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COVID-19 Outbreak in the Chiang Rai Border Area due to Illegal Immigration to Thailand: A Field Investigation

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) is a novel serious infectious disease to humankind. The COVID-19 pandemic has led to the deaths of many people worldwide almost a year (the year of 2020). Countries are implementing several public health measures, and some, such as Thailand, have successfully controlled the spread of the disease. However, imported cases are a major threat to a country like Thailand. **Methods:** A field investigation was conducted to identify positive cases and implement control measures for COVID-19 cluster cases reported who illegally entried into Thailand in the Chiang Rai Province, Thailand, between November 28, 2020, and December 5, 2020. Moreover, public health measures were implemented to control and prevent the disease. Cases of new infections were closely monitored to assess the effectiveness of the implemented control measures for at least two incubation periods (28 days). **Results:** A total of 15 COVID-19 cases (nine cases resided in Chiang Rai Province): 14 women and one man (contacted indexed case) were reported in a clustered outbreak in the Chiang Rai Province from late November to December 5, 2020. Twelve Thai women of 14 cases who had returned from working at a hotel in Myanmar tested positive for COVID-19 in late November 2020. A 28-year-old Thai man who was in close contact with one of these women tested positive for COVID-19 on December 2, 2020. Among the 12 women, nine had illegally entered Thailand, while three had legally entered the country and were isolated and treated at the Chiang Rai Prachanukroh Central Hospital. The illegal entrants included three from Chiang Rai, three from Chiang Mai, and one each from Pha Yao, Phi Chit, Bangkok, and Rat Cha Buri Provinces. Among the imported cases, about 50.0% were asymptomatic, and the average age was 26.1 years (Min = 21, Max = 26). Five symptomatic patients were admitted to public hospitals and received standard care. Those who had no specific signs or symptoms were under close monitoring and were observed in a hospital. Several public health measures were implemented at all levels in the provinces. **Conclusion:** Illegal crossing border is one of the most significant factors of COVID-19 outbreaks in Thailand. However, immediate responses with effective public health interventions to prevent and control the spread of the disease (contact tracing), including effective communication and strong collaboration among partners, are key factors for success in halting the spread of COVID-19 in Thailand.

Keywords: *COVID-19; Illegal crossing border; Investigation; Public health control measure*

Introduction

Coronavirus disease 2019 (COVID-19) is a serious infectious disease caused by severe acute respiratory syndrome coronavirus-2 (SAR-CoV-2) [1]. The disease spreads primarily through droplets generated when an infected person coughs, sneezes or speak [1]. Since its first report in Wuhan, China, on December 31, 2019 [2], more than 78 million cases of infection and 1.7 million deaths have been reported worldwide [3]. On December 4, 2020, the World Health Organization (WHO) stated that the USA had reported the largest number of cases, followed by Europe and Southeast Asia (SEA) [3]. Among the countries in SEA, Indonesia reported the highest cumulative confirmed cases (549,508) and deaths (17,199), followed by the Philippines (434,357 confirmed cases and 8,436

deaths) and Myanmar (92,189 confirmed cases and 1,972 deaths) [4]. During the pandemic of the disease, many countries have implemented several control and prevention measures to save their citizens such as keeping social distancing, improving personal hygiene, etc. [5].

On January 13, 2020, Thailand has been reported the first case of COVID-19 which was the first case outside China [6]. By December 3, 2020, a total of 4,026 confirmed cases had been reported in Thailand, with 60 deaths. On the same day, Thailand's Ministry of Public Health reported 18 newly confirmed cases within 24 hours; all of them were imported [7]. Almost one year from the first reported case of COVID-19 in Thailand, several cases were reported throughout the country in different populations and different settings [8, 9]. Considering that Myanmar has been reported as one of the countries with the highest number of newly confirmed cases per day in the world [10], people in Thailand are at a high risk of infection due to the more than 2,400-km long border shared between countries with a large migrant population reported each year [11, 12]. Chiang Rai Province is located in the northernmost region of Thailand and has both permanent and temporary ports of entry or crossing channels [13]. More than 1.2 million people live in Chiang Rai Province; approximately 30.0% of the total population here belongs to the hill tribe and other stateless populations with poor economic and educational status [14, 15]. Poorly educated populations are highly vulnerable to infectious diseases [16, 17], including COVID-19 [18].

