

# Close Contact Review in COVID-19: Examples of Three Families Living in a Small Town

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## ABSTRACT

The SARS-CoV-2 epidemic, which has spread rapidly around the world since December 2019, could not be stopped despite all vaccination and quarantine practices. In addition, with the mutations in the SARS-COV-2 strain, the virus has gained the ability to be transmitted much faster and easily. In this study, first of all, it has been tried to focus on the type of transmission route of the virus among close-contact family members. In this way, it is aimed to show the importance of social distance, infected person isolation, contact tracking and quarantine practices.

The research was planned, with a large number of people infected in three interconnected families living in the rural area where the virus was infected. The retrospective findings of the COVID-19 case cluster identified during the fieldwork were evaluated.

SARS-CoV-2 PCR test was positive in 40 members of 3 families included in the study. It was determined that index cases belonging to all families (Family B1, Family C1) had direct or indirect contact with the family (A1) who was detected as the first positive case in the village. The age range of all cases ranged from 1-79, while the age range of symptomatic cases was 18-79. The most common symptoms were cough, fever, fatigue and shortness of breath. The cases were mostly kept under hospital follow-up for 3-11 days.

Early isolation of COVID-19 cases is important and effective in preventing the clustering and further spread of the epidemic.

**Keywords:** SARS-CoV-2, Epidemic, Quarantine

## Introduction

On December 31, 2019, cases of pneumonia caused by a new corona virus were reported in Hubei province of Wuhan, China (1). The disease was officially named Coronavirus Disease-2019 (COVID-19) in the following days (2). On February 16, 2021, it was observed that there were 108 246 992 cases and 2 386 717 deaths due to the disease that spread rapidly around the world (3). The fact that SARS-CoV-2 causes global spread by affecting highly contagious and large populations revealed that the vaccine is an important public health criterion in protecting people from COVID-19 (4). It has been reported that there is a decrease in the number of new cases reported globally (16% decrease per week) and consequently a decrease in death cases (10% decrease per week) (3). Although there is a global decrease in cases and death rates, the spread of the virus in such a short time has led to the development of tens of thousands of mutations in the natural strain of SARS-CoV-2 (5).

The World Health Organization (WHO), which regularly monitors the number of COVID-19 cases, provides regular information about the mutations that occur and the situations that may occur (6). It is

thought that the resulting mutations cause an increase in viral load and transmission rather than the severity of the disease (4). It has been shown in epidemiological studies that the most common way of transmission of the disease is contact with droplets during speech, coughing or sneezing (7). Despite the time taken to reduce the transmission of the virus, good hygiene, social distancing and quarantine practices are still recommended worldwide (4). In our study, epidemiological, clinical, radiological and laboratory findings of 16 symptomatic and 24 asymptomatic SARS-CoV-2 PCR positive 3 family clusters were examined. In the light of the results obtained, it was aimed to provide guidance for the management of the epidemic.

## Materials and Methods

**First Case and Cluster Research:** The first COVID-19 case was detected on 05 April 2020 in Başkale, Örmetaş Neighborhood, located in Van Province with a population of 576. Upon receiving the information that a large number of people recently came to the village from Istanbul, the city where the first COVID-19 case was seen in Turkey,

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T.C. Field scanning (filiation) study, which is routinely applied by the Ministry of Health during the pandemic, has been initiated. The patients were admitted to Van Education and Research Hospital, which is a pandemic hospital in Van, for both treatment and isolation purposes. Ethical approval was obtained from the same hospital Ethics Committee with the decision dated 20.08.2020 and numbered 2020/16, and a filiation study was conducted on the patients. During the filiation study, a retrospective epidemiological and clinical examination of the COVID-19 cluster detected was performed. In order to prevent the spread of the disease outside the village, the region was quarantined with the decision of the Sanitation Board. 16 new cases were identified in the first stage as a result of the filiation and contact screenings made in the neighborhood where the strict isolation decisions were applied (Table 1).

As the density of cases increased in the same house and neighboring houses, an investigation was started on 18 April 2020. Detailed information was obtained by interviewing the families of the SARS-CoV-2 PCR test positive cases and the existence of epidemiological link was investigated. With the direction of the research, a swab sample was taken from 208 suspect people with contact history, after infection control measures were taken on April 18, 2020, and the whole neighborhood was scanned. As a result, 24 new cases were detected (Table 2).

