ORIGINAL RESEARCH

Mass Gatherings and Public Health: Case Studies from the Hajj to Mecca

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Abstract

BACKGROUND Many new and challenging risks can be introduced during mass gatherings. The Hajj, as one of the largest mass gatherings, provides an excellent annual opportunity to reflect on the public health risk posed by international and multicultural crowds and the value of mitigation strategies.

OBJECTIVES To identify the gap between preparation and training taken before being exposed to the mass gathering and postexposure experiences, and the breach between the expectations and reality of the holy place.

METHODS This was a qualitative study with in-depth interviews using semistructured questionnaires among Hajjis from 4 different countries (Bangladesh, Pakistan, Myanmar, and New Zealand). Purposive sampling was done. The present study was also supported by literature review.

FINDINGS Findings pointed to weaknesses in implementation and enforcement of law, for both the custodian country and countries of origin of Hajjis. Disparities among developed and developing countries were also noticeable.

CONCLUSIONS From a global health and human security perspective, strengthening of core capacities in managing mass gatherings as well as researching risks posed by such gatherings are paramount to safeguard the public's health. Attention of health professionals worldwide and adoption of strategic planning at custodian country and sending countries are obligatory.

KEY WORDS Hajj, mass gatherings, public health

INTRODUCTION

The World Health Organization describes a mass gathering as "An organized or unplanned event where the number of people attending is sufficient to strain the planning and response resources of the community, state or nation hosting the event," whereas the US-based National Association of Emergency Medical Service Physicians defines it as "Spectators and participants at events in which at least 1000 persons are gathered at a specific location for a defined period of time."[1]

The Hajj, one of the world's largest mass gatherings, takes annually place in Mecca, Saudi Arabia.[2] In 2015, approximately 2.8 million Muslims from more than 183 countries visited this holy place for

5 days of rituals compulsory for all Muslims capable of undertaking the journey.[3] This challenge to the country perhaps is no less than organizing an Olympic every year. Saudi Arabia, being the custodian of the 2 holy cities (Mecca and Medina), provides extensive, multifaceted programs to serve these "Guests of God." However, the annual event is confronted with public health challenges besides immigration, crowd, and crime management. In addition to the formidable logistics, the risk for spread of infectious diseases is well recognized in the era of globalization. Contemporary outbreaks of Middle East respiratory syndrome coronavirus (MERS-CoV), Ebola virus, and Zika virus have drawn much attention to global health. The annual Hajj event definitely calls for precautions.

This paper is informed by a review of the literature and case studies among 2015 Hajj pilgrims.

PUBLIC HEALTH CHALLENGES IN MASS GATHERINGS

Infectious Diseases. The 5-day ritual causes extensive physical and mental stresses. Heat, sun exposure, thirst, crowding, traffic congestions, steep inclines, rough terrain, and cultural diversity present extensive stressors. During Hajj, pilgrims are also challenged by various prevention and infection control measures. Weather conditions, along with overcrowding within a confined area, make pilgrims also more susceptible to acquiring and spreading infections, particularly acute respiratory infections.[4]

These major challenges have been witnessed when outbreaks of epidemics have occurred; for example, outbreaks of plague and cholera in ancient times involved large numbers of pilgrims, when quarantine was the prime means of control[5,6]; a global meningococcal serotype W135 outbreak in 2000 was widely linked to either a recent return from the Hajj or contact with returned pilgrims[2,7]; in recent years notable threats were avian influenza viruses, severe acute respiratory syndrome coronavirus, Middle East respiratory syndrome coronavirus (MERS-CoV), and multidrug-resistant tuberculosis.[8,9] In 2012, the Hajj received political and scientific attention when MERS cases were detected in France, Germany, Italy, and the United Kingdom. MERS-CoV was first isolated from a patient who died of a severe respiratory illness in Jeddah, Saudi Arabia.[8]

According to Bakhsh et al,[10] in 2 health care centers near the Holy Mosque, most of the patients were suffering from respiratory problems followed by skin and gastrointestinal problems during the 2013 Hajj season. "Hajj cough" was considered by pilgrims the most reported complaint, and 1 in 3 pilgrims were found to be affected. The severity and clinical spectrum of respiratory disease varies from mild sickness to severe pneumonia, hospitalization, and even death.[11] Unfortunately there are no comprehensive studies on the epidemiology of respiratory infections during Hajj; most investigations involved cross-sectional studies on a relatively small number of cases.[12,13]

Although governments of Hajji's countries of origin recommend flu vaccinations for Hajj pilgrimages before departure, most hajjis do not adhere to these recommendations. Influenza vaccine has been recommended since 2005 for all pilgrims, especially people at high risk, which includes those >65 years of age and people with preexisting medical or immune-compromising conditions.[14] Despite all these recommendations, the influenza vaccine acceptance rate among Hajj pilgrims varies by country and by year. Many pilgrims refuse vaccines; the main reasons identified were reliance on "natural immunity," lack of awareness or knowledge, and lack of access to vaccines. Many people have misperceptions about vaccines, including that they contain toxic preservatives and are themselves the cause of disease. Moreover these vaccinations do not cover variants of different strains of influenza. According to Alborzi et al.,[13] in their study on Iranian Hajj pilgrims, influenza vaccination could not prevent respiratory infections in pilgrims statistically ($P = .19$), but the consequences of this limitation remains less. Two hundred fifty-five pilgrims were examined for respiratory infections, and influenza virus was identified more in unvaccinated than in vaccinated pilgrims (16.5% vs 9.2%) in laboratory tests of their nasal swabs.[13] Another study among Malaysian pilgrims found that influenza vaccine was effective for 50%-60% in preventing hospitalization and pneumonia; it was 80% effective in preventing death in patients older than age 60.[15] Eventual vaccination failures might be explained by a new drift of variants or inappropriate vaccine handling and storage.[*] Therefore examining the circulating influenza strains is recommended in

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[*]For men, the special outfit for the hajj consists of 2 pieces of white, unsown cloth. One of the pieces is wrapped around the midriff to cover the lower body, and the other is draped around the shoulders to cover the upper body. Women must cover their bodies in a loose-fitting outfit and cover their hair. However, they are not permitted to cover their faces.