Type of Paper: Original

Communicable Disease Syndromic Surveillance in the Mobile Clinics during Arbaeenia Mass Gathering at Wasseit Governorate, Iraq, 2014

Wejdan Asi, MBChB, DFE
Faris Lami, MBChB, PhD, FFPH
Adnan Khistawi, MBChB, MSc
Iman Jawad, MBChB, DFE
Abstract

Background: Arbaeenia religious event is the largest Mass Gathering (MG) in Iraq and is attended by 8-14 million people annually. Outbreaks of communicable diseases are a significant risk during MGs due to overcrowding and contamination of food and water supply. Syndromic surveillance is often employed for rapid detection and control of disease outbreaks.

Objective: this study was conducted in order to describe communicable disease syndromes among mobile clinics attendees in Wassit governorate.

Methods: Forty mobile clinics were selected along the road to Karbala from Wassit governorates during the Arbaeenia MG, December 1-10, 2014 for a cross-sectional study on six communicable disease syndromes: acute watery diarrhea, bloody diarrhea, fever and cough, vomiting with or without diarrhea, fever and bleeding tendency, and fever and rash. Data on patients was collected, including age, sex and diagnosis from the mobile clinic registries and forms.

Results: A total of 87,865 patients attended the clinics during the study period, of which 3,999 (5%) had communicable disease syndromes. The average daily attendees were 8,786 patients for all clinics and 219 patients per clinic. Of the total patients attended the clinics, 2% had fever and cough, 1.3% had acute diarrhea, 1.2% presented with vomiting with/without diarrhea, <1% had bloody diarrhea. The distribution of the syndromes did not vary between the age groups and gender. Stool samples from 120 randomly selected acute watery diarrhea cases were all negative for Vibrio Cholera.

Conclusions: Syndromic surveillance was useful in determining the main CDs syndromes and their basic profile during MGs. Expansion of this surveillance to other governorates and the use of mobile technology can help in timely detection and response to CDs outbreaks and mitigate its impacts.
Introduction

Mass gatherings (MGs) are defined as pre-planned public events that are held for a limited time period and attended by more than 25,000 people. MGs can be festivals, religious activities, sporting events, concerts, political rallies, or other. The duration of the event could be from several hours to several days [1].

MGs create favorable conditions for infectious disease transmission [2]. Participants in MGs are at risk of infection with the potential to transmit diseases to their local communities after returning from the event. MGs may also exacerbate non-communicable disease conditions, which may lead to emergencies and hospital admissions [3]. Infectious disease outbreaks are common during MGs [4-6]. Severe respiratory infections are major causes of hospitalizations during MGs, such as Hajj [7-10]. National surveillance systems are often incapable of monitoring the public health threats from MGs [11]. While MGs pose challenges to healthcare systems anywhere in the world [12], they provide an opportunity to strengthen both emergency and routine surveillance and response system, which can benefit countries long after the event. [13]

Several religious mass gatherings occur on an annual basis in Iraq, drawing up to 10 million pilgrims at a time. The MG known as “Arbaeenia” is one of the largest annual mass gatherings in the world, during which individuals may walk up to 600km through Iraqi provinces to visit the Imam Hussein’s shrine in Karbala to commemorate the 40th day after his martyrdom [14]

The use of appropriate surveillance systems ensures timely information management for effective planning and response to infectious diseases threats during the pilgrimage. [15]. The influx of people places a strain on existing surveillance and response systems, and the media and political attention generated by MGs mean that the adverse consequences of any negative health event may be greatly magnified. [13]

As part of the health services delivered to pilgrims, the Ministry of Health of Iraq (MOH) set up mobile clinics along the main roads leading to Karbala to provide immediate care to minor medical emergencies. Public health surveillance is essential during MGs to control disease epidemics that could have pandemic potential. Syndromic surveillance makes preliminary clinical information available at much
more timely manner and avoids a potentially lengthy delay required for definitive, laboratory-confirmed diagnoses.

