



Health Problems Burden Among Thai Hajj Pilgrims During Hajj Season 2015-2019: Updated Situation of COVID-19

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Abstract

The Hajj, a mass-gathering of over 2-3 million pilgrims, faces challenges to global health-security, housing, food, water, transportation, communication, sanitation, crowd-control and security. The Hajj pilgrimage to Mecca, Saudi Arabia, is one of the largest annual mass gatherings in the world, and has a strong impact on international public health. And including Thai pilgrims. Each year, Thai dispatches roughly 10,000 pilgrims to join the Hajj. It is very crowded with many health risks, that create health problems among the pilgrims in every Hajj season. This paper presents an overview from a systematic search of the published literature on health risks and services in the Hajj for 2015-2019, with the aim of providing health policy recommendations to prevent health risks. Of the 335 studies initially identified, 30 met the inclusion criteria for the review. Studies identified were diverse in methodology and focus. The results were classified into 5 main categories: communicable diseases, non-communicable diseases, mental health, injury and other problems and health services.

Keywords: *hajj; hajj pilgrims; communicable diseases; non-communicable diseases; public health*

A. INTRODUCTION

The Hajj pilgrimage is one of the greatest mass gatherings in the world, and presents unique public health challenges. Millions of Muslims from around the world gather annually to perform the Hajj pilgrimage in Mecca, in Saudi Arabia. (Figure 1). In recent years, over 2 million people from 140 countries undertook the Hajj annually, including over 10, 000 people from Thailand. Hajj is one of the 5 pillars of Islam; therefore, it is mandatory for all Muslims, who are physically and financially capable, to make the journey to Mecca once in a lifetime.

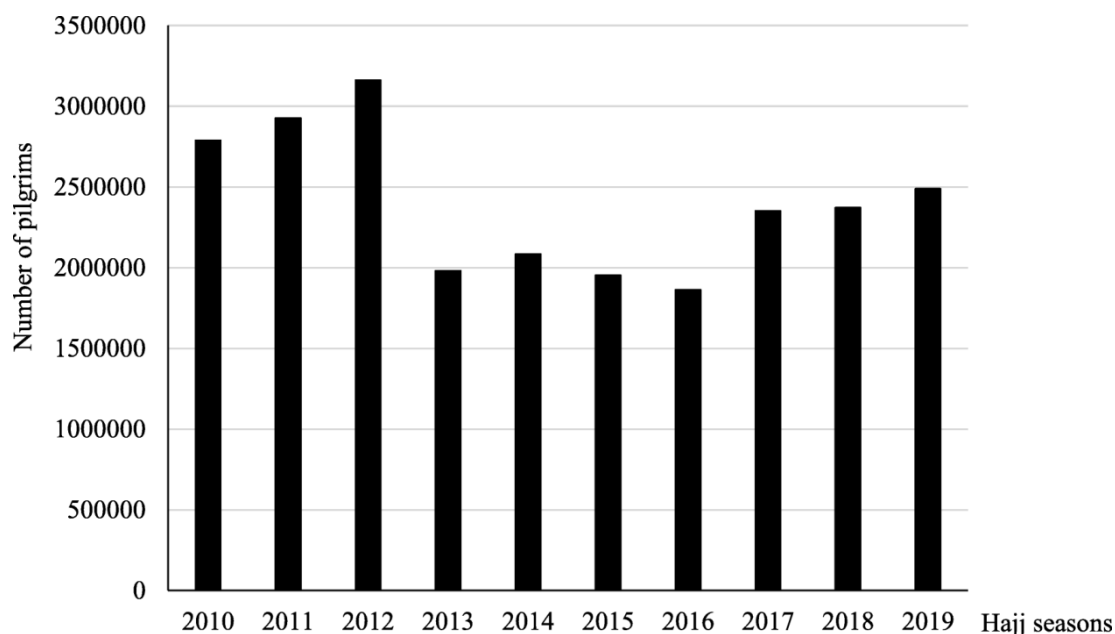


Figure 1. The Annual number of Hajj pilgrims, 2010 - 2019
 Source: General Authority for Statistic, Kingdom of Saudi Arabia (1)

