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ORIGINAL ARTICLE

Real-Time Surveillance of Communicable and Non-Communicable Diseases Among Visitants During the Arbaenia Pilgrimage in 2023 in the Babylon Province of Iraq

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Abstract

Background: Millionth clusters provide dynamic settings that profoundly affect pathogen activity and human reactions, making communicable and non-communicable disorders complicated biological processes. Pathogens recognize that elevated population density facilitates rapid mutations and dissemination. **Objective:** The purpose of the present study was to identify potential vulnerabilities and tailor healthcare services, to evaluate healthcare service distribution, to analyze emergency response effectiveness, to Identify Strengths and Challenges, province during mass gatherings in Babil, Iraq, 2023. **Methodology:** This cross-sectional design, from August 31, 2023, to September 6, 2023. Data was collected from a mobile clinic (medical stations) located in Babylon Province, Iraq by 15 trained data collectors across five sectors in the province, including (46 governmental and 4 non-governmental) mobile clinics. Using Kobo toolbox, which included questions/tables. The obtained data was statistically analyzed. **Results:** The study included 7991 visitors. The mean age of the visitant was 30.5 ± 9.84. Among age groups, the highest percentage was for the 26 to 35 age group, which represents 25.3% of the total visitors. The ratio of male to female was 1:1. Iran nation about 90%, of the study sample from the total visitant out of Iraq. The majority of data entered (we distributed the mawkibs on the province sectors) from the Al-Hilla First sector was (35%), while the Al-Musayyib sector was 28% the lowest data entered was the Kutha sector. Supportive elements about (10%) such as bandages, sugar test strips, massage elements, personal protective element. There 14% of visitors were referred to emergency hospitals in Babylon during mass gatherings, 100% of emergency cases healed. Establish 24-hour open mobile clinics to serve visitors, especially active surveillance/real-time surveillance like food poisoning. The number of active surveillance staff and clinics was 25% distributed throughout the province's healthcare sectors, and only (15%) of the mobile clinics had physicians. **Conclusion:** Babylon Province demonstrated a good health surveillance system during the Arbaenia pilgrimage and demonstrated a robust framework for managing large-scale public health events. While the system has proven effective in many areas, addressing identified challenges through strategic improvements can further enhance its efficiency and effectiveness. *[Journal of Current and Advance Medical Research, July 2024;11(2):109-114]*

Keywords: Communicable; non-communicable diseases; Arbaenia mass gathering; real-time surveillance; mobile clinics

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Introduction

Arbaenia Pilgrimage is one of the largest religious gatherings in the world, commemorating the martyrdom of Imam Hussein, the grandson of Prophet Muhammad. It takes place annually in the holy city of Karbala, Iraq, attracting millions of visitors from different parts of the world, particularly Shia Muslims[1,2]. The pilgrimage is a global event drawing participants from diverse and cultural backgrounds and holds significant religious, psychological, and spiritual importance for participants who embark on a journey of mourning, reflection, and devotion[3]. During Arbaenia, visitants walk long distances, often on foot, to reach the holy shrine of Imam Hussein, creating a vibrant atmosphere of unity, solidarity, and reverence[4]. highlighting the ongoing challenges in managing such a massive event Imam Hussein, the grandson of the Prophet Muhammad, was martyred in the Battle of Karbala in 680 AD, His death is commemorated on the 10th day of Muharram (Ashura), and Arbaenia marks the end of the 40-day mourning period, the Arbaenia walk is also marked by immense acts of charity and hospitality.

Local Iraqis and international volunteers set up thousands of service stations (mawkibs) along the route from Najaf to Karbala, offering free food, water, medical services, and even massages to the pilgrims[5]. Pilgrimage poses substantial health and logistical challenges due to the number of participants. Public health concerns include inadequate medical services and infrastructure, leading to difficulties in managing potential health crises. Facilitators have been identified to address these challenges, such as improved coordination among health ministrys[5-7]. Incorporated customized pilgrim training focusing on hygiene practices, active surveillance detects every case in the Arbaenia pilgrimage although active surveillance is more comprehensive, it requires significant human and financial resources[6,8]. and enhanced surveillance systems to rapidly identify contagious (communicable) diseases. In 2019, UNESCO recognized the hospitality during Arbaenia as an intangible cultural heritage of humanity[9].