Imported cases of COVID-19 are common in Thailand. The epidemiologists and surveillance and rapid response team (SRRT) working at local and national levels promptly implemented appropriate prevention and control measures to stop the spread of the disease. There have been recognized by the WHO and are being used as the key success models to be applied in other countries [19]. This study demonstrates the system, implementations, and outcome of SRRT measures in COVID-19 prevention and control among those who illegally entered into Thailand in Chiang Rai Province.

Methods

A field investigation [20] was conducted to identify positive cases and implement control measures for COVID-19 cluster cases reported in the Chiang Rai Province, which has various entry ports into Thailand from Myanmar, between November 28, 2020, and December 5, 2020. The data were collected and analyzed along the implementation time.

Step 1 – Preparation for fieldwork: All SRRTs at subdistrict, district, provincial, regional, and national levels in Thailand have well-developed structure and functions. During the COVID-19 outbreak, several training programs have been implemented to ensure that all team members are able to conduct their roles under the Thai regulations for disease control and prevention. Infrastructure, including essential medicines and standard care protocols, were provided at all levels. All relevant systems were tested multiple times during the reported period of the COVID-19 pandemic.

Step 2 – Confirming the diagnosis: On December 2, 2020, the first new cluster of COVID-19 cases was reported through the provincial COVID-19 information system. After testing positive for COVID-19 at a private hospital in Thailand, all cases were referred to the Chiang Rai Prachanukroh Central Hospital, which is one of the largest public hospitals in northern Thailand for a repeat COVID-19 test. Nasopharyngeal swab specimens were collected. The specimens were then transferred and tested for COVID-19 at the Regional Medical Sciences Center, Chiang Rai. Confirmed positive test results were reported to a medical doctor at the Chiang Rai Prachanukroh Central Hospital. Simultaneously, the information was reported to the Chief of the Chiang Rai Provincial Public Health Office.

Real-time polymerase chain reaction (RT-PCR) testing for the N-gene and ORF-1b gene was used to detect COVID-19 infection. QIAStat-Dx respiratory 2019-nCoV Panel was used as the reagent for RT-PCR for the first time. All positive test results and RT-PCR with the Logix Smart COVID-19 reagent were re-tested for confirmation before submitting the final report to the clinician. All PCR procedures were run on "Applied biosystem" version 7500 RT-PCR.

Step 3 – Determining the existence of the outbreak: The head of the provincial-SRRT was immediately informed of the positive test results, and the team started gathering information on the existence of an outbreak. COVID-19 is listed as a serious disease in Thailand and requires immediate investigation and control. Therefore, this instance was considered an outbreak of the disease. The next steps of disease investigation and control were required.

Step 4 – Identifying and tallying cases: Public health protocols and guidelines state that all confirmed cases of COVID-19 and those exposed to persons confirmed to have COVID-19 need to be indexed and instructed to follow public health control measures. All individuals exposed to persons with confirmed COVID-19 were classified as high-risk or low-risk. Those in the high-risk group were immediately tested for the disease following the standard procedure. Those with positive test results were isolated in a negative pressure room in a hospital for proper treatment and care. Those who had negative results were quarantined for at least 14 days. In addition to the individual measures, all environments, including schools, restaurants, and personal living residences, were cleaned with disinfecting solutions.

Step 5 – Tabulation and orientation of data in terms of time, place, and person: All data acquired from the fieldwork were presented in table form with

the information of the place, person, and time. The information was used for action, presentation, communication, monitoring, etc. The information was also used to identify the halting of the outbreak after careful observation for two COVID-19 incubation periods, i.e., 28 days after the last recorded case.

Step 6 – Considering whether control measures could be implemented: Several control measures have been introduced by the WHO and the Thai Ministry of Public Health. WHO recommends that all people use masks, wash hands, and maintain social distancing, which are common practices in Thailand. In this case, many effective methods of control were available and ready to be implemented.

Step 7 – Developing and testing hypotheses or questions: Our hypotheses were as follows: a) how could individuals enter Thailand without their COVID-19 status at the entry point being assessed? b) what was the scale of spread from the first imported cases? and c) could we control the cluster outbreak within the first-to-second generation of infection?

Step 8 – Planning one or more systematic studies: A concrete working plan was immediately developed according to the steps recommended by the SRRT. It particularly involved investigating and contacting all individuals exposed to the persons with confirmed COVID-19 in Thailand. This meant that all confirmed persons were interviewed on their recent travel history and the people they came into contact with after returning to Thailand. Moreover, all information were collected and reviewed.

