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Contact Tracing Assessment of COVID 19 Transmissions In Bhopal District

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ABSTRACT

Introduction: Contact tracing is a central public health response to infectious disease outbreaks, especially in the early stages of an outbreak when specific treatments are limited. Current clinical and epidemiological data are insufficient to understand the full extent of the transmission potential of the COVID pandemic. The main advantages are that it can identify potentially infected individuals before severe symptoms emerge, and if conducted sufficiently quickly can prevent onward transmission from the secondary cases. Hence the study was undertaken.

Methodology: It was a cross-sectional study conducted by the Department of Community Medicine, Bhopal from 9th May to 30th June 2020.

Results: Out of 426 COVID positive patients, 54.93% were asymptomatic and 45.07% symptomatic. Fever was the most common presentation reported by the COVID positive patients. Mean incubation period was 4.68 ±2.63 days. Contact with COVID-19 positive cases was major source of infection identified. Only 9.86% patients had co-morbidity. Out of 10512 contacts traced, 66.65% i.e., 6902 samples were collected. Overall Positivity rate was found to be 4.30%. The positivity of the advanced contact tracing is 2.42%.

Conclusion: Contact tracing is a highly effective and robust strategy if given sufficient resources.

Keywords: COVID-19, Contact tracing, positive cases, primary contacts, secondary contacts

INTRODUCTION

Contact tracing is a central public health response to infectious disease outbreaks, especially in the early stages of an outbreak when specific treatments are limited. Importation of novel corona virus (COVID-19) from China and elsewhere into the UK highlights the need to understand the impact of contact tracing as a control measure.[1] Contact tracing is the main public health response to importations of rare or emerging infectious disease like COVID-19.

India's Covid-19 containment protocol requires states "to identify contacts as early as possible for preventing spread of further transmission". The idea is to isolate such people as they could be infected too and possible carriers of the disease. The protocol laid down by the National Centre of Disease Control states: "Attempt should be made to identify all household members, social contacts, contacts at work place and contacts in health care settings who have had contact with a confirmed case anytime between two days prior to onset of symptoms and the date of isolation."[2] The Government also seems to have taken note. On June 7, the Union Ministry of Health and Family Welfare wrote to States and Union Territories asking them to ensure that the contacts within 72 hours of confirmation of infection. In reality, though, the National Centre of Disease Control guidelines, state that "equal emphasis must be given for low risk

contacts as they are potential source for transmitting the disease" [2]

Thus, contact tracing is the most important measure that States are undertaking to quickly identify and isolate cases. Yet there is large variation between States in the number of contacts of a positive person tested. Madhya Pradesh has been able to test i.e. 7.6% contacts/positive patients more than bigger States like Maharashtra and Delhi. [3] Efforts to curb infection rates, including testing and contact tracing, have varied across States as India doesn't have enough trained workers to do primary contact tracing and re-check those traced, or enough rapid response teams with doctors and epidemiologists who can confirm a positive case. Our focus has always been on testing rather than primary prevention. It's also true that when more than 30% of people are asymptomatic, contact tracing is a challenge. What we need now is secondary prevention—early diagnosis and treatment. [4]

"If well tracked, early introductions of an emerging pathogen provide a unique opportunity to characterize its transmission, natural history, and the effectiveness of screening. Careful monitoring of cases and low probability of infection from the general community enables inferences, important to modeling the course of the outbreak, that are difficult to make during a widely disseminated epidemic. In particular, we can make assumptions about when and where cases were likely to have been infected that are impossible when the pathogen is widespread."[5] Extensive contact tracing, isolating cases, and testing may reduce the spread of the novel corona virus, and favors control of the COVID-19 outbreak, suggests a study carried out in China.[6]

However, the researchers from the Harbin Institute of Technology at Shenzhen, China, caution that the impact of contact tracing to rapidly isolate people who could be infected with corona virus disease 2019 (COVID-19) depends on identifying asymptomatic cases.

