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Patient presentations at medical clinics during the martyrdom anniversary of Imam Ali ibn Abi Talib mass gathering, Najaf, Iraq, 2024: a cross-sectional study

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Abstract: **Objective:** Religious mass gatherings in Iraq attract millions of pilgrims and have significant public health challenges. The martyrdom anniversary of Imam Ali ibn Abi Talib (peace be upon him) in Najaf involves high population density and potential health risks. However, limited data exists on the spectrum of patient presentations during this event.

Methods: It was a cross-sectional study in 12 health facilities (10 temporary mobile clinics and 2 fixed centers) established in Najaf for the event. The study was conducted from March 29 to April 1, 2024 (18–21 Ramadan 1445H). Data was collected by convenience sampling, entered via KoboToolbox, and analyzed in SPSS version 26 using descriptive statistics and chi-squared tests.

Results: A total of 8,959 patients were registered. Most were aged 31–60 years (58.2%) and Iraqi nationals (80.8%). The most common acute infectious presentation was pharyngitis (16.7%: 95% CI: 15.9,17.4), followed by acute diarrhea (3.2%: 95% CI: 2.9,3.6). Noncommunicable conditions included hypertension (11.5%; 95% CI: 10.9,12.2), and diabetes mellitus (7.9%; 95% CI: 7.3,8.4). Patient presentations varied significantly by age group and nationality (P< 0.001).

Conclusion: Pharyngitis was the leading acute presentation, suggesting a risk of respiratory disease transmission. Chronic conditions, particularly hypertension and diabetes, especially among adults over 31 years. These findings highlight the need for preparedness of temporary clinics to manage both communicable and noncommunicable diseases during religious mass gatherings in Iraq.

Keywords: Mass Gathering; Patient Presentation; The Martyrdom of Imam Ali ibn Abi Talib

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1. Introduction

Mass gathering (MG) is the concentration of people at a specific location for a specific purpose over a set period, where attendance is sufficient to strain local planning and response resources of the country or community (1).

Diverse health risks are associated with MGs, including different infectious diseases, with the potential to transmit diseases to their local communities after returning from the event. Mass gatherings may also exacerbate noncommunicable conditions, leading to emergencies and hospital admissions (2,3).

Also, mass gathering attendees are at an increased risk for different health problems that range from mild muscle cramps to severe injuries (4). In addition to illnesses caused by environmental factors, such as heat-related illness and hypothermia (2).

In Iraq, several religious mass gatherings are held throughout the year, mainly in Karbala, Najaf, and Baghdad (5). On the day of 19-21 Ramadan Hajri month every year, many pilgrims come from different Iraqi provinces and some countries to Najaf city for the martyrdom anniversary of Imam Ali ibn Abi Talib (peace be upon him) (6).

The objective of this study was to identify the main patient presentations among attendees at health facilities during the

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mass gathering commemorating the martyrdom anniversary of Imam Ali ibn Abi Talib (peace be upon him) in Najaf, Iraq, in 2024. We hypothesized that the distribution of patient presentations would vary by both age and nationality. Specifically, we expected that chronic conditions such as hypertension and diabetes mellitus would be more common among older age groups, while acute infectious diseases such as pharyngitis and diarrhea, as well as trauma-related complaints, would be more frequent among younger attendees. Also, the majority of participants are Iraqi pilgrims, and differences in the types of presentations might also emerge between Iraqis and foreigners.

2. Methods

2.1. Study design

It was a cross-sectional study conducted in 12 health care facilities distributed across Najaf. Data was collected by convenience sampling, which included all individuals who attended the twelve participating health facilities during the mass gathering period.

2.2. Sample size

No formal sample size calculation was performed, as convenience sampling was used. The aim was to capture all attendees presenting to the clinics over the three days. Based on prior mass gathering reports, approximately 8,000–9,000 individuals were expected to seek care, providing a large and representative sample to describe patterns of patient presentations by age and nationality.

2.3. Inclusion and exclusion criteria

We included all attendees regardless of age, sex, or nationality. Patients with incomplete records were excluded. Each health facility visit was counted separately, even if the same individual presented more than once during the study period.

