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An Outbreak Investigation of COVID-19 among Furniture Factory Workers at Kuala Langat District, Selangor, Malaysia

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Abstract

On 9 Dec 2020, a coronavirus disease 2019 (COVID-19) case was reported in Telok Datuk Panglima Garang, Kuala Langat District, Selangor, Malaysia. The findings revealed that the virus originated from a distributing site of a furniture factory, where the index case worked as a lorry driver. The outbreak investigation was conducted by health district officers using a COVID-19 public health risk assessment. We determined the exposure risk of the index case, and close contacts (families, relatives, work colleagues, and segments of the population) that were likely to be infected. One hundred furniture factory workers were screened and five workers, including the index case, were confirmed positive using real-time polymerase chain reaction. Those who tested positive were lorry drivers and lorry attendants who were stationed at loading area A. No workers from the other areas were tested positive, suggesting localized transmission in the factory. The COVID-19 public health risk assessment, isolation of index cases and quarantine of close contacts have enabled effective control measures in preventing further spread and community transmission.

Keywords: COVID-19, health risk assessment, lorry driver, factory, workplace, Malaysia

Introduction

In December 2019, the first severe respiratory disease of an unknown origin reportedly emerged from a hospitalized patient in Wuhan, the capital city of Hubei, China.[1] The disease was caused by a novel coronavirus (termed 2019-nCoV), having 96% gene similarity with a bat coronavirus RaTG13 previously reported in China, and 70% homology with severe acute respiratory syndrome coronavirus (SARS-CoV).[2] In January 2020, the 2019-nCoV changed its name to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[3] Being highly transmissible, the SARS-CoV-2 virus spread rapidly to other countries and a pandemic was declared in March 2020. Up till March 2021, the SARS-CoV-2 has infected more than 117 million people and over 2.6 million deaths worldwide have been reported.

On 23 Jan 2020, Singapore reported an imported case of coronavirus disease 2019 (COVID-19) case from Wuhan.[4] A few days later, the first index COVID-19 case was reported in Malaysia, which was known to have close contact with the reported case in Singapore. Eight confirmed COVID-19 cases were reported within six days in Malaysia and were identified as imported cases.[4] The first Malaysian who was infected by the SARS-CoV-2 was reported on 3 Feb 2020. This person had traveled to Singapore for a business meeting that was also attended by delegates from China.[4]

In September 2020, Malaysia experienced three COVID-19 waves.[5] Since January 2020, the Ministry of Health has been working tirelessly on preventing and controlling the spread of SARS-CoV-2 at all levels based on the risk assessment criteria.[6] Risk

assessments have been developed by many countries,[7,8] particularly for healthcare workers and travelers.[9,10,11] Certain occupations such as lorry drivers are required to travel long distances, which increases their risk of infection. On 9 Dec 2020, the Kuala Langat District Health Office received a notification that one furniture factory worker had tested positive for SARS-CoV-2. He was a lorry driver who had transported furniture from the manufacturing site to the distribution site. An outbreak investigation by the district health office was initiated to understand the mechanism and magnitude of disease transmission and to establish preventive measures at the workplace.

This study aimed to investigate the COVID-19 outbreak in a furniture factory in Telok Panglima Garang, Kuala Langat District, Selangor, Malaysia by describing the characteristics of the outbreak, determining the source of infection, investigating close contacts and formulating preventive measures to be employed at the workplace.

Methods

Location and Timeframe

The factory under investigation was located in the Telok Panglima Garang Subdistrict, 15 kilometers from Banting Town. The factory is under the preview of the Telok Panglima Garang Health Clinic (Figure 1), which has a population of 5,000 people in an area covering 60 hectares. The outbreak investigation was conducted from 9 to 19 Dec 2021.

Figure 1. Map of Telok Panglima Garang Subdistrict, Kuala Langat District, Selangor

Study Population

The entire cohort of 100 workers (including the index case) at the factory was screened and monitored over 10 days between 9 and 19 Dec 2020. According to the Malaysian Ministry of Health Guidelines, the index case is the first identified case in a group of related cases of a particular communicable or heritable disease.[12] Close contact is defined as a person who was in close proximity with the index case, either by staying together, working together, sharing the same environment or traveling together in any kind of conveyance.[12]

Study Design

This was a cross-sectional study. The factors that were investigated include the exposure history of the factory workers and their close contacts, personal hygiene of the subject's factory, and home environment.

