

# NON-PHARMACEUTICAL STRATEGIES FOR CONTAINING INFECTIOUS DISEASES AMONG PILGRIMS

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## ABSTRACT

Hajj is one of the largest religious mass gatherings in the world that occurs once a year. Whereas umrah is a smaller scale gathering that occurs all-year round. Mass gatherings in Hajj and Umrah present unique challenges to both the host and travellers' countries. Transmission of communicable diseases, primarily, airborne agents are facilitated by the nature of the hajj which includes long stay at holy sites, fatigue, high temperature and cramped accommodation. While mandatory meningococcal vaccination has proven highly effective in curtailing such diseases among pilgrims, a spectrum of other infectious threats persists. This article endeavours to shed light on existing infection control protocols while offering forward-looking recommendations to further fortify infectious diseases management. By diligently addressing these concerns, we can ensure the health and well-being of pilgrims, safeguarding these sacred journeys for generations to come.

**Keywords:** hajj, umrah, infection control

## 1. INTRODUCTION

In the final month of the Islamic lunar calendar, millions of Muslims worldwide converge for Hajj, a pilgrimage to Mecca and other revered Islamic sites, making it one of the world's largest religious gathering (Memish et al., 2019). Hajj, an obligatory rite for capable Muslims, must be observed between the 8th and 12th days of Dhu Al-Hijja (Katz, 2004). pilgrims meticulously replicate the Prophet Muhammad's worship and rituals in Mecca, including circumambulating (Tawaf) the Kaabah, traversing (Sai'e) Safa and Marwah, and performing the symbolic cutting or shaving of hair. The journey proceeds to Arafat, with stops in Mina and Muzdalifah. Upon return to Mina, pilgrims engage in the symbolic stoning of pillars representing Satan. A customary animal sacrifice marks the completion of Hajj. The pilgrimage culminates with a

farewell Tawaf before departure from Mecca. Pilgrims typically stay in the vicinity for a few weeks to a month post-Hajj, an experience often regarded as a once-in-a-lifetime event. Many pilgrims extend their journey to Medina, visiting the Mosque of the Prophet, housing the tomb of Prophet Muhammad. In contrast, Umrah, a year-round pilgrimage to Mecca, requires prayer at the Miqat and Tawaf with Sai'e and can be completed in one to two weeks. Increased accessibility and travel options have led to congestion, particularly during Ramadan and the (Hoang et al., 2020)

Both Hajj and Umrah present unique challenges to host and traveller nations. Infectious diseases pose a significant threat among pilgrims due to the unique conditions of mass gatherings that create an environment conducive to disease transmission, with proximity, shared accommodations, and communal rituals fostering the spread of pathogens. Respiratory infections, such as influenza and coronaviruses like COVID-19, Middle East Respiratory Syndrome Coronavirus (MERS-CoV), are of particular concern due to their airborne nature and potential for rapid dissemination in densely populated pilgrimage sites (Hoang & Gautret, 2018). Contaminated food and water sources can lead to outbreaks of gastrointestinal diseases such as Salmonellosis (Hoang et al., 2020) . Furthermore, rituals like head-shaving, if not conducted under sterile conditions, may increase the risk of blood-borne infections e.g. hepatitis B and C (Samo et al., 2021). This article emphasizes non-pharmaceutical infection control measures and provides recommendations for enhanced disease management.

## **2. HAND HYGIENE**

Hand hygiene is an important intervention at Hajj particularly as it complements Muslims' purification cleansing five times a day before prayers. This ritual cleansing serves as a foundational aspect of Islamic worship, emphasizing the significance of cleanliness in spiritual devotion. In light of the global COVID-19 pandemic, the importance of hand hygiene has been further underscored. A Cochrane review lends support to this, emphasizing that simple and cost-effective interventions, particularly hand hygiene, play a crucial role in reducing the transmission of epidemic respiratory viruses (Jefferson T, et al 2010). This finding has profound implications for Hajj, where large crowds converge, making it essential to implement robust infection control measures.

Pilgrims are strongly advised to adhere to rigorous hand hygiene practices. In addition to the customary pre-prayer cleansing, it is imperative for individuals to use alcohol-based hand rubs after coughing, sneezing, and visiting washroom facilities (Boyce & Schaffner, 2021). This additional layer of protection not only aligns with religious principles but also aligns with evidence-based public health strategies, reflecting a holistic approach to safeguarding the health and well-being of the entire Hajj community.