Step 9 – Implementing and evaluating control and prevention measures: Public health prevention and control measures were immediately implemented for those exposed to the confirmed persons. In general, measures such as using a facemask, regular hand washing, and maintaining social distance, were continuously introduced through official and unofficial channels such as television, conference, social media. Moreover, contact tracing was immediately implemented to identify all exposed persons for testing and self-quarantine for at least 14 days.

Step 10 – Communicating findings: This was an important step in providing the public with validated information, particularly those who could be most impacted by the outbreak: residents of Chiang Rai Province, businesspeople, hospital staff, among others. Communication was executed through both formal government channels and other informal channels. The Chief of Chiang Rai Government Office and Public Health Office, including the director of Chiang Rai Prachanukroh Central Hospital, provided information once a day until the end of the outbreak. All lessons learned were identified and reported.

Ethical considerations

All participants were asked regarding their willingness to provide information on a voluntary basis, and written informed consent was obtained before the interview. All information, including medical records, were kept confidentially.

Results

Between December 1–5, 2020, 16 confirmed cases of individuals with COVID-19 who originated from the Chiang Rai Province were reported. These included one man and 14 women with an average age of 26.1 years (Min = 21, Max = 26) after excluding one 51-year-old woman. Nine of these cases were asymptomatic, while the others presented mild symptoms with fever, cough, and muscle pain. All positive COVID-19 cases were detected using PCR testing. By December 4, 2020, the individuals were living in different provinces: nine in the Chiang Rai Province, two in the Chiang Mai Province, and one in each of the following provinces: Pha Yao, Phi Chit, Sing Buri, Ratcha Buri, and Bangkok.

Among the nine patients who resided or were being treated at the Chiang Rai Prachanukroh Central Hospital, eight were women, and one was a man (transgendered). Four of the nine patients presented with mild signs and symptoms. An infected man was identified who had contracted the infection from a friend returning from Myanmar. No deaths were reported between December 1–5, 2020. All confirmed patients were admitted to the hospital for medical care and management in an isolated negative pressure room. The following are the details of early cohort cases who illegally immigrated to Thailand and were living in the Chiang Rai Province:

Case No. 1 *(Imported case)*

A 26-year-old woman worked at a hotel in Myanmar in early November 2020 before returning to Thailand. On November 25, 2020, she developed a mild fever, and some of her peers were detected positive for COVID-19. Early on November 27, 2020, she left Myanmar to travel to Thailand through an unofficial channel. On her way to her hotel in Thailand, she bought utilities at a small community store. On November 28, 2020, she went to Chiang Rai city by motorcycle and was tested for COVID-19 at a private hospital. She was referred to the Chiang Rai Prachanukroh Central Hospital. Twenty-eight exposed persons were identified; four of them were high-risk persons. Among those exposed, none tested positive for COVID-19. She was identified as an indexed case of the outbreak in Chiang Rai, Thailand.

Case No. 2 *(Imported case)*

A 23-year-old woman who worked at the same hotel as the woman in case no. 1 from the early days of November 2020 until November 27, 2020, decided to move back to Thailand. She crossed the border through an unofficial channel together with the woman in the first case and stayed at a hotel in Thailand overnight in a separate room from the woman in the first case. On November 28, 2020, she stayed for one more day at the

hotel and got food using the GrabFood delivery app. On November 29, 2020, she developed a cough and was contacted by the public health SRRT to be tested for COVID-19 at Chiang Rai Prachanukroh Central Hospital. Eventually, she tested positive for COVID-19 and was admitted to an isolated, negative pressure room at the hospital. Six contact persons were traced, with two in the high-risk group.

Case No. 3 *(Imported case)*

A 25-year-old symptomatic woman worked at the same hotel as the women in cases 1 and 2 between November 2–25, 2020, in Myanmar. On November 25, 2020, she found out that one of her friends who worked at the same hotel had tested positive for COVID-19. On November 26, 2020, she returned to Thailand using an unofficial channel. From November 26–27, 2020, after returning to Thailand, she stayed at her hotel and did not get out of her room. On November 28, 2020, a taxi was requested to transfer her to Chiang Rai, where she stayed at a hotel from November 28–29, 2020. On November 29, 2020, she was contacted to get tested for COVID-19 at the Chiang Rai Prachanukroh Central Hospital. On November 30, 2020, she tested positive for COVID-19. She was admitted and treated in an isolated negative pressure room at the hospital.

