

Original Research Article

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Cluster investigations of the COVID-19 in the UT of Dadra Nagar Haveli, Daman and Diu, India

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ABSTRACT

Background: This study presents the various variables of the first cluster of COVID-19 was identified in the Union Territory of Dadra and Nagar Haveli and Daman and Diu, India.

Methods: The investigation design combined active case findings, contact tracing, and containment policy around each confirmed case. The various epidemiological parameters were counted with the verbal autopsy of confirmed cases and possible contacts.

Results: It was a small-scale cluster that started with an imported case. In this cluster, a total of 18 infected persons, 243 high-risk contact, and 105 low-risk contacts were identified. The entire confirmed cases were linked to each other within a single chain of transmission, therefore; Airborne, droplet, and hand-to-hand transmissions were suspected.

Conclusions: The results of the present study were suggested that early detection, active surveillance, testing of suspected cases, isolation of cases and quarantine of contacts are the key objectives to contain the COVID-19 disease cluster. But we have to keep in concern what are variables affect about different type of the objectives of the cluster containment at the grassroots level.

Keywords: 2019-nCoV, Coronavirus disease, Cluster infection

INTRODUCTION

The COVID-19 (SARS CoV-2) is the worst pandemic in the century.¹ Due to the new form of the virus, and the continuous mutation in the form of the virus, there is still very little information about this virus.² The treatment of this disease still remains a challenge in the absence of effective drugs. To combat the situation, every country has adopted various strategies for COVID-19 like appropriate behavior, testing policies, contact tracing, containment zone, complete lockdown, etc.³ In the recent past, some researchers have tried to understand the contribution of contact tracing and cluster investigation in the prevention of infection of COVID-19.⁴⁻⁷ But in the

different geographical conditions, the strategies adopted for the cluster containment of the COVID-19 at ground level remain somewhat different. Therefore, it is necessary to take into concern, what are variables affecting the situation at the grassroots level. That's why; we are describing the different variables of the first cluster of the COVID-19 reported in the UT of Dadra Nagar Haveli and Daman Diu.

METHODS

It's a descriptive analysis of the first cluster of COVID-19 reported from the Dadra village of District Dadra and Nagar Haveli, UT of Dadra and Nagar Haveli and Daman

and Diu; (20.32455 longitudes and 72.96510 latitudes). The Dadra village is a semi-urban area with a total population of 11443. Due to the numerous establishments of industrial units in this area, most of the residents in this area are labour of these industrial units. These laborers lives in chawl (a building divided into many separate small dwellings) with their family or co-workers with limited resources. In these chawls, there is a provision of collective water and toilets. After reporting of first cases of COVID-19 on 31 May 2021, The rapid response team constituted by the administration immediately reached the place of residence of the infected person and did the verbal autopsy of the infected person. A confirmed COVID-19 infected was counted as RT-PCR positive along with the value of cycle threshold (Ct) less than 35 in the laboratory, irrespective of clinical signs and symptoms. A questionnaire was developed which contains demographic information of the positive cases, contact history of any other COVID 19 confirm case, travel history, and all contacts those came in contact with the primary patient within last 14 days. The definition of high-risk contact and low-risk contact, the policy of quarantine, surveillance, testing and containment zone & buffer zone, followed as per the guideline provided by the Ministry of Health and Family Welfare (MoHFW), Government of India. The data of this study were analyzed using Microsoft Excel 2019. The details of intra-departmental coordination under the administration to the contain the of cluster are shown in (Figure 1).

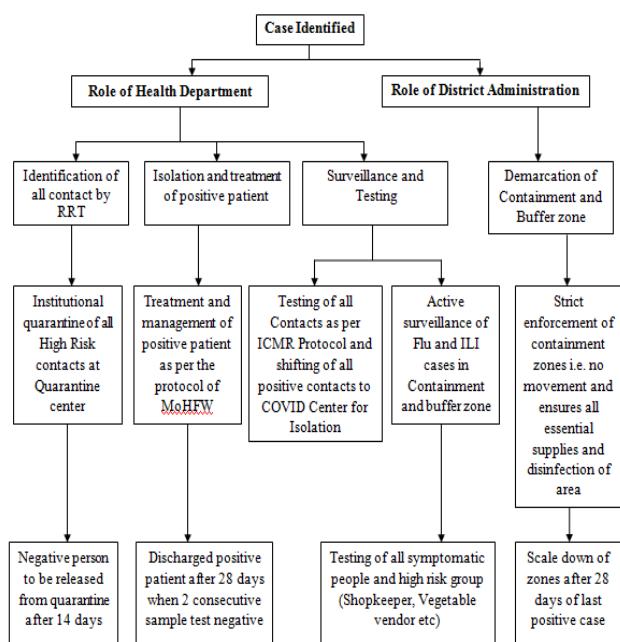


Figure 1: Details of cluster containment in the UT of Dadra Nagar Haveli and Daman Diu.