Published in *The Lancet Infectious Diseases journal*, the study of 391 cases and 1,286 of their close contacts found that contact tracing reduced the length of time people were infectious in the community over 4 weeks in Shenzhen, China.[6]

Contact tracing and mass testing are two sides of the same coin, when there are less number of cases, contact tracing is an efficient method, but when there are more number of cases, mass testing is a better way. Increasing in testing is essential but testing should be done following a particular structure and method. It should be associated with contact tracing. Kerala, which achieved great success with its elaborate contact tracing strategy in the early stages of the pandemic, still swears by its benefits. Contact tracing is thus a highly effective and robust strategy given sufficient resources. The main advantages are that it can identify potentially infected individuals before severe symptoms emerge, and if conducted sufficiently quickly can prevent onward transmission from the secondary cases. With the coming of first case on 22nd April in MP cases began to soar high day by day. Looking into this scenario, Department of Community Medicine, Gandhi Medical College, Bhopal undertook to leverage the act of tracing, and identify the implications of early contact tracing for containment of a novel pathogen, using parameters for the novel corona virus (COVID-19). Current planning is focused on tracing of contacts of introduced cases, and rapid isolation of these cases and early initiation of treatment.

METHODOLOGY

It was a cross sectional study conducted by Department of Community Medicine, Gandhi Medical College, Bhopal from 9th May to 30th June 2020. The contact tracing was initiated with one case at a colony of Airport Road and thus gradually increased up to 10 cases per day as the cases increased. This study was made possible by the significant effort by Depts. of Community Medicine, Bhopal and District Administration, Bhopal and Commissioner Medical Education which involved 120 healthcare workers. All the cases were chosen from the list of positive cases made available by District authority. The cases were randomly selected and contact tracing was carried out of the identified case. Team of GMC consisting of faculty and PGs was identified for this activity. The purpose of the study was explained to the contacts and verbal consent was taken. The team then surveyed the house of the positive case and took detailed history as to how he/she contacted the infection, any travel history and found out the primary and secondary contacts of the positive case.

A contact is defined as anyone with the following exposures to a COVID-19 case, from 2 days before to 14 days after the case's onset of illness: being within 1 meter of a COVID-19 case for >15 minutes; Direct physical contact with a COVID-19 case; Providing direct care for the patients with COVID-19 disease without using proper protective equipment (PPE). [7] Primary contacts were the contacts of the index case that were mainly household contacts. Secondary contacts were those who came in contact with the primary contacts. Also advanced contact tracing was done of the secondary contacts. House to house survey in all four directions was done surrounding the positive case. Samples were taken from primary, secondary and

advanced contacts and sent to lab of Microbiology Department of Gandhi Medical College, Bhopal. Data was collected and entered in MS Excel and findings were analyzed. The study was approved by Institutional Ethical Committee of Gandhi Medical College, Bhopal.

RESULTS

Age distribution of COVID-19 positive patients was highest amongst 21-30 years. 65.02% of the COVID positive patients were males and 34.98% were females. Majority of the patients were Hindu i.e. 65.49% by religion. Majority of the positive cases were house wives i.e. 23.7%, followed by businessmen. Health care workers constituted of 6.5%. 22.3% were graduates.

Above table describes the health status of COVID positive cases. Out of 426 COVID positive patients, 54.93% were asymptomatic and 45.07% symptomatic. Fever was the most common presentation reported by the COVID-19 positive patients

Table 1- Demographic Profile of Covid-19 Positive Cases

Variables	Cases (n= 426) (%)
Age (Years)	
< 10	10 (2.35)
Nov-20	33 (7.74)
21 - 30	109 (25.59)
31 - 40	84 (19.72)
41 – 50	77 (18.08)
51 – 60	67 (15.73)
>60	46 (10.79)
Sex	
Male	277 (65.02)
Female	149 (34.98)
Religion	
Hindu	279 (65.49)
Muslim	144 (33.08)
Christian	3 (0.7)
Occupation	
Unemployed	17 (3.99)
Student	43 (10.09)
Housewife	101 (23.71)
Driver	25 (5.87)
Private job	49 (11.5)
Business	58 (13.62)
Vendor	36 (8.45)
Police	15 (3.52)
Govt. Job	39 (9.15)
Health care worker	28 (6.57)
Retired	15 (3.52)
Education	
Illiterate	82 (19.25)
Primary	77 (18.08)
Middle	92 (21.6)
High secondary	80 (18.78)
Graduate	63 (14.79)
Post graduate	32 (7.51)

followed by cough and body ache. Majority of the symptomatic COVID-19 positive patients developed symptoms within 4.68 ±2.63 days from the contact of the patients. Contact with positive cases was major source of infection identified. Only 9.86 % COVID-19 positive patients had co morbidity.

Above table shows the contacts of COVID-19 positive patients. 42% were primary or household contacts and 58% were secondary contacts.

