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Morbidity And Mortality Amongst Indian Hajj Pilgrims: A 3-Year Experience Of Indian Hajj Medical Mission In Mass-Gathering Medicine

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ABSTRACT

The Hajj, a mass-gathering of over 3.5-million pilgrims, faces challenges to global health-security, housing, food, water, transportation, communication, sanitation, crowd-control and security. The Indian Medical Mission extended health-security to approximately 140,000 pilgrims, through outreach medical teams, primary-care clinics, tent-clinics, secondary-care hospitals and evacuation capabilities. Data on medical attendance, bed-occupancy, investigations, referrals, medication usage and deaths was compared. Outpatient attendance was 374,475 in static-clinics, 5135 in tent-clinics and 13,473 through task-forces. 585 (62.90%) in-patients were hospitalized amongst 930 secondary-care referrals. Secondary-care bed-days were 2106 with average bed-occupancy being 77.78%. 495 patients were institutionalized in tertiary-care Saudi-Arabian hospitals. Infectious diseases were most commonly (53.26%) encountered due to overwhelming respiratory-infections, followed by trauma (24.40%). Analgesics (66.38/100 patients) and antibacterials (48.34/100 patients) were frequently prescribed. Crude mortality amongst Indian pilgrims was 11.99/10,000. Risk-factors associated with high morbidity were old-age and pre-existing comorbidities. Overwhelming surge of patients facilitates transmission of communicable infections and leads to stress induced physical, mental and compassion fatigue amongst healthcare personnel. Respiratory infections are highly prevalent and easily transmissible during Hajj leading to significant morbidity, increased burden to existing health facilities, overwhelming costs on health systems and globalization of multiresistant pathogens. Diabetic patients should avoid heat exposure and use protective footwear during Hajj rituals. Mass-gathering medicine at Hajj can be optimized by improving patient knowledge on performing Hajj at a younger age, medicine compliance, avoiding self-medication, self-monitoring of hypertension, blood glucose, and preventive health measures; screening of pre-existing comorbidities; and resource augmentation with telemedicine networks and decision-support systems.

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Introduction

The Hajj pilgrimage exemplifies one of the world's largest peaceful mass-gatherings fostering globalization in a multicultural

environment. The five critical days of Hajj witness simultaneous congregation of over 3.5 million Hajj pilgrims from 200 countries in a harsh hot desert climate either unsheltered or in tent accommodation, with limited human assistance. The ever-increasing numbers of pilgrims pose a challenge to global health security along with housing, food, water, transportation, communication, sanitation, crowd-control and security. Mass-gathering medicine at Hajj is challenged by issues of high morbidity, healthcare accessibil-

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Advances in knowledge

1. The ambispective study adds to the existing knowledge on mass-gathering medicine, its implications, morbidity and mortality statistics for public health interventions in the international dimension.
2. Infectious diseases occurring in massive proportions (53.26%) pose a multipronged challenge during Hajj.
3. High prevalence and transmissibility of respiratory infections in an environment of Hajj cough remains a significant health hazard. Respiratory infections can increase burden to existing health facilities, overwhelm costs on health systems and lead to globalization of multiresistant pathogens.
4. The study highlights the occupational hazards associated with Hajj medical missions such as transmission of respiratory infections and stress amongst medical mission personnel.

Application to patient care

1. The spectrum of diseases presenting amongst 400,000 patients reported in the study forms a representative subset for planning of Hajj health systems by various nations.
2. The morbidity data can be utilized by Saudi Arabian hospitals to cater for specialty care, bed planning and ancillary services.
3. The study gives an insight to doctors and paramedics about the distribution of disease patterns and can thus help in institution of advance training programmes for both healthcare personnel and preventive health programme for pilgrims.

ity, patient management and evacuation especially in emergencies [1–3].

The Indian Medical Mission extends health security to approximately 140,000 Indian pilgrims annually through outreach medical teams, primary-care clinics, tent-clinics and secondary-care hospitals in Mecca, Medina and Jeddah. The endeavour encompasses mass-gathering and travel-medicine perspectives, the reflections of which are presented through this ambispective study on morbidity and mortality amongst Indian pilgrims.