2.4. Setting and dates

The twelve health care facilities were distributed in Najaf. Najaf al-Ashraf is the capital city of the Najaf governorate in central Iraq, about 160km from Baghdad. Its estimated population in 2024 is about 1.41 million people. The twelve health care facilities were classified into two fixed primary health centers (Muslim ibn Aqeel in Al-kufa sector and Al-Haidari Visitors in the southern sector) and ten temporary clinics that serve during the martyrdom anniversary of Imam Ali ibn Abi Talib (peace be upon him) mass gathering. The 12 clinics were set up by the ministry of health, which are considered governmental organizations. The study was conducted from March 29 to April 1, 2024 (18–21 Ramadan 1445H). In Iraq, this is the beginning of summer, and the weather is generally slightly hot and dry.

2.5. Data collection

A total of 24 data collectors took part in the field data collection for 12 health care facilities (2 for each health care facility), with one data collector every 12 hours. The team of data collectors was trained by the ministry of health in the Najaf Health Department. The information was collected through a form questionnaire by KoboToolbox collected through the personnel's mobile. Given the simplicity of the survey form, the duration of each case interview ranged from 30 seconds to a few minutes.

When the internet was available, they were sent to the mass gathering unit in the Najaf health department. The data were collected in a Google Sheet and sent to the Ministry of Health every 24 hours at 9:00 a.m.

2.6. Data variables

A short form was developed to gather information, including the age classified into three categories:(<15 years,15-30, and 31-60 years), nationality, and provisional diagnosis obtained from treating physicians. Also, nationality (Iraqi vs. non-Iraqi) was also recorded. Age was recorded in years and categorized into three groups: <15, 15–30, and 31–60 years. These cutoffs were chosen based on developmental and epidemiological considerations: children (<15 years) are more susceptible to infectious conditions, young adults (15–30 years) typically experience acute conditions and injuries related to mass gatherings, and adults over 30 years (31–60 years) are more likely to present with chronic noncommunicable diseases. This categorization is also consistent with previous studies on health outcomes in mass gathering settings. Diagnoses were based on clinical evaluation with or without laboratory or radiological confirmation, given the temporary mass-gathering setting. Pharyngitis as sore throat with pharyngeal erythema but with or without tonsillar findings; diarrhea as three or more loose stools within 24 hours; injury as any trauma-related complaint; and chronic conditions (e.g., hypertension, diabetes mellitus) as previously known diagnoses reported by the patient or documented in their medical record.

2.7. Ethical considerations

Ethical approval for this study was obtained from the ministry of health, directorate of operation and emergency medical services. The consent form was obtained from all participants before involving them in the survey.

2.8. Statistical analysis

The data were analyzed using the statistical package for the social sciences (SPSS, software version 26). Descriptive statistics were presented as frequencies and percentages. The Chi-squared test was used to test significant associations among categorical variables. The association was considered to be statistically significant when the P-value of <0.05 with a confidence level of 95 %.

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Table 1 Frequency of patients' presentations lead to attend to health care facilities with CI (95%)

Diseases	Frequency	Percent %	95% CI
Diabetes mellitus	706	7.9%	7.3,8.4
Hypertension	1032	11.5%	10.9,12.2
Enteritis	325	3.6%	3.2,4.0
Pharyngitis	1493	16.7%	15.9,17.4
Hypotension	272	3.1%	2.7,3.4
Intestinal colic	476	5.3%	4.8,5.8
Asthma	129	1.4%	1.2,1.7
Heat illness	150	1.7%	1.4,1.9
Skin rash	333	3.7%	3.3,4.1
Joints pain	1029	11.5%	10.8,12.1
Diarrhea	290	3.2%	2.9,3.6
Wounds	588	6.6%	6.1,7.1
Fractures	0	0%	0.0,0.0
Burns	9	0.1%	0.0,0.2
Others	2127	23.7%	22.9,24.6
Total	8959	100%	