Data Collection

Descriptive study

We reviewed the factory workers' records. Information regarding the demographic characteristics of the potential suspect or likely exposure to the index case was obtained from the general manager of the factory. These variables include age, gender, geographic location, date of symptoms onset, course of illness, and laboratory examination results.

The general manager was interviewed via phone and WhatsApp to secure a list of names of the workers. We retrieved their places of residence, and contact numbers to enhance the investigation of family contacts, friends, and close contacts for 14 days following the standard operation procedure (SOPs) by the Ministry of Health, Malaysia, using COVID-19 public health risk assessment.[12] All likely or suspected non-close contacts (family members, relatives, and friends) were subjected to active fever surveillance for 14 days. All information was kept confidential.

Laboratory tests

Real-time polymerase chain reaction (RT-PCR) tests for the SARS-CoV-2 virus were done for all close contacts. Postnasal specimens were collected, such as nasopharyngeal swabs, oropharyngeal swabs or nasopharyngeal wash/aspirate. All samples were placed in a viral transport media and kept at 2-8°C before further processing and testing. The processing and testing were carried out at the Institute for Medical Research and the National Public Health, Malaysia as designated COVID-19 laboratories.

Environmental study

An ocular survey was conducted to observe the entire workflow and work process in the factory. We observed the furniture delivery process from the factory to the distribution site. A spot map of the affected area was prepared (Figure 2).

Data Analysis

Descriptive statistics, count and percentage, were used to summarize the cases' distribution by place, time and person.

Ethical Approval

This study was registered under the National Medical Research Register, Malaysia, and ethical approval to conduct the study was obtained from the Medical Review and Ethics Committee, Malaysia.

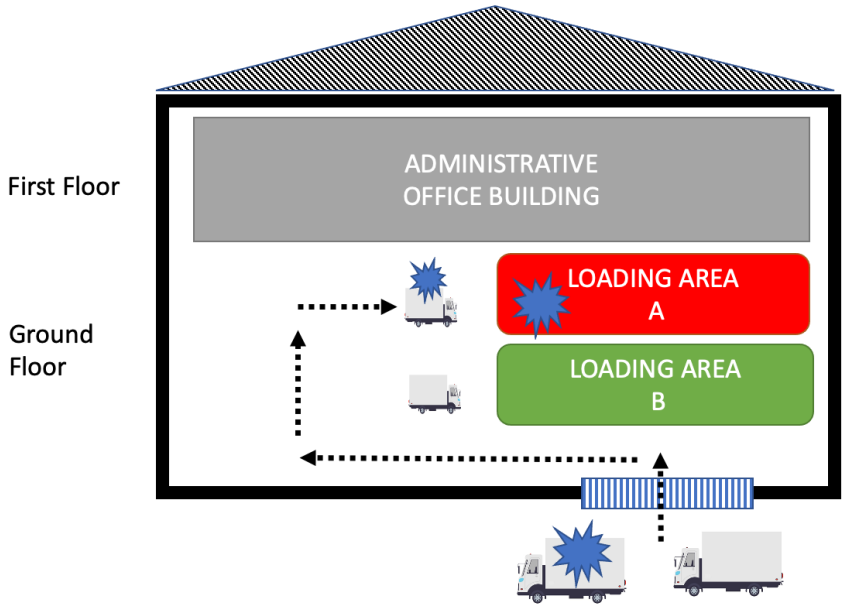

Figure 2. Spot map of the affected area at the furniture factory

Results

Descriptive Results

The district health office received a notification that one transport driver working at the furniture factory tested positive for SARS-CoV-2 on 9 Dec 2020. He had transported furniture from factories to retail stores within the sub-district. Further investigation revealed that he had also distributed furniture to other states in Malaysia, namely Perak, Selangor, and Johor.

The findings from the outbreak investigation showed that of the 100 workers screened, five (5%) tested positive (Table 1). The district health officials concluded that it was a new emerging cluster in the district.