B. THAILAND PILGRIMS SITUATION

The Ministry of Hajj, KSA previously set a quota of Thai pilgrims at 13,000 heads per year. Since 2013, all countries were asked to reduce the number of pilgrims by 20%, owing to the expansion project of the Grand Mosque. Therefore, 10,400 is Thailand’s annual current quota of pilgrims. There were 7,776 –10,441 pilgrims from Thailand during 2015-2019 due to the Thai economic recession. These pilgrims mainly utilized the services of 5 airports, which were Suvarnabhumi International Airport, Phuket International Airport, Krabi Airport, Had Yai International Airport, and Narathiwat Airport (2).

Table 1. Number of Thai pilgrims 2015 - 2019

Year	2015	2016	2017	2018	2019
Number of Pilgrims who got the Hajjcode	10,441	10,164	8,822	7,776	8,442

Source: The Regional Health 12 Office, Ministry of Public Health, Thailand

The season of the Hajj varies, due to its adherence to the Islamic lunar calendar. The Hajj takes place in month 12 of the lunar calendar, for 5 days, from days 8 to 12. In the last decade, the pilgrimage has taken place in fall and winter. These months have been associated with winter diseases. As the lunar calendar advances over the next decade, the Hajj will take place in summer months, and different diseases will be dominant. Pilgrims performing the Hajj are predisposed to diverse and significant health risks, due to the

limited time and confined geographical area of the event, and the large numbers of people, with population densities among the millions of participants, reaching 7 persons/m² (3).

The activities of the Hajj are now summarized, to provide context for the consideration of the attendant health aspects. Around 2 million Muslims arrive in Mecca. On day 1, the pilgrimage starts at the Grand Mosque with the ritual of Tawaf, circling 7 times around the central building (Kaaba). It then continues with the ritual of Sae, running 7 times between 2 small hills (Safa and Marwah) near the Grand Mosque and proceeding to Mina where they spend the whole night. On day 2, the pilgrims go to the plain of Arafat, about 8 miles east of Mecca, to perform what is called the Standing at Arafat; an afternoon of prayer and contemplation that is considered the highlight of the Hajj. After sunset, the pilgrims travel back towards Mecca, stopping to spend the night in Muzdalifa. On day 3, the pilgrims perform the ritual of Ramy Aljamrat, which involves throwing stones at a pillar in Mina, a neighbourhood in Mecca, and creates the densest crowds during the Hajj. Following that, pilgrims sacrifice an animal (a camel, cow or sheep). On days 4 and 5, pilgrims stay in Mina. On day 5, they move from Mina to Mecca, perform the final farewell ritual of Tawaf and Sae, and then leave Mecca.

The Saudi government provides free healthcare services for all pilgrims. In 1437 (Islamic calendar) (2016 Gregorian calendar), the healthcare system consisted of 27 hospitals with a total capacity of 5,038 beds, and 154 health centers (4). The healthcare system, which is operated by 26,421 domestic employees in addition to international visiting healthcare practitioners, provides curative and preventive services. The preventive services include infectious disease surveillance, outbreak investigations, mass vaccinations, mass administration of prophylactic medications, environmental health services, and health education. The health education activities include awareness campaigns, distribution of pamphlets to arriving pilgrims, and establishing toll-free telephone lines operated by trained healthcare providers. The data reported from different departments in hospitals and primary care centers, in addition to the surveillance data, feed the electronic web-based healthcare surveillance network at the Command and Control Center in Mecca, and are published in the annual statistical book of the Saudi Ministry of Health (4,5).

