Contact tracing during COVID- 19 pandemic: Ahmedabad Rural

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ABSTRACT:- Introduction: COVID-19 is disease caused by the new corona virus that emerged at China in December, 2019. Identifying contacts and ensuring they do not interact with others is critical to protect communities from further spread. Thus, contact tracing will break the chain of disease transmission. Contacts are persons who exposed to a confirmed case anytime between 2 days before onset of symptoms and the date of isolation.

Objective: To assess social determinants of contacts in COVID-19 patients and to find out attack rate among those contacts.

Method: A case of COVID-19 from Ahmedabad rural was traced in this study. Department of Community Medicine BJMC has been carrying out the contact tracing of laboratory confirmed COVID-19 patients since March 2020 for Ahmedabad rural. BJMC notified for tracing of rural cases. After getting cases from state, telephonic interview was taken through patients or relative of patient for contacts of conformed cases. Data was entered in excel sheet provided for contact tracing.

Result: Total 9671 contacts were traced for 1817 COVID-19 positive cases. Out of 1817 cases, 1275 were males and 542 were females. Majority numbers of contacts belongs to 15-30 age groups and were from Dholka taluka. We found house hold contacts were 79.40 % and high risk contacts were 87%. Crude secondary attack rate was found 11.98%. Majority of contacts were found asymptomatic.

Conclusion: The contact tracing is key elements for prevention of COVID-19. This is highlighted in our study showing high secondary attack rate among the close contacts.

Key words: Ahmedabad rural, Attack rate, Contact tracing, COVID-19

I. INTRODUCTION

The global pandemic caused by Corona virus (COVID-19), a new genre of acute respiratory syndrome corona virus 2 (SARS-CoV-2), has become a global health concern for its unpredictable nature and lack of adequate medicines.[1]

The primary case of COVID-19 in Kerala India, which originated from China, was reported on 30 January 2020. [2] In Gujarat, the first two cases of the COVID-19 were confirmed on 19 March 2020 from Rajkot and Surat.[3]1st Case in Ahmedabad district was reported on 20th March 2020 in Sanand Taluka who returned from United Kingdom on 17th March 2020.[4]

What is contact tracing?

Contact tracing is a little like detective work: Trained staff interview people who have been diagnosed with a contagious disease to figure out who they may have recently been in contact with. Then, they go tell those people they may have been exposed, sometimes encouraging them to quarantine themselves to prevent spreading the disease any further.[5]

Contact tracing will break the chains of transmission of a communicable disease when systemically applied and is thus a necessary public health tool for controlling communicable disease outbreaks.[6]

WHO guidelines for contact tracing state that "At least 80% of latest cases have their close contacts traced and in quarantine within 72 hours of case confirmation". The US and European Centers for Disease Control and

Prevention also recommend contact tracing, but offer seemingly conflicting advice within the face of widespread transmission, when thousands of new contacts might have to be traced daily. Indeed, the US CDC states that "When a jurisdiction doesn't have the capacity to investigate a majority of its new COVID-19 cases, it should consider suspending or lowering down contact tracing". On the opposite hand, the European CDC advises that "Contact tracing should still be considered in areas of more widespread transmission, wherever possible, and in conjunction with physical distancing measures".[7]

Definition of contact[8]**:**

Contacts are persons who are exposed to a confirmed case anytime between 2 days before onset of symptoms (in the positive case) and the date of isolation (or maximum 14 days after the symptom onset in the case).

The contacts are categorized into high and low risk contacts by the District RRT.

High-risk contact
- Touched body fluid of the patient(respiratory tract secretions, blood, vomit, urine, feces; e.g. being coughed on, touching used paper tissues with a bare hand)
- Had direct physical contact with the body of the patient including physical examination without PPE
- Touched or cleaned the linens, clothes, or dishes of the patient.
- Lives within the same household as the patient
- Anyone in close proximity (within 1 meter) of the confirmed case without precautions.
- Passengers in close proximity (within 1 meter) in a conveyance with a symptomatic person who later tested positive for COVID-19 for more than 6 hours.

