



Outbreak Investigation of Coronavirus Disease (COVID-19) among Islamic Missionaries in Southern Thailand, April 2020

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Abstract

From 30 Mar to 20 Apr 2020, an outbreak of coronavirus disease (COVID-19) occurred in Thung Yang Daeng District of Pattani Province in Southern Thailand. An outbreak investigation was conducted to identify the outbreak's magnitude, epidemiologic characteristics, and source of infection. A descriptive study was conducted in which we reviewed investigation reports of all Real Time - Polymerase Chain Reaction (RT-PCR) confirmed COVID-19 cases and identified active local transmission villages. A case was defined as a person living in one of the active local transmission villages with laboratory confirmation of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). A total of 27 laboratory-confirmed cases were identified from 471 individuals (overall attack rate 5.7%) who were deemed to be high-risk contacts. Among them, two cases were detected from the active case finding. The median age of the 27 cases was 46 years (Q1=28, Q3=58) and the male to female ratio was 1.07:1. The first imported case returned from religious gatherings at Markaz Yala, a place of worship in Yala Province. The analytic result showed that the group of religious contacts at Markaz Yala, local religious contacts, and household contacts of the confirmed cases, had a significantly higher risk of SARS-CoV-2 infection than other community members. Local quarantine for people returning from outbreak areas and religious gatherings, and for high-risk close contacts will be appropriate for the district context.

Keywords: Coronavirus Disease, COVID-19, Islamic missionaries, southern, Thailand

Introduction

An outbreak of a novel coronavirus disease (later termed COVID-19) spread throughout China starting on 30 Dec 2019 and several confirmed cases were subsequently reported across the globe prompting the World Health Organization (WHO) to declare the situation a global pandemic.¹ Rapidly growing numbers of confirmed cases and deaths ensued with a mortality rate of around 4.6%. Most of the severe cases have been older people and persons with underlying diseases such as cardiovascular disease and diabetes mellitus. Patients may have a fever

with respiratory symptoms such as cough, rhinorrhea, sore throat, or difficulty breathing, with death possible if the symptoms are severe. The incubation period is, on average, 5-6 days; however, it can be up to 14 days.² The route of transmission is human to human through droplets from coughing and sneezing of an infected person and close contact with a case.² Although there are several methods to diagnose COVID-19, the current gold standard was recommended by the US Centers for Disease Control and Prevention (CDC) and WHO³ with Thai guidelines still using Real Time - Polymerase Chain Reaction (RT-PCR) for the diagnosis of SARS-CoV-2.⁴

Among member states of the Association of Southeast Asian Nations (ASEAN), Singapore has the highest attack rate, followed by Brunei, Malaysia, Philippines, Thailand, and Indonesia with morbidity rates of 2,881, 322, 192, 81, 43, and 38 per million population, respectively.⁵

The Southern Border of Thailand experienced an outbreak of COVID-19 after missionaries and pilgrims returned from abroad to attend religious gatherings. Islamic missionaries are known as Dawah Tablighi and focus on advising other Muslims and encouraging them to continue practicing their religion.⁶ A Tabligh event in Kuala Lumpur called “International Qudamak & Ulamak Malaysia 2020” was held from 28 Feb to 2 Mar 2020, and was attended by over 100 Thai citizens.⁷ The attack rate among Thai Islamic missionaries participants was 29.3% (36/123).⁸ Another Tabligh event in South Sulawesi, Indonesia, that was held from 19 to 22 Mar 2020 resulted in a 60% attack rate among Thai Islamic missionaries participants (92/148).⁸

In mid-April 2020, the surveillance system for COVID-19 in the southern border provinces of Thailand showed that 25 cases occurred in Thung Yang Daeng District, Pattani Province. The distribution of confirmed cases was mainly in Village 6, Phiten Sub-District and Village 5, Nam Dam Sub-District. A joint investigation was conducted in Thung Yang Daeng District between 15 to 18 Apr 2020 to identify the outbreak’s magnitude, epidemiologic characteristics, and source of infection, and to recommend prevention and control measures.