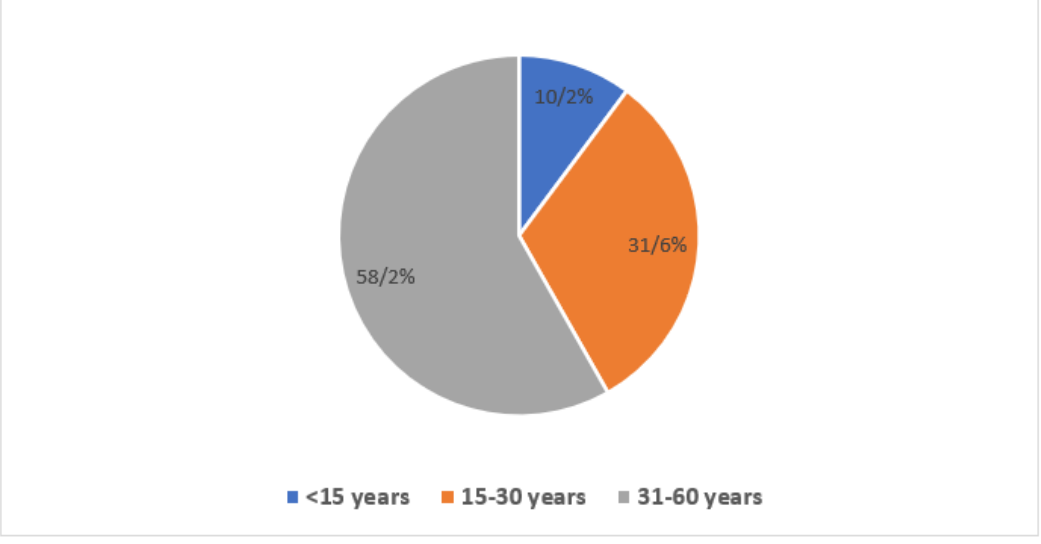

Figure 1 The distribution of the patients who attended health care facilities at different age groups

Table 2 The distribution and association of the patients' presentations and conditions according to age groups

		Age group (years)		Total (N=8959)	P-value
Diseases	**<15 (N=918)**	**15-30 (N=2829)**	**31-60 (N=5212)**		
Diabetes mellitus	3 (0.4%)	189 (26.8%)	514 (72.8%)	706 (100%)	0.00001
Hypertension	0 (0%)	169 (16.4%)	863 (83.6%)	1032 (100%)	
Enteritis	42 (12.9%)	122 (37.5%)	161 (49.5%)	325 (100%)	
Pharyngitis	309 (20.7%)	435 (29.15)	749 (50.2%)	1493 (100%)	
Hypotension	21 (7.7%)	132 (48.5%)	119 (43.8%)	272 (100%)	
Intestinal colic	91 (19.1%)	201 (42.2%)	184 (38.7%)	476 (100%)	
Asthma	36 (27.9)	22 (17.1%)	71 (55.03%)	129 (100%)	
Heat illness	0 (0%)	87 (58%)	63 (42%)	150 (100%)	
Skin rash	123 (36.9%)	83 (24.9%)	127 (38.1%)	333 (100%)	
Joints pain	29 (2.8%)	333 (32.4%)	667 (64.8%)	1029 (100%)	
Diarrhea	62 (21.4%)	123 (42.4%)	105 (36.2%)	290 (100%)	
Wounds	30 (5.1%)	263 (44.7%)	295 (50.2%)	588 (100%)	
Burns	4 (44.4%)	5 (55.6%)	0 (0%)	9 (100%)	
Others	168 (7.9%)	665 (31.3%)	1294 (60.8%)	2127 (100%)	
Total	918 (10.2%)	2829 (31.6%)	5212 (58.2%)	8959 (100%)	

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Table 3 The distribution and association of the patients' presentations and conditions according to their nationality