Case No. 4 *(Close contact with the imported case)*

This was the case of a 28-year-old man who had had contact with a COVID-19-positive woman living in Pha Yao Province between November 28 and 30, 2020. On December 1, 2020, he tested positive for COVID-19 at a private hospital before being treated and cared for at the Chiang Rai Prachanukroh Central Hospital.

Case No. 5 and 6 *(Imported cases)*

Both the patients in these cases were female and had illegally entered Thailand on November 26, 2020. From November 27–28, 2020, they stayed at a hotel located in the border area. On November 29, 2020, both women underwent COVID-19 testing using a rapid testing kit at a private clinic and had negative results. On December 2, 2020, both developed fever and chills. On December 3, 2020, they tested positive for COVID-19 at a public hospital in the border area. On the same day, they were transferred to a negative pressure room at Chiang Rai Prachanukroh Central Hospital.

However, three reported cases (a man from Chiang Rai, a woman from Ratcha Buri, and a woman from Sing Buri Province) were confirmed to have been infected from the Myanmar imported cases.

All confirmed cases are now being treated and cared for under the standard protocols in the hospital, including three additional patients who had used the official route to enter the country. No patient presented with severe disease, and no death was reported.

In summary, the main causes of the outbreak were as follows: I) the patients with suspected cases did not use the official route to enter Thailand, failed to be detected at the entry point, and could not be recruited into the recommended state quarantine program for 14 days; II) some cases (No.5 and No.6) might have been in the incubation period; therefore, the tests were negative for COVID-19 at the private clinic; III) all of the infected patients visited several entertainment venues in Thailand with or without strictly using face masks and a number of people visited these venues; IV) all of the illegally immigrated patients did not cooperate with the SRRT while reporting their history after returning to Thailand because of the fear of being punished by law; and V) poor personal concern about the problem particularly regarding the impact of the outbreak on people's life and economic loss because Chiang Rai province is one of the most attractive tourists in the autumn season in Thailand.

Several measures of prevention and control were introduced, such as closing schools, using face masks, maintaining social distancing, and regular hand washing. All individuals exposed to confirmed cases have now been contacted and detected for infection. All exposed persons were formally and officially informed to self-quarantine for 14 days. Individuals without clarity regarding COVID-19 status could be asked to get tested at both private and public hospitals. People who attended the big festival in Chiang Rai city between 28-29 November 2020 were advised to get tested for COVID-19 and self-quarantine for 14 days at least as well.

Since November 18, 2020, the Chiang Rai chief government has announced that no more COVID-19 cases were reported in Ching Rai Province. On December 27, 2020, a total of 71 cases were confirmed; 55 cases attended at the state quarantine, and 16 cases were reported inside Thailand from the current outbreak. A total of 3,259 cases were screened through the active case finding program, and 1,656 cases were screened through the sentinel surveillance system. Moreover, 11,490 persons were tested for COVID-19 through the private health clinics in Chiang Rai Province.

Discussion

Fifteen cases of COVID-19 were reported between December 2-4, 2020. Of these, 12 were infected while living in Myanmar and three were exposed to the confirmed cases. Most infected persons were young adult Thai females and had a history of working at a hotel in Myanmar located close to Thailand. The first infected cohort (nine individuals) crossed the border to return to Thailand through an illegal, unofficial channel. Half of the infected cases were asymptomatic and the other half presented with mild symptoms. Some infected cases had traveled to several places after returning to Thailand, particularly during one large festival in Chiang Rai city on November 29, 2020.

Few other confirmed cases traveled to Bangkok, the capital city of Thailand.

A screening for COVID-19 among all individuals entering Thailand is important because no positive cases have been reported within the country for a long time. This means that there is no COVID-19 positive case reported in Thailand. However, countries surrounding Thailand, such as Myanmar and Malaysia, are reporting a high number of newly infected cases. Therefore, close and serious monitoring of those who expect to enter Thailand is an essential procedure for Thai public health professionals. Unfortunately, there are long border areas between Thailand and Myanmar which are more than 2,400 km. Therefore, many individuals are crossing borders. Basically, Thailand has closed the airspace, intercountry road connections, and sea transportation from other countries. Crossing borders through unofficial channels has led to the spread of the COVID-19 epidemic in northern Thailand. Currently, several large-scale and serious measures have been implemented to address this problem under the collaboration of the Thai Ministry of Interior, Thai Ministry of Defense, and the Thai Ministry of Public Health.