In 2008, The Elsevier published a review entitled: "Hajj: Health lessons for mass gatherings" (6). Since then, some trends in health risks have changed; for example, severe acute respiratory syndrome and Middle East respiratory syndrome (MERS), several emerging infectious diseases have arisen, such as influenza A H1N1 (5), and new policies to control health risks in the Hajj have been implemented, such as administering polio vaccine to pilgrims on arrival in Saudi Arabia, and reducing Hajj quotas for foreign and domestic pilgrims in 2013 (5). The present study presents an updated comprehensive review about the health issues in the Hajj, with the aim of providing policy recommendations to prevent these risks.

C. METHODS

The study consists of 1 part; review of existing literature. And data analysis

1. Review Literature

A review of literature was conducted to identify health risks, health care services and preventive measures. Search engines were used specifically: Google, Google scholar, PubMed, Medline, WHO's web page, Thailand's and KSA's Ministry of Health webpage, were accessed to get relevant information. Few grey literature, publications and reports were screened for relevant topics. Approximately 300 published articles were retrieved by using keywords combination, but some articles were excluded after reading the abstracts.

2. Inclusion criteria.

- a. Documents during 2005-2020 (updated situation of COVID 19)
- b. Documents in English and Thai

3. Exclusion Criteria.

- a. Full published document that could not be retrieved were excluded.

Table 2. Summary of search Strategy

Objective	Source	Keyword
To identify and analyze health risks and problems among Thai pilgrims	- PubMed - Google - Google Scholar - Institution's Websites - Grey Literatures	Hajj, Hajj pilgrims, health risk, health care service, preventive measures, communicable diseases, NCD, stampede

4. Analysis

Each of the eligible publications was carefully read, and 8 key data elements were extracted: authors, objectives, year of the Hajj, study design, population, data collection, sampling methods, and results. The findings were then organized into coherent themes using a review approach, which identified common elements in the studies. Due to the heterogeneity of the studies included in this review, a qualitative method to consolidate the data was used and not quantitative (statistical) methods. The information about certain diseases was gathered from different publications and then reported in one place.

D. RESULTS AND DISCUSSION

The 30 papers fulfilling the eligibility criteria represented studies that were variable in their scope and methodology. The results were classified into 5 main categories:

communicable diseases, non-communicable diseases, mental health, injury and other problems and health services.

1. Communicable diseases

a. Meningococcal infection

Only 6 serogroups (A,B,C,W135,Y,X) of *Neisseria meningitidis* are responsible for an invasive meningococcal disease. The large outbreaks of meningococcal disease occurred in KSA during Hajj, were caused by serogroup A in 1987 and serogroup W135 in 2000 and 2001. Since 2001, KSA requires that every pilgrim is to be immunized with a quadrivalent (A,C,W135,Y) meningococcal vaccine. It is mandatory, and the pilgrims have to show the proof of vaccination for a Hajj visa issuance (7,8). The vaccine does not cover all serogroups which causes the disease. There is a potential of the causing of an outbreak if there is any sudden change in serogroup prevalence. According to the National Surveillance database from the Bureau of Epidemiology, Thailand, in 2019, there were 24 cases of meningococcal infection, two of them died. The morbidity is quite low, 0.04 per 100,000 population (9).

There might be some possibility for the pilgrims to get contracted from the serogroups that the vaccine did not cover, however there is no report of the Meningococcal patients who get contracted from KSA after arrival.

b. Influenza and other viral respiratory infection

In 2013, a study on Influenza-like Illnesses (ILI) among pilgrims from Australia, Qatar, and Saudi Arabia, during Hajj days in Mina, found that 42 laboratories confirmed cases out of 112 22 recruited patients (who were asked to participate in the study) with ILI. The most common viral respiratory infection was Rhinovirus, 28 cases from 42 cases. The other viruses were Influenza A, Adenovirus, human corona virus (OC43/229E), and parainfluenza (10). According to the National Surveillance database from the Bureau of Epidemiology, Thailand, there were 390,773 cases of Influenza in Thailand in 2019. The morbidity was 588.39 cases per 100,000 population. There was no data available on what type of influenza. The mortality was 0.04 per 100,000 population (9). Based on this data, quadrivalent influenza vaccine is a prerequisite vaccine for Thai pilgrims, before leaving for Hajj. There is a high possibility to get contracted Influenza during Hajj, because several strains of Influenza viruses are circulated among the pilgrims from all the nations.

