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## **FACTORS INFLUENCING THE RISE OF COVID-19 CASES IN TAMILNADU SINCE ITS OUTBREAK**

**ANU ISWARYA JAISANKAR<sup>1</sup>, A.S.SMILINE GIRIJA<sup>2\*</sup> AND D.EZHILARASAN<sup>3</sup>**

- 1:** Department of Microbiology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai, Tamilnadu  
- 600077, India
- 2:** Department of Microbiology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai, Tamilnadu  
- 600077, India
- 3:** Department of Pharmacology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences [SIMATS], Saveetha University, Chennai, Tamilnadu  
- 600077, India

**\*Corresponding Author: E Mail: Dr. A.S.Smiline Girija: [smilinegirija.sdc@saveetha.com](mailto:smilinegirija.sdc@saveetha.com)**

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### **ABSTRACT**

This review gives an overview on the rise of covid cases in Tamilnadu since its outbreak and the factors underlying the increase in the number of cases. More than 35 articles and official daily media Bulletins put forth by the Ministry of Health and Family Welfare Department of Government of Tamilnadu dated until May 31, 2020 had been reviewed for the construction of the article. The articles had been searched with the help of search engines like Google scholar, Pubmed, Biorxiv and Chemrxiv. As it is a review article, no approval was required for its publication. As of May 31, 2020, 4,91,962 samples were tested with 9,400 active cases, 12,757 recoveries with 173 deaths. Each and every district in the state were classified into hotspot, non hot spot and green zone classification as per the criteria given by the Government. As of May 16,

the only Green zone area was Krishnagiri. The article has provided a compiled data of the number of active cases, overall positive cases, testing facilities, testing rate, mortality and recovery rates till May 2020. This review also addresses on the various factors associated with the rise in the covid cases in Tamilnadu

**Keywords: Mortality Rate, Recovery Rate, Transmission Rate**

## INTRODUCTION

Covid 19 disease is a dreadful pandemic that has created terrorsome among the people all over the world. The virus, Severe acute respiratory syndrome coronavirus 2 (SARS - Cov 2) provincially called as the Novel coronavirus is responsible for this unfortunate biological disaster [1]. The outbreak was first identified in China on 31 December 2019, when health authorities in China had reported a cluster of viral pneumonia cases of unknown cases in Wuhan to the World Health Organisation [2]. The SARS CoV 2 viruses are a family of enveloped, single stranded, positive strand RNA viruses that are classified within the nidovirales order [3]. The virus is found to be zoonotic in origin and is thought to have spread from a seafood wholesale market in Wuhan, China [4]. Now, As of May 2020, the outbreak has spread tremendously and has affected more than 4.96 million people residing over more than 188 Countries and territories [5]. The death toll is reported to be more than 3,30,000 [6]. The SARS Cov 2 virus is not the first of its kind. Six other

corona viruses are known to cause human diseases [7]. Four of the viruses namely 229E, OC43, NL63 and HKUI cause common cold in humans [8]. Two other viruses SARS Cov and MERS virus cause fatal illness in humans. The SARS Cov virus had led to the Severe acute respiratory syndrome outbreaks in 2002, 2003 in Guangdong Province, China [9]. SARS-CoV virus had never been identified before 2002 [10]. SARS-CoV likely originated in wild bats [11]. Then they were known to spread to palm civets or similar mammals [12]. The virus then mutated and adapted itself in these animals until it eventually infected humans. SARS spread to over 24 countries until health authorities managed to contain it [13]. Nevertheless, between November 2002 to July 2003, there were 8,098 cases worldwide and 774 deaths [14]. SARS-CoV has been added to the National Select Agent Registry, which regulates the handling and possession of bacteria, viruses, or toxins that have potential to pose a severe threat to public health and safety [15]. The SARS

outbreak was controlled solely by following public-health measures, such as wearing masks, washing hands with soaps and sanitizers and isolating infected patients [16, 17]. Similarly, the first case of the Covid 19 Pandemic in India was reported on 30 January, 2020 which has got its origin from China [18]. The patients of Covid 19 infection suffer from fever, cough, dyspnoea, fatigue and tiredness [19]. The symptoms may get complicated to cause pneumonia and acute respiratory syndrome [20]. The patient may experience the symptoms from a range of two to fourteen days [21]. Currently there is no known vaccine or antiviral treatment available for the disease [22]. This makes the disease deadly. Primary treatment focuses on symptomatic treatment and supportive therapy [23].

