
Operations Research

COVID 19

Dynamics of COVID-19 transmission in Kerala



Department of Health & Family Welfare

Government of Kerala

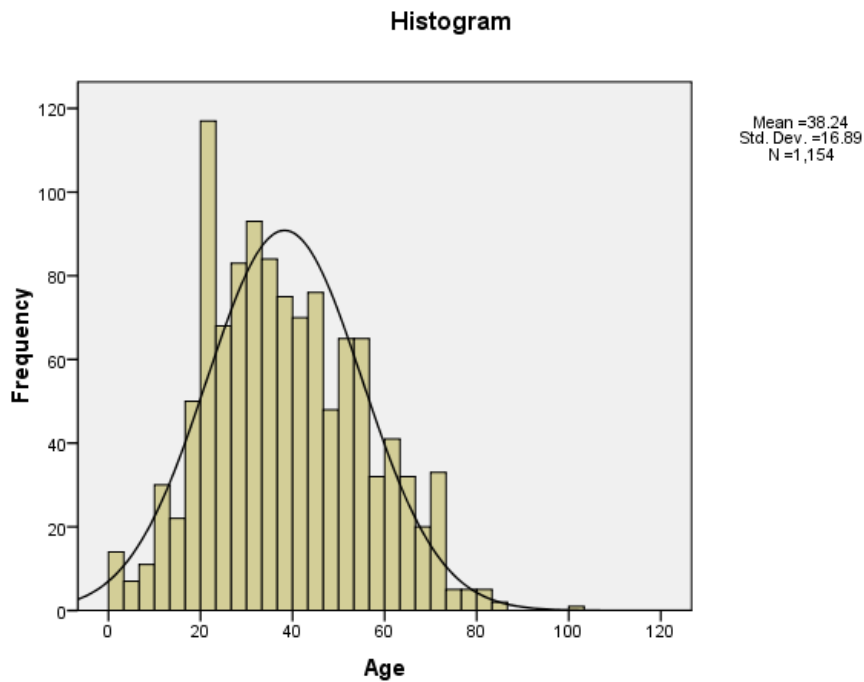
Dynamics of COVID-19 transmission in Kerala

Report on the Operations Research

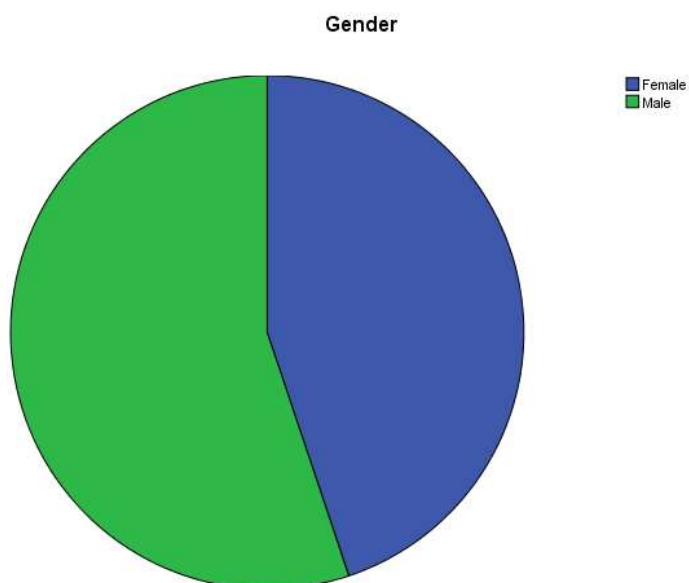
- 1. Background:** The first case of SARSCoV2 in India was reported from Kerala in January 2020. Kerala's epidemic curve touched baseline by the first week of May 2020; but with different phases of unlocking and influx from within and outside the country, the number of cases went up. At no point of time, the number of cases exceeded the management capacity of hospitals. The epidemic curve had plateaued off, beyond October 2020 and remained at that level for many weeks. In January 2021, further unlocking happened and many relaxations were announced such as reopening of schools(10th and 12th grades), cinema theatres. Post LSGD elections and following the relaxations in many social activities, an increase in the number of cases was observed in January 2021. A quick Operations Research was undertaken by the Dept of Community Medicine, Govt Medical College, Thiruvananthapuram and the report was presented in the Rapid Response Team Meeting. This was pertaining to the data on the third week of January. Using the same questionnaire, data pertaining to the period 1st December to 26th January 2021 was collected from a larger sample from all the districts through the District Surveillance Officers. This report combines the data from both the above.
- 2. Process:** Data was collected from those who tested positive between December 2020 and January 2021. A questionnaire was prepared to collect data on major variables related to transmission. Data was collected through telephonic interview of selected participants using the structured questionnaire.

3. **Results:** Data was collected from 1154 positive patients from all the districts in Kerala.

3.1. Baseline Characteristics: Mean age of the sample was 38.2 years (standard deviation 16.8 years) .



There were 637 males (55.2%) and 518 females (44.8%) among the participants.