Low-risk contact
- Shared the space (worked in same room/similar) but not having a high-risk exposure to confirmed case of COVID-19.
- Shared the same • Travelled in same environment (bus/train/flight/any mode of transit) but not having a high-risk exposure

Purpose of Contact tracing:

The purpose of identifying and managing the contacts of probable or confirmed COVID-19 cases is to rapidly identify secondary cases which will arise from transmission from the primary known cases and to intervene to interrupt further onward transmission.[9]

This is achieved through:

• The prompt identification of contacts of a probable or confirmed case of COVID-19;

• providing contacts with information on self-quarantine, proper hand hygiene and respiratory etiquette measures, and advice around what to do if they develop symptoms;

• Timely laboratory testing of those all with symptoms and asymptomatic with high exposure.

Contact tracing, together with the quarantine and potential testing of contacts, is considered a key component in a phase when lockdown measures are gradually lifted. Contact tracing is an intervention where an index case with confirmed infection is asked to provide information about contact people who were at risk of acquiring infection from the index case within a given time period before the positive test result. These contacts are then traced and informed about their risk, quarantined, and tested if eligible for testing according to national testing guidelines.[10]

Contacts are encouraged to remain home and maintain social distance from others (at least 6 feet) until 14 days after their last exposure, in case they also become ill. They should monitor themselves by checking their temperature twice daily and watching for cough or shortness of breath. To the extent possible, public health staff should check in with contacts to make sure they are self-monitoring and have not developed symptoms. Contacts that develop symptoms should promptly isolate themselves and notify public health staff. They should be promptly evaluated for infection and for the need for medical care.[11]

II.   METHODS AND MATERIALS

The cases of COVID-19 used in this study were based on the cumulative number of laboratory-confirmed cases of COVID-19 occurring in Ahmedabad rural between March 20th, 2020 and August 31st, 2020. We defined an index case as the first identified laboratory-confirmed case.

Department of Community Medicine BJMC has been carrying out the contact tracing of laboratory confirmed COVID-19 patients since March 2020 for Ahmedabad rural. Till date 9671 contacts were traced for 1817 COVID-19 positive cases.

Details of the contacts which include age, sex, testing details were collected in the given format ("Contact tracing excel sheet" from State level) by telephonic interview with cases and contacts.

Those who had pending result during telephonic interview were again contacted to know their test results. The impact of age on transmissibility and the infectivity of COVID-19 cases during their incubation period were investigated.

Data enter in MS Excel and analyzed in WPS software.

III. RESULT

Total 9671 contacts were traced for 1817 COVID-19 positive cases. Out of 1817 cases, 1275 and 542 were males and females. Majority of cases of rural Ahmedabad were from age group of 21-50 years according to table 1. Children were not affected as such. Mean age of cases was 44 years. Cases of COVID -19 were more in men (70.17%).

As shown in figure 1, majority numbers of contacts belongs to 15-30 years age groups. Out of total 9671 contacts, 5325 (55.06%) were male and 4346 (44.94%) were female contacts. Based on risk according distribution of contacts of Ahmedabad rural, most of contacts we found were high risk (87%) as per Ahmedabad district criteria.

Majority of cases occurred from Dholka taluka and similarly contacts were more in that taluka followed Sanand, Dascroi, Viramgam, Bavla, Dhandhuka, Mandal, Detroj and Dholera.(figure :2)

Majority of contact we trace were house hold contacts (79.40 % } followed by community contacts and health care contacts 17.86% and 1.5% respectively. Positivity rate in our study was 43.97% based on total positive contacts for COVID-19 out of total sample collected among contacts.

Crude secondary attack rate calculated from positive contacts for COVID-19 from total contacts was found 11.98%.similarly crude secondary rate among household was 11.11 %. (Table 2)

Male were predominantly high among contact traced of COVID patient due to high mobility related to their occupation. This was statistically significant with Chi square 98.34 with $p < 0.00001$.similar finding was statistically supported among various social determinant of contact contacts.

