COVID control strategy—-is there any light at the end of the tunnel?

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ABSTRACT

Context: India has been witnessing a huge surge of COVID-19 cases, with increasing number of new cases and deaths daily. There is yet no effective vaccine, drug or strategy to combat this disease. Various models of COVID-19 trend and management have been put forward by different researchers, yet no prediction has yet turned out to be close to the reality. Aims: To find an effective public health strategy against COVID control. Settings and Design: Ahmedabad district in Gujarat. Methods and Material: Ahmedabad Model for control of COVID-19 based on Ct threshold has been put forth which stresses upon the fact that higher viral load (super-spreaders) could be an important determinant in spreading infections in the community. Results: The cycle threshold (Ct)-based segregation of laboratory-confirmed positive cases along with contact tracing of all of them of previous 5 days has been found to be effective strategy and needs to be adopted for further management. The Ahmedabad model of COVID-19 control was practiced during 3rd week of June 2020 onwards. Following implementation, cases started declining in Ahmedabad district whereas it showed an increasing trend in rest of Gujarat where it was not implemented. Conclusions: Cases with low viral load may be quarantined at home with standard precaution whereas cases with higher viral load need to be quarantined in institutions (hospital or separate premises away from family).

Keywords: Ahmedabad model, COVID transmission, cycle threshold, infectivity, super-spreaders

Introduction

India has been witnessing a steady rise in the number of cases of COVID-19 where every day, large number of new cases get added up to the already existing burden in the country.¹ Till now there has been no sign of dwindling in the number of cases. From the current scenario, it is impossible to predict exactly when it will reach the plateau stage and eventually decline. At the moment, it seems to be an unlikely circumstance unless an effective vaccine or drug is made available. Various models of COVID-19 trend and management have been put forward by different researchers yet no estimate has yet turned out to be close to the reality.

Officials had claimed that increasing the number of tests would have helped control the epidemic.²,³ Yet they couldn't provide with any effective strategy for reducing new infections that will help us reach the plateau of the national epidemic curve due to COVID-19. It was observed through several survey results that a small percentage of the people of the country have developed herd immunity as they were not aware of their infections. So, controlling through reaching an adequate amount of herd immunity is a remote possibility. Hence, we need to concentrate on some effective public health strategy which is already established (as evidenced by data) such as the Ahmedabad Model for control of COVID-19.⁴,⁵ It appears, if we further delay in
taking actions about it or if we turn a blind eye on it, cases will keep on increasing exponentially, resulting in high mortality and morbidity; and the country will eventually have to pay a heavy price due to lack of an effective action taken by us.

**Materials and Method**

Recently, one public health research institute based in Ahmedabad had established and suggested a public health control strategy of COVID-19 infections based on their pilot research work.[4,5] The strategy stresses upon the rationality that, the viral load could be an important determinant in spreading infections in the community. Individuals with high viral load are super-spreaders - they take the centre stage in person to person transmissions of coronavirus. This appears to be true as similar observations (few people spread most and most people spread few) were also made during severe acute respiratory syndromes (SARS) epidemics.[6] The same nature of super-spreading events had also been observed in epidemic caused by COVID-19.[7] It has been estimated that 10% of all those infected with SARS-CoV-2 are responsible for spreading 80% of all local transmissions.[8]

It was suggested in the Ahmedabad model that cycle threshold (Ct)-based segregation of laboratory-confirmed positive cases to be adopted for home quarantine, institutional quarantine and hospitalization based on symptomatology. Moreover, the contact tracing of the previous 5 days of the cases with higher viral load (high & moderate) is to be done rigidly considering the fact that transmission starts on an average 4 – 5 days prior to first appearance of symptoms. People with low Ct value have high viral load and vice versa. Hence, Ct value of initial viral load of already diagnosed cases mandatorily be mentioned in each individual report for further management.

Ahmedabad is one of the fastest growing cities and the former capital of the Indian State of Gujarat. It is the largest city of the state and one of the richest cities in the country, housing a population of 56,33,927 as per Census India of 2011.[9] Once upon a time Ahmedabad district including Ahmedabad city was the largest contributor of Gujarat state COVID cases. But cases started declining visibly following implementation of viral load/Ct-based segregation and management following adoption of it by Government of Gujarat as per suggestion of ICMR-National Institute of Occupational Health on experimental basis.[5] It may be noted that it was restricted to Ahmedabad district only initially to assess its impact. There was a plan to implement it all over Gujarat state if proved to be effective.

