SURVEILLANCE FOR MENINGOCOCCAL CARRIAGE BY MUSLIMS RETURNING FROM THE HAJJ TO HAT YAI AIRPORT, THAILAND

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Abstract. This study had three objectives: firstly, it aimed to examine an appropriate model for preventing and controlling the risk of meningococcal disease as a result of an epidemic carrying by returning pilgrims at Hat Yai International Airport; secondly, it aimed to establish the number of meningococcal carriers among pilgrims returning from Saudi Arabia; thirdly, it considered the health problems that arose during the Hajj pilgrimage. A structured questionnaire was used to collect data from 374 pilgrims at the Hat Yai airport checkpoint between March 15th and April 2nd, 2001. Each subject provided a naso-pharyngeal swab and reported on their health status by postcard once they had reached their homes 7-10 days later. It was found that most of the pilgrims were from Satun Province (23%). The average age was 50.5 years (range 20 to 86; SD 12.8). More than half of the pilgrims had some knowledge of meningococcal meningitis. Most, about 80.7%, knew that vaccination against meningococcal infection is required before traveling to Saudi Arabia. About 77.8% were vaccinated at the Provincial Health Office (PHO) in their hometown. Nearly 19% had underlying diseases such as chronic cough, asthma, diabetes, hypertension, headache and rheumatism. During their pilgrimage some were troubled by symptoms of respiratory tract disease, fever and headache. All had negative laboratory results. Only 16.6% returned postcards describing their self-assessed health status. About 30.6% described themselves as healthy. Among those who reported sick, coughs, sore throats and stomach aches were prevalent. Health education and public information about vaccine need to be strengthened. The best place to get the vaccination is their hometown PHO. Trained health personnel, instead of tour leaders or guides, should pay attention to the health of the pilgrims. The tour leaders are an important target group for improved health knowledge because most pilgrims will trust and follow them. Even though there were negative laboratory results, it is worth having a good surveillance system for meningococcal meningitis in order to prevent epidemics and reduce mortality among returning pilgrims.

INTRODUCTION

From February to April every year, 2-3 million of Muslims from all over the world gather together for the Hajj pilgrimage. They meet in Mecca, Saudi Arabia. Hajj is a duty of a Muslim who can afford the pilgrimage to the House of Allah once in a lifetime.

Before the economic crisis, about 25,000-30,000 Thai Muslims went to perform the Hajj. Since 1998, the number has declined to an average of 6,500 per year.

During the pilgrimage, all dress in customary dress and worship Allah. The Hajj means that large number of pilgrims live in crowded conditions for 2-6 weeks. Heat and overcrowing increase the risk of communicable disease, such as diseases of the gastro-intestinal and respiratory tracts. Influenza and meningococcal meningitis are common diseases during the Hajj season.

Meningococcal meningitis remains a significant health problem in developing countries. It is endemic in the Sub-Saharan region (the so-called African meningitis belt). It is highly contagious and virulent and is a leading cause of death. Meningococcal outbreaks may be caused by serogroups A, B, C, Y, and by W135 in some localities.

In 1987, there was a group A outbreak in Saudi Arabia. A number of pilgrims died and others carried infection to their native countries. Since then, the government of Saudi Arabia has required the vaccination of those seeking to enter the Kingdom. Bivalent A/C vaccine is recommended. Despite vaccination, pilgrims from all over the world still suffer from meningococcal meningitis: 225 cases and 55 deaths were reported in 2000. In 2001, the WHO reported an outbreak of W135 serogroup among people traveling to Saudi Arabia and their close contacts. From February 9 to March 22, 109 cases and 35 deaths among those returning from the Hajj pilgrimage were confirmed.

Because there is no specific surveillance system for returning pilgrims, the magnitude of meningococcal carriage associated with the Hajj is difficult to assess. Between 12-22 January 2001, 55 Thai pilgrims were randomly selected in order to conduct naso-pharyngeal swabbing before their journey to Saudi Arabia: one carrier was found and prophylaxis was given to her and her close contacts at the Office of International Communicable Disease.

Unlike other parts of Thailand, direct flights of THAI airline bound to Saudi Arabia were organized to southern Hajj pilgrims at Hat Yai International

Airport. The check-in can be made at the Multi-purpose building, 500 meters away from the airport building. In such a way, a specified event, an intervention, or a research can be conducted.

This study was intended to examine the health problems of Muslim pilgrims, as well as their health risks - in particular meningococcal infection, which often causes epidemics in Saudi Arabia. This study also aimed to establish an appropriate surveillance system for preventing and controlling communicable diseases which will effect the health of pilgrims.

MATERIALS AND METHODS

Cases

All pilgrims of southern Thailand returning from the Hajj to the Hat Yai airport checkpoint were subjects of the study. A total of 7 flights of 1,732 THAI airways passengers between 15th March and the 2nd April 2001 were selected. At least 20% of all the pilgrims from each flight (374 cases) were randomly sampled.

Study methods

Such pilgrims were announced to get a treatment if they were sick. All randomly selected pilgrims were interviewed using a structured questionnaire. The questionnaire consisted of 2 parts: part I contained questions about the pilgrims' general characteristics; part II focused on health perceptions about communicable disease and meningococcal meningitis.

Nasopharyngeal swabs were taken by well-trained nurses from Hat Yai Hospital. Culture specimens were sent for examination at the Center of Medical Science, Songkhla within 24 hours.

Each subject assessed his/her own health status after 7-10 days back in Thailand; this was reported by a given postcard.

