

Original Research Article

Role of active and passive surveillance in early case detection and prevention of disease spread in COVID-19 pandemic: our experience

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ABSTRACT

Background: Strong surveillance systems which include both active and passive surveillance are the important steps to halt a disease outbreak by early case detection and management, which helps in breaking the chain of transmission. The main aim of this article is to share our experience regarding the active and passive surveillance done during COVID 19 spread in the year 2021.

Methods: The early case detection of COVID 19 cases through active and passive surveillance was slightly different from the usual methods that are carried out for regular known communicable diseases. Active surveillance was done round the clock by screening of all vehicles entering the union-territory of Puducherry and by house-to-house survey. Passive surveillance was carried out by screening of various symptomatic patients attending to hospitals which needed motivation of health personnel as well as awareness among the general public.

Results: Out of 12 Govt. PHCs (3,30,000 population) where active and passive surveillance was conducted, the total number of individuals referred to designated COVID centre by active and passive surveillance is 30 and 110 respectively for COVID testing and further management.

Conclusions: Active and Passive surveillance plays a major role in early case detection and prevention of disease spread in COVID-19 pandemic.

Keywords: COVID-19, Pandemic, Active surveillance, Passive surveillance

INTRODUCTION

COVID-19 is an infectious disease caused by the coronavirus, SARS-COV-2, which is a respiratory pathogen. This virus was first identified from a case in Wuhan, the People's Republic of China on 31 December 2019.¹ On January 30 2020, WHO declared COVID-19 a public health emergency of international concern, and on the same day India reported its first COVID-19 case in the state of Kerala. On March 11 2020, WHO declared it as a pandemic. In less than 3 months it affected millions of people and caused countries to shut down public life and business which led to the implementation of public

health measures throughout the world. One of the important steps to control the spread of pandemic is early case detection and thereby breaking the chain of transmission which can be achieved by strong surveillance systems which include Active and Passive surveillance.²

Active surveillance means that the health staff reach out to the community and systematically screen the population to find out the symptomatic individuals. It provides the most accurate and timely information. It helps to detect the cases early and break the chain of transmission. But it is also expensive.³

Passive surveillance means, the case detection triggered by patients seeking care for their illness from clinicians working in static health facilities. Clinicians who detect the case should notify to the appropriate epidemiological surveillance system. It is a relatively inexpensive strategy to cover large areas.⁴

As on 4/1/2022, the number of COVID-19 cases.⁵⁻⁸

Aims and objectives

The main aim of this article was to share our experience regarding the importance of active and passive surveillance in early case detection of Covid-19 and control of the spread of the pandemic.

METHODS

Study design

The study design was population-based cross-sectional study.

Study population

Population under 12 Government PHCs (Murugapakkam, Muthialpet, Reddiarpalayam, Mannadipet, Mettupalayam, Mudaliarpet, Kalapet, Thirukanur, Villianur, Kosapalayam, Lawspet, Koodapakkam).

Inclusion criteria

All residents in the above-mentioned area were included in the study.

Exclusion criteria

Patients under home isolation were excluded from the study.

Study period

The study was conducted from August 2020 to October 2020.

Study procedure

Our team has conducted active and passive surveillance in the field practice areas of 12 Govt. PHCs under Puducherry Government.

Active surveillance was carried out by house-to-house survey and border screening of all vehicles entering into Union Territory of Puducherry. A House-to-house survey was conducted with the help of ANM and ASHAs in the respective PHCs (Figure 1). Individuals in the houses were screened for fever with a thermal scanner and also screened for other symptoms (cough, cold, loss of taste,

loss of smell, high-risk contact of COVID-19 patients) suggestive of COVID-19. The symptomatic patients were referred to a concerned health facility for testing and further management and the rest of the individuals in the houses of symptomatic persons were advised for home quarantine. Their details were given to ANM and ASHAs for follow-up.

Passive surveillance

Passive surveillance was carried out by screening of patients attending to 12 Govt. PHCs (Figure 2). COVID-19 symptomatic patients were referred to a higher center for testing and further management. Referred patients' details were given to medical officers for follow-up.

RESULTS

The total number of Individuals screened for Active surveillance is 2545 and the total number of Individuals identified with fever in active surveillance is 2, individuals identified with other symptoms suggestive of COVID-19 in active surveillance is 25, and the total number of individuals referred for testing in active surveillance is 5, and 12 individuals advised for home quarantine (Table 1).



Figure 1: House-to-house survey, with the help of ASHA.

Active surveillance

The total number of passengers screened for Active surveillance by the round-the-clock screening of all vehicles entering the Union-territory of Puducherry is 39,028. Total number of individuals identified with symptoms suggestive of COVID-19 and referred for testing is 25 (Table 2).