Both among COVID + or COVID – contacts majority were asymptomatic which is statistically highly significant with chi square value 536.9 at p value less than 0.00001. (Table 3)

Table-1 Age group wise distribution of COVID-19 Patients

Age Groups	Total Frequency	Percentage	Male	Female
0-10	21	1.15%	17	4
11-20	94	5.17%	64	30
21-30	353	19.42%	246	107
31-40	365	20.09%	292	73
41-50	340	18.71%	228	112
51-60	318	17.50%	214	104
≥60	326	17.94%	214	112
Total	1817	99.98%	1275	542

Table 2: Positivity rate and Attack rate among contacts

Positivity rate	**43.97%**
Crude secondary rate among contacts	11.98%
crude secondary rate of house hold contacts	11.11%

Table 3: Cross analysis of contacts with various parameter

Risk contact	Male (%)	Female (%)	Total	P value
High Risk	4454(53.1)	3934(46.9)	8388	χ^2=98.34 < 0.00001
Low Risk	871(67.89)	412(32.11)	1283	
Total Contact	5325	4346	9671	
Type of contact				

House hold contact	3907(50.84)	3772(49.12)	7679	χ^2=272.34 < 0.00001
Community contact	1234(71.45)	493(28.55)	1727	
Health care worker contact	89(61.38)	56(38.62)	145	
Other contact	95(79.17)	25(20.83)	120	
Total Contact	5325	4346	9671	
COVID -19 status of contacts	**Symptomatic**	**Asymptomatic**	**Total**	
COVID-19 +VE	459(39.6)	700(60.4)	1159	χ^2=536.90 < 0.00001
COVID-19 –VE	44(3.12)	1364(96.88)	1408	
Total	503	2064	2567	

