ABSTRACT The first case of the COVID-19 in Kerala was confirmed in Thrisur on 30 January 2020 which was the first case in India too. Prevention of developing clusters and their containment is a very important strategy to slow down the spread of disease. This paper describes the epidemiological investigation of two family clusters occurred in the month of May and June 2020 in central Kerala when the state was experiencing a surge of cases. Descriptive research method was used to investigate two clusters of Covid 19 cases in a family in a rural area of central Kerala to understand the possible transmission dynamics and clinical profile. Data was collected by interviewing the family members and health workers over phone after obtaining informed consent, Reverse transcriptase polymerase chain reaction of nasal swab was done to confirm the Covid 19 case. Attack rate in first family cluster was 83.3% and 2nd cluster was 100%. Primary case was asymptomatic in both clusters. Majority of secondary cases were also asymptomatic. Cluster was developed by close contact with family members during quarantine period. In both clusters one person each became symptomatic, one an old age person and other one a person with diabetes. There were no severe complications or deaths. Children and healthy adults were asymptomatic. Old age and high risk people are at high risk of contracting severe disease if reverse quarantine is not followed at home. Quarantine breach was the main reason for the evolvement of clusters.

KEYWORDS COVID 19, family cluster, quarantine

Introduction

The first case of the COVID-19 in Kerala was confirmed in Thrisur on 30 January 2020[1], which was the first case in India. Coronavirus is transmitted mainly through close contact and respiratory droplets, with possible airborne transmission if aerosols are present[2]. With the rapid spread and emergence of new variants, an alarm is still spreading, making it the largest threat to public health ever in the world. So immediate action is needed at the grass-root level to tackle the virus. In Kerala, the number of active cases peaked at 266 on 6 April before declining. However, following the return of Keralites from other countries and states, more cases were reported in mid-May[3]. The state implemented various social and public health interventions to combat outbreaks from the experience of the Nipah outbreak. However, in the absence of enough epidemiological understanding of COVID-19, the lockdown was also enforced to flatten the peak of the curve, which has its own merits but also affects the poor and vulnerable like in many other parts of the country[4,5].

The number of cases increased from the initial isolated cases for travellers to small clusters by local contact and later as large outbreaks in institutions and public places. Clusters formed by family or local contacts contribute a major proportion of cases [6,7]. Therefore, prevention of developing clusters and their containment is a very important strategy to slow down the spread of disease. This paper describes the epidemiological investigation of two family clusters that occurred in May and June 2020 in central Kerala when the state was experiencing a surge of cases.
central Kerala to understand the possible transmission dynamics and clinical profile. After obtaining informed consent, data were collected by interviewing the family members and health workers over the phone. The nasal swab's reverse transcriptase-polymerase chain reaction was done to confirm the Covid 19 case. A cluster is defined as ‘an unusual aggregation of health events grouped in time and space and reported to a health agency’ so the occurrence of more than two epidemiologically linked cases was considered a cluster.

Case series

Family cluster - 1

This family consists of 6 members: one old age woman, two middle-aged adults and three children.

Of the 6 membered families, 5 persons became RTPCR positive. The attack rate was 83.3%

The primary case is a 42-year-old male of a family working in an automobile shop in a neighbouring state. Due to lockdown, his shop was closed, and he was left with no income and was forced to come back home after a short period of stay in a nearby room with his friend. As there was strict border control, he required an interstate pass to cross the border, which he could not get in time and came as a helper in a goods vehicle and reached home on 21st May 2020. He went directly to his home and informed health workers about his arrival over the phone. Health care workers were unaware of his arrival as he came without registering but arranged a quarantine facility for him and his family in a nearby quarantine centre. All of his family members got in contact with him on arrival. They all stayed in quarantine from 22nd May to 4th June. On 14th day of the quarantine, his mother 72-year-old female, developed fever and nausea, and the nasal swab was sent for RT PCR testing; they continued in the centre for four more days till 8th June and went home at their request. However, the RTPCR result of the mother came as positive on 9th June, and she was shifted to District hospital and the rest of them back to the quarantine centre. After the index case (72-year-old mother) got admitted, the rest of five of the family members nasal swab was taken and sent for RTPCR though they were all asymptomatic. The result of four members except the 13-year-old child came as positive. 72-year-old mother recovered after 18 days of hospital admission and was discharged.