Table 1. Attack rate of furniture factory employees in Telok Panglima Garang Subdistrict, Kuala Langat District, December 2020 (n=100)

	Characteristic	Number of employees examined	Number of RT-PCR tests	Number of employees who tested positive	The attack rate (%)
Area	Office area	58	0	NA	0
	Loading area A	17	12	5[†]	29.4%
	Loading area B	25	0	NA	0
Total	Employees	100	12	5	5.0%

[†]*Including the index case*

After the discovering of the index case, the COVID-19 risk assessment revealed 11 employees were close contacts to the index case. These 11 close contacts were subjected to the SARS-CoV-2 RT-PCR test and four were tested positive (36%) on 10 Dec 2020. The positive cases were transferred to a designated hospital for quarantine while the other employees were subjected to home quarantine. The remaining 88 factory workers were non-close contacts of the index case. They were given a wrist band (indicating the Home Surveillance Order) and quarantined for 10 days as per the Ministry of Health's protocol. The outbreak resulted in a 5% SARS-CoV-2 positive rate without symptoms and required zero transfers to an intensive care unit. The population of Kuala Langat Health District was 44,653. Thus, district incidence was 11 per 100,000 population of the Kuala Langat District (5/44,653), while the incidence rate for COVID-19 in the furniture factory was 5% or 5,000 per 100,000 population.

The factory was closed for 10 days and allowed to reopen on 19 Dec 2020 as per the SOP issued by the Ministry of Health, Malaysia (Figure 3). There was no evidence of the occurrence of community cases as a result of the outbreak that happened in the factory at the end of the 10-day active surveillance period.

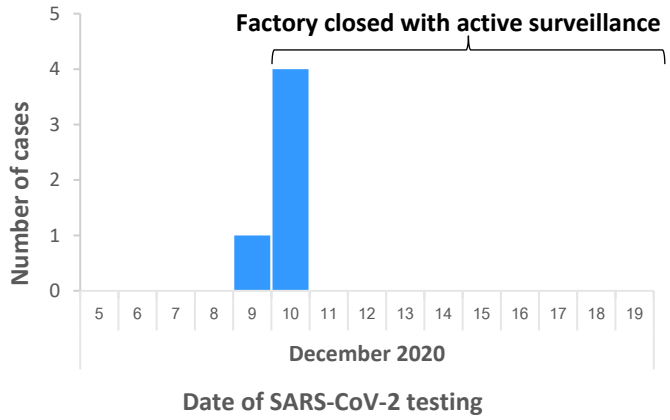

Figure 3. Number of confirmed COVID-19 cases in the furniture factory by date of SARS-CoV-2 testing

Environmental Assessment

The furniture factory had a working area of two hectares with 100 workers, making the crowding index 50 persons per hectare. There were two loading areas, which we designated as areas A and B with the administrative office located on the upper floor. Loading area A had five positive cases, while both loading area B and the administrative office had zero cases. All positive cases were lorry drivers (n=3) and lorry attendants (n=2) in loading area A. There was evidence that the risk of SARS-CoV-2 transmission was only among close contacts of drivers and attendants at the loading area A. Thus, an epidemiological link was established between the cases, the drivers and attendants at loading area A. There was an association between loading area A and the lorry driver with lorry attendants. All positive cases were asymptomatic. Loading area A has a 29% attack rate following the exposure of one positive case, while loading B and the administrative office had an attack rate of zero.

Discussion and Recommendations

COVID-19 public health risk assessment was utilized to determine the exposure risk of the index case and close contacts who were likely to be infected. Appropriate control measures were instituted to prevent transmission among these close contacts. Immediate isolation of the index case, and quarantining close contacts and factory workers prevented transmission of SARS-CoV-2 among family members, relatives, and members of the community. This contributed to a localized cluster at loading area A without community or household transmission.

It is hoped that the investigation of the epidemic will reveal ways to reduce the transmission risk at the factory. A major accomplishment would be the identification of close contacts who are likely to be infected and could further spread the disease; thus, they should be isolated and quarantined accordingly. The resignification of transmission risk factors that lead to the spreading of diseases includes demographic factors, socioeconomic conditions, physical distance, mask-wearing, and hand hygiene.