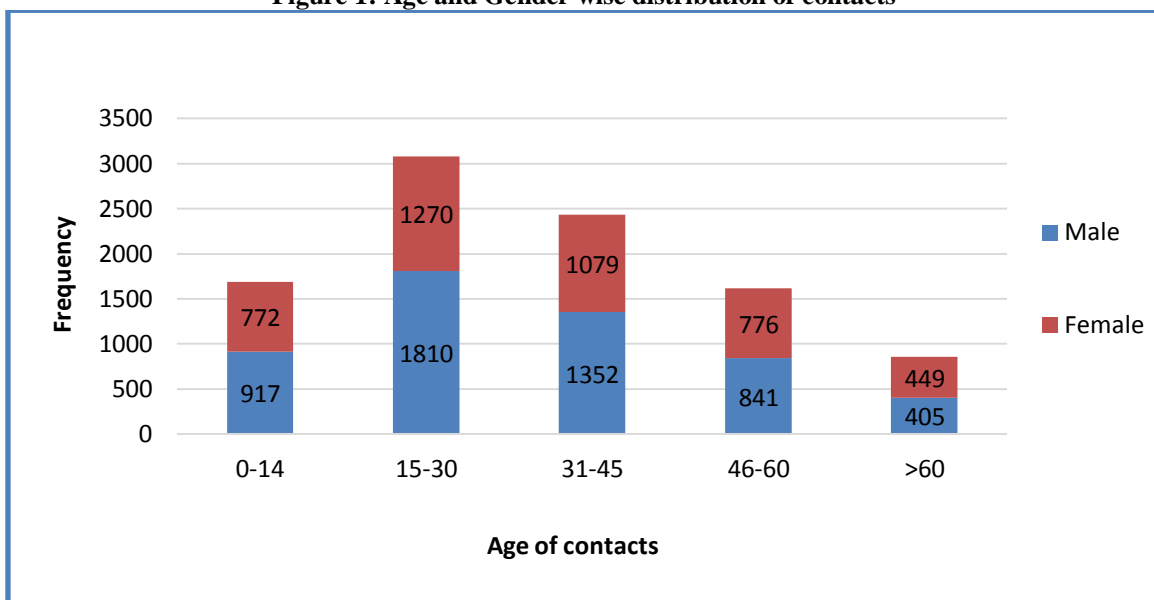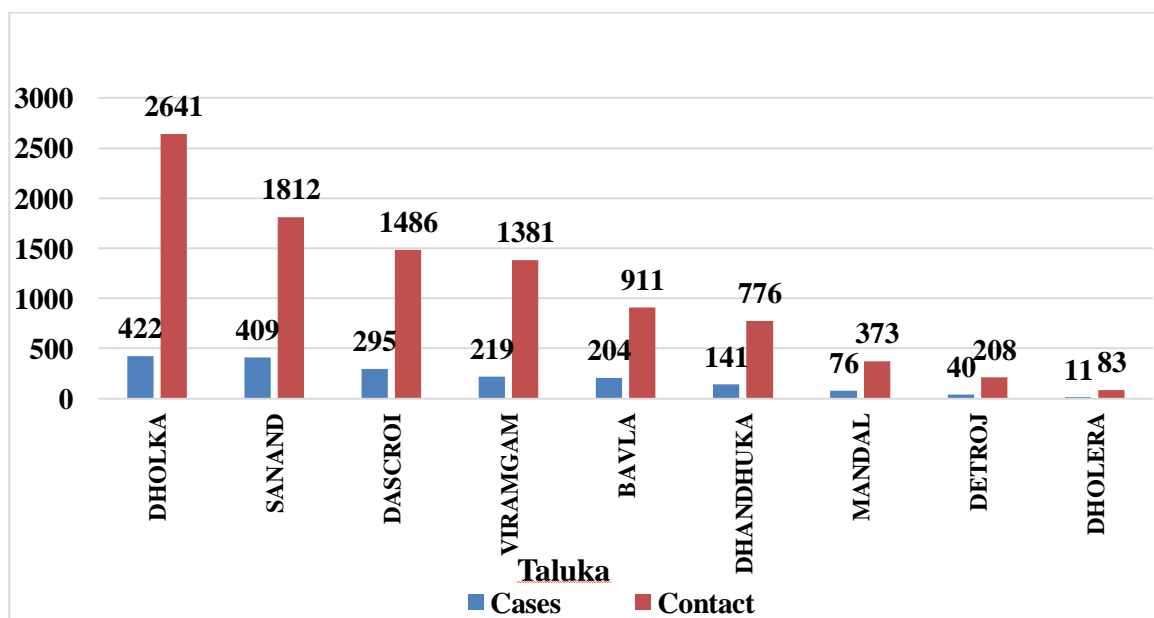**Figure 1: Age and Gender wise distribution of contacts**

Figure 2: Taluka wise cases and contacts

IV.   DISCUSSION

Now a day the whole world is under threat of COVID-19. The ongoing pandemic has forced public health department to foster that research and analysis of all various related activities. The study was an ongoing process that we analyzed during our routine COVID-19 work. With total 1817 cases of rural Ahmedabad.

Majority cases were from age group of 21-50 years. Similar result was reported at Delhi that 42% patients belong to 21-40 years age group.[12] In this study, majority cases of COVID -19 were men (70.17%) compared to women (29.83%). Similar to our study result, in India nearly three-fourth (76%) of all novel corona virus cases was men. While in Germany, France, Italy and China have almost equal case representation in men and women.[13] A number of factors may be working against men in the current situation such as lifestyle, activities, biological reasons and even immunity system. When it comes to mounting an immune response against infections, men are the weaker sex.[14]

There were high cases in Dholka and Sanand taluka, the major reason is due to large number of factories employing young workers majorly from Ahmedabad city and nearby village areas.