Methods

Review of Contact Tracing Data and Identification of Active Local Transmission Villages

We reviewed investigation reports of all laboratory-confirmed COVID-19 cases. We interviewed a physician and local public health officers to describe the contact tracing process, updated situation, epidemiological distribution, and events of the index case during 15 to 16 Apr 2020. An active local transmission village was defined as a village in Thung Yang Dang District or any other location that had an epidemiologic linkage with this cluster. We also reviewed and observed district geography, populations, and social culture during the investigation period.

Active Case Finding

We conducted an active case finding in two active local transmission villages on 17 and 18 Apr 2020. A

Corona-1 questionnaire was used to collect identification data, demographic characteristics, clinical information, and risk factors from all participants.⁴ A suspected case was defined as a person living in Village 6 of Phiten Sub-District or Village 5 of Nam Dam Sub-District in Thung Yang Daeng District who satisfied at least one of the following two criteria: (i) high-risk close contact with a confirmed case who did not take laboratory testing and who was a participant of a religious gathering at Markaz Yala (a central place of worship in Yala Province) during 22 to 25 Mar 2020 or other places within 14 days, or their household contacts, (ii) patient with a history of having fever or documented temperature ≥ 37.5 °C or any of the following respiratory symptoms: cough, rhinorrhea, sore throat, tachypnea, or shortness of breath, or difficulty breathing during 10 to 18 Apr 2020.

According to Thai guidelines for surveillance and investigation of COVID-19, close contact was defined as a person who had at least one of these following criteria⁴: (i) a person who came into close (within 1 meter) contact with, or had a conversation with any patient for >5 minutes, or was coughed or sneezed on by any patient when he/she did not wear appropriate personal protective equipment (PPE), e.g. a face mask, (ii) a person who was in an enclosed space without proper ventilation, e.g. in the same air-conditioned bus/air-conditioned room as any patient, and was within one meter of any patient for >15 minutes without wearing appropriate PPE.

A high-risk close contact was defined as a close contact who was likely to contract the virus from any patient through exposure to respiratory secretions of any patient while not wearing PPE according to standard precautions. While a low-risk close contact was defined as a close contact who was less likely to contract the virus from any patient. This includes close contacts who have not met the definition for high-risk close contacts.

A person who satisfied any of the above criteria would have a respiratory specimen collected to detect SARS-CoV-2 by RT-PCR, and become a laboratory-confirmed COVID-19 case when the result is positive.

Laboratory Investigation

Both nasopharyngeal and throat specimens were collected in all suspected cases and high-risk contacts to detect SARS-CoV-2 by RT-PCR. If the test results from any high-risk contact came back negative, a repeated specimen was taken 5 days later. Specimens were packaged at 2-8 °C and transported to the

regional medical sciences center, region 12, Songkhla Province for SARS-CoV-2 RT-PCR within 24 hours.

Table 1. Specific attack rate of confirmed COVID-19 cases in Thung Yang Daeng District, Pattani Province, April 2020^a

Characteristic		Number of persons examined	Positive by RT-PCR	Attack rate (%)
Sex	Male	244	14	5.73
	Female	227	13	5.72
Age	≤5 years old	34	1	2.94
	6-14 years old	46	2	4.35
	15-24 years old	257	16	6.23
	25-59 years old	82	6	7.32
	≥60 years old	52	2	3.85
Case source	Contact tracing process	387	25	6.46
	Active case finding	84	2 ^b	2.38
Type of contacts (contact tracing)	Religious contacts at Markaz Yala	56	5	8.93
	Household contacts	106	12	11.32
	Locally religious contacts	36	6	16.67
	Community contacts	189	2	1.06

Note: ^aincluding index case ^bboth of them were communities contact of a prior confirmed case

Analytic study

A cross-sectional study was conducted among 471 participants from contact tracing and active case finding. All had respiratory specimens collected for detection of SARS-CoV-2 during 1 to 20 Apr 2020. A case was defined as having a positive result of RT-PCR for SARS-CoV-2, and a non-case was identified as a person with negative result of RT-PCR for SARS-CoV-2. Data were analyzed using Stata version 11. Univariable and multivariable analyses were conducted using logistic regression and presented as prevalence ratios (PR) and adjusted odds ratio (OR) with 95% confidence intervals (CI).