Table 2- Health Status of Covid 19 Positive Patients Traced

Variables	Cases (n= 426) (%)
Clinical Presentation	
Symptomatic	192 (45.07)
Asymptomatic	234 (54.93)
Presenting Symptoms	
Fever	130 (67.7)
Cough	64 (33.3)
Body Ache/Head Ache	20 (10.4)
Breathlessness	18 (9.4)
Sore Throat	13 (6.8)
Chest Pain	8 (4.2)
Anosmia	7 (3.6)
Co-Morbidity	
Yes	42 (9.86)
No	384 (90.14)
Possible Source of Infection	
Contact With Positive Case	176 (41.3)
Visit To Hospital/Health Care Facility	44 (10.3)
Travel History	39 (9.2)
Work Place	38 (8.9)
Kirana Store	29 (6.8)
Vegetable Vendors	22 (5.2)
Health Care Workers	14 (3.3)
Milk Vendors	10 (2.3)
Medical Stores	4 (0.9)
Religious Places	3 (0.7)
Banks/ATM	2 (0.5)
Battalion/Policeman/ Media	3 (0.7)
Social Ceremony	2 (0.5)
Market Place	16 (3.8)
Unknown Source	24 (5.6)

Table 3- Distribution of Covid-19 Positive Patients According to Their Contacts Traced

Contacts Traced	Contacts (%)
Primary contacts	4412 (41.97)
Secondary contacts	6100 (58.03)
Total contacts traced	10512 (100)

Table 4- Positivity Rate of Primary & Secondary Contacts

Risk Category	Contacts (%)	Positive	Positivity
High risk	3266 (47)	244	7.47
Low risk	3636 (53)	53	1.46
Total	6902 (100)	297	4.30

Out of 10512 contacts traced, only 6902 samples were collected. Remaining samples were not taken either due to unavailability of the contacts, fear factor, or refusal for testing. Out of 6902 samples collected, 53% of the samples were low risk out of which the positivity rate was 1.46% followed by 47% of the samples which were high risk and the positivity rate was 7.47%. Overall Positivity rate amongst the primary and secondary contacts was found to be 4.30%. The positivity of the advanced contact tracing is 2.42%

Consent form

Namaste, we have come from Dept. of Community Medicine, Gandhi Medical College, Bhopal. COVID-19 pandemic is spread all across the country. COVID-19 is an infection caused by corona virus. A person contacts this infection if he/she gets in contact with a COVID-19 positive case in close proximity for more than 15 minutes. We are doing contact tracing of COVID-19 patients in Bhopal city. We have got your name from the list of positive cases from District Administration. Please tell us about the details of your contacts whom you have met 2days before you got yourself tested. And provide us the information regarding the health status through which we will be able to help you out for immediate treatment and isolation facility.

DISCUSSION

The effectiveness of isolation and contact-tracing methods hinges on two key epidemiological parameters: the number of secondary infections generated by each new infection and the proportion of transmission that occurs before symptom onset.[8] In addition, successful contact tracing and reducing the delay between symptom onset and isolation are crucial, because, during this time, cases remain in the community where they can infect others until isolation.[9,10] Transmission before symptom onset could only be prevented by tracing contacts of confirmed cases and testing (and quarantining) those contacts. Cases that do not seek care, potentially because of subclinical infection, are a further challenge to control. If COVID-19 can be controlled by isolation and contact tracing, then public health efforts should be focused on this strategy; however, if this is not enough to control outbreaks, then additional resources might be needed for additional interventions.

In a study by Ramanan Laxminarayan et.al, Risk of transmission from an index case to a close contact ranges from 2.6% in the community to 9.0% in the household and does not differ significantly with respect to the age of the index case. Infection probabilities ranged from 4.7-10.7% for low-risk and high-risk contact types, respectively. This study found high prevalence of infection among children.[11] Another study by Stein brook R et al., has important messages for the control of COVID-19 throughout the world. First, people with COVID-19 were found to be most infectious to others before and within 5 days of symptom onset. Within 5 days of symptom onset, the attack rate was 1.0% (95% CI, 0.6%-1.5%). With exclusive pre-symptomatic exposures, the attack rate was 0.7% (95% CI, 0.2%-2.4%), and with exposures 6 days or more after symptom onset, there were 0 cases from 852 contacts (95% CI, 0%-0.4%).[12]

In a study by Abraham et al., 2020, the proportion of positive cases was highest among symptomatic and asymptomatic contacts, 2-3-fold higher than among those with severe acute respiratory infection, or those with an international travel history or healthcare workers. The attack rate (per million) by age was highest among those aged 50-69 yr (63.3) and was lowest among those under 10 yr (6.1). [13]

We found that SAR varies widely across countries with lowest reported rate as 4.6% and highest as 49.56%. [14]

CONCLUSION

The study has important messages for the control of COVID-19 in Bhopal This study ascertains high prevalence of infection amongst young population (21-30 years) of contacts traced, which signifies that younger population are more mobile and hence more exposed.