Currently, the routine national surveillance system for the main communicable diseases in Iraq is not implemented in the temporary mobile clinics during MG events, as these clinics are more concerned with provision of basic curative services. To fill the gap in disease surveillance in these clinics, we introduced the syndromic surveillance that covers a spectrum of communicable diseases (CDs) of concern to the national public health system during MGs. This study was conducted to identify the main CDs syndromes reported among MG attendees who seek care from these clinics in Wasit governorate during the Arbaeenia MG event. Information obtained from this study is expected to inform future planning of MG events and to develop an effective surveillance system for the MG.

Methods

We conducted a cross sectional study during Arabeenia MG, December 1-10, 2014, in Wasit governorate. Forty mobile clinics set up along 140 Km road from Ali Al Garbee district in Northern Missan governorate to Al Shomali district in Southern Babylon governorate were selected and assessed. Data on patients attended at the mobile clinics and recorded in the clinic registries and forms were collected, including patients presenting with the following six communicable disease syndromes: "acute watery diarrhea", "bloody diarrhea", "fever and cough", "vomiting with or without diarrhea", "fever and bleeding tendency" and "fever and rash".

We collected data on age, sex, number of patients attended at the mobile clinics, and diagnosis of syndromes of communicable diseases listed above. Age was recorded in two categories, <5 years and ≥ 5 years. We used Epi Info software for data entry and analysis, and estimated percentages, frequencies and cross tabulation of variables.

Results

There were 87,865 patients attended at the mobile clinics in 10 days, with average daily attendees of 8,786 patients, 219 patients per clinic. Table 1 shows the number and percent of patients attended for the selected communicable disease syndromes.
There were 3,999 patients with communicable diseases syndromes and constituting 4.6% of the total patients attended the mobile clinics.

Approximately 2% (1,693) were attended for "fever and cough", 1.3% for "acute diarrhea" and 100 patients (0.11%) attended for "bloody diarrhea". During the 10 days of observation, none of the attendees presented with “fever and rash” or “fever and bleeding” syndromes.

Moreover, one hundred twenty stool samples collected from patients with acute diarrhea (10.5%) for culture for Vibrio cholera; all proved negative.

Table 1: Distribution of CDs syndromes among Mobile Clinics Attendees in Wasit Governorate in Arbaenia MG, 2014

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Total Mobile Clinics' Attendees (N=87,865)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>Fever and cough</td>
<td>1,693</td>
</tr>
<tr>
<td>Acute Diarrhea</td>
<td>1,144</td>
</tr>
<tr>
<td>Vomiting with or without Diarrhea</td>
<td>1,062</td>
</tr>
<tr>
<td>Bloody Diarrhea</td>
<td>100</td>
</tr>
<tr>
<td>Fever and rash</td>
<td>0</td>
</tr>
<tr>
<td>Fever and bleeding</td>
<td>0</td>
</tr>
<tr>
<td>All Syndromes</td>
<td>3,999</td>
</tr>
</tbody>
</table>

As demonstrated in figure 1, "fever and cough" constituted the major proportion of patients with CDs presented at the mobile clinics (42.3%) followed by acute diarrhea (28.6%).
The total number of reported syndromes was almost similarly distributed among the two age groups and both sexes, except acute diarrhea where 61% were $\geq 5$ years old (Table 2).

The time distribution of the four syndromes is displayed in figure 2. The highest proportion of the four syndromes was reported on the second day. Apart from the small increase in the proportion of "fever and cough" and "vomiting" on the eighth day and "acute diarrhoea" on the ninth day, there was a gradual decrease over the study days.

