment before this ritual and the absence of awareness of the passive defense measures seen in this ceremony can lead to unfortunate incidents (such as the Mena incident). The participants in the present study also highlighted other issues related to the safety and security of the host country. These issues were a lack of attention to structural and non-structural safety in the place of establishment and dangerous traffic in the host country, potentially affecting pilgrims' safety and security.

## Discussion

Every year, about 17 to 20 million pilgrims participate in the Arbaeen march ritual, creating the largest annual gathering in one place [25]. Any large group at this level can always pose fundamental challenges to health and healthcare.

One of the critical findings in this regard was related to traumatic events and their related care. In this ritual, a large number of pilgrims prefer to reach the border by their vehicles, which is known as the most important cause of injuries and physical trauma as a result of car accidents. In 2019 alone, more than 1500 trauma patients from Arbaeen pilgrims were referred to hospitals and medical centers in Ilam Province, Iran [26]. Offering the public transport fleet to transport pilgrims from different parts of the country, encouraging people to use this fleet instead of private vehicles, and providing extensive training about accident-prone areas can reduce the number of trauma-related accidents. The experts who participated in the present study believed that the facilities for providing healthcare to trauma patients are insufficient. In line with this finding, Karami et al. investigated the distribution of facilities dedicated to caring for trauma patients in different Iran provinces [27]. The results of the study showed that these facilities have not been distributed reasonably, especially in Iraq. In other words, the facilities did not align with demands and scientific evidence.

Health issues were another critical issue noticed by the present study participants. It is vital to establish health standards and comply with health protocols and instructions to hold a ritual and any healthy and safe religious gathering. This issue becomes particularly significant when the majority of participants in religious ceremonies in the world belong to middle to low economic classes [28], and it is expected that they have a lower risk perception regarding health and hygiene issues. Among the health issues, environmental health holds a special place. If little attention is paid to this issue, places and pilgrimage routes may become focal points for spreading pathogens and endanger their health [29].

The present study revealed that training related to various health issues for pilgrims and even care providers had not been provided sufficiently and effectively. In this regard, Dauda Goni et al. investigated the level of knowledge of Hajj al-Umrah (a quick, non-compulsory pilgrimage to receive blessings at any time of the year) pilgrims about the prevention of respiratory diseases in a comprehensive survey study. This study was conducted on more than 220 pilgrims and showed that people's knowledge about preventive behaviors of respiratory diseases was insufficient [30]. It is also possible that a significant number of pilgrims ignore the health risks due to the religious nature of these gatherings [31].

Leadership, command, and cooperation are the three essential pillars of management science. Without their effective establishment, no organizations and communities, even the smallest ones, can be led in line with their goals. However, these prominent elements were recognized as one of the most critical challenges in establishing and effectively managing healthcare provision in the AS Arbaeen march ritual. Meanwhile, implementing and developing systems such as command and control to increase the accuracy and speed of decision-making in critical situations can be an efficient step in managing all aspects of the Arbaeen marching ritual, especially the management of healthcare services [32].

The disease monitoring system in these gatherings was one of the main concerns of the interviewees. Furthermore, contagious diseases have become more critical due to the conditions of holding such events. For example, it has been predicted that 50% to 90% of the pilgrims suffer from infectious lung diseases during the Muslim Hajj ceremony alone [33]. This issue becomes especially noticeable in 2021 and 2022. The emergence and global impact of COVID-19, as an infectious disease, has widely affected all aspects of social and even individual life [34]. Therefore, national and international organizations are expected to design and implement systematic programs to prevent any devastating consequences of the spread of this disease [31].

The present study underscores that according to the opinion of experts regarding health care management in rituals such as AS Arbaeen marching, severe challenges exist in information and communication management. This challenge is not unique to organizing special rituals. Many structural, operational, and infrastructure challenges in the information management sector in the country's health system affect healthcare management in special rituals more than before. It is clear that to provide integrated care to pilgrims, we need to establish comprehensive medical information systems more than ever [35].