Family cluster – 2

The family consists of a 52-year-old male, a 48-year-old female and a 24-year-old son. The primary case is a 52-year-old male working in a neighbouring state and came home after losing his job. He came in a traveller on May 6th 2020, and was picked by his son in a car to home and stayed in-home quarantine. His wife, the 48-year-old female, took care of him while in quarantine. She reported having breached in quarantine a few times by having a conversation from a closer distance without proper mask use. On the 12th day, he was tested for RT PCR though he was asymptomatic and tested positive, and later, his son and wife were also tested on May 21st and found to be positive. A nearby shop owner 45-year-old female who is a diabetic patient on treatment, also tested positive later on 24th May, who was a high-risk primary contact of the son of the primary case. She had a mild fever as presenting symptoms. In this cluster, all family contacts got infected, and all were asymptomatic except one person at the shop who had diabetes. Quarantine breach was the reason for the spread of the disease.

Prevention and containment of clusters of COVID 19 cases are very important to break the cycle of transmission, to decrease the morbidity and mortality due to COVID-19 to slow down the spread of the epidemic.

In both of these family clusters described; primary cases were asymptomatic. Asymptomatic carriers and persons in the incubation period can spread the disease and cause clusters, as evidenced by various studies[8,9,10]. The majority of secondary cases were also asymptomatic. The cluster was developed by close contact with family members during the quarantine period. In both clusters, one person became symptomatic, one an old age person and the other one a person with diabetes. There were no severe complications or deaths. Though high-risk people, including old age, do not have much social exposure during the lockdown period, they are at a high risk of contracting the disease from family members who got a high risk of exposure. Women being; having the caretaker role in the family also have a high risk of getting a disease from home. Children in this series of lab-confirmed cases were asymptomatic. Various studies have shown that most COVID 19 infected children are showing mild or no symptoms[11,12]. Transmission from asymptomatics is a challenge in the containment of clusters[13] but finding asymptomatic infections and isolating them is one of the critical points for early prevention and control of COVID-19 worldwide[14].

Old age people are at a high risk of developing more severe illness compared to young and healthy people in whom the disease is largely mild or asymptomatic. Therefore, it signifies the importance of reverse quarantine of high-risk people, including old age and those with co morbidities[15].

A breach in quarantine was an important reason for developing family clusters. Delay in testing and reporting were another important factor for breaching quarantine, especially among asymptomatic.

Figure 1: Timeline of events in family cluster 1.

Gantt chart of COVID 19 cases of the family cluster- 1

In this cluster, all family members were transported together to the quarantine centre and were cohorted in the following manner- Primary case and eldest non-infected son, index case and case no 4 and case no 3 and 5 were quarantined together in three separate rooms in the quarantine centre, and they reported to have quarantine breach in between too. In this cluster, all except old age woman was asymptomatic. The difficulty of the public to get through new interstate restrictions, Quarantine breach, lack of time for preparedness for health workers, improper cohorting at quarantine centre and delay in getting the results contributed to the spread and prolonged quarantine and related difficulties.

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Rapid response teams, health care workers and local self-government have important roles in preventing and containing clusters by constant surveillance, contact tracing, arranging quarantine and timely testing facilities.

Health authorities need to encourage people to maintain respiratory and hand hygiene, self-monitoring for symptoms, social distancing, and quarantine[16]. Intensive risk communication and isolating cases also are important cluster containment strategies[17].

Conclusion and recommendations

Asymptomatic persons were the primary cases in both clusters. Children and healthy adults were asymptomatic. Old age and high-risk people are at high risk of contracting the severe disease if reverse quarantine is not followed at home. Quarantine breach was the main reason for the evolvement of clusters.

Implementation of people friendly and flexible border restrictions and guidelines, continuation of quarantine until the reporting of RTPCR results, reverse quarantine of high risk persons including old age while in quarantine centre or home quarantine is required. Early testing of travelers especially when there is a history of quarantine breach and awareness generation and motivation of public to stick on to strict quarantine measures will also help in prevention and containment of clusters in the community.

Declarations

Ethics approval and consent to participate
All consents have been taken.

Consent for publication
Informed consent has been taken.

Availability of data and materials
Not applicable

Competing interests
The authors declare that they have no competing interests.

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