c. Middle East Respiratory Syndrome Corona Virus (MERS-CoV)

In 2012, Hajj received international concern when MERS-CoV firstly emerged in Jeddah, KSA and spread to other countries. The virus originated in

bats and spread to camels and to humans (23). The case fatality was more than 30% and no vaccine was available (11). It is important to note that there was no reported case from pilgrims that performed Hajj that year. Nevertheless, there was a reported case of Umrah-related MERS-CoV from various countries like Malaysia in 2014 (12). In June 2015, Thailand detected the first imported case of MERS in an Omani patient, with a diagnosis of pneumonia on hospital admission. After that, there were 170 contacts traced, 48 were quarantined and 122 self-quarantined. All their laboratory results were negative (13). From this incident, the pilgrims might have some chance to get infected by MERS-CoV.

d. Coronavirus Disease 2019 (COVID-19)

In December 2019, the Corona virus disease was first identified in Wuhan, China. It was caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). COVID-19 caused a global pandemic outbreak, which was so declared by the World Health Organization on the 11th March 2020. As of the 9th of June 2020, there were 406,000 deaths and 7.1 million infections reported cases worldwide (14). The first case of COVID-19 was detected on the 2nd of March 2020. By the 9th of June 2020, there were 108,571 cases and 783 deaths in country wide in KSA (26). There were cases in Pakistan and India, that were linked to the KSA visit (15). In this context, this posed a high risk of creating a super spreader event for the global pandemic outbreak, due to the fact that Hajj is one of the largest mass gatherings. The Ministry of Hajj and Umrah was urged to contribute, to apply the appropriate measures, to prevent the spreading of COVID-19 from July 2020 Hajj (15). Recently, KSA have stated that they do not allow foreign pilgrims from overseas to enter the country for Hajj (16). In Thailand, the first case of COVID-19 was discovered on the 14th of January 2020. (17). Due to the KSA's policy in 2020, no pilgrims from Thailand attended the Hajj. There is no possibility for Thai pilgrims to get infected by COVID-19.

e. Pneumonia

During Hajj, the leading cause of ICU admission and hospitalization was pneumonia, among pilgrims in KSA hospitals (18). A pneumococcal pathogen played an important role in this 23 infection. In 2012, the nasal carriage of *Streptococcus pneumoniae* was increasing among French pilgrims from 7% before departing from France to 20% after arrival (18). Since then, the Thai medical mission diagnoses pneumonia among Thai pilgrims every year, there is a chance for them to get the disease. However, there is no report of the patients after 14 days of the arrival.

f. Tuberculosis (TB)

According to Saber Yezli et al, a prospective cross-sectional study was conducted in Mecca 2015 and found that there were 15 (1.4%) undiagnosed pulmonary TB cases from the TB endemic countries (1,093 pilgrims from 5 countries). KSA is also endemic to TB (19). This poses the risk to spread TB to the other pilgrims in Hajj (20). According to the National

Surveillance database, from the Bureau of Epidemiology, Thailand, in 2019, there were 8,894 cases of Pulmonary tuberculosis. The morbidity was 13.39 cases per 100,000 population. The mortality was 0.03 per 100,000 population. Forty-eight percent of Pulmonary TB was found in the age group over 55 years (9). There might be some chance to contract TB due to overcrowded pilgrim groups.

g. Diarrhoea and Gastrointestinal infection

Diarrhoea and Gastrointestinal disease (GID) used to be the potential public health concern, during Hajj, in the past due to cholera. Because of the improvement of public sanitation and hygiene in KSA, the last cases were reported in 1989. GID and diarrhoea are still reported among the pilgrims. The etiological causes are various. It could be virus, parasites, or bacteria. According to the National Surveillance database from Bureau of Epidemiology, Thailand, in 2019, there were in total 1,068,108 cases of diarrhoea. The morbidity was 1,608.26 cases per 100,000 population. The mortality was 0.01 per 100,000 population (9). There is a high possibility for pilgrims to contract GID. The Thai medical mission diagnoses and reports this disease every year.