### **3. COUGH ETIQUETTE**

Respiratory tract infections emerge as the predominant health concern among Hajj pilgrims (Petersen et al., 2020), with the notorious "Hajj cough" being a common grievance, as noted by pilgrim de Riquer. A longitudinal study conducted among African pilgrims showed that respiratory symptoms were the most experienced symptoms during (70.2%) and post-Hajj (82.2%) (Mushi et al., 2021). Notably, advanced age and the presence of co-existing medical conditions were significant factors associated with hospital admissions. Respiratory infections that are caused by various viruses and bacteria such as influenza, SARS CoV-2, rhinovirus and *Streptococcus pneumoniae* are transmitted primarily via airborne or/and respiratory droplets. The risk of transmission is compounded by various factors, including close contact in densely populated mosque areas during prayers, communal sleeping arrangements, and heightened levels of air pollution (Karampourian et al., 2019)

The Centre for Disease Control and Prevention (CDC) advocate a comprehensive cough etiquette, which encompasses the use of tissues to cover both nose and mouth when coughing, followed by proper disposal of used tissues in designated bins, and meticulous hand hygiene. Given the elevated incidence of coughing during Hajj and Umrah, pilgrims are strongly advised to carry essential items like tissue or handkerchief, cough suppressants, antiseptic sprays, gargles, and lozenges. These measures not only help alleviate symptoms but also play a crucial role in reducing the potential spread of infections during this sacred pilgrimage.

### **4. GARGLING**

Gargling to wash the throat is commonly performed in Japan. Many studies have been done to assess the effectiveness of gargling in reducing upper respiratory tract infections. A randomized controlled trial proved that gargling with plain water was effective to prevent upper respiratory tract infections in healthy people (Goodall et al., 2014; Satomura et al., 2005). A previous

study has shown that povidone-iodine based preparations (1% and 7.5% gargle and 0.45% throat spray) were highly effective against all relevant oral bacteria (MRSA and *P. aeruginosa*), *S. mutans* and *S. sanguinis* as compared to chlorhexidine 0.2% and Hexetidine 0.1% mouthwash. A laboratory study done by Egger et al demonstrated virucidal activity of povidone-iodine against Modified Vaccinia Virus Ankara (MVA) and MERS-CoV at room temperature, within only 15 seconds of exposure (Eggers et al., 2015). Another study showed that most commercially available gargle formulations have good activity against SARc CoV2 (Tiong et al., 2021).

Based on the above reports, it is beneficial to encourage pilgrims to gargle routinely especially after coming back from crowded areas. More frequent gargling is suggested during symptomatic period.

## **5. FOOD HYGIENE**

Food safety is one of the main issues during mass gathering. The preparation of food in large quantities presents a distinctive challenge in safeguarding against foodborne illnesses. The sheer scale of food production for events like the Hajj introduces specific complexities. This encompasses the careful management of handling, storage, and distribution of considerable amounts of perishable goods, demanding rigorous adherence to hygiene and sanitation practices.

Historically, the occurrence of cholera outbreaks following the Hajj was a substantial worry. However, with notable enhancements in water supply and sewage infrastructure, cholera outbreaks have been effectively eliminated, marking the last recorded epidemic in 1989, which affected 102 pilgrims (Aldossari et al., 2019). A recent study found that enteric bacteria such as *E. coli* that are frequently associated with traveler's diarrhea due to the consumption of contaminated food and drink were frequently found in pilgrims (Hoang et al., 2021).

To proactively mitigate the risk of diarrhoea, several recommended measures should be heeded. These include comprehensive education on proper hand hygiene practices, discouraging the consumption of food from street vendors, and exercising caution with dishes containing fresh eggs. Pilgrims must also be well-informed about self-treatment options for diarrhoea and understand the critical importance of timely rehydration.