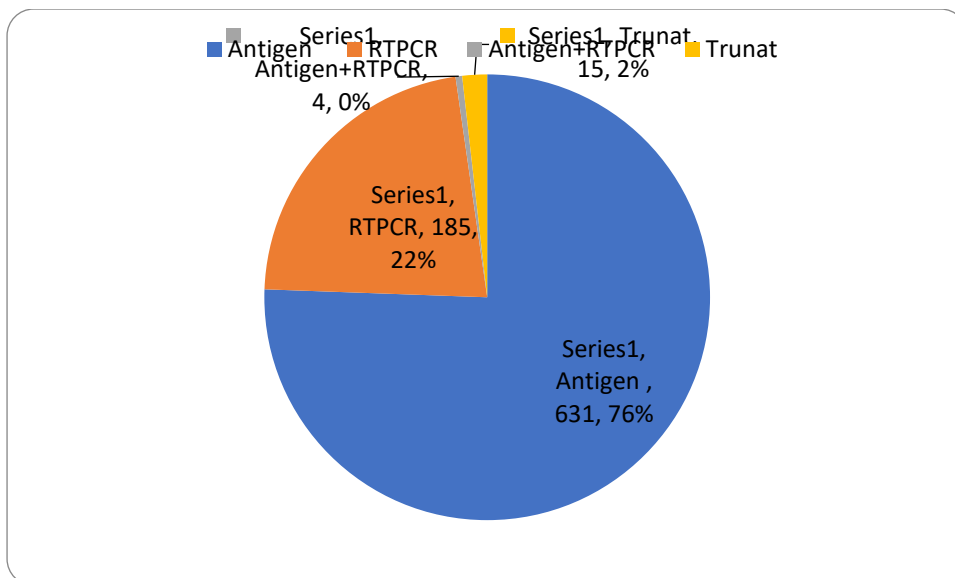


3.1.1 Baseline Characteristics- Comparison with the profile of COVID cases in Kerala:

Kerala: The total number of reported COVID cases in Kerala from 1st December to 26th January was 2,96,950. The proportion of males in December was 55% and in January, 53%. Hence the gender pattern of this random sample is comparable, with that of Kerala data. The age distribution of the state data shows that 18% is in 20-30 year age group, 18% in 30-40, 17% in 40-50 and 15% in the 50-60 year age group.

3.2. Type of Test done

Type of test	Number (n=835)	Percentage
Antigen	631	76%
RTPCR	185	22%
Antigen+RTPCR	4	0.5%
Trunat	15	2%



3.3. Patients symptomatic at the time of testing: 65.2% of the patients (698/1070) were symptomatic at the time when they had undergone testing, **while 34.8% did not have any symptom when they tested** (372/1070).

3.4. Contact with a positive COVID case: 71.7% of patients reported history of contact with a positive COVID case (812/1132), **while 28.2% did not report contact history with a positive case (320/1132), during the previous 7 days.**

Both the above observations are important in understanding the dynamics of COVID transmission, in Kerala, from the view of taking preventive interventions. And the Kerala data is comparable to the conclusions of reviews¹ which reported that approximately 40% to 45% of those infected with SARS-CoV-2 will remain asymptomatic. This is an important observation which highlights the importance of universal interventions such as wearing masks, since there is evidence that asymptomatic persons can also transmit SARS CoV -2.

3.5. Probable Source of Infection

To estimate the proportions related to the probable source of infection, we had responses from 727 participants. ***In majority of cases, transmission was reported from within households (57%). This was followed by workplaces (23%) and community gatherings (21%), such as visit to shops, restaurants, malls, political gatherings and playing together.*** This again is an important observation, because majority of our mild cases are under domiciliary treatment. Targeted interventions in workplaces should be another focus. So also, with the upcoming elections to the state assembly, it is very important that people and political parties adhere to COVID protocols by strict observance of social distancing and wearing masks properly, while participating in community gatherings

Probable source of infection	Number of participants (n=727)	Percentage
Household contact	411	56.5 %
Community-visit to a crowded shop/restaurants/malls/markets, playing together, political activities	150	20.6%