2. Non-communicable diseases

a. Cardiovascular disease

Ischemic Heart Disease (IHD) is the most common cause of death during Hajj. In 2002, one of the most important causes of death was cardiovascular disease with hypertension. The percentage of mortality was 45.8% (21). According to the Department of Disease Control and Prevention, MOPH, Thailand. The prevalence of IHD among Thais is 5 per 1,000 populations (22). This is also the leading cause of death among Thai pilgrims.

b. Cerebrovascular disease

Stroke is the leading cause of death with a neurological complication. One study showed that the incidence of stroke during Hajj. The peak of the incidence was on the 10th Dhul-Hijjah (23) According to the Department of Disease Control and Prevention, MOPH, Thailand. The prevalence of Cerebrovascular disease, among Thai people is 4.5-5 per 1,000 populations (22). It may occur

among the pilgrims, due to the exacerbating of the pre-existing diseases like DM, Hypertension, etc.

c. Terminal illness

Due to cultural belief, some pilgrims believed that they will be rewarded with being in the paradise in the Hereafter if they die during the Hajj. This encourages some of the terminal illness cases, like cancer, to be found among the Hajj pilgrims. According to Pane et al, there were 2-8 deaths (0.4-1.51% out of the total deaths) due to neoplasm among Indonesian 25 pilgrims from 2004-2011(24). In the Thai medical mission during 2017-18, there were some pilgrims who died from cancer among the Thai pilgrims.

3. Mental Health

The overseas pilgrims may face all kinds of stress during Hajj stay. Being in a foreign land, language barrier, different culture, fear of getting lost, and home sickness are the factors that can cause mental health problems (25). Common mental health problems are Psychosis, Insomnia, and Mood disorders, such as Major depression and Bipolar (25).

4. Injury and other problems

a. Orthopaedic and musculoskeletal diseases

Myalgia, osteoarthritis, dislocation, fractures, sprain, low back pain, sciatica can be found. Indian medical mission reported that 45% of all fractures among Indian pilgrims were Colle's fracture due to falls (26). There is some possibility to diagnose this medical condition. There was no data available among Thai pilgrims.

b. Heat Stroke

Mecca in the summer is very hot. The temperature could exceed 40 Celsius degrees in the afternoon; therefore, heat stroke is common and usually occurs when the ambient temperature is higher than 41 Celsius degrees (27). In 1985, approximately 2,000 cases of heat stroke were reported and 1,000 died after a few days into Hajj (28). In 2016, 80 patients (29%) out of 267 patients at four hospitals in the Mina and Arafat regions, were diagnosed with heatstroke. There is some possibility to diagnose this medical condition. There was no data available among Thai pilgrims.

c. Stampede

Hajj is one of the most crowded gatherings. Most of the pilgrims are from the lower- and middle-income countries and are old, poor, and illiterate. Hajj maybe their first international trip. Hajj must be completed within a limited time for 5 days (6 days for Muslims in some Islamic sects). Hajj has to be performed in a

specific unchangeable sequence, following a fixed route within the 4 km² area. This leads to a stampede almost every year (11). From 1990-2015, there were at least 9 incidents of stampede occurring, during the Hajj period, that caused hundreds to thousands of deaths, due to the massive human congestion. It mostly occurred at the Devil stoning area in Mina. This is probably the most serious public health problem, that can cause many casualties and fatalities (29). There is some possibility to face the incident. There was no data available among Thai pilgrims.

5. Hajj health services

a. The governance to manage the disaster risk

The structure of the governance for Hajj in Thailand can be viewed by the multisectoral coordination in the public private coordination and collaboration in all levels. In Thailand, the Ministry of Interior is the main organization to organize and facilitate all the partners to move all the process since the beginning till the date of the pilgrims arrived. MOI initiates the committee from the organizations, such as the representative from the travel agents, the representative of the leading Islamic organizations, the representative from Ministry of Public Health and other stakeholders.