Throughout the pilgrimage, the Iraqi people and international volunteers provide extensive hospitality to the pilgrims, significant logistical and health challenges due to the massive influx of people. Health concerns include the spread of infectious diseases, heat-related illnesses, and the need for adequate medical facilities. Efforts to address these challenges include coordinated health services, training for visitors on hygiene practices, and improved surveillance systems. Babylon Province (Iraqi province) neighboring Karbala and its central location in Iraq, receives visitants from all boundaries, necessitating an active surveillance system to monitor, calculate, and respond to any unusual events like (outbreaks) among visitants and residents[10,11]. The purpose of the present study was to identify potential vulnerabilities and tailor healthcare services, to Evaluate healthcare service distribution, to analyze emergency response effectiveness, to Identify Strengths and Challenges, province during mass gatherings in Babil, Iraq, 2023.

Methodology

Study Settings and Population: This cross-sectional study was conducted among visitors of Arbaenia mass gatherings in Babil Governorate during the period from August 31, 2023, to September 6, 2023. This descriptive survey (cross-sectional design), The study in the Arbaenia pilgrimage, survey the visitor, located in Babylon Province, Iraq. Study population were all visitant during the Arbaenia pilgrimage, excluding healthcare workers and Service providers in mawkibs.

Survey Procedure: Data was collected from a mobile clinic (medical stations (by 15 trained data collectors across five sectors in the province, including (46 governmental and 4 non-governmental) mobile clinics.

Sampling and sample size: The study used convenience sampling to collect data from (50 mobile clinics for 7991 visitors) over a specified period using an electronic link developed by the Kobo toolbox, which included questions/tables designed to achieve the study objectives. Before implementation, the electronic link underwent a pretest (pilot) for clarity and comprehension on 28-29 August 2023, collecting data took 10 hr. per day. The electronic link variables: comprised (27 questions/tables related to disease or events and demographics among visitors divided into five parts: Part one gathered general information about demography, age, sex, education level, and nation. Part two focused on visitors' disease/events recorded in mobile clinics. Part three was regarding the type of mobile clinics and the availability of physicians in them. Part four recorded the type of medication that would be given according to the availability of medication in a mobile clinic. Part five recorded the type of services that would be given to sick visitors in a mobile clinic.

Data Management: Entered the data using an electronics tool (kobotoolboks program), and analyzed using appropriate descriptive statistics). Descriptive statistics are used to summarize participant's demographics.

Statistical Analysis: Data were checked for accuracy and completeness regularly. The collected data was entered and organized using Microsoft Excel 2021 and analyzed with the Statistical Package for Social Sciences (SPSS v.26). Descriptive analyses were performed and the results were presented as counts with frequencies, and means with standard deviations, as appropriate, in tables and graphs. Pearson's Chi-square ($\chi 2$ test) or Fisher's exact test was used to compare categorical variables between groups, with a P-value of ≤ 0.05 considered statistically significant. To maintain data quality, questions with a non–response rate of more than 15% were excluded from the analysis.

Ethical Consideration: Ethical considerations were approved by the institution's ethics committee before implementing the survey. Informed consent was obtained from all participants, and Confidentiality and anonymity of participants were ensured (conducted in compliance with ethical guidelines).

Results

The study included 7991 visitors. The mean age of the visitant was 30.5 ± 9.84. Among age groups, the highest percentage was for the 26-35 age group, which represents 25.3% of the total visitors. The ratio of males to females was 1:1. Iran nation about 90%, of the study sample from the total visitant out of Iraq. The majority of data entered (we distributed the mawkibs on the province sectors) from the Al-Hilla First sector was (35%), while the Al-Musayyib sector was 28% the lowest data entered was Kutha sector (Figure I).

For visitants who attend mobile clinics appears that chronic conditions like high blood pressure (hypertensive) were recorded at a rate of 60% compared to high blood sugar and cases of shortness of breath (asthma), while the droplet in visitors' pressure rate was less than 1%. About 60% of the study sample (visitors) have a hypertensive condition regarding to non-communicable disease (Figure II).