Preventive measures such as washing the hands frequently with alcohol based hand washes and sanitizers, covering one's mouth while sneezing or coughing, wearing face masks and gloves in public settings, maintaining safe distance and self isolation of infected people are carried out by people across the world [24, 25]. Following the declaration of Covid 19 spread as a pandemic on 11th March 2020 by WHO, authorities worldwide have responded by implementing travel restrictions, lockdowns, workplace

hazard controls and facility closures [26]. Many countries have increased the testing facilities to enhance rapid testing of n-CoV cases [27]. The Pandemic has caused severe global, social and economic disruptions across the world which is reported to be the largest Global recession since the Great depression [28]. The current study aims at providing a detailed statistical data of n-CoV case raise in Tamilnadu, The mortality rate , recovery rate and the testing rate in Tamilnadu.

More than 35 articles and official daily media bulletins put forth by the Ministry of Health and Family Welfare Department of Government of Tamilnadu had been reviewed for the construction of the article. The articles had been searched with the help of search engines like Google scholar, Pubmed, Biorxiv and Chemrxiv. As it is a review article, no approval was required for its publication.

### **Covid-19 Pandemic: A brief Overview:**

The first case of Covid 19 pandemic in India was reported on 30 January, 2020 in Kerala [29]. The number of n-CoV cases rose to 3 by 3rd February. No cases were reported during the rest of the month. Then by 4th March, 14 new cases came to light [30]. Then the transmission began to escalate steeply during the month of March. Many cases were

reported in various states all across the country. All the cases were linked to people who had got travel history to the affected countries. As of May 20, The Indian Government had confirmed a total of 1,06,750 cases with 3,303 death toll and 42,296 recoveries [31]. India's case fatality rate is relatively lower at about 3.09% [32]. Like in other countries Covid 19 Pandemic has caused a great disruption to the economy of the country.

#### **Government measures to curb n-CoV-19:**

From 21st January, India began thermal screening of passengers from China. In the month of February, the screening was extended to almost all International passengers from affected countries. During the mid March 2020, the Indian Government had combined seven Ministries which included Home, Defense, Labour, Minority affairs, Aviation and Tourism together in order to deal with the worsening pandemic [33]. From March 3, 2020 travel restrictions were implemented. No new visas were issued. Indian Government had also suspended the already issued visas. On 24th March, Indian Government announced a complete Nationwide lockdown for 2 weeks. On 14th April, the Nationwide lockdown was extended till 3 May [34]. On May 1, the lockdown was extended till 17 May with

conditional relaxation to areas in which the spread has been controlled. All the education institutions were ordered to be closed till 31 July, 2020 [35]. All multiplexes, theaters, public areas are closed without the reopening date being announced. All the states were divided into 3 different zones namely red, orange and green based on the number and rate of spread of cases [36].

#### **Overview Of Covid 19 Pandemic progression in Tamilnadu:**

##### **Timeline of events in March:**

The first covid-19 case in Tamilnadu was reported on 7th March, 2020 from Kancheepuram with a travel history from Oman [37]. On March 9, The Ministry of Health and Welfare Department of the Government of Tamilnadu had issued their first Media Bulletin [37]. As of March 9, the total number of thermally screened International air passengers since February 2020 was about 1,31,793 [37]. Among them 1137 people were home quarantined and 5 were hospital quarantined. The samples tested since February accounted for 63 [37]. In which 58 samples turned negative, 1 turned positive and 4 were under process. Government had officially announced the first recovery of a covid patient of the state on March 13. Initially the sample testing was less and progressed slowly. March 17 marks

