

Brief Report

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Successful COVID-19 Contact Tracing of Crew from Two Cargo Ships at the Morowali Seaport, Indonesia

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Abstract

Objectives: This study aims to report a successful systematic quarantine of coronavirus disease (COVID-19) to detect Omicron, a new variant of concern, among 2 cargo ships in the Morowali seaport, Indonesia.

Methods: An international standard entry point protocol had been followed in this study for all crew. Rapid diagnostic tests and whole-genome sequencing (WGS) tests have been conducted to identify Omicron, the variant of concern. Individual characteristics, laboratory result, and vaccine status were collected in this study.

Results: On December 9 and 18, 2021, there was an increase of 21 and 22 new cases, respectively, from 2 ships in the seaport. Both ships came from abroad, 43 new cases with a positivity rate increase from 0 to 13.4% and 13.7% within 2 weeks. A polymerase chain reaction (PCR) examination was carried out on all crews and obtained results 21 of the 22 positive COVID-19 crew (95.5%). The monitoring results showed that there was no fever in the entire crew, no symptoms of cough, runny nose, shortness of breath, and other symptoms pointing to COVID-19.

Conclusion: Systematic quarantine has successfully contained the large clusters of COVID-19 in the crews of 2 ships and prevented further outbreaks in the local community.

Omicron was declared the fifth variant of concern for coronavirus disease (COVID-19) by the World Health Organization (WHO) on November 26, 2021, 2 days after it was designated a variant under monitoring. The first case of Omicron was detected in Indonesia on December 15, 2021, among cleaning service personnel at Wisma Atlet, a quarantine center for Indonesian travelers. The center performs routine tests for all personnel.¹ As of January 9, 2022, there were 318 cases of Omicron in Indonesia with most travel history from Turkey, Saudi Arabia, and Europe.²

Cross-border contact tracing is a standard protocol to prevent fast spreading of epidemic-prone disease in the global community, including Indonesia, containment at state entry points through isolation and quarantine on air, sea, and land transportation routes known as effective to control the diseases. For the air route, only 5 entry points are opened in all of Indonesia, namely, Jakarta, Batam, Tanjung Pinang, Bali, and Manado (North Sulawesi), whereas the sea route has a huge number of seaports, although only 2 passenger ports are opened in Batam Center in Riau Islands and Nunukan in North Kalimantan. Many trade and industrial seaports are still operating; one of the hundred such seaports is Morowali in Central Sulawesi.³

The aim of this study is to describe the cross-border contact tracing process in the Morowali seaport as an entry point to Indonesia from 2 ships with almost all (> 90%) crew confirmed positive for COVID-19. The objective of this intervention is to mitigate the community transmission in the district of Morowali, Central Sulawesi Province, Indonesia.

Methods

The standard entry point protocol is from cross-border contact tracing for ASEAN Member states (AMS)⁴ with active base surveillance through active case finding, entry and exit tests, whole genome sequencing, quarantine, health monitors, risk communication and health promotion to related sectors (crew member staff and passengers) followed to handle these cases.^{5,6} We have adopted Health Quarantine Law No. 6, 2018, and Ministry of Health Regulation No. 612 about health quarantine. An entry test is carried out using the rapid diagnostic test (RDT) antigen as a screening effort. If at least one of the crew was confirmed positive with COVID-19 using RDT, a polymerase chain reaction (PCR) examination was

carried out on all crew members. Quarantine and isolation were carried out on board, an S-gene target failure (SGTF) examination was carried out on all specimens, as well as whole-genome sequencing (WGS) for the SGTF positives at the National Institute of Health Research and Development (NIHRD) top referral laboratory under the Ministry of Health, Republic of Indonesia. It had taken 4–5 days to get WGS results; during this time, temperature and symptoms monitoring for the crew were conducted. PCR antibody tests as an exit test were applied to all crew members before they could land with a tight health protocol, mandatory for all crew members on land.

Consent to Participate

Informed consent was obtained from all study participants.