RESULTS

A 14-year girl was reported at the community health center of Dadra on 30th May 2020, along with a 2 days history of fever, cough, and cold. As per the protocol of

MoHFW, the Government of India the sample was taken on the same day to test the COVID-19 through RT-PCR. On dated 31 May 2020 the patient was found positive with a CT value of 26. Total 18 contacts of Index cases were identified as high-risk contact and 27 contacts as low-risk contact. Out of high-risk contact, 5 were family members, 7 were friends, and 6 were neighbours. As per testing policy, all high-risk contacts were quarantined in the institute and tested for COVID-19 on the same days. A total of 6 high-risk contacts were found positive. Out of total 6 positive cases, 1 was family member, 3 friends, 2 neighbours were found positive. Out of total positive, 2 were adult, 3 were pediatric and 1 was neonate (Table 1).

Table 1: The demographic information of the COVID-19 confirmed cases in the cluster (N=18).

Variables	N (%)
Age (years)	
1 to 10	5 (27.78)
11 to 20	5 (27.78)
21 to 30	1 (5.56)
31 to 40	7 (38.89)
Mean age	20.76
Range	0.7 to 38
Gender	
Male	11 (61.11)
Female	7 (38.89)
Occupation	
Children/no work	10 (55.56)
Industrial worker	5 (27.78)
House wife	3 (16.67)
Relation wise contact	
Family member including C/1	8 (44.44)
Friend	5 (27.78)
Neighbour	3 (16.67)
Co-worker	1 (5.56)
Family friends	1 (5.56)
Symptom status	
Symptomatic	3 (16.67)
Asymptomatic	15 (83.33)

As soon as the first-generation positive patients (F1) were identified, their contacts were traced and identified. Total 52 high-risk contacts (12 were also high-risk contacts of the index case, 27 were low-risk contacts of the index case, and 13 were new contacts) were identified. Out of total these, 10 were family members, 9 friends 13 co-workers, and 20 neighbours. All high-risk contacts were tested as per the protocol, out of the total identified high-risk contacts, 2 contacts (one friend, and one co-worker) were found positive. Now the contacts of the second-generation positive patients (F2) were traced and identified. Total 18 high-risk contacts (3 family members, 2 friends' 13 co-workers those were also high-risk contact of previous positive) and 146 low-risk contacts were also identified. Out of total contacts, 4 high-risk contacts (3 family members and 1 friend) were found positive and 5

low-risk contacts were also found positive. Total 149 high-risk contacts (13 family contacts, 136 neighbours which were also low-risk contacts of F2 positive patients) and among the 15 new low-risk contacts of F3 generation positive patients (Figure 2). Among the contacts of F3 positive patients, none of them was found positive. In the cluster, total of 18 positive cases and 348 contacts (243 high and 105 low-risk contacts from 4 different chawls) were encountered. The highest proportion of cases were reported in the age group of 31 to 40 years (38.89%) followed by 1 to 10 years and 11 to 20 years (27.78%) and 21 to 30 years (5.56%). The males (61.11%) were outnumbered than females (38.89%) (Table 1). In this group, 44.44% of family members, 27.78% of friends, 16.67% of neighbours, 5.56% of co-workers, and 5.56% of friends were infected with their contacts. Most of the infected did not have any type of symptoms, only 3 (16.67%) of the people showed mild symptoms like fever, cold, and cough. The detail of the case tree is shown in (Figure 2). The timeline of new cases reported from the cluster is depicted in (Figure 3).

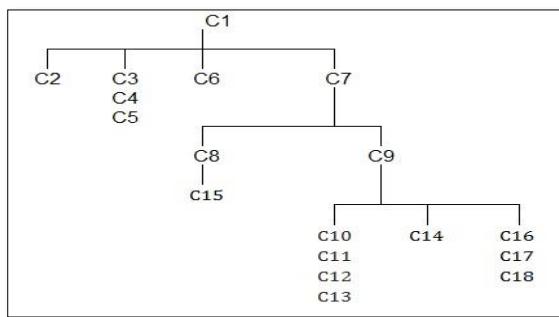


Figure 2: The cluster tree of the COVID-19 cases.