Diseases	Iraqi (N=7239)	Foreigners (N=1720)	Total (N=8959)	P-value
Diabetes mellitus	504 (71.4 %)	202 (28.6%)	706 (100 %)	0.00001
Hypertension	761 (73.7%)	271 (26.3%)	1032 (100 %)	
Enteritis	301 (92.6%)	24 (7.4%)	325 (100 %)	
Pharyngitis	1094 (73.3 %)	399 (26.7%)	1493 (100 %)	
Hypotension	201 (73.9%)	71 (26.1%)	272 (100%)	
Intestinal colic	421 (88.4%)	55 (11.6%)	476 (100%)	
Asthma	115 (89.1%)	14 (10.9 %)	129 (100%)	
Heat stroke	150 (100%)	0 (0 %)	150 (100%)	
Skin rash	286 (85.9%)	47 (14.1%)	333 (100%)	
Joints pain	811 (78.8%)	218 (21.2 %)	1029 (100%)	
Diarrhea	251 (86.6%)	39 (13.4 %)	290 (100%)	
Wounds	445 (75.7%)	143 (24.3%)	588 (100%)	
Burns	9 (100%)	0 (0%)	9 (100%)	
Others	1890 (88.9 %)	237 (11.1%)	2127 (100%)	
Total	7239 (80.8%)	1720 (19.2%)	8959 (100%)	

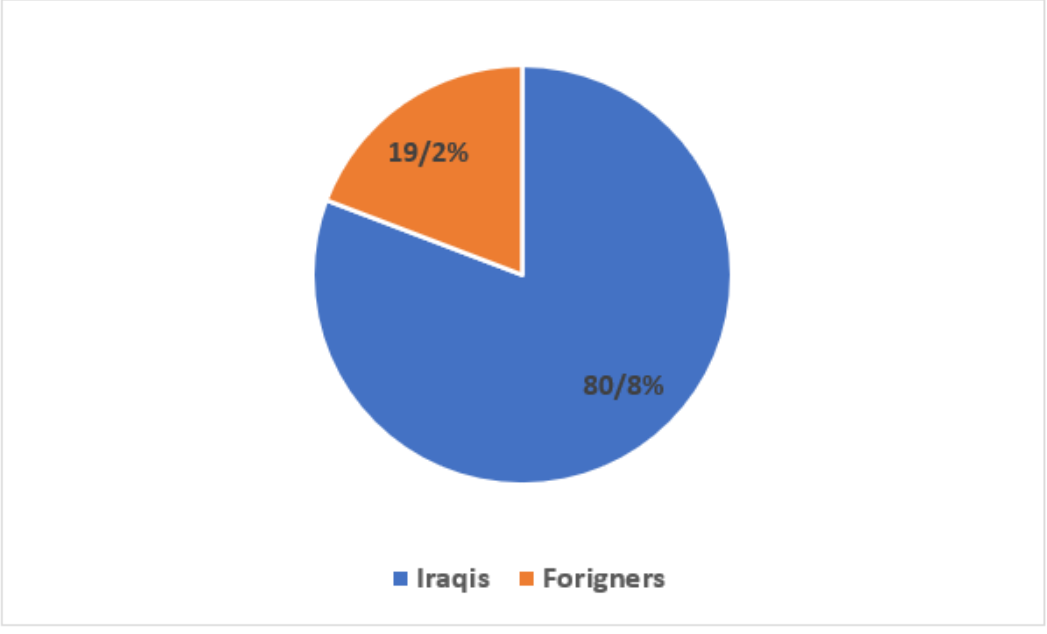

Figure 2 The distribution of the patients who attended health care facilities on their nationality