Results

The district of Morowali had 100 days with no confirmed COVID-19 cases since the beginning of the systematic entry point quarantine, from the beginning of August to the end of November 2021 (> 1/1000 of the population with a positivity rate [COVID-19-positive cases divided by total examinees] of < 0.5% per week) with very adequate level of testing. On December 5, 2021, information was obtained on the arrival of a Vietnamese-flagged ship, the *Harmoni Six*, with a crew of 22, carrying heavy equipment to be delivered at PT Indonesia Morowali Industrial Park (IMIP) in Bahodopi subdistrict, Morowali District, Central Sulawesi, with an arrival planned for December 9, 2021. This ship had sailed from Korea, Russia, Vietnam, and continued its journey to Papua New Guinea. After the ship arrived, an entry test was carried out using the RDT antigen as a screening effort. Two members of the crew (9.1%) were found to be reactive, therefore a PCR examination was carried out on the crew, obtaining positive COVID-19 results for 21 of the 22 crew (95.5%). On December 9 and 18, 2021, there was an increase of 21 and 22 new cases, respectively, from 2 ships, with both ships from abroad. Those 43 new cases increased the COVID-19 positivity rate from 0 to 13.7% in 2 weeks, causing the public health alert level in Morowali to deteriorate suddenly from level 0 to alert.

Based on the test result, the quarantine and isolation procedure was conducted on the ship. An SGTF examination was carried out on all specimens, resulting in 14 positive samples of SGTF, and a WGS examination done at the NIHRD referral laboratory. The monitoring showed that there was no fever in the entire crew, no symptoms of cough, runny nose, shortness of breath, and other symptoms pointing to COVID-19 (Table 1). WGS results showed no Omicron present; all specimens were Delta variants with high transmission and higher virulence than Omicron. On December 26, an exit test with PCR and antibody tests were carried out to determine whether to continue isolation at the quarantine post. The first exit test found 90.9% of the crew still positive with infection, then 2 weeks later (January 9) after the first day of isolation, 18.2% remained positive. All crew were male with an average age of 38 years (the youngest was 21 years and the oldest was 69 years); 57.8% were less than 40 years old and high school graduates. Most of them had not yet been vaccinated (55.6%), and only 35.5% were fully vaccinated and 8.9% vaccinated with 1 dose only, with most using the AstraZeneca vaccine.

Notification of the second ship was on December 14, 2021, the *Motor Vessel G*, with a planned arrival of December 18, 2021. This Indonesian flagged ship had an Indonesian crew of 22 and a

Table 1. Test procedure of port quarantine for HS and MV G characteristics of the cases

Test	N	MV G		MV HS			
		N %	N	%			
Entry test (RDT) (n = 45), December 9 (MV HS), December 18 (MV G)							
Positive	5	3	13.0	2	9.1		
Negative	40	20	87.0	20	89.9		
Entry test (PCR) (n = 45), December 9 (MV HS), December 18 (MV G)							
Positive	44	23	100	21	95.5		
Negative	1	0	0	1	4.5		
Exit test (days 5) (n = 44), December 14 (MV HS), December 23 (MV G)							
Positive	28	8	34.8	20	95.2		
Negative	12	11	47.8	1	4.8		
Invalid	5	4	17.4	0	0		
Exit test (days 14) (n = 44), December 24 (MV HS), January 1 (MV G)							
Positive	17	0	0.0	17	81.0		
Negative	27	23	100	4	19.0		
WGS-SGTF (n = 22)							
AY.57 (Delta)	9	0	0.0	9	40.9	–	–
N/A	13	0	0.0	13	59.1		

Note: PCR, polymerase chain reaction; RDT, rapid diagnostic test; WGS-SGTF, whole-genome sequencing-S-gene target failure.

Russian captain. It had sailed to Pohang and Busan, South Korea. After the ship arrived, an entry test was carried out using the RDT antigen as a screening, resulting in 3 reactive crew members. A PCR was then carried out on December 20, 2021, and the results showed all the crew members were positive (95.5%). After, a containment procedure was carried out on the ship and 15 samples were sent for genome sequencing; all WGS samples showed a Delta strain, and no Omicron was found. The results of the monitoring showed some people had mild symptoms, but some of the crew seemed to be depressed, characterized by slow response and flat affect when communicating.