For public health control and preventive measures, unregistered workers with the company need to be identified and subjected to RT-PCR screening together with home quarantine for 10 days. At work, it is important to maintain the recommended one-meter physical distance. Continuous education on wearing face masks and practicing hand hygiene needs to be regularly enforced to prevent re-infection in the furniture factory, preventing another outbreak at the workplace. The living condition of the factory workers, living in hostels and housing areas, should be inspected and monitored, to ensure the workers are not living in crowded spaces as each person needs to always have at least a 1-meter radius. Regular disinfection at each loading station after each loading activity is advised. All common meeting areas such as bathrooms, meeting rooms, rest areas, and work areas should be disinfected every 4-8 hours.

Conclusion

Although the index case was a lorry driver, there was no community and within-family transmission

reported, as evidenced by the epidemiological curve that showed there were no cases seen in the community at the end of 10 days. At the workplace, the transmission was localized only at the loading area where the index case was stationed. This suggests that immediate action taken by the employer and staff from the health office to identify and investigate those who had close contact with the index case was important in preventing further transmission. Furthermore, strict SOPs and enforcement imposed by the government of Malaysia to balance economic and health sectors might have effectively controlled the transmission. Preventive measures such as wearing face masks, good hand hygiene and regular disinfection are needed to prevent the spread of this disease.

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Suggested Citation

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References

1. Wu F, Zhao S, Yu B, Chen Y-M, Wang W, Song Z-G, et al. A new coronavirus associated with human respiratory disease in China. Nature. 2020;579(7798):265-9.
2. Zhou P, Yang X-L, Wang X-G, Hu B, Zhang L, Zhang W, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature. 2020;579(7798):270-3.
3. World Health Organization. Coronavirus Disease (COVID-19) Weekly Epidemiological Update and Weekly Operational Update 2020 [Internet]. Geneva: World Health Organization; [cited 2020 May 10]. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>
4. Malaysia Ministry of Health. COVID-19 Malaysia 2020 [Internet]. Putrajaya (MY): Malaysia Ministry of Health; [cited 2020 Mar 15]. <https://covid-19.moh.gov.my>. Malay.
5. Rampal L, Liew BS. Malaysia's third COVID-19 wave - a paradigm shift required. Med J Malaysia. 2021 Jan;76(1):1-4.
6. Malaysia Ministy of Health. Risk assessment and determination of COVID-19 infection and transmission for an area [Internet]. Putrajaya (MY): Malaysia Ministry of Health; 2020 Nov 6 [cited 2021 Jan 10]. <https://covid-19.moh.gov.my/sorotan/112020/penilaian-dan-penentuan-risiko-risk-assessment-jangkitan-dan-penularan-covid-19-bagi-sesuatu-kawasan>. Malay.
7. Health and Safety Executive. Risk assessment during the coronavirus (COVID-19) pandemic [Internet]. Merseyside (England): Health and Safety Executive; [updated 2020 Dec 31, cited 2021 Jan 5]. <https://www.hse.gov.uk/coronavirus/working-safely/risk-assessment.htm>
8. Occupational Safety and Health Administration. Coronavirus Disease (COVID-19) [Internet]. Washingtan: United States Department of Labor; [cited 2020 Mar 20]. <https://www.osha.gov/coronavirus>
9. World Health Organization. Risk assessment and management of exposure of health care workers in the context of COVID-19: interim guidance, 19 March 2020. Geneva: World Health Organization; 2020 [cited 2020 Apr 14]. 6 p. <https://apps.who.int/iris/handle/10665/33149>
10. Boldog P, Tekeli T, Vizi Z, Dénes A, Bartha FA, Röst G. Risk Assessment of Novel Coronavirus COVID-19 Outbreaks Outside China. J Clin Med. 2020;9(2):571.
11. World Health Organization. Risk assessment tool to inform mitigation measures for international travel in the context of COVID-19: annex to: Considerations for implementing a risk-based approach to international travel in the context of COVID-19, 16 December 2020 [Internet]. Geneva: World Health Organization; 2020 [cited 2021 Jan 10]. 9 p. <https://apps.who.int/iris/handle/10665/337850>
12. Malaysia Ministry of Health. Guidelines for COVID-19 Management in Malaysia No. 5/2020. Putrajaya (MY): Malaysia Ministry of Health; 2020.