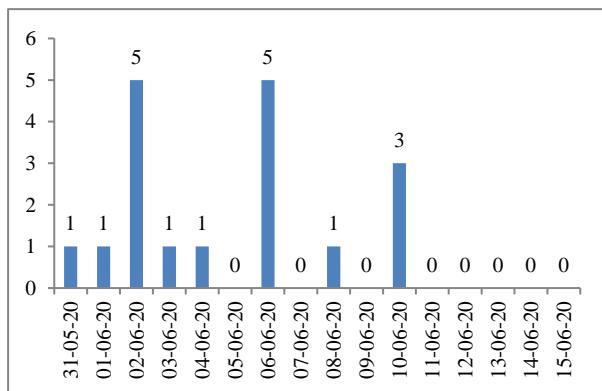


Figure 3: The time line of new cases reported from the cluster.

Countermeasure

To contain the cluster, inter-departmental coordination was done and many steps were taken at the administrative level. The health department and the administrative officers together determined the 338 houses and 856 populations as containment zone and 8538 houses and 27440 populations as a buffer zone. The police

department has ensured that the people living inside the designated containment zones stay inside their homes and no person can enter the containment zones and vice versa except for medical emergencies. All essential daily need items were supplied at doorsteps in the containment zone by Panchayat Raj department. The Containment and Buffer Zone was kept active for 28 days after the last case was reported. Total 5 ILI cases were reported in containment zone and 71 ILI cases in buffer zone during 28 days surveillances. Furthermore, In the Containment Zone and Buffer Zone, a total of 2444 people with high-risk professions (shopkeepers, vegetable vendors, and daily commuters) were identified and tested for COVID-19. All were tested with RTPCR and none was found positive for COVID-19. However, none of them were found positive. Disinfection of the houses in the containment zone and buffer zone was carried out with 0.1% hypo chloride solution.

DISCUSSION

This field investigation on patients infected with COVID-19 provided a good understanding of how to manage clusters or outbreaks.⁸ In the present study, all the cases were linked to each other within a single chain of transmission.

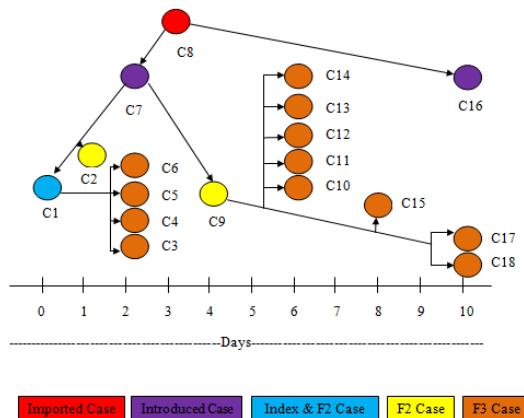


Figure 4: The transmission dynamics of the cases.

All the 18 positive cases were known to each other as they were family members, friends or co-workers, and neighbours, therefore; Airborne, droplet, and hand-to-hand transmissions were suspected. Furthermore, space of dwelling may be another important factor in this cluster, as all the contacts and positive cases reside in chawls have the provision of collective water and toilets. In the initial phase of the pandemic, local transmission was started due to International imported cases.⁹ Then the introduced cases were encountered, in the early phase, it was restricted up to few families or a restricted area.⁴ In the present investigation, it was found that case number C8 was imported cases, who are daily commuters used to out of the state for his business. Cases no C7 and C16 were identified as introduced cases, as they were high-

risk contact of imported cases (F1). A total of 3 cases of F2 were encountered, including one index case. All these cases were linked to case number C7. Maximum of 12 cases were registered from F3 (Figure 4). The result of the present study has confirmed the result of the investigation conducted in China and Singapore.^{4,9} The way of life of the people on whom all the studies were conducted previously was completely different from our people. So our strategies of cluster containment were slightly different from the strategies of previous researchers. But the basic rules of the containment of the cluster like as early detection, social distancing, active surveillance, testing all suspected cases, isolation of cases, quarantine of contacts were the same.

Limitations

The limited number of infected persons in the cluster is the main limitation of current study. Furthermore, the variables related to contacts were generated through personal interviews of positive patients and cross-examine by the interview of contacts. However, the marginal error may be possible.

CONCLUSION

The active surveillance, to the early detection of the infected, testing, and isolation of suspected, quarantine of contacts, declaration as containment zone the infected area, intra-sector coordination are the key objectives to contain the cluster of COVID-19. But we have to keep in mind that the ground-level variables affecting the objectives of the cluster prevention may be different in all geographic conditions. The supply of essential items should be maintained in the containment zone. In the present study, the residents were residing in a very small place with very few basic facilities; therefore, all the cases were linked to each other within a single chain of transmission.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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