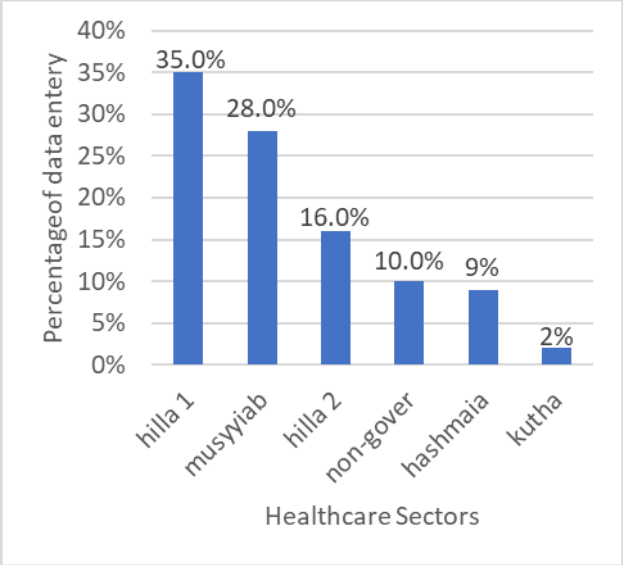

Figure I: Distribution of study healthcare sectors according to percentage of visitor's data during mass gathering Babylon, 2023

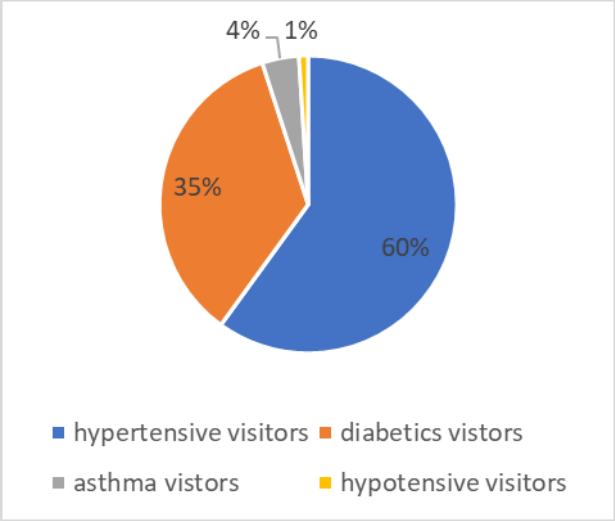

Figure II: Percent of Chronic Conditions reported during Mass Gathering, Babylon Province, Iraq, 2023

The study collected the medication spent in mobile clinics and showed that gastrointestinal disturbance drug was the major type described/ used (36%) (Table 1).

Table 1: Percent of Medication Consumption in Mobile Clinics During Mass Gathering, Babylon province, 2023

Medication	Consumption Rate
Gastro-intestinal disturbance drug	36.0%
Pain killers drug	21.0%

Medication	Consumption Rate
Motion sickness drug	16.0%
Analgesic drug	12.0%
Anti-histamine drug	12.0%
Anti-hypertensive drug	2.0%
Diabetics drug	2.0%

The study collected the reported cases in mobile clinics by medical staff and showed that injuries/traffic accidents were the major type reported (37.0%) (Table 2).

Table 2: Percent of Cases/Diseases Reported in Mobile Clinics During Mass Gathering, Babylon Province, 2023

Case report	Percent
Injuries/Traffic Accidents	37.0%
Joint/ Muscle Pain	21.0%
Flu-like illness	12.0%
Topical/ wound infection	9.0%
Chronic illness (Hypertension /Diabetics/Asthma)	8.0%
Fatigue	4.0%
Acute diarrhea	4.0%
Abdominal pain	4.0%
Food poisoning	1.0%
Total	**100.0%**

Discussion

Among the health challenges in mass gatherings, including the Arbaenia walking, are the spread of infectious diseases and the health needs of the visitors. An excellent way to provide health 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 treatments and prevention of human catastrophes is vital[12-14]. Despite the various treatment camps along the Arbaenia walking route, accurate epidemiological information on the number of patients, drugs used, and common diseases, is not available. The health surveillance during the Arbaenia pilgrimage in Babylon Province presents several critical points covering the effectiveness, challenges, and potential improvements in the health surveillance system based on the study's findings with recent studies conducted in Iraq and other countries[1]. Several studies have focused on limited cases through the Arbaenia pilgrimage. In contrast, this study focused on the rapid response capability of medical staff in diagnostic and emergency cases that refer to hospitals indicating an effective triage and referral process.