In our study, maximum number of contacts were traced between 15-30 years of age group while study conducted by Y.J Park et al in south Korea reported 19.2% contact traced between 50-59 years of age group.[15]

We found high number of house hold contacts 79.40 % followed by community contacts and health care contacts 17.86% and 1.5% respectively. A study conducted in Taiwan reported 5.5% were household contacts, 2.8% were non-household family contacts, and 25.3% were health care contacts.[16]

Crude secondary attack rate among all the contacts was 11.98% and in house hold contacts secondary attack rate was 11.11%. The study showed higher transmission of covid-19 among house hold contact. Reason for higher secondary attack among household than other type of contacts was due to lack of social distancing and not wearing mask at home possibly creating spread within the household. The dynamic of covid-19 transmission will help for control strategic at two different level which include at individual level and population level. While study conducted in China reported attack rate of 11.2% among household contacts and 6.6% (95% CI, 5.4 to 8.1) overall.[17] The secondary clinical attack rate was 4.6% (95% CI, 2.3%-9.3%) among household contacts in Taiwan.[16]

The crude secondary attack rate (11.98%) was higher in our study compare to ICMR which was reported around 6% or that 94% of family members or close contacts of a COVID-19 patient did not contract the virus.[18]

In present study, majority of contacts were found asymptomatic. In India 80% Cases were asymptomatic or presented with mild symptoms.[19] The study conducted by Manoj Murhekar reported that the proportion of the asymptomatic infected people was more than the 28.1 per cent and this is a cause of concern.[20]
There have been reports for asymptomatic infection with covid-19.[20]

The virus spread between peoples through respiratory droplets produced when an infected person coughs or sneezes.[21]
The whole population count as a susceptible to corona virus and occurring of infections depend on contact with covid-19 patients or individual with asymptomatic infections.[22]

Testing of all symptomatic patients as well as asymptomatic (direct and high risk) contact of laboratory conformed case was recommended by ICMR.

The surveillance would include contact tracing, mapping the containment zones and buffer zones, active surveillance for contact tracing, testing and hospitalization where needed.

V.   CONCLUSION

The contact tracing is key elements for prevention of COVID-19. This is highlighted in our study showing high secondary attack rate among the close contacts.
Majority of cases was found between age group of 21-50 years.

RECOMMENDATION

Early identification of suspects should followed by quarantine wherever applicable and them testing for corona virus disease.

District administration must expand efforts for tracing all the contacts and testing for diseases based on testing protocols.

At district level, the health department along with the civic bodies should actively undertake contact tracing.

Ethical Statement

We were identified as a state nodal authority for contact tracing of rural Ahmedabad district. So it did not need ethical approval.

CONFLICT OF INTEREST

The authors have no conflict of interest.

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REFERENCES

[1]. Sannigrahi S, Pilla F, Basu B, Basu AS, Molter A. Examining the association between socio-demographic composition and COVID-19 fatalities in the European region using spatial regression approach. Sustain Cities Soc. 2020 Nov 1;62:102418.

[2]. COVID-19 pandemic in India - Wikipedia [Internet]. [cited 2020 Sep 11]. Available from: https://en.wikipedia.org/wiki/COVID-19_pandemic_in_India

[3]. Coronavirus | Gujarat reports first cases of COVID-19 infection - The Hindu [Internet]. [cited 2020 Sep 11]. Available from: https://www.thehindu.com/news/national/other-states/coronavirus-gujarat-reports-first-cases-of-covid-19-infection/article31111847.ece

[4]. Gujarat: First COVID-19 patient from Ahmedabad district discharged | Cities News,The Indian Express [Internet]. [cited 2020 Sep 11]. Available from: https://indianexpress.com/article/cities/ahmedabad/gujarat-first-covid-19-patient-from-ahmedabad-district-discharged-6356934/

[5]. What Is Contact Tracing? How It Will Be Used for COVID-19 | Time [Internet]. [cited 2020 Available from: https://time.com/5825140/what-is-contact-tracing-coronavirus/

[6]. Contact tracing in the context of COVID-19 [Internet]. [cited 2020 Sep 9]. Available from: https://www.who.int/publications/i/item/contact-tracing-in-the-context-of-covid-19

[7]. uneau C-E, Briand A-S, Pueyo T, Collazzo P, Potvin L. Effective Contact Tracing for COVID-19: A Systematic Review.