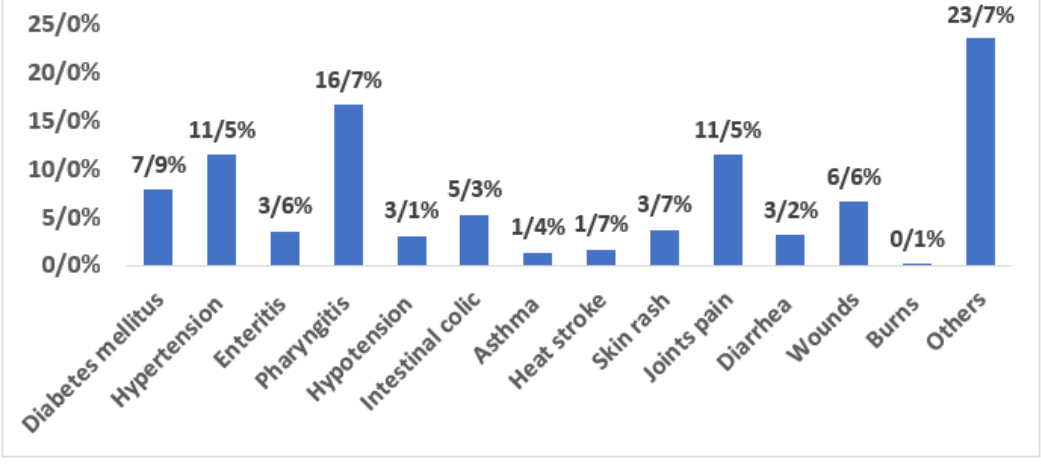

Figure 3 The distribution of the patients' presentations who attended health care facilities

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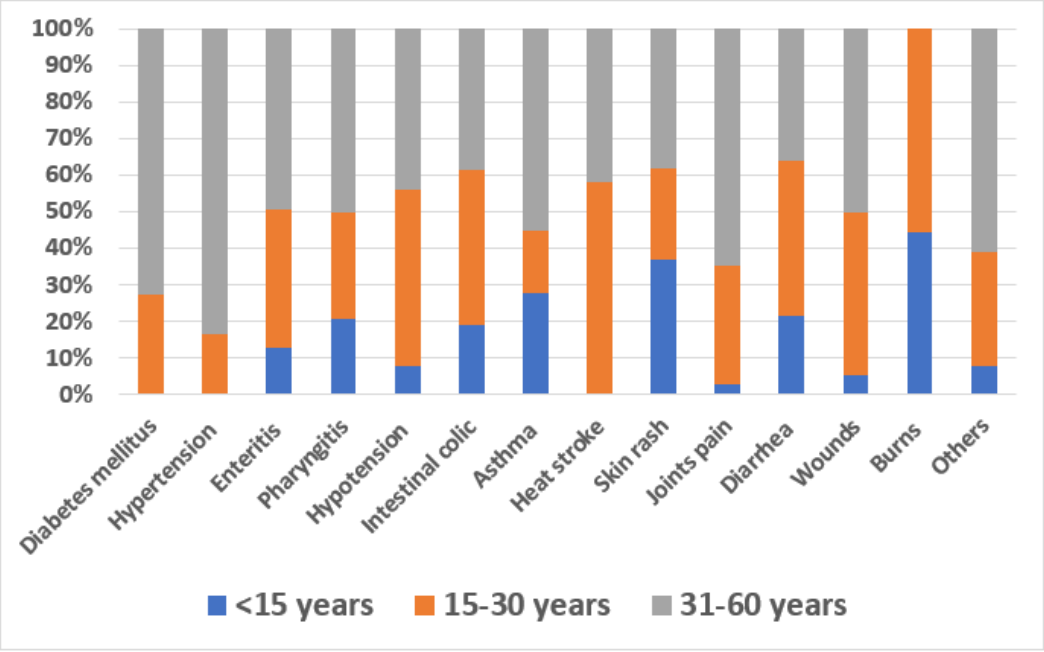

Figure 4 The distribution of the patients' presentations and conditions according to age groups

3. Results

A total of 8959 patients attended the 12 health care facilities over 3 days between March 29, 2024, and April 1, 2024. Two-thirds of the patients, 5212(58.2%), were aged 31-60, as shown in figure 1. 7239 (80.8%) were from Iraq, while 1720 (19.2%) were foreigners, as shown in figure 2. Table 1 shows that the most frequent conditions were others, 23.7%, and pharyngitis, 16.7 %.