a slight progressive increase in the testing rate with 42 samples tested on a single day. The total sample testing crossed 150 on March 18. March 18 also marks the record of 2nd n-CoV case in Tamilnadu [37]. March 21 marks 6 new cases in the state [37]. On March 22, the state Government had officially activated the District level disaster management control room helpline number – 1077 [37]. On March 23, The state Government released the details of the n-CoV Patients for the first time. The first death of a n-CoV patient was officially announced on March 31. On the whole, At the end of March, Tamilnadu had crossed 100 Positive n-CoV cases, which included 6 recoveries and 1 death (**Figure 1**). Totally 2,09,288 passengers were screened till date. 77330 were home quarantined, 81 were quarantined in quarantine facilities and 630 were quarantined in hospitals. Total samples tested accounts to 2354 [37].

#### **Increase in mortality rate and recovery rates:**

On the first day of the month, 372 samples were tested with 234 overall positive n-CoV cases [38]. Of the 234 cases, 110 cases were from one cluster of people who attended the Tablighi Jamaat Religious Congregation Event in Delhi. As of April 1, overall affected people from a single event adds up

to 190. As of date, Tamilnadu had a provision of 3771 ventilators and 22,049 isolation beds. As of April 5, 2,10,538 passengers were screened. 10,814 people had completed their follow up and overall tested samples accounted for 4612 [38]. Tamilnadu crosses 500 positive n-CoV cases. 571 positive cases were reported till date with 522 cases belonging to a single cluster. The state government had about 19 testing laboratories as per the reports of April 7 [38]. By April 10 the number of recoveries increased to 44, with overall 911 positive cases which included the recoveries and deaths [38]. The number of positive n-CoV cases crossed 1000 cases on April 12. It was about 1074 with 50 recoveries and 11 deaths. The number of testing centers had been increased to 23 [38]. On April 20, the number of n-CoV cases crossed 1500 with 1520 overall positive cases which included all the recoveries and deaths till date. The number of testing facilities had also been increased to 33. We can see a proportionate increase in the testing rate. On the whole, The number of n-CoV cases had increased steeply in the month of April with 1035 active cases, 2323 overall positive cases, 1258 total recoveries and 27 deaths (**Figure 2**). Considering the infection and

transmission rate, there is a drastic spread of the infection in the month of April.

#### **Testing facilities and challenges:**

The State Government had increased the number of testing facilities to 46. The number of active cases increased to 1183 with 54 recoveries and 1 death reporting on the first day of the month [39]. For the first time a transgender in Tamilnadu reported positive for the virus on 2nd May, 2020. As of May 4, 1,62,970 samples were tested till date. There were about 527 new cases reporting for the day which was the highest till date. A large number of the cases were related to a common cluster of people linked to Koyambedu market complex, Chennai [39]. May 8 reports 600 new cases, 58 new recoveries and 3 deaths. Tamilnadu crossed 5000 active cases on May 10 which also marked the recovery of 1959 patients. There was a slight fall in the number of active cases on May 15, which reported 7435 active cases, 2599 recoveries and 71 deaths till date. The number of active cases reduced to 7219 on May 20 [39]. On the whole, as of May 31, 4,91,962 samples were tested with 9400

active cases, 12,757 recoveries, 173 deaths with 13,191 overall positive cases till date (Figure 3). The number of testing facilities had also been increased to 72. Of the 72 laboratories, 29 laboratories belonged to private sectors. Men were more affected than women and correlated with various earlier reports associated with the risk factors viz., smoking, and other co-morbidities. 14,065 men had tested positive for the infection. 8,259 women and 9 transgender were also tested positive. The number of Covid 19 suspected individuals in isolation ward admission were 6710 [39]. From the data, we can observe that the Rate of Recovery was as fast as the rate of spread. The mortality rate has also been considered as one of the lowest among the other states in the Country. Majority of the cases of n-CoV cases in Tamilnadu were from Chennai. Chennai being the most populous city of Tamilnadu was the worst affected with approximately half the reported positive cases. Unavailability of the rapid screening tests need to be addressed at the earliest with more sensitivity and specificity.