Methods

For Hajj-2016, the Indian Medical Mission comprising of 144 doctors and 146 paramedics, established, operated and coordinated a tiered healthcare network including primary-care static-clinics, tent-clinics and mobile medical task-forces; secondary-care hospitals; referral and evacuation capabilities; at Mecca, Medina and Jeddah from Aug to Oct 2016. (a) Twenty-two static-clinics having 5–6 doctors, 5–6 paramedics per shift and basic first-aid capabilities catered for 6000–9000 pilgrims/clinic extending medical cover to 400 buildings in Mecca, Medina and Jeddah, and onward referral to secondary-care hospitals. (b) 35 tent-clinics having one doctor, one paramedic per shift and medical attendance facilities only, catered for 3000–4000 pilgrims/clinic extending medical cover to total of 5000 tents in Mina and Arafat, as well as 1.4 million unsheltered pilgrims in Muzdalifah. (c) One mobile referral tent-clinic having 5–6 doctors, 5–6 paramedics per shift at Mina and Arafat during the five critical days of Hajj catered to 35 satellite tent-clinics. (d) Mobile medical task-forces having one doctor and two paramedics per shift covered mass-gathering congregations along the pilgrimage assemblage expected to have 5000–100,000 Indians. Onward referral was to secondary-care or tertiary-care Saudi hospitals. (e) Two 40-bedded secondary-care referral hospitals having 8–10 doctors, 8–10 paramedics per shift catered to 13 static-clinics in Mecca, a 14-bedded facility

catered to five static-clinics in Medina. Secondary-care referral hospitals catered for critical care, internal medicine, general surgery, orthopaedics, gynaecology, paediatrics, psychiatry, dermatology, isolation, lab-medicine and radiology. (f) Tertiary-care transfers were coordinated with 30 Saudi-Arabian hospitals in Mecca, Medina and Jeddah. Data on medical attendance, bed-occupancy, procedures, investigations, referrals, medication usage and deaths for 2016 was compiled and compared with previous years.

Results

The Indian Medical Mission provided health-security to approximately 400,000 patients in a period of 60 days from Aug to Oct 2016 by a team of 144 doctors including 50 specialists, 146 paramedics and 74 ancillary staff. The doctor: patient and paramedic: patient ratio in Indian, Thailand and Malaysian Hajj Medical missions was approximately 1:944 and 1:931, 1:250 and 1:950, 1:320 and 1:140.

The patient beneficiaries included both pilgrims and non-pilgrims from India, Saudi Arabia and other countries totaling approximately 140,000 annually. For 2016, outpatient attendance in static-clinics was 374,475 (89.27%) comprising 213,162 males (56.90%), and 161,295 females (43.10%). Attendance in tent-clinics was 5135. 13,473 (3.40%) patients were treated through task-forces. Average stay per pilgrim in Saudi Arabia was 45 days and average medical attendance per pilgrim was 3.2. 585 (62.90%) in-patients comprising 245 (41.80%) males and 340 (58.10%) females (mean ages 62.7 and 56.7 years) were hospitalized for secondary-care amongst 930 secondary-care referrals. 323 hospitalized patients were between 70 and 90 years with a mean of 73.89 years. Total secondary-care bed days were 2106, average bed occupancy being 77.78% for 30 days prior and 15 days after Hajj, and 32% otherwise. Pooled unadjusted average length of stay of all patients was 3.6 days. Total referrals to Saudi-Arabian hospitals were 523 out of which 495 were institutionalized for treatment. The details of procedures and investigations are depicted in Table 1.

Infectious disease was the most common (53.26%) outpatient diagnosis. Upper and lower respiratory infections, gastroenteritis and diabetes related skin and soft-tissue infections were seen. Respiratory infections outnumbered all other forms of illness. 90% healthcare personnel reported respiratory infections presenting as cough and viral prodrome, sometimes leading to sickness absenteeism. Upper respiratory infections presented as throat pain, sinusitis or otitis after a viral prodrome resembling common-cold or influenza like illness. Lower respiratory infections presented with productive cough, dyspnoea and fever more so in pre-existing lung conditions such as bronchial asthma or chronic obstructive pulmonary disease (COPD). Acute gastroenteritis presented with vomiting and diarrhoea, with a history of food intake from multiple sources. Diabetic patients largely presented with pneumonia and cellulitis foot. There was inadequate glycemetic control at presentation due to poor medication and precautionary compliance despite prescriptions of insulin and oral antihyperglycemics from India. Urinary tract infections (UTI) were found to have a predilection for female sex, diabetes and benign prostatic hypertrophy.

Orthopaedic, trauma and musculoskeletal diseases included fractures, dislocations, myalgia, osteoarthritis, sprains, low back-ache, sciatica and crush injuries. 45% of all fractures were Colle's fracture due to fall on outstretched hand from escalators, beds or washroom flooring. Blunt trauma during mass-gatherings led to shoulder dislocation and chest wall injuries. Myalgia, osteoarthritis, sciatica and low backache precipitated due to stress, exertion, dehydration and old age. Crush injuries and metatarsal fracture occurred from overstepping of feet and wheelchairs during moving assemblage.

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