**Result**

As of July 7, 2020, even though the number of new cases in Gujarat was a record-breaking 778 yet number of new cases in Ahmedabad district was 187. Ahmedabad city alone witnessed a total case of less than 200 cases on 30 June, which happens to be the lowest in the past 60 days as per press release in a city-based newspaper.

Figures 1 and 2 represent the data[10] of the new cases detected daily both in Ahmedabad district (that includes Ahmedabad city too) where the said model was implemented and the same in rest of the Gujarat state leaving Ahmedabad district where the model was not implemented. From the graphical representation, the continuous decline in cases - both in absolute number of daily cases as well in the trend (indicated by the dotted line) is evident. Following was the picture of daily reported cases of Ahmedabad district from 10 June till 7 July. The district includes both Ahmedabad city and its adjacent rural area.

This model of COVID-19 control was implemented on 3rd week of June, resulting in continuous decline in the number of new cases in Ahmedabad district. But that was not the case when it came for the rest of the state of Gujarat where the new cases were still rising and the said model of control was yet to be implemented. The rising trend of COVID-19 infections in Gujarat (barring Ahmedabad district) is similar to that in other states with huge disease burden such as Maharashtra, Delhi, Tamil Nadu.

**Discussion**

Since the country is struggling to find some suitable strategy for containment of epidemic caused by COVID 19, Ahmedabad model could be an effective model for its containment. Strategy adopted in it based on some scientific approach, which is biologically plausible as the same holds true for other infectious diseases too. This model of management does not add any extra cost over the existing health care delivery practices for managing COVID 19 cases. In it, Ct value obtained from the RT-PCR machine needs to be mentioned on the test report for indicating high, moderate & low viral load just to assess the transmissibility of already detected cases. On the contrary, it has some extra added benefits. For instance, if the health care personnel are aware who all the patients with high viral load are, they could take some extra precaution while dealing with the latter - thereby reducing the chances of infection among the health
care providers. Duration of exposure to the super spreaders can be minimized by changing duty shifts of the doctors, nurses and housekeeping staff alternately with patients having low viral load keeping them in a separate ward. Asymptomatic patients with higher viral load, if any, may need close observation in an institutional quarantine set up as it was reported that few asymptomatic cases collapsed suddenly and some even died - the cause of which remain unexplored. Home quarantine with higher viral load is expected to facilitate intra-familial transmission of COVID cases, hence not suggested. On the other hand, same with low viral load may be quarantined at home. Presently COVID epidemic is largely concentrated on cities & urban areas that are gradually approaching towards rural areas through population movement. More number of rural population will become infected in coming days since 60 to 70% of our country’s population reside in villages. Considering above, primary health care physicians must prepare themselves on Ct value - based segregation of COVID 19 infected cases with contact tracing of high viral cases of previous five days to reduce transmission of cases in the community. This will also reduce hospitalisation of cases & deaths and help improving bed availability, thereby better utilisation of public health infrastructure would be possible. Extensive community awareness about prevention & control of COVID 19 infection along with role of viral load/ Ct value is essential for that. If we assume that it would reduce at least 50% burden of the cases in the country over a period of another couple of months following implementation with visible declining trend after few weeks, it needs to be implemented as early as possible for the interest of the nation. Once implemented and system is in place, we may expect some positive changes in the health sector with respect to COVID-19. In the said situation, Ahmedabad model of COVID-19 control may be the light at the end of the tunnel which we better follow to bring the situation under control as it is a proven effective strategy.

**Summarizing the Key Points**

1. Viral load indicated by Ct value could be used as an indicator of infectiousness of an infected person
2. Ct value based segregation along with contact tracing of previous 5 days appears to be an effective strategy as was observed in Ahmedabad Covid infection Control programme
3. Health care workers need to know their patients’ Ct value on admission to hospital/health centre to enable them to remain more careful about the transmission potential of patients
4. Effective implementation of it in primary health care set up would better utilise country’s rural public health infrastructure
5. Finally, Ahmedabad COVID control model may be implemented in the entire country as a proven and effective strategy for COVID control
6. Ultimately, Ct value could be used for better management of epidemic caused by COVID 19 infection

**Key messages**

In the absence of an effective vaccine segregation of COVID-19 patients as per Ct threshold is an effective strategy for control of COVID infection.

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**Conflicts of interest**

There are no conflicts of interest.

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