RESULTS

The sample population

As shown in Table 1, 374 pilgrims were selected from 7 flights between March 15th and April 2nd 2001. On average, approximately 20% of each flight was sampled except the flights of March 19th and April 2nd.

General characteristics

As shown in Table 2, pilgrims from Satun, Songkhla and Narathiwat Provinces accounted for 22.7%, 21.1% and 11.5% respectively. The male: female ratio was 1.02. Nearly 30% were elderly (>60 years). Both general and religious education were of a poor standard. Thirty percent of the pilgrims were agricultural workers. There were both extremely low and high income-earners, *eg* below 5,000 and above 15,000 baht per month (1 US$ 43 baht).

Health literacy

As shown in Table 3, only 80% of the pilgrims said that they knew about the vaccine requirement. Almost 80% were vaccinated at Provincial Health Offices. Half of the pilgrims had some knowledge of meningococcal meningitis (MM).

Health problems

As shown in Table 4, more than one-third of the pilgrims had underlying disease, such as asthma, diabetes mellitus, hypertension, cardiovascular disease, or cough. Nearly 30% had symptoms or were ill during the Hajj.

Table 1
Samping population in 7 flights.

Date of arrival	Total THAI passengers (Pilgrims)	Sampled pilgrims	Percentage of total
15 March 2001	243	51	21
17 March 2001	252	48	19
19 March 2001	256	30	12
21 March 2001	252	55	22
29 March 2001	251	54	22
31 March 2001	252	58	23
2 April 2001	226	78	35
Total	1,732	374	22

Table 2
Characteristics of the subjects.

Item	No. (persons)	%
Place of residence (Province)		
Satun	85	22.7
Songkhla	79	21.1
Narathiwat	43	11.5
Pattani	42	11.2
Yala	37	9.9
Others	74	19.8
Unknown	14	3.7
Sex		
Male	185	49.5
Female	175	46.8
Unknown	14	3.7
Age group (years)		
40 and below	81	21.7
41-50	88	23.5
51-60	87	23.3
Above 60	118	31.5
Marital status		
Couple/married	260	69.5
Single/divorce	50	13.2
Unknown	64	17.4
General education		
Grade 6 or less	194	50.9
Grade 7 or above	64	29.1
Unknown	116	31.0
Religious education		
Feraudin	157	42.0
Inditaee and above	36	9.7
Unknown	181	48.3
Occupation		
Agriculture	115	30.7
Student	40	10.7
Others	164	43.9
Unknown	55	14.7
Income (baht per month)		
5,000 or less	131	35.0
5,001-15,000	24	6.4
Above 15,000	203	54.3
Unknown	16	4.3

Self-assessed health status

Only 62 pilgrims mailed back their postcard. The response rate is 16.6%.

Laboratory surveillance

A total of 335 samples (out of 374 pilgrims) were obtained by naso-pharyngeal swabbing. All of them were negative for meningococcal carriage.

DISCUSSION

Most pilgrims were elderly and rather poorly educated: the majority were in poor health. Nearly 19% of the subjects reported underlying diseases. About 28% were sick during the Hajj. Due to the hot weather and the overcrowding, the pilgrims were frequently ill with diseases of the respiratory tract, such as influenza.

It seems that there was inadequate free vaccination at the pilgrims' hometown health service centers. Nearly 22% had to be vaccinated at an airport checkpoint. Since there were only few health officers at the airport, services were often rushed and inconvenient. Therefore, public health information distibution needs to be strengthened. Provincial Health Office (PHO) should be recommended as being the best place for vaccination.

Because of old age and poor general health, pilgrims' preparedness, routine check-ups, and readiness for medication is essential. At present, tour leaders, grovernment officers, and religious leaders provide simple group advice. Attention is seldom given to health education and self-care. It is surprising that very few health staff get actively involved in health education.

Even though the sampled pilgrims proved not to be meningococcal carriers, routine lab surveillance for meningococcal meningitis among pilgrims remains worthwhile because of severe manifestations of, and high mortality associated with the disease.

Recommendations

In order to ensure the good health of pilgrims, a systematic approach needs to be adopted:

1. All pilgrims should be told about the vaccination requirements, the weather and their place of residence etc by their tour leaders or religious leaders.
2. While being vaccinated at Provincial Health Offices, health officers ought to educate pilgrims about how to stay healthy and fit prior to, and during the Hajj.
3. When arriving at Hat Yai airport, pilgrims should be randomly selected in order to perform

Table 3
Health knowledge.

Item	Number (persons)	Percentage
Vaccine requirement as a regulation		
Yes	302	80.7
No	6	1.6
Unknown	66	17.6
Place of vaccination		
PHO	291	77.8
International customs checkpoint	83	22.2
Knowledge about MM.		
Ever heard about meningococcal meningitis - yes	248	66.3
Is it a communicable disease? Yes	203	54.3
Can it be spread via the respiratory route? - yes	185	49.5
Does it cause death? - yes	187	50.0

Table 4
Health problems prior to and during the Hajj.

Item	No. (persons)	%
Prior to the Hajj		
Healthy	206	55.1
Underlying disease	72	19.3
No answer	96	25.7
During the Hajj		
Healthy	267	71.4
Symptoms / illness	105	28.1
No answer	2	0.5

Table 5
Reported health status 7-10 days after returning to Thailand.

Item	No. (persons)	%
Healthy	19	30.7
Sore throat	38	61.3
Stomach ache and vomiting	3	4.8
Unknown	2	3.2

nasopharyngeal swabbing.

4. In addition, all pilgrims should be asked to assess their health status 7-10 days after their return. If they became ill, their postcard should be sent to health officers.

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