3.1. Main conditions and complaints at presentation

As table1 and figure 3 were shown, the patients' presentations were classified into the following:

Infectious conditions and symptoms

About 16.7% (95% CI:15.9,17.4) of those patients had pharyngitis. Stratified analysis showed lower odds of pharyngitis in older age groups compared to children under 15 years: OR 0.33 for 31–60 years and OR 0.36 for 15–30 years. By nationality, Iraqi participants had lower odds of tonsillitis than foreigners (OR=0.59). Other main categories were enteritis (3.6%; 95% CI: 3.2,4.0), and diarrhea (3.2%; 95% CI: 2.9,3.6).

Acute conditions and symptoms

Most acute conditions related to mass gathering directly or indirectly were joint pain 11.5% (n=1029), intestinal colic 5.3% (n=476), hypotension 3.1% (n=272), and heat-related illness 1.7% (n=150).

Chronic conditions

The reasons for visiting health care facilities among those with chronic conditions, included problems such as hypertension (11.5%; 95% CI: 10.9,12.2), and diabetes mellitus (7.9%; 95% CI:7.3,8.4), were predominantly reported in patients aged 31–60 years. Stratified ORs indicated that older adults had markedly higher odds compared to children (<15 years): OR= 365 for hypertension and OR= 33.4 for diabetes mellitus.

Traumas and injuries

The only prevalent cases of injuries reported were wounds (6.6%: n=588), and burns (0.1%: n=9), while fractures were (0%: n=0). In table 2, the highest frequencies of patients' presentations in the 31-60 years age group were 83.6% (n=863) hypertension, 72.8%(n=514) diabetes mellitus, and 64.8% (n=667) joint pain. There were reported high frequencies of patients' presentations in the 15-30 years age group; 58% (n=87) heat-related illness, 48.5% (n=132) hypotension, 42.4% (n=123) diarrhea, and 42.2% (n=201) intestinal colic. Otherwise, the only high frequency of patients' presentations in the age group less than 15 was just 44.4% (n=4) burns, but still less than 55.6% (n=5) burns in the 15-30 years age group. The association of the patients' presentations with age groups was highly significant with a P-value=0.00001.

Figure 4 shows that most high frequencies were in 83.6% hypertensives, followed by 72.8% diabetes mellitus, in the age group of 31-60. As shown in the table 3, there was a highly significant difference in the distribution of the patients' presentations, with the highest frequency for Iraqi pilgrims with (P-value=0.00001). The table 3 showed that all patients' presentations had the highest frequency in Iraqi pilgrims.

4. Discussion

In Iraq, religious mass gatherings are increasingly common and can harbor considerable public health risks. This study describes common patient presentations reported at health

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facilities during the martyrdom of Imam Ali ibn Abi Talib's mass gathering in Najaf Governorate, Iraq.

A total of 8,959 patients visited the 12 health care facilities (2 fixed and 10 temporary or mobile clinics) during 3 days throughout the mass gathering. The health services burden during such events falls mainly on temporary or mobile clinics. This could be due to the high occurrence of minor illnesses during mass gatherings as well as the accessibility of mobile clinics to the mass gathering participants (4,8).

The findings of this study highlighted the importance of symptoms of respiratory and gastrointestinal infections. Previous studies emphasized that there is a similar risk of infectious disease outbreaks during mass gatherings (3,9). Mass gatherings create favorable conditions for infectious disease transmission, as sore throat is caused by many pathogens transmitted mainly from person to person through the respiratory tract, and it is the leading cause of pharyngitis. The mass gathering in the year of the study took place at the end of spring, which could explain the high proportion of upper respiratory symptoms observed.

Many pathogens, including bacterial, parasitic, and viral pathogens, can cause acute diarrhea. In a previous study conducted in the country, Escherichia coli and Salmonella species were the predominant causes of acute diarrhea (10).

Acute diarrhea and vomiting in the mass gathering could be related to food poisoning due to an unhygienic environment of serving foods and drinks that were not reported in this study. Foods and drinks served to the pilgrims are freely provided by local people, but they are not all licensed by the health authorities, with minimal monitoring and auditing (3).