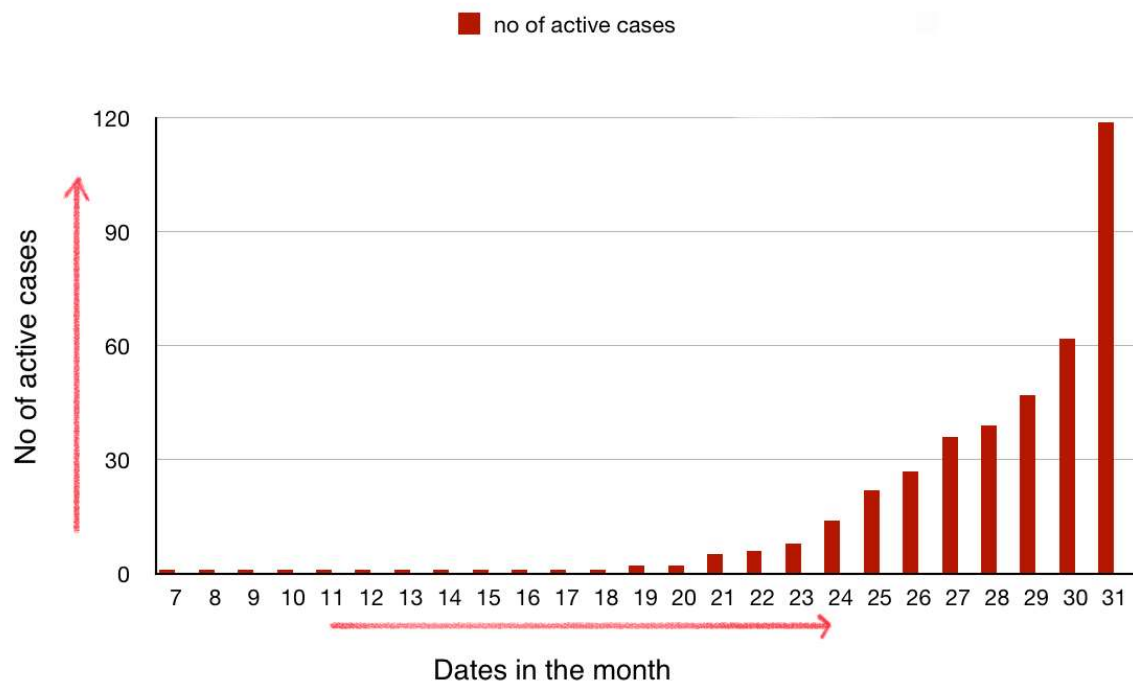


Figure 1: Number of active covid cases in Tamilnadu in the month of March, 2020

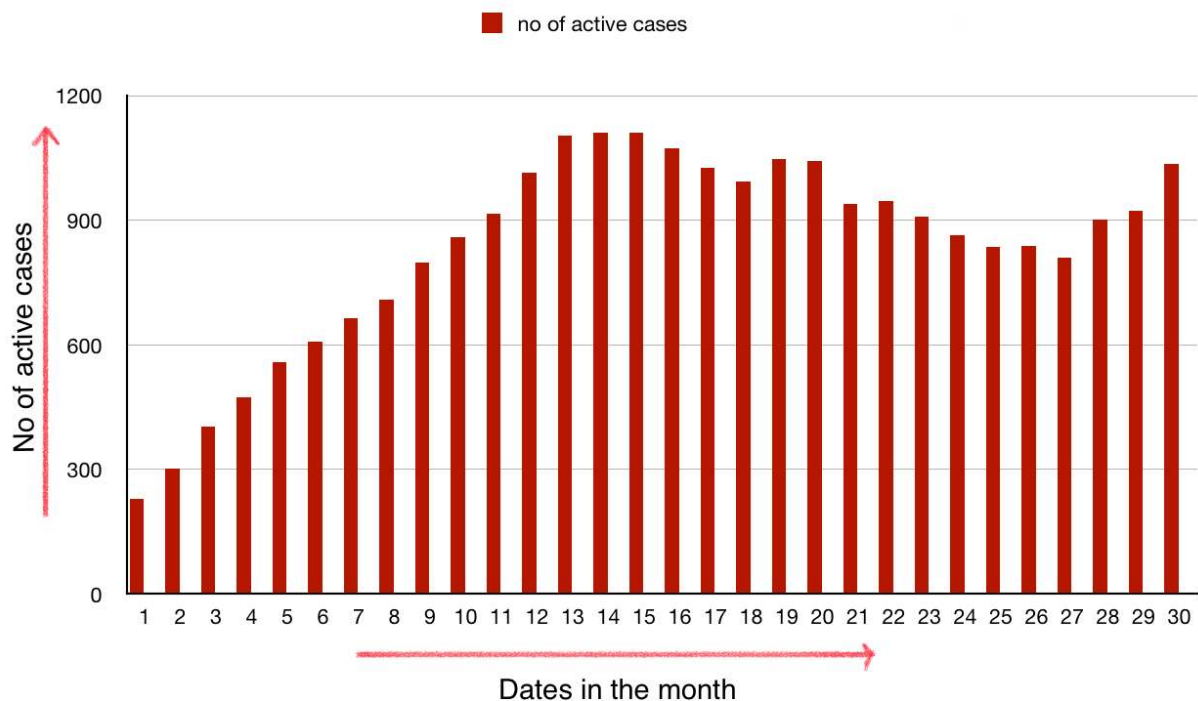


Figure 2: Increase in the number of covid cases in Tamilnadu in the month of April, 2020

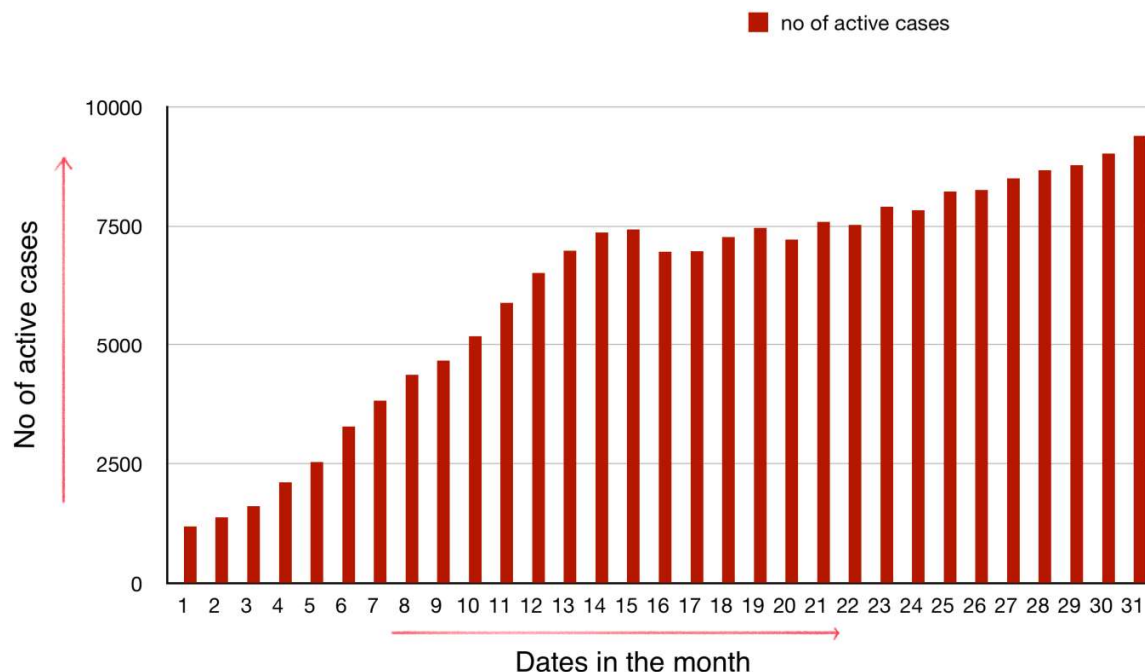


Figure 3: Rapid propagation of the covid cases in Tamilnadu as of May, 2020

### Criteria on the containment zones/hotspots-its limitations:

With the raising concerns on the rapid propagation and exorbitance in the mortality rate each and every district in the state were classified into hotspot, non hot-spot and green zone classification as per the criteria given by the Government. Hotspot districts that contribute to more than 80% of cases in the state or with doubling rates less than four days come under the red zone. Zones without new cases in the last 14 days are categorised under orange zone and non infected districts or previously classified as hotspot districts with no new cases in the last 28 days come under Green zones. Here is the list of zonal classification of districts in Tamilnadu as of