The Southern Border Provinces Administrative Centre (SBPAC) is the main actor in deep south provinces. This organization is playing an important role, to steer the hajj process in the deep south, while other regions did not have an organization like this in the area. In other regions, the travel agents do registration on the pilgrims' behalf in Hajj and bring their customers to receive the medical services such as health screening and immunization. Some travel agents didn't bring their customers to health care centers or clinics. They just bring the pilgrims, to receive the vaccination, because this is compulsory required by the government of KSA. This is one reason why the data of Hajj pilgrims is not complete.

The Ministry of public health is a partner who deals with the pilgrims' health by providing health care to all pilgrims. This responsibility includes the medical personnel recruitment, health care screening, giving immunization, providing medical care to the pilgrims for the whole trip.

The ministry of foreign affair plays an important role in coordinating with the KSA government to take care all Thai pilgrims' welfare.

Travel agents are the private companies who run business as a tour leader. They have to arrange all the air tickets, housing, food and take good care of the pilgrims as their customers. If their pilgrims are sick, they have to bring the pilgrims to see a doctor at the clinics or hospitals during Hajj.

There is no non-government organization or community representatives involve in Hajj management.

All the partners in the hajj process require the integration and cooperation from multisectoral partners from local to international organization. Key partners on the national level are the Ministry of Interior, Ministry of Public Health, and travel agents. All their roles share the responsibility, to facilitate the Hajj, to the pilgrims with care and safety.

The government of KSA is the most important actor on a Global level. The Ministry of Hajj, KSA, provide all the facilities and coordinate with other KSA government officers from other ministries to run Hajj campaign in the country.

The Ministry of Health, KSA, provide medical care and manage the prevention measures to the pilgrims from all over the world. They have to run all the hospitals and primary health centers during Hajj, to reduce morbidity and mortality of the pilgrims. They monitor the Hajj situation, related to the public health hazards and provide the rapid response to mitigate the morbidity and mortality of the pilgrims. In other roles, they provide other facilities like infrastructure and security such as the transportation, housing, food, and security for the pilgrims.

The KSA embassy in Thailand provides every year Hajj visa for Thai pilgrims.

Jedda airport will open a special terminal, called Hajj terminals, to provide air traffic service to the pilgrims, due to more flights during Hajj.

This interrelation between KSA and Thai partners provide the Hajj service for all pilgrims to have a qualified Hajj. The problems that occur in any situation in this multisectoral cooperation may reflect the worse consequences, especially in the morbidity and mortality of the pilgrims.

The next steps are to strengthen the governance to manage the risks and to invest in risk reduction for resilience. All the health care facilities both on national level and international level are identified and the health care measures are described.

1) Medical service and prevention in pre- travel phase

All pilgrims should be screened for their health status. But not all of them are. The coverage of the screening is varied by the regions. The deep south region has the highest coverage of screening, because of the fact that the deep south of Thailand has the Southern Border Provinces Administrative Centre (SBPAC) and a strong provincial Islamic committee,

due that it is a Muslim dominant area. One of the committee's important tasks is to collaborate with the local public health administration such as the provincial health office for Hajj and Umrah. There is incomplete medical record reported in pilgrims' health books. If all the medical screening result from three medical examinations were recorded well, it would be easy for Thai doctors and other medical care providers to give the proper treatment for the pilgrims. Unfortunately, not all health books were filled with sufficient health information.

For the diagnosis that recorded in the health books, it does not follow the ICD X. This makes the data analysis difficult to be done. The diagnosis in one disease may be recorded in many diseases' name. Common cold, viral infection and acute pharyngitis may be referred to the same diagnosis as upper respiratory disease. All the pilgrims must be given 2 pre-requisite vaccinations before departure: Meningococcal and influenza vaccine. This is compulsory and required by KSA before the visa issuance. The data on vaccine coverage in each region is not available. Health education is provided to the pilgrims by health personnel. This is to ensure that the pilgrims have the basic knowledge of potential health risks and how to take care of themselves in general, while travelling and performing Hajj. The travel agents and Ministry of Public Health, collaborate to manage this training session. There is no data available on the coverage of the training in each region.

