



Short Communication

Coronavirus Disease-19: Summary of 2,370 Contact Investigations of the First 30 Cases in the Republic of Korea

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ABSTRACT

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Between January 24th and March 10th, a total of 2,370 individuals had contact with the first 30 cases of COVID-19. There were 13 individuals who contracted COVID-19 resulting in a secondary attack rate of 0.55% (95% CI 0.31-0.96). There were 119 household contacts, of which 9 individuals developed COVID-19 resulting in a secondary attack rate of 7.56% (95% CI 3.7-14.26).

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Introduction

Since the first reported cases of coronavirus disease 2019 (COVID-19) in the Republic of Korea, there have been 30 confirmed cases as of February 17th, 2020. The epidemiological and clinical characteristics of 28 cases have been previously reported [1].

Contact tracing is essential for containing COVID-19 within the community. In Korea, an established system exists where public health centers conduct epidemiological investigations and instigate the quarantine/isolation of suspected cases, thus interrupting the line of transmission. This approach has been particularly successful in containing COVID-19 in the early phase of the outbreak.

Here, we summarize the investigation into the first 30 cases

of COVID-19, and the 2,370 individuals who came into contact with these original 30 cases in Korea. The study includes calculation of secondary attack rates among different age groups and modes of transmission of COVID-19.

Materials and Methods

Demographic, epidemiological, and early clinical information were retrieved from COVID-19 reporting and surveillance data from Korea Centers for Disease Control and Prevention (KCDC). As in the previous report, the patient's age was provided on the date of diagnosis, and key indicators were identified by an epidemiological investigator who participated in the field investigation and the epidemiological investigation team [1].

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Table 1. Demographics of traced individuals and secondary attack rates for COVID-19, Republic of Korea.

Variables	Traced (n)	Infected (n)	Secondary attack rate	
			%	(95% CI)
Sex				
Female	1,303	5	0.38	(0.16 - 0.89)
Male	1,067	8	0.75	(0.38 - 1.47)
Age group (y)				
0 - 9	88	0	-	-
10 - 19	67	1	1.49	(0.08 - 9.13)
20 - 29	486	3	0.62	(0.21 - 1.80)
30 - 39	477	0	-	-
40 - 49	439	3	0.68	(0.23 - 1.99)
50 - 59	388	3	0.77	(0.26 - 2.25)
60 - 69	275	2	0.73	(0.20 - 2.61)
70 - 79	91	1	1.10	(0.19 - 5.96)
≥ 80	45	0	-	-
Unknown	20	0	-	-
Mode of contact*				
Household contacts	119	9	7.56	(3.73 - 14.26)
Healthcare personnel	233	0	-	
Patients	169	1	0.59	(0.18 - 0.65)
Co-workers	38	0	-	
Total	2,370	13	0.55	(0.31 - 0.96)

CI = confidence interval.

*Provisional data, as of March 13th 2020.

Data presented in this study may change depending on further epidemiological investigations.

The working definition for “close contact (or high risk exposure)” was being within 2 meters of a COVID-19 case and “daily contact (or low risk exposure)” was defined as having proximity with a person who was a confirmed COVID-19 case, without having had close contact. The classification was then repealed and was integrated into “contact (regardless of level of exposure).” All contacts who were asymptomatic were mandated to self-quarantine for 14 days and were put under active surveillance by public health workers who called twice a day to check presence of fever or respiratory symptoms. A smartphone-based, “self-assessment app,” was introduced as an additional tool to track symptoms of COVID-19.

Results

Between January 24th and March 10th, a total of 2,370 individuals were contact traced to the first 30 cases of COVID-19. There were 12 individuals who contracted COVID-19, resulting in a secondary attack rate of 0.55% (95% CI 0.31-0.96; Table 1). Males had a higher secondary attack rate (0.75, 95% CI 0.38-1.47) than females (0.38, 95% CI 0.16-0.89). Of 119 household contacts, 9 individuals had coronavirus infections which resulted in a secondary attack rate of 7.56% (95% CI 3.73-14.26; Table 1). The number of traced individuals from a case ranged from 15 to 649 people and the mean monitored time per person ranged from 5.7 to 31.3 days (Table 2).

Table 2. Number of traced individuals and secondary transmissions by cases of COVID-19, Republic of Korea.

Case no.	Traced individuals (n)	Mean monitored days (per person)	Infected individuals (n)	Transmission description
3	95	16.7	1	Transmitted to case #6 (meal)
5	35	17.0	1	Transmitted to case #9 (meal)
6	23	16.8	3	Household transmission to cases #10, #11 Transmitted to case #21 (church)
12	649	9.1	1	Household transmission to case #14
15	15	31.3	2	Transmitted to case #20 (meal)
16	452	16.0	2	Household transmission to cases #18, #22
20	2	12.0	1	Household transmission to case #32
27	40	5.7	2	Household transmission to cases #25, #26
29	111	19.9	1	Household transmission to case #30

Provisional data, as of March 13th, 2020.

Discussion

Contact tracing of 2,370 individuals from the first 30 COVID-19 cases in Korea indicated that the risk of symptomatic cases from transmission to contacts was low at 0.55% (95% CI 0.31-0.96). However, the findings also suggested that the transmission of COVID-19 was significant among household contacts, which is in line with other reports. In the earlier reports, familial clusters of COVID-19 had been reported and household transmission was thought to be a major driver in the spread of the outbreak in the community [2,3]. Of the first 262 COVID-19 cases in Beijing, China, 133 (50.8%) were family cluster cases [4]. In the US, active symptom monitoring was performed for 445 close contacts of the 12 cases with travel-related COVID-19, resulting in symptomatic cases with a secondary attack rate of 0.45% (95% CI, 0.12-1.6) among all contacts, and 10.5% (95% CI, 2.9-31.4) among household members [5].

This study suggested that contact tracing was critical in the containment of the COVID-19 outbreak in the early phase in Korea. Contact tracing relies on other concurrent aspects of the COVID-19 containment strategies such as investigating, classifying, tracking, and managing contacts by identifying the patient's route. A mathematical model predicted that highly effective contact tracing and quarantine was sufficient enough to control a new outbreak of COVID-19 in most scenarios [6]. In Korea, various tracking measures such as the history of clinic visits, GPS of cell phones, credit card transaction logs,

and CCTV have been used to complete the contact tracing of COVID-19 cases [7].

There are certain limitations that should be considered in this study. Firstly, this is a summary of the first 30 cases of COVID-19 in Korea, when containment of cases and contacts was the mainstay of the control strategy. Following the increase in the number of cases above 30, the strategy shifted from containment to mitigation, which is now applied in many parts of the world. Secondly, potential risk factors such as the characteristics of a household and other transmission routes were not assessed and would merit further study. However, the observations reported in this study underscores the infectious nature of COVID-19 in households and identify the main drivers that facilitate secondary transmission in the community.

This summary identifies the overall risk of symptomatic transmission of COVID-19 in the early phase of the disease. Implementation of basic infection control practices, such as isolation of family members who are symptomatic, and enhancement of hand hygiene measures, which may lead to a reduction in transmission of COVID-19. Future analyses should attempt to incorporate screening of COVID-19 and serology in symptomatic and asymptomatic contacts.

Conflicts of Interest

There was no conflicts of interest to declare.

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