Results

Descriptive results

Thung Yang Daeng District is located in the south of Pattani Province. About 20,000 people live in four Sub-Districts. Around 98% of the residents are Muslim. A total of 27 laboratory-confirmed cases were

identified from both contact tracing and active case finding (overall attack rate 5.7%; 27/471). Of the 27 cases, 25 were identified from index case detection with contact tracing and two cases were identified from active case finding among active local transmission villages (Table 1). By source of infection, five imported cases had returned from a religious gathering at Markaz Yala in Yala Province (four females and one male) and the remaining 22 cases were locally transmitted. The specific attack rates among religious contacts at Markaz Yala, household contacts, local religious contacts, and community contacts were 8.9%, 11.3%, 16.7%, and 1.1%, respectively. All of them were hospitalized for at least 14 days and received supportive treatment at the cohort ward, an isolation ward under infectious control specifically reserved for COVID-19 patients. One case had pneumonia. No case required a mechanical ventilator and there was no death. There were six symptomatic cases presenting with myalgia (five cases), fever (four cases), cough (four cases), rhinorrhea (two cases), and sore throat (two cases).

The median age was 46 years (Q1=28, Q3=58), and the male to female ratio was 1.07:1.

Confirmed cases were distributed in three villages. The highest attack rate occurred in Village 6 of Phiten Sub-District, followed by Village 4 of Paku Sub-District and Village 5 of Namdam Sub-District with attack rates of 148, 50, and 16 per 1 million people, respectively. The onset of symptoms for the first case (index case) was on 30 Mar 2020. As shown in Figure 1, the highest number of cases occurred during 9 to 13 Apr 2020 and onset of symptoms for the latest reported cases was on 18 Apr 2020.

Tracing of Index Case and Source of Infection Hypothesis

The first case was a 68-year-old male Muslim religious leader. He was an Islamic missionary (Dawah Tabligh) who returned from the Markaz Yala religious gathering in Yala Province, during 22 to 25 Mar 2020. At this central place of worship, daily religious activities are conducted. Some of Islamic missionaries returning from religious events in Malaysia and Indonesia had also attended that particular event at Markaz Yala. It is possible that the index case had spread the infection after returning from that event. His onset of symptoms began on 30 Mar 2020 and was diagnosed with SARS-CoV-2 on 5 Apr 2020 after being admitted to hospital with pneumonia. Between 25 Mar and 5 Apr 2020, he joined some local religious activities such as praying at the mosque near his home with many other people, a funeral ceremony, and two wedding ceremonies. His wife's onset of symptoms started on 4 Apr 2020 and she was later confirmed to have SARS-CoV-2. She

attended the Markaz Yala religious gathering at the same time with her husband. She was a spiritual teacher in their community and hosted a religious gathering at her home (Taalem) among many women and on many occasions (Figure 2). The other three imported cases were women who attended the same religious gathering.

Laboratory Results

Of the 471 respiratory specimens tested, 27 were found positive for SARS-CoV-2 (5.7%). Of 387 collected specimens from the index case detection and contact tracing, 25 were positive (6.46%). The other 84 specimens were collected from the active case finding process of which two were positive (2.38%).

Analytical Study Results

After controlling for covariates in the multivariable analysis, the group of religious contacts at Markaz Yala (adjusted OR 5.85, 95% CI 1.52-22.49), locally religious contacts (adjusted OR 7.22, 95% CI 1.93-27.06), and household contacts of the confirmed case (adjusted OR 9.36, 95% CI 3.06-28.62) were a significantly risk of SARS-CoV-2 infection than community contacts (Table 2).

Preventive and Control Measures

We adjusted the proper case definition for early detection and immediately implemented control measures and set it as a surveillance definition in communities and hospitals. We joined the meeting with the local authorities including a district chief and village head to give specific recommendations on this outbreak.