To compile a response plan for health care in this ritual, the planners of this critical event must identify their duties and roles well, assuming descriptive responsibilities. Only through such clarity can proper planning be established for an effective response [36]. The active presence of the military forces with financial, human, and equipment resources at their disposal has provided an excellent opportunity to eliminate the shortcomings of this part. The active presence of the military forces with financial, human, and equipment resources has provided a perfect opportunity to stop the defects. However, these organizations, institutions, and officials must take steps in line with the unity of command and procedure and sync with the guidelines issued by the authority organizing this ceremony [37].

Policymaking and providing financial resources, support, and legal protections stand as the essential principles of social gathering management. The present study identified it as a critical factor in the direction of healthcare services related to AS Arbaeen marching ritual, aligning with findings from other studies [38]. Numerous sources indicated that with integrated management and practical support, effective healthcare services can be provided, and additional costs and wastes of resources are prevented, leading to effective financial management [38].

Given the vast number of people participating in the AS Arbaeen marching ritual, it is clear that the safety and security of pilgrims are of utmost importance. In the current study, several issues were raised; the presence of vulnerable people in this population is one of the most critical issues. It is suggested that special care facilities be available to vulnerable groups such as older adults, disabled people, children, and those with special diseases. These recommendations align with the guidelines put forth by the WHO for these vulnerable groups.

### Strong points and limitations of the study

As recommended by the WHO [38], this study examined health topics in the Arbaeen pilgrimage by sharing the opinions of stakeholders from different disciplines and groups. The study can provide a deep and comprehensive view of the situation and its real challenges. In addition, the use of various information sources, including interviews, observation, and available documents, has increased the validity of the findings of this study. Also, this study was conducted in the field in real-time; as a result, the challenges were extracted when the ceremony was held. This study did not consider the limi-

tations of retrospective studies, the most important of which is recall bias.

However, this study also has certain limitations, the most important of which are as follows: The lack of volunteers at the given time of the research, the impossibility of establishing the researcher at some crossings (such as the Mirjaveh border in Sistan and Baluchistan Province and the newly opened Khosravi border), the limitation of data collection during the interview with managers stationed in operational areas, especially the armed forces, and finally the low number of researchers in proportion to the scope of the research area.

### Conclusion

The current study offers a comprehensive analysis of healthcare issues associated with the AS Arbaeen marching ritual. The result of the survey shows fundamental challenges in various health domains. The findings can be considered an evidence-based guide for policymakers and planners of this highly populated religious ritual. Also, given the importance of ensuring the health of pilgrims in such gatherings, it seems necessary to include experts and health managers in the core of supervision, leadership, and management of this ritual.

The implications of this study can be generalized to other marches and gatherings. For example, the gathering of “Rahyan Noor” (the group of religious and political caravans that travel between visiting zones in south and southwestern Iran to commemorate Iranian efforts and lives lost in the Iran–Iraq War.) is similar to the Arbaeen march. Our results can be used for better management of this and similar events.

### Ethical Considerations

#### Compliance with ethical guidelines

#### Ethical considerations

The following measures were observed in the present study based on the World Medical Association Declaration of Helsinki on ethical principles in medical research: 1) Obtaining the necessary permits to start and conduct the study, 2) Transparently explaining the purpose of the study to the participants, 3) Ensuring the participants that their identities and opinions will not be revealed in any study stages, 4) Providing participants the option to leave the study at each stage, 5) Arranging the time, place, and duration of the interview based on the physical, mental,

and emotional condition of the participants, and 6) Respecting the principle of honesty and trustworthiness.

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### Authors' contributions

Study design: Jalil Arabkheradmand & Hamidreza Khankeh; Writing manuscript: Seyedeh Samaneh Miresmaeli; Data collection: Seyyed Mohsen Hosseini Borujeni, Ali Nasiri, Yousef Akbari Shahrestanki, VahidGhanbari, JafarBazyar, Asghar Tavan, Hamid Safarpour, Saeed Nazari1 Mohammad Munici; Data analysis: Seyedeh Samaneh Miresmaeli, Seyyed Mohsen Hosseini Borujeni, Ali Nasiri, Yousef Akbari Shahrestanki, VahidGhanbari, JafarBazyar, Asghar Tavan, Hamid Safarpour, Saeed Nazari1 Mohammad Munici.

### Conflict of interest

The authors declared no conflict of interest.

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