

Challenges in Contact Tracing and Sampling in Three Districts of Western Rajasthan during the COVID-19 Pandemic

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Abstract

Introduction : Contact tracing commenced in districts of Western Rajasthan in March 2020 to control the spread of Covid -19. It was an ongoing process involving isolation and sampling of contacts. