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Exploring barriers to and facilitators of preventive measures against infectious diseases among Australian Hajj pilgrims: cross-sectional studies before and after Hajj

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SUMMARY

Objective: For reasons that have yet to be elucidated, the uptake of preventive measures against infectious diseases by Hajj pilgrims is variable. The aim of this study was to identify the preventive advice and interventions received by Australian pilgrims before Hajj, and the barriers to and facilitators of their use during Hajj.

Methods: Two cross-sectional surveys of Australians pilgrims aged ≥18 years were undertaken, one before and one after the Hajj 2014.

Results: Of 356 pilgrims who completed the survey (response rate 94%), 80% had the influenza vaccine, 30% the pneumococcal vaccine, and 30% the pertussis vaccine. Concern about contracting disease at Hajj was the most cited reason for vaccination (73.4%), and not being aware of vaccine availability was the main reason for non-receipt (56%). Those who obtained pre-travel advice were twice as likely to be vaccinated as those who did not seek advice. Of 150 pilgrims surveyed upon return, 94% reported practicing hand hygiene during Hajj, citing ease of use (67%) and belief in its effectiveness (62.4%) as the main reasons for compliance; university education was a significant predictor of hand hygiene adherence. Fifty-three percent used facemasks, with breathing discomfort (76%) and a feeling of suffocation (40%) being the main obstacles to compliance.

Conclusion: This study indicates that there are significant opportunities to improve awareness among Australian Hajj pilgrims about the importance of using preventive health measures.

1. Introduction

The transmission of infectious diseases is high at mass gatherings such as the annual Hajj pilgrimage in Makkah, Saudi Arabia.[1] Hajj is the largest annual mass gathering on the planet, with around two to three million people attending from over 180 countries. Intense congestion, shared accommodation, air pollution, and compromised hygiene all contribute to the transmission of infections at Hajj, most notably acute respiratory infections (ARIs).[1,2]

Hajj presents a public health challenge for Saudi Arabia, as the authorities need to cater for an increasing number of pilgrims and respond to emerging infections such as the Middle East respiratory syndrome coronavirus (MERS-CoV).[3,4] It is also challenging for the countries sending pilgrims, since these pilgrims can import epidemic diseases to their home countries upon return. In an effort to reduce the risk of infectious diseases at Hajj, an array of preventive measures have been recommended by the Saudi

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Table 1
Health recommendations for travellers to Saudi Arabia for Hajj 2014[5]

Health hazard	Vaccine	Countries required	Other preventive measures
Air-borne diseases			
Meningococcal disease	Quadrivalent meningococcal vaccine (ACYW135)	Compulsory for all pilgrims	Not applicable
Influenza	Seasonal influenza	Recommended for all, in particular at-risk pilgrims	Not applicable
MERS-CoV and other respiratory infections	Not available	Recommended for all	People aged ≥65 years, those with chronic diseases, pregnant women, and children aged <12 years recommended to postpone Hajj 2014 Hand washing with water or disinfectant Cough etiquette Avoiding hand contact with eyes, nose, and mouth Avoiding contact with ill persons Facemask use Maintenance of good personal hygiene and food hygiene People at risk of severe diseases due to MERS-CoV are asked to avoid close contact with animals when visiting farms Complying with hygiene measures while dealing with animals Avoiding contact with sick animals
Diphtheria	Diphtheria	Remaining up to date	Not applicable
Pertussis	Pertussis	Remaining up to date	Not applicable
Measles	Measles	Remaining up to date	Not applicable
Mumps	Mumps	Remaining up to date	Not applicable
Food- and water-borne diseases			
Poliomyelitis	OPV or IPV	Compulsory for pilgrims from endemic countries Other pilgrims should remain up to date	Not applicable
Soil-borne diseases			
Tetanus	Tetanus	Remaining up to date	Not applicable
Vector-borne diseases			
Yellow fever	Yellow fever	Compulsory for pilgrims from endemic countries and those transiting through endemic countries	Not applicable
Health education			
Health authorities in countries of origin are required to provide health information to pilgrims on infectious disease symptoms, modes of transmission, and measures for prevention			

MERS-CoV, Middle East respiratory syndrome coronavirus; OPV, oral poliovirus vaccine; IPV, inactivated poliovirus vaccine.

Arabian Ministry of Health (MoH), which include vaccination and hygiene measures (Table 1).[5] However, studies have demonstrated that vaccine uptake and compliance with hygiene and protective measures are highly variable among pilgrims,[6,7] and the reasons behind this variability remain unclear.

To date few studies have assessed the knowledge, attitudes, and beliefs in relation to preventive measures among Hajj pilgrims. A recent qualitative study of Australian pilgrims found that considerable misconceptions about preventive measures and the risk of respiratory infections prevail among Hajj pilgrims.[8] A French study demonstrated that less than half of pilgrims were aware of social distancing and facemask use as precautions against respiratory infections,[9] but no study has explored the barriers to and facilitators of the uptake of preventive measures. To address these questions, two cross-sectional surveys were conducted among Australian pilgrims, one before and one after the Hajj 2014, to identify what preventive advice and interventions pilgrims received before travel, and what factors influenced their compliance with these measures while they were there.

2. Materials and methods

2.1. Study design

Two cross-sectional self-administered questionnaires were distributed among Australian Hajj pilgrims aged ≥18 years in 2014. The first survey was conducted on a group of departing pilgrims approximately 1 month before Hajj (pre-Hajj study). The second survey was conducted on a second, separate group of pilgrims immediately after their return to Australia (post-Hajj study).

2.1.1. Pre-Hajj survey

The pre-Hajj survey collected data on socio-demographic characteristics, Hajj itinerary details, and the receipt of pre-travel advice, including vaccinations. The questionnaire also assessed the pilgrims' knowledge of and attitudes towards preventive measures, and their risk perception of diseases occurring at Hajj, including influenza, pneumonia, and blood-borne diseases.

2.1.2. Post-Hajj survey

The post-Hajj questionnaire assessed the actual compliance with infection control measures (such as the use of facemasks, hand disinfectants, and handkerchiefs) during Hajj, and the barriers to and facilitators of the use of those preventive measures while at Hajj. The surveys were primarily in English, with Arabic translations available for those who preferred to complete the survey in Arabic.

2.2. Participant recruitment

Muslims residing in the Greater Sydney area, New South Wales (NSW) were the target population for the study. NSW has the largest Muslim population (50%) of any state in Australia with the