[8]. (No Title) [Internet]. [cited 2020 Sep 10]. Available from: https://www.mohfw.gov.in/pdf/GuidelinesonpreventivemeasurestocontainspreadofCOVID19inworkplacesettings.pdf

[9]. Contact tracing: Public health management of persons, including healthcare workers, having had contact with COVID-19 cases in the European Union – second update, 31 March 2020.

[10]. Kretzschmar ME, Rozhnova G, Bootsma MCJ, van Boven M, van de Wijgert JHHM, Bonten MJM. Impact of delays on effectiveness of contact tracing strategies for COVID-19: a modelling study. Lancet Public Heal. 2020 Aug 1;5(8):e452–9.

[11]. Case Investigation and Contact Tracing : Part of a Multipronged Approach to Fight the COVID-19 Pandemic | CDC [Internet]. [cited 2020 Sep 11]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/php/principles-contact-tracing.html

[12]. 42% of coronavirus patients in 21-40 age bracket: Govt - The Economic Times [Internet]. [cited 2020 Sep 15]. Available from: https://economictimes.indiatimes.com/news/politics-and-nation/42-of-coronavirus-patients-in-21-40-age-bracket-govt/articleshow/74987254.cms

[13]. How Covid-19 has affected men more, figures of both infected cases and deaths show [Internet]. [cited 2020 Sep 15]. Available from: https://theprint.in/health/how-covid-19-has-affected-men-more-figures-of-both-infected-cases-and-deaths-show/396758/

[14]. Coronavirus: Why are there more male than female patients - Times of India [Internet]. [cited 2020 Sep 15]. Available from: https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/coronavirus-why-are-there-more-male-than-female-patients/articleshow/74674351.cms

[15]. Park YJ, Choe YJ, Park O, Park SY, Kim Y-M, Kim J, Kweon S, Woo Y, Gwack J, Kim SS, Lee J, Hyun J, Ryu B, Jang YS, Kim H, Shin SH, Yi S, Lee S, Kim HK, Lee H, Jin Y, Park E, Choi SW, Kim

M, Song J, Choi SW, Kim D, Jeon B-H, Yoo H, Jeong EK, COVID-19 National Emergency Response Center, Epidemiology and Case Management Team. Contact Tracing during Coronavirus Disease Outbreak, South Korea, 2020. Emerg Infect Dis. 2020 Jul 16;26(10).

[16].   Cheng HY, Jian SW, Liu DP, Ng TC, Huang WT, Lin HH. Contact Tracing Assessment of COVID-19 Transmission Dynamics in Taiwan and Risk at Different Exposure Periods before and after Symptom Onset. JAMA Intern Med. 2020;

[17].   Study: Contact tracing slowed COVID-19 spread in China | CIDRAP [Internet]. [cited 2020 Sep 12]. Available from: https://www.cidrap.umn.edu/news-perspective/2020/04/study-contact-tracing-slowed-covid-19-spread-china

[18].   ICMR Study in UP Finds COVID-19 Infectivity May Be Significantly Higher - The Wire Science [Internet]. [cited 2020 Sep 15]. Available from: https://science.thewire.in/the-sciences/icmr-study-eastern-uttar-pradesh-covid-19-infectivity-super-spreader-event/

[19].   Asymptomatic infections: India's next big coronavirus challenge - The Week [Internet]. [cited 2020 Sep 16]. Available from: https://www.theweek.in/news/india/2020/06/01/asymptomatic-infections-india-next-big-coronavirus-challenge.html

[20].   Indian Journal of Medical Research : 404 Page [Internet]. [cited 2020 Sep 16]. Available from: http://www.ijmr.org.in/temp/IndianJMedRes000-1451245_002411.pdf

[21].   What you need to know about corona virus disease 2019 [Internet]. [cited 2020 Sep 15]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/downloads/2019-ncov-factsheet.pdf

[22].   Role of frontline workers in prevention and management of coronvirus [Internet]. [cited 2020 Sep 15]. Available from:
https://www.mohfw.gov.in/pdf/PreventionandManagementofCOVID19FLWEnglish.pdf