During the isolation and quarantine period, 8.9% had symptoms such as cough, runny nose, and fever, whereas the rest of the crew had no symptoms. The results of the first exit test showed that most of the crew members (62.2%) were still positive, thus isolation followed. After 13 days of isolation, 8.9% of them were still positive; however, the antibody titer showed a positive result, so the isolation and quarantine period could end, the crew could land and work and keep their distance from local people, wear masks properly, and work as quickly as possible to return and proceed with their journey. For residents, an active case finding was carried out, including active surveillance through schools and closed populations in orphanages, nursing homes, prisons, and dormitories. Up to 1 month later, there were no new cases in post quarantine, only sporadic and local transmission in the Morowali district, and all indicators were under control.

Discussion

As of January 9, 2022, there were 318 cases of Omicron in Indonesia with the most travel history from Turkey, Saudi Arabia, and Europe.² To prevent the spread of Omicron in the community, the control strategy implemented was to carry out containment at entry points to the country that were directly related to traveling abroad through isolation and quarantine through cross-border contact tracing interventions^{4,5} by air, sea, and land transportation

Table 2. Characteristics of the ship crew

Characteristics	N (45)	%
Age		
< 40 years old	26	57.8
40–60 years old	16	35.6
> 60 years old	3	6.7
Education		
High school	39	86.7
Diploma	2	4.4
Bachelor's	4	8.9
Vaccine status		
Fully vaccinated	13	28.9
First dose	9	20
Not yet	23	51.1
Vaccine type (n = 22)		
Abdala	1	6
AstraZeneca	14	4.5
Moderna	1	4.5
Pfizer	1	22.7
VeroCell	5	6
Symptoms		
Yes (cough, fever)	4	8.9
No	41	91.1
Exit test result (positive)		
First test	28	92.2
Second test	4	7.8

routes.⁶ Most cases were detected at the entrance of the country (Table 2), and there were 23 cases (7.23%) where local transmission was found but they were able to be contained in various areas.⁷ Two variants of concern circulating globally, namely AY.4.2 and Omicron, since September to November, 2021, have had a significant impact on several countries experiencing an exponential increase in cases.⁸ Omicron quickly spread to more than 130 countries within a short period of time, less than 1 month, increasing the number of cases globally to 71% in a month.⁹

Very high transmissions between ferries and cruise ship crews have been reported in the literature. The median number of contacts related to ship travel was higher than that associated with air travel. This can be explained by the travel time of passengers on board and the movements and contacts associated with various activities such as restaurant visits, sports, or entertainment.¹⁰ In addition to carrying out optimal cross-border contact tracing, there needs to be engagement and communication about COVID-19 with everyone involved in or affected by cross-border travel, with particular emphasis on this vulnerable segment of the population. Public health infrastructure, vaccination rates, and protection of large numbers of populations that are more susceptible to infection should also be a concern. Therefore, a concerted global effort is needed between government agencies, the pharmaceutical/biotech industry, and academic and health institutions to tackle this pandemic efficiently.

Conclusion

Systematic entry point quarantine has successfully contained the large clusters of COVID-19 in the crews of 2 ships and prevented further outbreaks in the local community. Strengthening public-private engagement is crucial support of the contact tracing system.

Data availability statement. Data are available by request.

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Author contribution. MP and MAR conceived the study. MP, MAR, and SM developed the protocol. HTN and MTV collected data. SM and TBP analyzed data. MP, MAR, SM, and TBP interpreted the findings and wrote the paper. All authors reviewed the paper.

Competing interests. None.

Ethical standard. This study protocol had performed in accordance with the ethical principles of the Declaration of Helsinki and has been approved by the National Institute of Research and Development, Ministry of Health, Indonesia with referral number LB.02.01/2/KE/357/2020.

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