In Indonesia, all pilgrims have to see a doctor for medical assessment at least 3 times, whether they are healthy or have pre-existing diseases. The first visit is done at least 4 months prior to the departure date at the Primary Health Center. (18)

There was a difference in the number between the departed pilgrims and the registered group, due to the long process from registering until departure. Some people were too old and too ill to go for Hajj.

2) Medical care provided to Thai pilgrims during the Hajj

The Thai medical mission provided health care to 10,000 patients approximately, in a period of 2 months, between 2015 and 2019, by a team of 8-9 doctors and 24-33 paramedics. In 2018, the ratios of doctors: pilgrims and paramedic: pilgrims from Thailand were approximately 1.14:1000 and 3.43:1000. The total number of medical staffs was 42 in most years, except in 2018 with 32 medical staff, due to the budget cut.

Normally, The Thai medical mission is recruited from the Ministry of Public Health's officers from all over the country, before the departure for

Hajj, at least 4 months. After the recruitment, they have some training together, before going to Hajj (2)

There was limited data on medical service during Hajj, such as OPD visit, IPD admission, place of deaths, etc.

Table3. Human resources in Medical Hajj mission during 2015-2019

Human Resource/ Year	2015	2016	2017	2018	2019
Doctor	9	9	9	8	9
Pharmacist	3	3	3	3	3
Nurse	24	24	24	17	24
Technician	6	6	6	4	6

Source: The Regional Health 12 Office, Ministry of Public Health, Thailand

Table4. Human resources in Medical Hajj mission during 2015-2019

Human Resource	2015		2016		2017		2018		2019	
	Number	Per 1000	Number	Per 1000	Number	Per 1000	Number	Per 1000	Number	Per 1000
Doctor	9	0.86	9	0.88	9	1.02	8	1.02	9	1.06
Paramedic	33	3.16	33	3.24	33	3.74	24	3.08	33	3.90

Source: The Regional Health 12 Office, Ministry of Public Health, Thailand Doctor and pilgrims ratio= (number of doctors / number of pilgrims) * 1000 Ex. Doctor and pilgrims ratio in 2016 = (9/ 10,164) * 1000 = 0.88

a) Thai Medical Mission Centre in Mecca

There is one 30-bedded secondary care Hospital, set up by the Thai medical team in Mecca, with 3 - 9 doctors and 10 - 36 paramedics (including nurses, pharmacists, and health officers) each year. The number of health personal, depends on human resource management, because they must dispatch a small medical team (2-3 doctors and 3-4 paramedics), to run another clinic in Medina. The hospital plays an important role as a temporally community hospital, which can provide OPD, IPD and Emergency care. The doctors at the hospital can refer patients for further treatment to the Saudi Hospitals, if the patients need more 36 specialized medical attendance (2). In 2016, Khan et al, the Indian medical mission

provided their medical services to their Indian pilgrims, with 22 static clinics with 5-6 doctors and 5-6 paramedics, which covers Mecca, Medina, and Jeddah. The Indian medical mission is bigger than the Thai, in terms of Human resources and facilities. They have medical facilities such as an x-ray machine, Ultrasonography machine and electrocardiogram (26).

b) Thai Medical Mission Clinic in Medina

There is one clinic in Medina, which serves a small number of Thai pilgrims who visit Medina. The Medical Mission center in Mecca organizes and dispatches a small medical team, including one doctor, one pharmacist or nurse and three to four paramedics to run the clinic with a rotational 8-9 days shift. The clinic provides only OPD service and will refer the patient to the Saudi Hospitals if the patients need additional medical treatments (2). Compared to the Indian medical mission, they have more accessibility to their own pilgrims more than the Thai's.