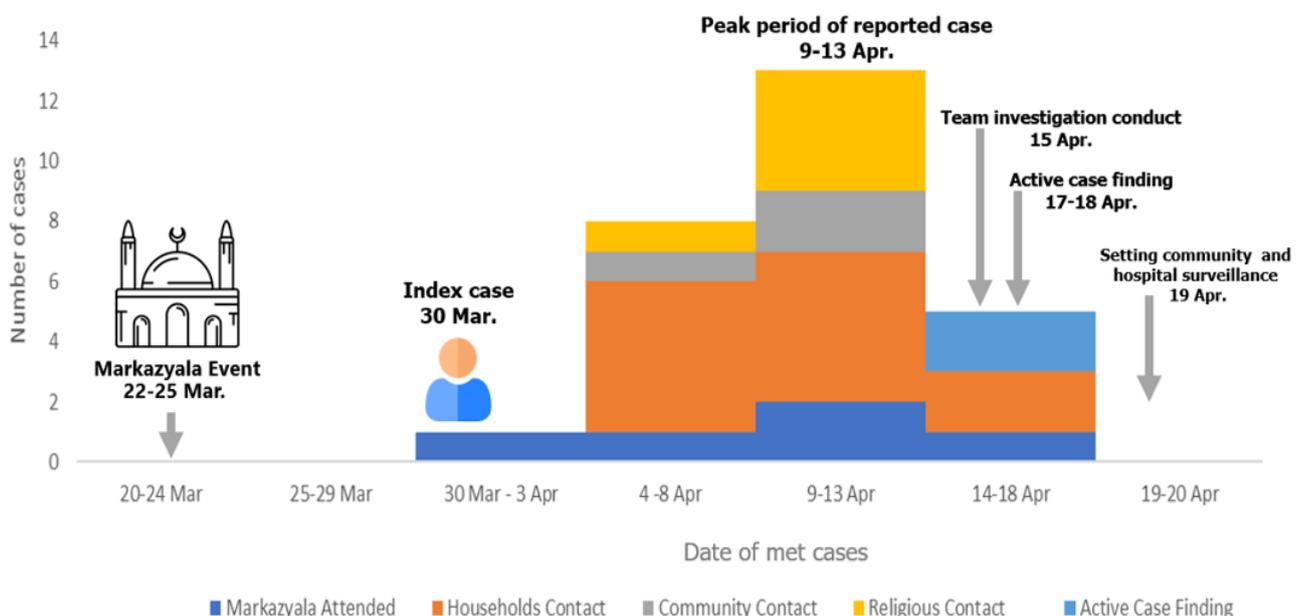


Figure 1. Number of COVID-19 cases in Thung Yang District, Pattani Province, Thailand between March and April 2020 (n=27)

Discussion

An outbreak of COVID-19 occurred in Thung Yang Daeng District due to imported cases of Islamic missionaries (Dawah Tabligh) who had returned from religious gatherings at Markaz Yala. Religious gatherings of Islamic missionaries had recently identified a high proportion of COVID-19 cases among Thai Islamic missionaries returning from Malaysia and Indonesia to the Southern Border Provinces of Thailand during the same time period.^{7,8} Mass gatherings such as sporting, religious, music,

and other events, can contribute to the spread of COVID-19, and have been the source of infectious diseases that have spread globally.⁹

The mass attendance of locals at religious gatherings in the area was an important factor that contributed to the spread of COVID-19 in this study supported by higher than expected specific attack rates and our analytical study. The index case and his wife were both religious leaders. They were often invited as guests of honor to take part in various ceremonies in the community, particularly religious gatherings.

Table 2. Factors associated with COVID-19 in Thung Yang Daeng district, Pattani Province, Thailand

Factor		Univariable analysis		Multivariable analysis	
		PR	95% CI	Adjusted OR	95% CI
Sex	Male	Ref	Ref	Ref	Ref
	Female	1.35	0.64-2.85	1.56	0.63-3.84
Age	<15 years old	Ref	Ref	Ref	Ref
	15-59 years old	1.70	0.51-5.64	3.06	0.82-11.43
	≥60 years old	2.09	0.54-8.11	4.33	0.86-21.74
Type of contact	Community contacts*	Ref	Ref	Ref	Ref
	Religious contacts at Markaz Yala	3.41	1.02-11.36	5.85	1.52-22.49
	Local religious contacts	5.30	1.62-17.39	7.22	1.93-27.06
	Household contacts	4.32	1.56-11.94	9.36	3.06-28.62

Note: *Both close and non-close contacts

In theory, a super-spreader is generally taken to refer to a person who infects significantly more people with a disease than usual; however, the WHO has not clearly defined this term. Many epidemiologists have suggested using the term "super-spreading event" because they were worried about "social stigma". Many factors can contribute to a super-spreading event, including immune suppression, disease severity, viral load, large numbers of asymptomatic cases, and extensive social interactions.¹⁰ The index case of this particular outbreak was likely to be the cause of a super-spreading event, although information about the disease severity is unknown. However, the prolonged duration of exposure and profusion of social interactions may have played key

roles in this outbreak. The national Islamic authority of Thailand declared and set guidelines on how to behave in religious ceremonies for Muslims during the COVID-19 pandemic.¹¹ For example, instead of coming to the mosque for praying, people should pray at home. This is just one of the important ways in which the outbreak can be mitigated.