Although these infections were expected, considering the exposure of the mass gathering attendees to crowded, unhygienic environments, and most of the individuals preparing and serving food are not certified food handlers, which creates favorable conditions for transmission of respiratory and food-borne diseases.

In general, acute diarrhea diseases affected young children more than older adults; however, children aged<15 were 21.4% (n=62) with diarrhea, and 12.9% (n=42) with enteritis, which is due to the narrow grouping of ages into <15 years that represent 10.2% (n=918) of the participants.

Skin rash was reported in 3.7% (n=333) of patients. While this finding coincided with a measles outbreak registered by the ministry of health in Iraq in spring 2024, our data collection tool did not capture fever with rash as a specific syndrome. Therefore, it is not possible to confirm the etiology of these cases.

Mass gatherings may also exacerbate noncommunicable diseases (NCDs) and chronic conditions, which may lead to emergencies and hospital admissions. In our study, chronic noncommunicable diseases, especially hypertension and diabetes mellitus, represented a considerable proportion and were concentrated in older age groups.

The study has some limitations, that population with ischemic heart disease symptoms were not reported. Thus, during the MG, NCD emergencies rose in cases of ischemic heart disease (IHD) and asthma, and most upsurge in cases of severe HT and diabetes (hyperglycemia). These findings are consistent with other studies conducted in the Ashura and Arbaeen in Karbala, Iraq as religious events (8,11).

Hypertension, diabetes mellitus, asthma, and ischemic heart disease or symptoms are likely to be sensitive to changes in daily activities and intense physical activities during mass gatherings. Moreover, poor adherence to diet and medications for hypertensive, diabetic, and asthmatic patients predisposes them to emergency room (ER) attendance (11).

It is true that the studies reveal regular exercise controls HT and diabetic hyperglycemia and improves IHD, but if there are sudden physical activities in individuals with cardiovascular diseases, they might precipitate a heart attack, and intensive physical activity leads to an IHD emergency, correlated with severe HT and diabetic-hyperglycemia emergencies during the MG event (12).

The study showed joint pain was the most common chronic condition reported. This can be explained by the pilgrims' walking, standing, and physical activity during the event.

During mass gatherings, trauma is one of the most common medical problems. The health consequences of mass gatherings include injuries resulting from crowd density and inadequate infrastructure, exposure to extreme weather events, and escalation of violence as a result of crowd behavior. Injuries were reported but occurred less frequently than expected. Importantly, most presentations were more common among Iraqi attendees compared with foreigners.

The percentage of wounds' injuries was roughly the same for participants under 31 years and those over 31 years. This is inconsistent with the global figures on injuries, which show that youth are more likely to take risks than older individuals, increasing their risk of injury. The study had limitations in registration because the injuries were transported to the hospital by ambulance, which could explain the discrepancy in results.

Although the MG event encountered the hot weather at the end of the spring, besides the event in the month of Ramadan, where almost all people were fasting. The findings of hypotension and heat-related illnesses are regarded as less than expected.

All presenting diseases were mostly higher in Iraqi nationality than non-Iraqi participants, which may be related to a large number of Iraqis in comparison to foreign participants and to the healthy habits of non-Iraqis.

5. Limitations

This study has several limitations and potential sources of bias. It was relied on provisional clinical diagnoses without laboratory confirmation, and absence of syndromic surveillance which may have led to misclassification particularly for infectious conditions such as tonsillitis, pharyngitis, and diarrhea.

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A limitation of this study is the large 'Others' category (23.7%), for which specific conditions were not captured, limiting detailed description of less common presentations. Selection bias is also possible, as severely ill individuals who could not reach the clinics were not captured, potentially underestimating serious cases. In addition, data were collected during a single mass gathering in Najaf, which may limit generalizability to other events or seasons. Despite these constraints, the large sample size, inclusion of both fixed and mobile facilities, and standardized data collection procedures strengthen the reliability of the reported findings.

