CLOSE CONTACT AND COVID - 19 INFECTION CASES IN SOUTH SUMATRA

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Close Contact and COVID-19 Infection: Cases in South Sumatra

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ABSTRACT

COVID-19 causes a high death toll, illness, and economic losses. Transmission of the virus occurs from human to human and has spread to more than 200 countries. This study aims to determine the relationship between close contact relationship and the COVID-19 incident in South Sumatra Indonesia. This research used an observational analysis with a cross-sectional design. The population in this study were all COVID-19 patients and those who had close contact with COVID-19 patients in South Sumatra. The results show that close contact was related to the incidence of COVID-19 with a p-value <0.0001 and Odds Ratio Adjusted (OR_{Adj}) = 3.591 (95% CI: 2,933-4,396) after the variables of history of visiting local transmission areas, history of visiting health facilities, history of contact with suspected cases, and history of contact with confirmed cases were controlled. The transmission of close contact within families such as households was very high. A transmission could occur between a husband and wife and people who lived in the same house and shared plates while eating. To prevent a wider transmission, people who had close contact with people with COVID-19 needed quarantine. From these results, we could carry out public health interventions to fight this infectious disease globally.

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1. INTRODUCTION

After the first case of COVID-19 was detected in Wuhan China in December 2019, COVID-19 became a serious threat and was confirmed as a pandemic.[1] The total positive COVID-19 cases on October 6th, 2020 was 35,347,404 with a death toll reaching 1,039,046 cases. The cases rise and affect over 200 countries.[2]

The COVID-19 infection related to the seafood market at Huanan and presumably came from illegally-sold wild animals.[1] The first case in Indonesia was reported on March 2nd, 2020 then spread and increased every day. The total cases in Indonesia on October 6th, 2020 was 315,714 cases with a total death of 240,291 cases. [3] The spread of COVID-19 can happen to people with symptoms or asymptomatic.[4], [5]

COVID-19 is identified by fever, cough, fatigue, shortness of breath, pneumonia, and other respiratory disorder symptoms in the early stage.[6] The morbidity and mortality rate for COVID-19 is quite high. A prone patient is often someone with low immunity, ≥60 years, male, retired, obese, and having comorbidities.[7]–[9] COVID-19 has been confirmed a human-to-human transmission by multiple means, namely, by droplets, aerosols, and fomites and it can occur within families who make close contact with an infected person. [4], [10] To control the transmission, it is necessary to conduct close contact tracing with the case. The closer the contact with COVID-19 patients, the higher the risk of infection. Close contact is defined as those who live in the same household, share food, travel, or interact socially with a confirmed case two days before the onset of symptoms of COVID-19.[11] The population movement, such as people going to the office by public transportations and traveling to infected areas, can increase the risk of transmission when they are returning home with their family.[12] The vastly spread cases require sensitive and specific detection methods and also the knowledge of potential transmission with close contact. This study aims to determine the relationship between close contact transmission and COVID-19 infection.

2. RESEARCH METHODS

This study used an observational analytic method with cross-sectional study design. The population in this study was all SARS-CoV-2 patients and those in close contact with the patients. The research was conducted in South Sumatra. Data were collected in June-September 2020. Epidemiological investigation instruments developed by the Indonesia Epidemiological Association in collaboration with the CDC Foundation (Kobo.humanitarianresponse) was used as the data collection tool. The Data were collected using the total sample data collection technique. The number of samples entered at Kobo.humanitarianresponse was 2,203. The data were inputted through a cleaning process so that the samples ready to analyze were 2137 respondents. Incomplete filling question form data were excluded from this study.