c) Saudi Arabia Hospitals and Health Centers

There are many Saudi Hospitals in Mecca and Medina, which act as referral Hospitals, such as Al-Noor Hospital, King Abdul Aziz Hospital, etc. They provide an excellent center for specialized medical treatment (e.g., Open heart surgery, Cardiac Cauterization, Renal dialysis, mental health care, and etc.). All medical service expense is free of charge. Health facilities may vary from year-to-year, based on the annual number of pilgrims. In 2012, there were 25 hospitals including a 4,427 bed capacity, 141 health centers with 20,000 health personnel around the Hajj sites (i.e., Mina, Arafat and Muzdalifah). All health facilities are connected with the tertiary health care hospitals in Mecca and Jeddah (21).

3) The Public health care and medical care services in post Travel phase

Due to the long period of travel, people might bring some diseases from the source countries, or people may get sick from the journey. There is no data available for the post travel phase. It is recommended in the personal health book (every pilgrim was given before the departure to Hajj) that if the pilgrims have any illness, within 14 days after arrival, they have to inform the doctor about the travel history

a) Ministry of Health in Indonesia set up fever screening at the airports where the pilgrims arrived. When pilgrims arrived, If they look sick, they would be referred to the hospital near the International airport (30).

- b) In Thailand, if any notification from any health care service, that the pilgrims was ill during 14 days after the arrival, the outbreak response team from MOPH will be dispatched to conduct the investigation and disease control.

6. Future of health care at the Hajj

The Saudi Ministry of Health takes the Hajj season seriously. It starts to plan for the next season immediately after finishing the current season by gathering feedback from local and international health agencies (5), and publishes annually public health recommendations and regulations to prevent and control health threats during the Hajj. The Saudi authorities do not currently directly supervise implementation of the strict Hajj health regulations outside its borders. Instead they depend on pilgrims' host countries for that task. For example, each pilgrim should provide a valid vaccination certificate to obtain a Hajj visa. However, it is not known who could ensure that the certificate is valid. and therefore may have become a potential source of infectious disease. To overcome such a problem, the Saudi authorities could help to ensure Hajj health regulations are implemented by strengthening the public health systems in pilgrims' host countries. This could come in the form of outreach training programs for public health professionals, healthcare providers, and health system research projects as part of what is known as global health diplomacy.

E. CONCLUSION

Hajj is the spiritually religious mass gathering from Muslims worldwide. It is important to take a good care of the wellbeing of the pilgrims and the indigenous populations both in the host and home countries. Many environmental health risks and pilgrims' underlying diseases or health conditions can induce many health problems, like communicable diseases, non-communicable diseases. The impact of health problems during Hajj, may pose a public health threat, to the host and home countries, due to the speed of air transportation, that is faster than the incubation period of pathogens, such as virus or bacteria. The outbreak of serious contagious diseases may happen in home and host countries.

In the pre-travel phase, most of Thai pilgrims were screened and prepared for the Hajj, but not covered enough compared to the Indonesian. The pilgrims' health database was not complete enough to be studied, for establishing the linkage between determinants and health outcome. This needs to be improved. Three medical visits can be done like in Indonesia, but the government has to support, not only for the deep south, but for the whole country. During Hajj, infectious diseases are most common, especially respiratory infections. Gastrointestinal infection and skin infection are quite common among the pilgrims. There are many diseases that were not found but cannot be excluded, such as

leishmaniasis and heat stroke. This must be discussed in the operation staff meeting, on how to improve the effective medical services. The mortality rate is quite low and this may be due to the effective screening and health care service providers in KSA. For the post-travel phase, the procedure of health problem monitoring for the returned pilgrims is not in place at the moment.

Thai health services are good and for the Hajj. It is of most importance to use the best quality Thai health services possible, to get the best religious and health outcomes, not only for Hajj pilgrims, but also Hajj pilgrims' family members, and the rest of the Thai community.

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