Household contacts had the highest odds of SARS-CoV-2 infection in this study (attack rate 11.32%; 12/106), which suggests a low quality of home quarantine among high-risk contacts of a confirmed case. According to the characteristics of Muslim families in the study area, most of the members interact together in a shared room which increases

the risk of disease transmission. Also, the rural lifestyle engenders close relationships with neighbors.

The percentage of asymptomatic cases in this cluster was 77.8%. It is claimed that most people infected with SARS-CoV-2 are asymptomatic but are still able to infect between 50% and 75% of others.¹² Therefore it is a challenge for healthcare workers to establish a new definition to cover those who have participated in community gatherings without showing any symptoms and set it up as a hospital and community surveillance system for early detection.

Aging is associated with certain changes in pulmonary physiology, pathology, and function, during the period of lung infection and can lead to worse clinical outcomes in elderly patients (those aged ≥ 60 years) compared with younger people.¹³ The main behavioral risk factor in this study was a religious gathering of which many elderly people attended, and although none of the infected cases were severe, further policies should encourage them to avoid mingling in crowded areas.

Completion of contact tracing and implement immediate control measures were important to contain this outbreak. We used active case finding to assess the extent of the outbreak in villages where new cases were continuing to be reported and found two new cases having a history of contact with confirmed cases in the community. Active case finding can determine the effectiveness of contact tracing. Our study showed that SARS-CoV-2 transmission occurred mostly in high-risk contacts of the confirmed case according to classification by WHO, which is not common in general community members.¹⁴

Dawah Tabligh is an Islamic missionary with a way of doing unique religious activities. Members often travel to other countries such as India, Pakistan, Bangladesh, and ASEAN countries, usually once per month, and can takes about one week to four months, and sometimes there are more than 10,000 people per gatherings. They are one of the high-risk groups when there are emerging or re-emerging infectious disease outbreaks. Delayed detection often causes community transmission. Disease surveillance, and outbreak response, according to WHO guidelines for a mass gathering, should be considered, especially pre and post pilgrimage.¹⁴

Limitations

A limitation of this study is that the religious places in question were closed due to local control measures being enforced. Therefore, we could not explore in detail the characteristics of local religious gatherings

that may have helped identify more specific interventions for further recommendations.

Recommendations

High-risk close contacts should be quarantined in designated disease control areas provided by the local authorities. The quantity and quality of these local quarantine places must be assessed by all stakeholders in the area for proper planning. The social distancing policy should be strengthened in public areas by the local authorities to prohibit gatherings, religious or otherwise, in the community according to the declaration of the national Islamic authority of Thailand. The Provincial Health Office should adapt the travel medicine to deal with the prevention and management of health problems of Thai Islamic missionaries (Dawah Tabligh) when attending further religious activities abroad, including health checkups, pre-travel vaccinations, and advice on how to take care of themselves while attending mass gathering events.

Conclusion

The majority of Islamic missionaries (Dawah Tabligh) in Thailand are from the Southern Border Provinces of Pattani, Narathiwat, and Yala Provinces. They attended religious activities abroad such as the last event held in Malaysia and Indonesia during the pandemic of COVID-19.¹⁴ Some of them that were returning from both events also attended the Markaz Yala event that was held between 22 to 25 Mar 2020 then became a source of local transmission. For this particular COVID-19 cluster in Thung Yang Daeng District of Pattani Province, a religious leader was identified as the source of the outbreak. He had attended many joint activities in the community and thus deemed to be a super-spreader. A total of 27 cases were identified with an overall attack rate of 5.7% among suspected and high-risk contacts within this cluster. Local religious contacts and household contacts had a significantly high-risk of SARS-CoV-2 infection compared to community contacts. The cluster was localized to only three villages and transmitted only among the close contacts of the cases. According to the classification by WHO, there were no community transmissions.

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Suggested Citation

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