The statistical analysis used was the Chi-square test, simple logistic regression, and multiple logistic regression. The dependent variable was divided into two categories based on the results of the examination, namely confirmed cases and non-confirmed cases. Positive confirmation cases were cases that had been examined through a swab test, while non-confirmed cases were cases that had not been checked. The last cases comprised probable cases and suspected cases. A Chi-square test was used to compare the differences between patients who had COVID-19 infection and those who did not. A significance was set at $p < 0.05$. Continuous and categorical variables were presented as means and absolute numbers (percentages). Multiple logistic regression analysis with a risk factor model was conducted to determine the relationship between close contact and the incidence of COVID-19 cases, after being controlled by confounding. Potentials Confounding in this study were gender, occupation, history of traveling abroad, history of visiting health facilities, history of contact with suspects, and history of contact with positive confirmation patients.

3. RESULTS AND DISCUSSIONS

The majority of respondents were 52% male from the total respondents of 2,137. The mean of respondents' age was 38.19 years. Most respondents worked as entrepreneurs (12.7%) (Table 1).

Table 1. Distribution of Socio-demographic Characteristics

Sociodemographic characteristics	Finding
Age (years)	
(Mean + Standard deviation)	38.19 + 17.32
Gender	
Male	1111 (52 %)
Female	1026 (48 %)

Job	
Day laborer	89 (4.2 %)
Pharmacist	8 (0.4 %)
Accounting	36 (1.7 %)
Medical worker	182 (8.5 %)
Artist	1 (0.01 %)
Factory worker	42 (2 %)
Traders	72 (3.4 %)
Public service	111 (5.2 %)
Institution	90 (4.2 %)
Businessman	19 (0.9 %)
Fishery	4 (0.2 %)
Forestry	3 (0.1%)
Mining	24 (1.1 %)
Farmer	79 (3.7 %)
Government employees	199 (9.3 %)
Information technology	3 (0.1 %)
Merchants	1 (0.01)
Army	58 (2.7 %)
Transportation	28 (1.3 %)
Entrepreneur	271 (12.7 %)
Unemployed	817 (38.2 %)

Table 2. Bivariable Analysis of Factors Associated with COVID-19

Variable	Category	COVID-19 cases				p-value
		Confirmed		Unconfirmed (probable +suspect)		
		n	%	n	%	
Gender	Male	681	61.3	430	38.7	0.921
	Female	632	61.6	394	38.4	
Job	Employee	815	61.7	505	38.3	0.751
	unemployed	498	61	319	39	
Abroad travel history	Yes	7	58.3	5	41.7	0.015
	Unknown	17	94.4	1	5.6	
	No	1289	61.2	818	38.8	
Local transmission history	Yes	96	50.8	93	49.2	0.0000
	Unknown	60	92.3	5	7.7	
	No	1157	61.4	726	38.6	
Medical facility visitation history	Yes	195	77.4	57	22.6	0.0000
	Unknown	73	92.4	6	7.6	
	No	1045	57.9	761	42.1	
Contact history with suspect	Yes	138	63.3	80	36.7	0.0000
	Unknown	235	81.6	53	18.4	
	No	940	57.6	691	42.4	
Contact history with confirmed case	Yes	456	72.8	170	27.2	0.0000
	Unknown	189	76.2	59	23.8	
	No					
Close contact	Yes	742	76.2	232	23.8	0.0000
	No	571	49.1	592	50.9	

Table 2 shows that close contact, history of visiting abroad, history of visiting local transmission areas, history of visiting health facilities, history of contact with the suspected-COVID-19 patients, and history of contact

with COVID-19 patients were significantly (p <0.0001) associated with the incidence of COVID-19. Nevertheless, gender and occupation were not related to COVID-19.