Contacting all individuals exposed to confirmed cases or contact tracing is one of the standard procedures for controlling COVID-19 [21]. The main purpose of this exercise is to detect all possible individuals contracting the disease. This could significantly reduce the number of new cases. This is supported by different sources of contact tracing guidelines [22–24]. In Chiang Rai Province, they are two approaches to test the individuals who have been in contact with confirmed cases, including hospital and mobile laboratories. Both approaches are provided free for testing.

During the investigation and disease control in Chiang Rai Province, communication was defined as one of the key success factors. The validity of the content and frequency of communication was important to maintain collaboration among people in communities. The communication itself could be a tool to reduce the panic among people, which directly impacts businesses and tourist programs in the area. Normally, Chiang Rai Province is a tourist attraction area in Thailand and has a million people, including both Thai and foreign visitors. The high season of tourists is between November and March. Therefore, under the current situation, if the SRRT could not control and stop the disease, it could impact the people living in Chiang Rai Province on a large economic scale. This coincides with a study in India, which reported that effective communication from healthcare workers could significantly contribute to the decrease of COVID-19 cases in communities [25]. Moreover, a study conducted in Australia reported that during the pandemic, communication was one of the effective tools to reduce the burden of the disease, and the validity of the content could impact public trust as well [26]. Hinjoy et al. [27] reported that communication through reports for Thai and international populations under the Ministry of Public Health was still effective.

There are several lessons learned from the disease investigation and control. First, strengthening the operation in the border areas should continuously maintain serious action. Villagers who are living along the borders should be trained in all essential practices regarding disease prevention and control, including identifying immigrated people through the villages. Collaboration between all stakeholders is highly important in this situation for Thailand. Second, communication with effective methods to the people is crucial to reduce the impact of the transmission of the disease. If people are aware of the situation at an early stage, they will support the public health system to maintain a strong practice to prevent the disease through social distancing, hand washing, and regularly using a face mask. Communication should be performed continuously through information holders, such as SRRT or medical staff. The information will directly support the right decision of a person and reduce panic. Third, contact tracing of persons exposed to the confirmed cases is another key to success in halting the spread of the disease. If all individuals exposed to confirmed cases have a COVID-19 positive status and self-quarantine for 14 days, it would be crucial for disease control and prevention. Fourth, gathering information from those who illegally immigrated could be inadequate due to fear of being punished by law, and these people may not provide all the critical points of their history to SRRT. This limitation may lead to a second outbreak; thus, ensuring friendly communication with the cases is very important to gather real information. Fifth, granting authority to school-directors to close schools as well as other organizations in the area is important to control the spread of the disease. Finally, sharing validated information with all people or organizations who need to use it is very important to make decisions within the organizations, such as the university opting to use distant learning instead of physical classroom attendance for teaching.

Even the outbreak in Chiang Rai Province has been completely controlled, but a new cluster outbreaks are reported in the central of Thailand which is originated by Myanmar migrant workers. On December 27, 2020, almost 33 provinces were reported of having COVID-19 cases particularly in the central, southern, and eastern regions of Thailand.

Conclusions

Unexpected spread of the COVID-19 cases through illegal channel immigration into Thailand from a neighboring county is a serious worry for the SRRT in Thailand. An urgent response according to the national protocol through the system developed at the local level, which means the need for great collaboration between health officers and other local

authorities, is a crucial factor in halting the spread of the disease. The structure and function of the border guard system needs to be improved, particularly a specific design to control people who favor entering the country through the illegal channels promoted by long border areas. Communication from both public health agencies and local authorities to the people to maintain clear and valid information can reduce the panic among the people and maintain the economic system in these areas. National political agencies are also important to contribute to the implementation of public health prevention control measures, particularly in supporting the strong collaborations among the agencies. One of the lessons learned from this specific cluster outbreak is that having highly active working according to the international protocols for COVID-19 prevention and control at the port on country entry is very important while sharing long borders with countries with a high prevalence of COVD-19. Enhancing community capacity and engagement with COVID-19 prevention and control among people living along the border could be a great protective strategy to reduce the possibility of an unexpected outbreak in these areas.

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