**Epidemiological Review:** Since there was no restriction on intercity travel in the first stage in Turkey after the epidemic, people who were in Istanbul for reasons such as work and education returned to their hometown. Many people across the country had to return to their families with the closure of their workplaces due to the pandemic restrictions imposed. The city of Van is located in the easternmost point of Turkey and has a relatively lower level of work and education at the point of development compared to the western regions. After the restriction, it was understood that people coming to their hometown from Istanbul accepted many visitors, especially because of the local culture, and also visited other relatives, and despite the quarantine conditions, social distance and isolation rules were not followed during these visits. Complaints of FA1, the first case in the study; It developed on April 4, 2020 as a result of the relatives visiting the son of FA1 who came from Istanbul (between 23-25 March 2020). After that, the results of SARS-CoV-2 RT-PCR test performed on people living in the same house (n: 13/6) were found to be positive (FA1,2,3,4,5,6). FB1 and the SARS-CoV-2 PCR test of the case who visited the house of the first case detected by the

filiation teams by not following the mask and distance rules, and 8 of the 10 people living in the same house were found to be positive (FB2,3,4,5,6,7,8,9). When people who came into contact with these positive houses were tested with COVID RT-PCR, it was seen that there were new cases specified in Table-2. Family members living in FA, FB and FC; It was learned that the cases were together in a closed area for at least 1 hour without paying attention to social distance and mask measures. It was also learned that the families of FA, FB and FC came together without complying with the social distance rules for reasons such as the patient visit or the information meeting held by the headman, as well as their internal contacts.

**Data Collection:** In the study, out of 240 people who were screened for epidemiological contact risk for COVID-19, 40 of them were found to be positive for the SARS-CoV-2 RT-PCR test. While 19 of the SARS-CoV-2 RT-PCR positive people were asymptomatic, 21 were symptomatic. All people with positive SARS-CoV-2 RT-PCR test were hospitalized and followed up for both treatment and isolation purposes. Asymptomatic cases were tightly isolated until the SARS-CoV-2 RT-PCR test was found to be negative in two consecutive tests taken at 24-hour intervals. In order to obtain the necessary data in the study, the patient cards created by the hospital information processing system and the filiation team for each patient were retrospectively scanned. Haemogram, biochemical parameters, C-Reactive protein, D-Dimer, Ferritin and Thorax computed tomography (CT) data of each case were recorded.

**Statistical Analysis:** Descriptive statistics for the variables in the study; expressed as mean, standard deviation, number(n) and percentage (%). SPSS 26.0 (IBM Corporation, Armonk, New York, United States) program was used for calculations.

## Results

Within the scope of the study, all members of 3 families and 208 contacts were screened, and the SARS-CoV-2 PCR test was found to be positive in 40 (19.2%) people. In 19 of these (47.5%), the disease was symptomatic. It was observed that index cases (FB1, FC1) belonging to all families had direct or indirect contact with the first positive FA1 in the village. The mean age of symptomatic cases was found to be  $39 \pm 1$  (min 18- max 79). When the underlying diseases of the cases were examined, it was determined that there was hypothyroidism and obesity in FA1, chronic kidney failure (renal transplant) and diabetes mellitus (DM) in FA5, and DM in FA6. The most common reasons for admission to the hospital were cough (30%),

**Table 1.** Cases Detected Between 06-17 April 2020

Family member	Age (years)	Gender	Relation to index case	Semptom starting date	Date of nucleic acid test positive
FA1	66	F	Index case	04 Apr.	06 Apr.
FA2	27	F	Daughter	14 Apr.	16 Apr.
FA3	16	F	Granddaughter	14 Apr.	16 Apr.
FA4	44	F	Son's wife	14 Apr.	16 Apr.
FA5	45	M	Brother	15 Apr.	17 Apr.
FA6	79	F	Mother	15 Apr.	17 Apr.
FB1	55	M	Index case B	10 Apr.	16 Apr.
FB2	53	F	Wife	14 Apr.	16 Apr.
FB3	21	F	Daughter	14 Apr.	16 Apr.
FB4	29	M	Brother	15 Apr.	16 Apr.
FB5	18	F	Daughter	15 Apr.	16 Apr.
FB6	53	M	Brother	14 Apr.	17 Apr.
FB7	59	M	Brother	15 Apr.	17 Apr.
FB8	11	M	Grandson	17 Apr.	19 Apr.
FC1	46	F	Index case C	14 Apr.	17 Apr.
FC2	46	M	Husband	16 Apr.	17 Apr.

**Table 2.** Cases detected as a result of epidemiological examination on 18 April 2020

Family member	Age (years)	Gender	Relation to index case	Semptom starting date	Date of nucleic acid test positive
FA7	1	M	FA1 Grandchild	Asymptomatic	19 Apr.
FA8	11	F	FA1 Granddaughter	Asymptomatic	19 Apr.
FB9	4	F	FB1 Granddaughter	Asymptomatic	19 Apr.
FB10	9	M	FB1 Grandson	Asymptomatic	19 Apr.
FB11	9	F	FB1 Granddaughter	Asymptomatic	19 Apr.
FB12	10	M	FB1 Grandson	Asymptomatic	19 Apr.
FB13	10	M	FB1 Grandson	Asymptomatic	19 Apr.
FB14	11	M	FB1 Grandson	Asymptomatic	19 Apr.
FB15	12	M	FB1 Grandson	Asymptomatic	19 Apr.
FB16	13	M	FB1 Grandson	Asymptomatic	19 Apr.
FB17	16	M	FB1 Grandson	Asymptomatic	19 Apr.
FB18	17	M	FB1 Grandson	Asymptomatic	19 Apr.
FB19	19	M	FB1 Grandson	18 Apr.	19 Apr.
FB20	19	F	FB1 Granddaughter	Asymptomatic	19 Apr.
FB21	21	F	FB1 Daughter in law	18 Apr.	19 Apr.
FB22	26	M	FB1 Son	Asymptomatic	19 Apr.
FB23	27	M	FB1 Son	Asymptomatic	19 Apr.
FB24	35	F	FB1 Brother wife	20 Apr.	19 Apr.
FB25	40	M	FB1 Brother	Asymptomatic	19 Apr.
FB26	49	F	FB1 Sister	Asymptomatic	19 Apr.
FB27	55	F	FB1 Sister	17 Apr.	19 Apr.