Table 2: Distribution of syndromes by sex and age groups, Arbaeenia MG, Wasit, 2014

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Gender</th>
<th>Age Groups</th>
<th>Male</th>
<th>Female</th>
<th>$\geq$5 Years</th>
<th>$&lt;$5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever and cough</td>
<td></td>
<td></td>
<td>804</td>
<td>889</td>
<td>802 (47.4%)</td>
<td>891 (52.6%)</td>
</tr>
<tr>
<td>Acute Diarrhea</td>
<td></td>
<td></td>
<td>550</td>
<td>594</td>
<td>699 (51.9%)</td>
<td>445 (38.9%)</td>
</tr>
<tr>
<td>Vomiting with or without Diarrhea</td>
<td></td>
<td></td>
<td>502</td>
<td>560</td>
<td>502 (47.3%)</td>
<td>560 (52.7%)</td>
</tr>
<tr>
<td>Bloody Diarrhea</td>
<td></td>
<td></td>
<td>55</td>
<td>45</td>
<td>52 (52%)</td>
<td>48 (48%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>1,911</td>
<td>2,088</td>
<td>$2,055 (51.4)$</td>
<td>1,944 (48.6)</td>
</tr>
</tbody>
</table>

Figure 1: Proportion of CDs syndromes presented at the mobile clinics, Arbaeenia MG, Wasit, Iraq
Discussion

The study describes six syndromes related to communicable diseases that are often attended in MG mobile clinics. The syndromes belong to respiratory and gastrointestinal infections, mostly to the latter. The MG participants are exposed to crowded and unhygienic environments, which creates favorable conditions for transmission of respiratory and foodborne diseases. The national surveillance system for communicable diseases in Iraq reports diseases and not syndromes, and the distribution of the syndromes studied could not be compared to the national figures. Syndromic surveillance was used for multiple purposes to detect outbreaks, such H1N1 influenza pandemic and in MGs [16,17].

Fever and cough syndrome is caused by many pathogens that are transmitted mainly from person to persons through respiratory tract, and it was the leading syndrome of the study. The Arbaeenia MG took place during the winter, which could explain the findings in the study.
Many pathogens, bacterial, parasitic, or viral can lead to acute diarrhea; the most dangerous pathogen of interest during mass gatherings is Vibrio cholera. Acute diarrhea and vomiting in the MG could be related to contaminated foods and drinking water. All collected stool samples tested negative for *vibrio cholerae*. In a study for the US military deployed in Iraq, E. coli and Salmonella species were the predominant causes of acute diarrhea [18]. Acute diarrhea affected less <5 year children than older age group, ≥ 5 years. This may be due to grouping wide range of ages, with varied risks to different causes of acute diarrhea, into a single age group.

Fever and rash syndrome which might indicate measles or rubella were not reported in this study. This finding coincided with the fact that southern Iraq was free of measles and rubella in 2014. Zero reporting was also noted for fever and bleeding syndrome. In Iraq, the most common cause of hemorrhagic fever is the tick-borne Crimean-Congo hemorrhagic fever. The winter season does not support transmission of the disease.

The observed peak of the four syndromes on the second day of surveillance that immediately followed a very low proportion of the first day is more likely due to over-attendance after launching the clinics rather than a coincident outbreak of the four syndromes together. The investigation done later by the surveillance officers did not reveal any clustering of cases in particular mobile clinics.

We can conclude that the syndromic surveillance installed during MGs can provide timely data to public health officials, which in turn helps in timely response. It is also useful in determining the main CDs syndromes and their profile. This can help in developing preparedness plans for the coming MGs. Iraq Ministry of Health is requested to expand this surveillance to other governorates and the use of mobile technology instead of the paper work used in this study.

The study has some limitations. The population at risk for communicable disease syndromes was not known, thus rates of syndromes could not be estimated. The ≥5 age group lumps together a wide range of ages with varied risk, which limits the comparison of syndromes by age. Since, the study was limited to Wassit governorate and 40 mobile clinics; it is difficult to generalize the results to all mobile clinics in the country that provided basic medical services to Arbaeenia MG attendees.
Acknowledgement:
We acknowledged the generous financial support from the Eastern Mediterranean Public Health Network (EMPHNET) to conduct this study.
Authors declare that there is no conflict of interest.

References

3. Karami M, Public Health Surveillance and Hajj Pilgrimage as a Mass Gathering. Iran J Public Health v.42 (7); 2013 PMC3881628


18. Monteville Mr, Riddle Ms, Baht U et al. Incidence, Etiology, And Impact Of Diarrhea Among Deployed Us Military Personnel In Support Of Operation