May 16. The Red zone areas were Chennai, Madurai, Namakkal, Thanjavur, Chengalpattu, Thiruvallur, Tiruppur, Ranipet, Virudhunagar, Thiruvarur, Vellore, Kancheepuram [39]. The orange zone areas were Theni, Tenkasi, Nagapattinam, Dindigul, Villupuram, Coimbatore, Cuddalore, Salem, Karur, Tuticorin, Tiruchirapalli, Tirupathur, Kanyakumari, Tiruvannamalai, Ramanathapuram, Tirunelveli, The Nilgiris, Sivagangai, Perambalur, Kallakurichi, Ariyalur, Erode, Pudukkottai, Dharmapuri [39]. The only Green zone area at that time was Krishnagiri [39]. Periodical lock-downs, and standard precautionary measures of social distancing, hand-hygiene, use of masks etc., were



implemented, however, we feel it ended in vain as there was no cooperation from the public and the infection started spreading in the community as well, but was not clinically evident as of now.

### **Reasons for the rapid spread of the n-CoV cases:**

Though the testing rate is high now, the initial testing laboratories and samples tested per day were very low that forms a reason for the increase in the number of active cases. Early detection of the infection can help in early isolation of the patients and can thus prevent contact spread. The Delhi event has contributed moderately to the rise in n-CoV cases during the month of April. The number of cases from the Koyambedu cluster occupies a primary role in the rapid spread of the disease and markedly contributes to the number of active cases. More awareness should be spread among the people of rural sectors. People should always maintain a proper social distance which can reduce the spread through contacts. As of May 31, There are about 72 testing laboratories in Tamilnadu. But still the number of testing facilities should be increased further and the Government should continue to take necessary plans to lift up the livelihood of the people and to bring life back to normal. As of 10th June, 2020 India's R0 value is steady at

1.22. As per the Guidelines provided by the Government, pregnant women, people of age above 65 years and existing comorbidities may stay at home unless there is an essential need or an health issue [40]. People should maintain at least 6 feet distance from one another in public settings. Always masks and gloves should be worn in public settings. Frequent touching of eyes, nose and mouth should be avoided. Frequent hand washing techniques should be followed even when the hands don't look visibly dirty. If using soap, hands should be washed for about at least 40 to 60 seconds. Alcohol based sanitizers can be used wherever feasible at least for 20 seconds. Respiratory etiquettes should be followed and spitting in a public setting is strictly prohibited [40].

### **CONCLUSION**

The review had highlighted the progression of coronavirus cases in Tamilnadu and tracked the timeline of events in the propagation of the infection since its outbreak till May 2020. The article also underpins the zonal classification of districts in Tamilnadu into hotspot, non-hotspot and green or unaffected zones. It also gave a compiled data of the number of active cases, overall positive cases, number of testing facilities, mortality and recovery rates. It has also discussed in brief, the reasons for the

increase in the number of n-CoV cases in Tamilnadu. Conclusively, we state that the disease can be controlled only by following the proper preventive measures implemented by the government in order to curb the menace of the covid diseases in Tamilnadu.

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#### **Author Contributions:**

Anu Iswarya Jaisankar, contributed to the data acquisition and drafting of the manuscript. Dr. A.S.Smiline Girija, contributed to the design, editing and critical revision of the manuscript. Dr. D.Ezhilarasan, contributed to the supervision and proof reading of the manuscript.

#### **Conflicts of Interest:**

The authors declare that there are no conflicts of interest

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