



REVIEW

## Diarrhea at the Hajj and Umrah



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Received 6 December 2014; received in revised form 20 February 2015; accepted 22 February 2015

Available online 3 March 2015

### KEYWORDS

Hajj;  
Umrah;  
Pilgrimage;  
Diarrhea;  
Gastro-intestinal  
diseases

**Summary** This systematic review aims to summarize the incidence and etiology of diarrheal illness among pilgrims attending the Hajj and Umrah. Gastroenteritis and diarrhea have been potential threats during previous Hajj pilgrimages. The last cases of Hajj related cholera were reported in 1989. Currently, respiratory tract infections account for the majority of health problems during the Hajj. This shift in epidemiology reflects the improvement of sanitary conditions in Saudi Arabia in general, and at religious sites in particular. Nevertheless, gastrointestinal diseases, food-poisoning outbreaks, and diarrhea continue to occur among pilgrims. Available studies about diarrhea among Hajj pilgrims indicate a mean prevalence of 2% with the highest prevalence of 23% among a group of French pilgrims in 2013. There is an obvious lack of information about the etiology of diarrheal disease at the Hajj. Further studies addressing this issue in hospitalized patients as well as prospective cohort studies would be of interest. During the Hajj, hand washing is regularly carried out by pilgrims under a ritual purification, often called ablution. We recommend implementation of effective hand hygiene practices focusing on the regular use of alcohol-based hand rubs, as they require less time than traditional hand washing, act more rapidly, and contribute to sustained improvement in compliance associated with decreased infection rates.

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## 1. Introduction

Each year, more than 3 million Muslims from more than 180 countries gather each year in the Kingdom of Saudi Arabia to perform the pilgrimage to Makkah, (the "Hajj"). On arrival in Makkah, the holiest city in Islam, most Hajj pilgrims begin their visit by performing the "Umrah" (also known as the minor pilgrimage) which consists of various rituals taking place in the Grand Mosque. The rituals of the Umrah can be undertaken at any time of the year, while the 6 day-Hajj dates are fixed according to the Muslim lunar calendar. As part of the Hajj rituals, the pilgrims move to different sacred places located around the city of Makkah, including Mina (Fig. 1), the plain of Arafat and Muzdalifah (Fig. 2). Although not required as part of the Hajj, most pilgrims usually travel to the city of Medina to visit Islam's second holiest site, the Mosque of the Prophet containing Prophet Muhammad's tomb. The presence of a large number of pilgrims from many parts of the world in congested and crowded areas greatly increases the risk of spreading infectious diseases, particularly respiratory and gastrointestinal diseases [1]. In the past, cholera at the Hajj represented a public health concern and was the main cause of morbidity and mortality among pilgrims, resulting in large epidemics and international spread. The last outbreaks were observed after the Hajj in 1984–86 and 1989 [2]. As the global cholera pandemic continues, and outbreaks in countries where pilgrims come from are frequent, cholera is under constant surveillance by the Saudi authorities with a focus of public health surveillance based on proactive surveillance, early detection and implementation of prompt control measures [3]. Traveler's diarrhea and food-borne disease outbreaks are considered common

during the Hajj [4]. Many factors may contribute to this problem including: inadequate standards of food hygiene, shortage of water, the presence of asymptomatic carriers of pathogenic agents, and the preparation of large numbers of meals poorly stored by pilgrims [5]. As a precautionary measure the Saudi Arabian Ministry of Health strongly enforces that pilgrims are not allowed to bring fresh food into Saudi Arabia. Only properly canned or sealed food or food stored in containers with easy access for inspection is allowed in small quantities, sufficient for one person for the duration of their trip [6].

In this review, we summarize the available literature on the incidence and etiology of diarrhea among Hajj and Umrah pilgrims.

## 2. Search strategy

On 1 October 2014 we searched the MEDLINE database ([www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)) for articles published in English from January 1980 to September 2014 using a combination of keywords for search strategy:

- #1: "diarrhea" OR "food poisoning"
- #2: "hajj" OR "hadj" OR "Umrah" OR "pilgrimage";
- #3: "gastrointestinal";
- #4: #1 AND #2 AND #3.

A total of 47 references were retrieved through this search. In addition, the reference lists of all retrieved relevant papers were searched for additional related articles that could be considered for inclusion in this review. A supplementary search was conducted using the Google search engine (<https://www.google.fr/>) with similar



**Figure 1** Pilgrim tents at Mina, inside and outside the official encampment area.

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