Finally, the findings of this study may be generalizable to other religious mass gatherings in Iraq, such as Arbaeen and Ashura, since they share similar crowd dynamics and health service challenges. However, differences in time and season could alter the spectrum of clinical presentations; for example, heat-related illness is likely to be more prominent during summer like Tuwairij (13). In addition, while nearly one-fifth of attendees in this study were foreigners, the majority were Iraqi pilgrims, unlike Hajji that cultural or behavioral differences among international pilgrims may limit the direct applicability of these findings to non-Iraqi contexts (14). Further studies across different governorates, seasons, and populations are needed to strengthen external validity.

6. Conclusion

Nonspecific pharyngitis was the most common clinical presentation that reflects a high risk of infectious spread. Noncommunicable presentations, mainly chronic conditions, included problems such as hypertension, diabetes mellitus, and asthma were common and increased mainly in age above 31 years.

7. Declarations

7.1. Acknowledgement

The authors thank the ministry of health which supported the research.

7.2. Authors' contribution

All steps of this study have been done with the participation of all authors.

7.3. Conflict of interest

The authors declare no conflict of interest.

7.4. Funding

None.

References

1. Koski A, Pappinen J, Kouvonen A, Nordquist H. Preparedness for mass gatherings: rescue and emergency medical services' workloads during mass gathering events. Scand J Trauma Resusc Emerg. 2022;30(1):15.
2. Hoang V-T, Gautret P. Infectious diseases and mass gatherings. Curr Infect Dis Rep. 2018;20:1-12.
3. Lami F, Asi W, Khistawi A, Jawad I. Syndromic surveillance of communicable diseases in mobile clinics during the Arbaeenia mass gathering in Wassit Governorate, Iraq, in 2014: cross-sectional study. JMIR public health and surveillance. 2019;5(4):e10920.
4. Hantoosh H, Lami F, Saber B. Disease burden on health facilities in governorates south of Karbala during the Arbaeenia mass gathering in Iraq in 2014: cross-sectional study. JMIR public health and surveillance. 2019;5(4):e10917.
5. Hajian M, Mohaghegh S. Factors influencing the health of participants in religious mass gathering ceremonies in Iraq: a systematic review. Trauma Monthly. 2023;28(1):694-714.
6. Aslan RS. From body to shrine: the construction of sacred space at the grave of'Ali Ibn Abi Talib In Najaf: the university of North Carolina at Chapel Hill; 2014.
7. Shafaqna News. The number of pilgrims in the shrine of Imam Ali reached 4.7 million on the 21st day of Ramadan [Internet]. April 2, 2024.
8. Zeitz KM, Zeitz CJ, Kadow-Griffin C. Injury occurrences at a mass gathering event. Australasian Journal of Paramedicine. 2005;3:1-10.
9. Lami F, Hameed I, Jewad AW, Khader Y, Amiri M. Real-time surveillance of infectious diseases and other health conditions during Iraq's Arbaeenia mass gathering: cross-sectional study. JMIR public health and surveillance. 2019;5(4):e14510.
10. Monteville MR, Riddle MS, Baht U, Putnam SD, Frenck RW, Brooks K, et al. Incidence, etiology, and impact of diarrhea among deployed US military personnel in support of operation Iraqi freedom and operation enduring freedom. American Journal of Tropical Medicine and Hygiene. 2006;75(4):762-7.
11. Lami F, Jewad AW, Hassan A, Kadhim H, Alharis S. Noncommunicable disease emergencies during Arbaeenia mass gathering at public hospitals in Karbala, Najaf, and Babel Governorates, Iraq, 2014: cross-sectional study. JMIR Public Health and Surveillance. 2019;5(3):e10890.
12. Al Shimemeri A. Cardiovascular disease in Hajj pilgrims. Journal of the Saudi Heart Association. 2012;24(2):123-7.
13. Habeeb AA. Medical presentations reported among participants of the Tuwairij run (Ashura day), Karbala, Iraq, 2024.
14. Yezli S, Mushi A, Almuzaini Y, Balkhi B, Yassin Y, Khan A. Prevalence of diabetes and hypertension among hajj pilgrims: a systematic review. International journal of environmental research and public health. 2021 ;18(3):1155.

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