This rapid response capability is crucial in managing serious health incidents promptly, also focused on facilities capacity during millions of pilgrims, there were more than (80) mobile clinics installed, while under our study only (50) clinics from multiple healthcare sectors were involved each (governmental and non-governmental clinics) are cooperative for enhancing the healthcare services of visitant and highlights a collaborative effort, enhancing the system's reach and effectiveness. The proportion of cooperation between local communities and volunteers in surveillance systems might increase responsibility towards public health. The system's ability to refer (14.0%) of visitant to emergency hospitals indicates an effective triage and referral process, so the importance of having specialized medical teams and facilities to address these specific needs. This rapid response capability is crucial in managing serious health incidents promptly[7,9,11]. The number of active surveillance medical staff during millions of visitant is not propitiated with peak time (crowded period) for reported each case resulted in insufficient data coverage. The high rates of injuries (37%) and chronic condition management (8.0%). The presence of flu-like illness (12.0%) and acute diarrhea (4.0%) among visitors highlights the importance of infection control measures, including rapid identification and isolation of cases to prevent outbreaks. The study identified shortages in critical medical supplies, such as bandages and sugar test strips.

Supportive elements (10.0%) such as bandages, sugar test strips, massage elements, personal protective elements. There 14.0% of visitors were referred to emergency hospitals in Babylon during mass gatherings, 100.0% of emergency cases healed. Establish 24-hour open mobile clinics to serve visitors, especially active surveillance/real-time surveillance like food poisoning. The number of active surveillance staff and clinics was 25.0% distributed throughout the province's healthcare sectors and only (15.0%) of the mobile clinics had physicians. The study revealed that the majority of visitors were from different areas of Babylon and showed that health challenges related to Arbaenia walking were identified. These challenges were categorized into four main groups: group one, insufficient health supervision, and surveillance. The second, group has inadequate health facilities and services. The third group was health risks and hazards, and the fourth group was a lack of health knowledge and awareness among pilgrims. Overall,

the most common challenges included infectious diseases[14-15].

Being single-center and lack of follow-up of patients are among the limitations of the present study. It is suggested that more comprehensive studies be performed on patients referring to different treatment camps in the future. Also, referring patients should be followed up and examined after returning from the gathering. Designing and setting up patient data recording systems can be helpful in this regard. Increasing the number of trained personnel and distributing them across shifts can address this issue[1,10,15].

Implementing a dynamic resource allocation model based on real-time data and historical trends can help ensure an adequate supply of medical resources throughout the pilgrimage. Expanding data collection efforts to cover all shifts comprehensively will provide a more accurate register of data on health events and enhance the responsiveness of the surveillance system.

Conclusion

Babylon Province demonstrated a good health surveillance system during the Arbaenia pilgrimage and demonstrated a robust framework for managing large-scale public health events. While the system has proven effective in many areas, addressing identified challenges through strategic improvements can further enhance its efficiency and effectiveness. By implementing these recommendations, a future health surveillance system can improve for a more resilient and responsive health surveillance infrastructure, ensuring the safety and well-being of millions of visitors. The data used in this study are not sufficient due to the lack of a pre-created data recording system, the results of this study showed that in addition to the importance and necessity of holding such ceremonies, health issues and facilities should also be considered. Also, equipment, facilities, and specialized personnel should be provided on-site considering needs assessments and studies performed on health surveillance systems and provide an excellent annual opportunity for coordinated international research on populations of different countries intending to compare different interventions attempting to reduce the risk of spread of infection.

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Conflict of Interest
The authors have no conflicts of interest to disclose

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Contributions to authors: Conception and design, Acquisition, analysis, and interpretation of data, Manuscript drafting and revising it critically, and Approval of the final version of the manuscript

Ethics Approval and Consent to Participate
Ethical considerations were approved by the institution's ethics committee before implementing the survey. Informed consent was obtained from all participants, and Confidentiality and anonymity of participants were ensured (conducted in compliance with ethical guidelines).

Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

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