The total number of Individuals screened for passive surveillance is 4589 and the total number of Individuals identified with fever in passive surveillance is 37,

individuals identified with other symptoms suggestive of COVID-19 is 144, and the total number of individuals referred for testing in passive surveillance is 110, and 124 individuals advised for home quarantine (Table 3).



Figure 2: Passive surveillance of patient attending to Govt. PHC.

Table 1: House-to-house survey.

The total number of individuals screened	2545
Individuals identified with fever	2
Individuals had other symptoms suggestive of covid-19	25
Individuals referred for testing	5
Individuals advised for home quarantine	12

Table 2: Border Screening of passengers under active surveillance.

Total number of vehicles	17,039
Total number of passengers screened	39,028
Passengers identified with Covid-19 symptoms	25
Referred to concerned health facility	25

Table 3: Passive surveillance of patients attending to Govt. PHC.

Total number of individuals screened	4589
Individuals identified with fever	37
Individuals had other symptoms suggestive of covid-19	144
Individuals referred for testing	110
Individuals advised for home quarantine	124

DISCUSSION

Surveillance is important in early case detection and prevention of disease spread in the COVID-19 pandemic by appropriate quarantine measures. A study conducted by Honzao et al showed that nearly half of the confirmed COVID-19 cases in the Pudong New Area in China were

detected through active surveillance measures. Large proportions of potentially exposed individuals and close contacts were identified and quarantined before the development of symptoms. On average, quarantine was initiated 1 day before the onset of illness among potentially exposed individuals and 0.5 days before the onset of illness among close contacts.⁹ In our study also we have identified the high-risk contacts and advised for quarantine before the development of symptoms. Another study conducted by Shielei et al developed a Susceptible, Un-quarantined infected, quarantined infected, Confirmed infected (SUQC) model. They have applied this model for daily released data of the confirmed infections to analyze the outbreak of COVID-19 in Wuhan, Hubei (excluding Wuhan), China (excluding Hubei), and four first-tier cities of China. They found that, before January 30, 2020, all these regions except Beijing had a reproductive number $R > 1$, and after January 30, all regions had a reproductive number $R < 1$, indicating that the quarantine and control measures are effective in preventing the spread of COVID-19.¹⁰ Our study also shows similar results that the cases have been identified early and prevented disease spread by identification of symptomatic patients through active and passive surveillance. Zhaogjie et al applied containment strategy to an early-stage epidemic in a geographically limited area, taking measures that prevent person-to-person transmission of SARS-CoV-2 and importation and exportation of infection. The core measures of a containment strategy are proactive finding and managing cases, tracing and quarantining close contacts, and strict restriction or control of population movement when feasible and appropriate. They estimated that this containment effort had not been done, the number of COVID-19 cases would have been an estimated 67-fold higher than they have been thus far. Integration with Nonpharmacological interventions served to strengthen and accelerate the effect of detection, isolation, tracing, and quarantine. Suspending intracity public transport, closing entertainment venues, and prohibiting mass gatherings were also associated with reductions in case incidence.¹¹ Our study also we have followed the containment measures like home quarantine for high-risk contacts. Another study conducted by Zongbin et al analyzed the first 100 COVID-19 patients in Singapore to determine the effectiveness of the surveillance and containment measures. COVID-19 patients were classified by the primary means by which they were detected. Application of the case definition and contact tracing identified 73 patients, 16 were detected by enhanced surveillance, and 11 were identified by laboratory testing and they also found that Rapid identification and isolation of cases, quarantine of close contacts, and active monitoring of other contacts have been effective in suppressing expansion of the outbreak and have implications for other countries experiencing outbreaks.¹² In our study, we have identified 233 high-risk contacts through these surveillance activities and referred 140 individuals for laboratory testing for COVID-19. Joel hellewell et al developed a stochastic

transmission model, to quantify the potential effectiveness of contact tracing, active case finding, and isolation of cases at controlling a severe acute respiratory syndrome coronavirus 2. They found that highly effective contact tracing and case isolation is enough to control a new outbreak of COVID-19 within 3 months. They also suggested that this model can be modified to reflect updated transmission characteristics and more specific definitions of outbreak control to assess the potential success of local response efforts.¹³

Limitations

As our study was a population-based cross-sectional study, we screened the patients only one time, not in a continuous manner. So, there was a chance to miss the cases, who turned symptomatic, after the day of surveillance. The stigma and fear associated with Covid-19 during the pandemic acted as a barrier at times in the process of active surveillance as the public didn't respond and were not willing to come forward to answer the health care workers and co-operate with them. Symptomatic and referred patient's details were given to medical officers, ANMs and ASHAs but we didn't follow up with them about those patient's status for further isolation and quarantine measures.

CONCLUSION

Active and Passive surveillance plays a major role in early case detection and prevention of disease spread in the COVID-19 pandemic by early identification of symptomatic patients and appropriate quarantine measures, which needed the motivation of health personnel as well as awareness among the general public.

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