## **6. SHAVE SAFE**

At the end of the hajj, male Muslim would shave their heads marking its completion. While this communal shaving ritual holds deep spiritual meaning, it also presents a potential risk for the transmission of blood-borne diseases, including hepatitis B, hepatitis C, and HIV infections (Patwa et al., 2021). Although there are no prevalence reports of those blood borne infections among pilgrims, the act of shaving poses a risk of minor cuts or abrasion and bleeding. The exposure of blood presents a potential pathway for transmission of HIV, hepatitis B and C. While instances of infections related to shaving are not widely reported, it is imperative to recognize the potential risk and take appropriate precautions to ensure the safety and well-being of pilgrims. This highlights the importance of implementing stringent infection control measures, such as the use of sterile equipment and the promotion of proper wound care, to mitigate any potential risks associated with this ritual. Recognizing this risk, regulatory measures have been put in place to safeguard pilgrims' health. Barbers participating in post-Hajj ritual are mandated to undergo regular testing for blood-borne viruses and are strictly required to use disposable, single-use blades (CDC, 2023) . Despite these regulations, it remains distressingly common to encounter unlicensed barbers offering their services on roadsides, employing non-sterile blades on multiple scalps. As a crucial preventative measure, it is strongly recommended that pilgrims receive a full series of hepatitis B vaccinations before embarking on their journey to Hajj. Additionally, pilgrims are advised to exercise utmost caution and avoid unlicensed barbers for their head-shaving needs. Furthermore, it is imperative to educate pilgrims about the potential risks of blood-borne infections associated with using unlicensed barbers. By disseminating this crucial information, we aim to empower pilgrims with the knowledge they need to protect their health and well-being during this sacred journey.

## **7. CAUTION AND REFRAIN TO VISIT CAMEL FARM**

Pilgrims embarking on their journey to Saudi Arabia for Hajj and Umrah are at a heightened risk of contracting Middle East Respiratory Syndrome (MERS). Since its initial identification in September 2012, a total of 2624 laboratory-confirmed cases have been reported across 27 countries, with a significant mortality rate of 36%, accounting for 945 recorded deaths (WHO, 2023) . These cases have been predominantly concentrated in Africa and the Middle East, with Saudi Arabia reporting around 80% of all human cases. Notably, MERS identified outside the

Middle East typically involve individuals who were infected during their travels in the region before subsequently moving to areas beyond the Middle East (Willman et al., 2019).

This respiratory illness is attributed to the MERS Coronavirus (CoV), a zoonotic virus capable of transmission between animals and humans. Extensive studies have revealed that the primary mode of transmission to humans occurs through close contact with infected dromedary camels, which serve as a major reservoir host for MERS-CoV (Killerby et al., 2020). The virus is primarily transmitted from camels to humans through close contact with infected animals or their bodily fluids. This can occur during activities like milking, herding, slaughtering, or even through direct contact with camels, especially those exhibiting respiratory symptoms. Additionally, consumption of raw camel products, such as milk or undercooked meat, can also pose a risk of transmission.

To mitigate the risk, it is imperative to advise both travel agents and pilgrims to exercise caution and refrain from visiting camel farms during their pilgrimage. Furthermore, in their respective home countries, healthcare providers should diligently inquire about travel history, particularly any visits to the Middle East, when attending to individuals exhibiting symptoms consistent with respiratory syndromes. This measure is paramount in facilitating early isolation and accurate diagnosis, ensuring prompt and effective intervention.

## **8. CONCLUSIONS**

Efforts to prevent infections during Hajj and Umrah necessitate a collaborative approach involving authorities, travel agencies, and the pilgrims themselves. While mandatory and recommended vaccinations are crucial, it is equally important to ensure that every pilgrim is well-informed about the potential risks of infections they may encounter and the measures to prevent these diseases. We recommend a proper module on 'Infectious Diseases and Prevention' to be taught during Pre-Hajj and Umrah courses. This module would cover fundamental knowledge about common infectious diseases and effective prevention strategies. By equipping pilgrims with this essential information, they can take proactive steps to protect their health during the Hajj and Umrah seasons. Ultimately, the aim is to realize every pilgrim's dream of embarking on these sacred journeys in good health and well-being. With the right knowledge and adherence to proper infection control practices, most infectious diseases can be effectively prevented. This educational initiative not only enhances the safety of pilgrims but also upholds the integrity and sanctity of the Hajj and Umrah experiences.

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