Workplace contact	166	22.8%
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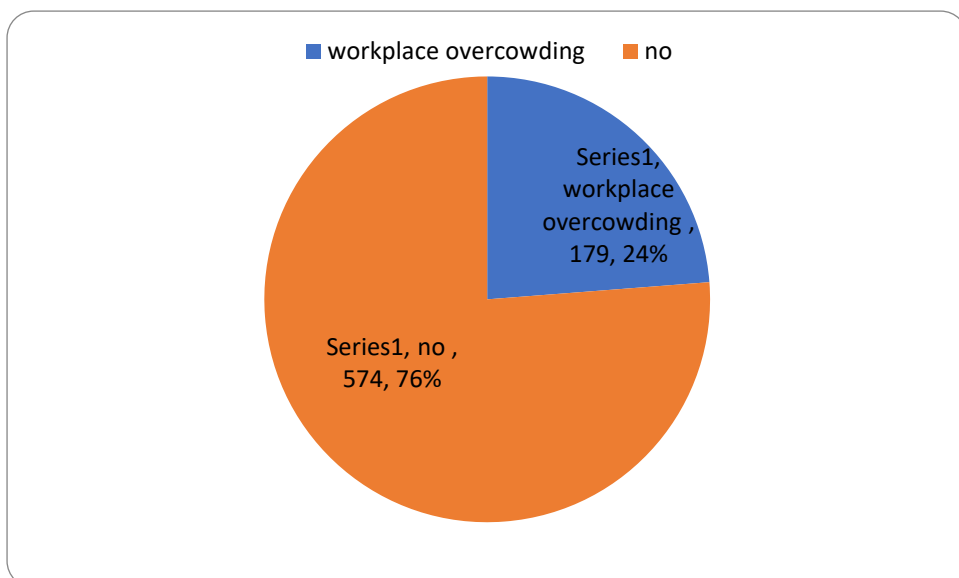
3.6. Adherence to preventive measures such as wearing masks and social distancing

Wearing masks and observing social distancing are the two most important preventive interventions. Among the COVID positives, the proportions of those who gave history of high risk behaviour are as follows

1. **Social distancing:** The operations research done among positive patients demonstrate that there was a non-adherence to social distancing in nearly half of them ($409/764=46.5\%$), when they interacted with a confirmed case.
2. **Wearing masks:** Nearly one third of patients ($263/778= 34\%$) gave history of the high risk behavior of not wearing the mask.

3.7. Workplace Environment

3.7.1. Overcrowding in workplace: Nearly one-fourth of the workplaces reported overcrowding



3.7.2. Air-conditioned environment: Out of the 747 positive patients, 107 (14.3%) worked in air-conditioned environment.

3.7.3. Visit to canteens in the workplaces: Among the COVID positive patients, 13.3%

(98/737) gave history of visiting a canteen or cafeteria in their work place during the previous one week.

3.8. Visit to hospitals during the previous 7 day period

Another important observation was that 22% (196/883) patients had history of visit to a hospital, during the past one week.

3.9. Use of public transport

Nearly one fifth of the patients (155/866=18%) gave history of travel in a public transport vehicle during the previous 7 days.

4. Interpretations and policy implications:

These observations also have policy implications in strengthening the measures for health literacy and behaviour change communication, institutional infection control and regulatory actions.

4.1. High Risk Behaviour: Nearly half of the patients **did not adhere to social distancing (47%)** and **one third did not wear masks(34%)**

- Strengthening IEC and regulatory measures

4.2. Majority of *transmission was reported from within households (57%). This was followed by workplaces (23%) and community gatherings (21%), such as visit to shops, restaurants, malls, political gatherings and playing together.*

- Strengthening IEC and supervision on household level precautions
- Targeted interventions in workplaces

- IEC and regulatory measures for adherence to COVID protocols by strict observance of social distancing and wearing masks properly, while participating in **community gatherings. This is very important in the context of upcoming** elections to the state assembly.

4.3. **Asymptomatic Transmission:** *Our data shows that 34.8% did not have any symptom when they tested and while 28.2% did not report contact history with a positive case during the previous 7 days.*

- **Universal Interventions must continue:** This data can be used in IEC to convince people to adhere to use of masks and social distancing, in public places.
5. **Limitations:** There was no comparison group ; hence risk estimates could not be done. This analysis is based on data pertaining to those who responded, hence there may not be enough sample for district-wise analysis and further granularity with generalisation.
6. **Future Plan:** In the context of the ICMR sero-survey reporting that the sero-prevalence in Kerala is 11%, there is a high proportion of vulnerable population. Kerala population being older than the rest of India and with high prevalence of Non-communicable diseases, achieving herd immunity by vaccination is the scientific alternative before Kerala; especially in the context of genetic variations reported. The results of ongoing sero-prevalence study and genetic epidemiology study will further provide robust data in planning. The fact that vaccination of a large enough population may take time and that it may not produce sterilising immunity highlights the need for quick operations researches to plan immediate interventions. A case control study is also being planned with a comparison group. Determinants of transmission of COVID in Kerala will be identified and risk estimates will also be presented.

Acknowledgement

The operations research is conducted by team of Doctors from PEID Cell MCH Thiruvananthapuram and Surveillance Unit of DHS, District Surveillance Officers and PG and UG students. The OR study was completed with the guidance from Dr P S Indu Prof and HoD Community Medicine Department MCH Thiruvananthapuram. The involvement of students stands out, as through this study not only the relevant subject is dealt with but also involving students in the study have given them experience. This approach of learning by doing will go a long way to equip students for the future.

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Prl Secretary H&FW

Govt of Kerala

References

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2. Govt of Kerala –COVID Dashboard

APPENDIX

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