Table 3. Multivariate Analysis with Multiple Logistic Regression Risk Factor Model

Risk Factors	Category	β	p-value	OR (95% CI)
History of local transmission area	No			Reff
	Unknown	1.949	0.000	0.142 (0.049 – 0.412)
	Yes	0.812	0.121	0.444 (0.159 – 1.241)
Medical facility visitation history	No			Reff
	Unknown	0.759	0.122	0.468 (0.179 – 1.224)
	Yes	1.470	0.002	0.230 (0.091 – 0.579)
Contact history with suspect	No			Reff
	Unknown	0.833	0.007	0.435 (0.238 -0.794)
	Yes	1.020	0.000	0.361 (0.206 – 0.632)
Contact history with confirmed case	No			Reff
	Unknown	0.078	0.781	1.082 (0.622 – 1.882)
	Yes	0.870	0.002	2.387 (1.362 – 4.184)
Close contact	No			Reff
	Yes	1.278	0.000	3.591 (2.933 – 4.396)

Table 3 shows that close contact was associated with the incidence of COVID-19 with a p-value < 0.0001 with an Odds Ratio Adjusted (OR) value = 3,591 (95% CI: 2,933 - 4,396) after the variables ofhistory of visiting local transmission areas, history of visiting health facilities, contact history with the suspected cases, and contact history with the confirmed cases were controlled. People who had close contact with people with COVID-19 had 3,591 greater risks of being infected by COVID-19 than people who never had close contact. These results indicated that attributable risk (%) was 35.52%, while the population attributable risk (%) was 19.76%. It could be interpreted that among COVID-19 cases, 35.52% could be prevented by controlling close contact with those infected, while 19.67% could be prevented by controlling close contact. Therefore, tracing people who were in close contact with cases was very necessary to control the transmission of this disease.

45.6% of respondents with COVID-19 infection had had close contact with a person infected by COVID-19. Close contact was defined as a person having close contact (within 1 m) with a confirmed and suspected patient two days before the onset of symptoms in suspected or confirmed patients, or two days before samples of asymptomatic infection were taken.[13]

Preventing widespread transmission, people who were in close contact with people with COVID-19 needed quarantine. Based on the clinical examination, the incubation period for this virus was generally 1–14 days, and mostly 3-7 days. Those who had made close contacts were quarantined for 14 days according to the incubation period of COVID-19, but some others were quarantined for 21 days.[14]

Close contact with a person with COVID-19 infection could occur within family, close friends, or workmates. Similarly, a study carried out by Margarita's (2020) revealed that 42% of COVID19 transmissions occurred due to close contact. [15] The transmission of close contact with families had a high risk of being infected. The risk of infection could occur from activities such as eating together, sharing transportation, social visits, serving medical care, and taking care of individuals with COVID-19 infection. [1], [16]–[18] COVID-19 had robust pathogenicity and transmission, and is more contagious than SARS - CoV and MERS - CoV.[19]

Meeting up with a confirmed patient, staying close for 15 or 50 seconds, and not wearing a mask were all factors of infection route. [20], [21] The higher the frequency of contact, the greater the risk of infection, therefore isolation measures need to be taken to prevent a wider transmission [22]. COVID-19 causes cluster transmission, especially within a family. Transmission within family members affected by MERS occurred in around 13% - 21%, and 22% - 39% in SARS infection cases.[23] It is proven that infected family members treated at home could infect other people in the house. It was also possible that COVID-9 transmission transmitted through feces and the virus could last for 1-2 days in feces.[24], [25]

4. CONCLUSION

The results show that close contact was associated with the incidence of COVID-19 with a p-value < 0.0001 and the Odds Ratio Adjusted (OR) value = 3,591 (95% CI: 2,933 - 4,396) after the four variables: the history of visiting local transmission areas, history of visiting health facilities, history of contact with suspected cases, and history of contact with confirmed cases were controlled. The transmission of COVID-19 needed to be prevented starting from yourself, family, and society. Self-prevention could be done by wearing a mask when you left your house, maintaining at least 1 m distant (social distancing), practicing personal hygiene, such as routine washing hands, and avoiding crowds. We could do prevention in the family by maintaining sanitation, reducing gathering activities with other family members, doing quarantine or independent isolation if we had close contact with the patient. Meanwhile, in regard to the prevention in the community, we could avoid activities that had the potential to cause crowds and keep wearing masks when doing activities outdoor.

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