decreased frequency (22.5%) fever, weakness (20%), and shortness of breath (7.5%). Diarrhea, loss of smell and taste, and headache, which are frequently

reported in the clinic in COVID-19 disease, were not observed in the patients in our study during admission and hospital follow-up (Table-3). The cases

**Table 3.** Summary of Clinical Features Results of The Family Cluster Infected With COVID-19

Case	Age	Semptom starting date	Date of nucleic acid test positive	Fever	Cough	Fatigue	Dispne	Poor appetite	Myalgia or joint pain	Total hospital stay (day)
FA1	66	4 Apr.	6.Apr.	+	+	+	+	+	+	62
FA2	27	14.Apr.	15. Apr.	+	+					5
FA4	44	14. Apr.	16. Apr.	+	+					5
FA5	45	15. Apr.	17. Apr.			+				11
FA6	79	15. Apr.	17. Apr.		+					10
FB1	55	10. Apr.	15. Apr.	+	+	+	+			7
FB2	53	14. Apr.	16. Apr.	+	+					9
FB3	21	14. Apr.	16. Apr.		+	+				5
FB4	29	15. Apr.	16. Apr.	+	+					5
FB5	19	15. Apr.	16. Apr.	+	+					6
FB7	59	15. Apr.	16. Apr.	+						4
FC1	46	16. Apr.	17. Apr.			+				6
FC2	45	16. Apr.	17. Apr.	+						8
FB20	19	18. Apr.	19 Apr.			+				5
FB22	21	18. Apr.	19 Apr.			+				3
FB25	35	19. Apr.	19 Apr.		+		+			4
FB28	55	17. Apr.	19 Apr.	+	+					3
FBC3	18	20. Apr.	19 Apr.		+					8
FC5	23	19. Apr.	19 Apr.			+				6

were mostly followed for 3-11 days in the hospital, and only 1 case (FA1) was followed up in the hospital for 62 days. During the hospital follow-up, patients routinely received antiviral, antibiotics and supportive treatments recommended in the Ministry of Health Covid Guide.

## Discussion

In this study, it has been tried to show how COVID-19 spread rapidly with close contact within the family. By examining the COVID-19 case cluster, epidemiological, clinical, radiological and laboratory findings of three families residing in rural areas far from collective settlement, the importance of reducing close contact with index cases in epidemic management was emphasized. Studies show that households are and will continue to be important places for transmission, even in areas where community transmission has decreased (8).

In the analyzed sample, there were 13 individuals under the age of 18 who had positive SARS-CoV-2 RT-PCR test in familial cluster. The youngest of the children are 12 months old and the oldest is 17 years old, and the virus has progressed asymptotically in all of them, in line with the literature (9). This clearly

contributed to the idea that children in families living together are more likely to have the disease asymptotically compared to adults.

As in similar studies; The contagious potential of asymptomatic cases should be taken into account in the prevalence of the disease among families with close contact (10). The fact that the symptoms of the index cases, which were in contact with each other in the 3 families in the study, appeared at different times can be explained by the difference of SARS-CoV-2 virulence from person to person. Although similar aspects of this issue have been emphasized in the literature, more studies are needed (11).

Likewise sleeping in the same room as seen in an index patient, our data indicate a close and even a casual contact. This simple proximity, for instance eating in the same room, increases the risk for transmission. Therefore, in the management of the COVID-19 epidemic; Detection and notification of those infected with the SARS-CoV-2 virus for the source, isolation and treatment of the patient, screening studies, examination and follow-up of the contacts, quarantine practices, as well as social distance (at least 1 meter) for the route of transmission, hand hygiene (hand washing, use of hand sanitizer), respiratory hygiene, surface cleaning,

disinfection, frequent ventilation of indoor environments, and improving indoor air quality are of great importance (12).

As a result; for because of epidemic management, large mass movements and interpersonal contact continue to occur inevitably for reasons such as economic, logistics and education. This creates an opportunity environment for the spread of SARS-CoV-2. Therefore, the constant continuation of screening studies for potential cases, with great emphasis on the risk of clustering of confirmed COVID-19 cases among various groups, is still the most important cornerstone of the fight against the epidemic.

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