Risk of transmission from a positive case to contacts ranges from 7.47% in high risk contacts and 1.46% in low risk contacts, whereas overall positivity rate is 4.30%.

Almost 54.5% of COVID -19 patients were asymptomatic The finding that these asymptomatic people and those with minimal or fewer symptoms early in infection are those most likely to transmit COVID-19 strongly argues for maintaining social distancing and having people wear face masks to reduce the potential for transmission.

On tracing the source of infection revealed that contact with a positive case was the major source. Co-morbidity was found in 10% of cases.

Our study findings showed that secondary attack rate of high-risk cases was 5.53% and low risk cases were 0.86%. Positivity rate for advanced contact tracing was 2.42%.

Above findings underscore the pressing public health need for accurate and comprehensive contact tracing and testing. Testing the people who are

symptomatic will miss many infections and render contact tracing less effective.

Thus, contact tracing in Bhopal helped in acquainting to understand the transmission dynamics of the Corona virus, timely testing and quickly and comprehensively reporting of the results and proactively and rapidly responding to COVID-19 pandemic in the city.

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REFERENCES

1. Keeling MJ, Hollingsworth TD, Read JM. Efficacy of contact tracing for the containment of the 2019 novel coronavirus (COVID-19). *J Epidemiol Community Health*. 2020;74(10):861-866. doi:10.1136/jech-2020-214051
2. https://scroll.in/article/967223/covid-19-as-cases-surge-in-india-most-states-abandon-contact-tracing
3. https://www.indiatoday.in/diu/story/is-india-failing-the-contact-tracing-test-in-its-battle-against-coronavirus-1683969-2020-05-31
4. https://www.livemint.com/news/india/india-slackens-contact-tracing-as-country-opens-up-11591709082961.html
5. The Lancet Infectious Diseases journal on line on April *27, 2020* ... M3 India news desk May 08, 2020. A AA
6. Chinese study suggests contacting tracing, isolating and testing can control the spread of Corona virus Press April 29, 2020 08:27:23 IST ,The Lancet Infectious Diseases Journal https://www.firstpost.com/health/chinese-study-suggests-contacting-tracing-isolating-and-testing-can-control-the-spread-of-coronavirus-8310361.html
7. Contact tracing in the context of COVID-19 Interim Guidance 10 May 2020 by WHO (WHO/2019-nCoV/ Contact_Tracing/2020.1)
8. Fraser C, Riley S, Anderson RM, Ferguson NM. Factors that make an infectious disease outbreak controllable. Proc Natl Acad Sci USA 2004; 101: 6146–51.
9. Peak CM, Childs LM, Grad YH, Buckee CO. Comparing nonpharmaceutical interventions for containing emerging epidemics. Proc Natl Acad Sci USA 2017; 114: 4023–28.
10. Klinkenberg D, Fraser C, Heesterbeek H. The effectiveness of contact tracing in emerging epidemics. PLoS One 2006; 1: e12.
11. Laxminarayan R, Wahl B, Dudala SR, Gopal K, Mohan B C, Neelima S, Jawahar Reddy KS, Radhakrishnan J, Lewnard JA. Epidemiology and transmission dynamics of COVID-19 in two Indian states. Science. 2020 Nov 6;370(6517):691-697. doi: 10.1126/science.abd7672. Epub 2020 Sep 30. PMID: 33154136.
12. Abraham et al., 2020 (ICMR) Laboratory surveillance for SARS-CoV-2 in India: Performance of testing & descriptive epidemiology of detected COVID-19, January 22 - April 30, 2020. Indian J Med Res. 2020 May;151(5):424-437. doi: 10.4103/ijmr.IJMR_1896_20. PMID: 32611914; PMCID: PMC7530445.
13. Shah K, Saxena D, Mavalankar D. Secondary Attack Rate of COVID-19 in household contacts: Systematic review [published online ahead of print, 2020 Jul 29]. *QJM*. 2020;hcaa232. doi:10.1093/qjmed/hcaa232
14. Steinbrook R. Contact Tracing, Testing, and Control of COVID-19-Learning From Taiwan. JAMA Intern Med. 2020 Sep 1;180(9):1163-1164. doi: 10.1001/jamainternmed.2020.2072. PMID: 32356871.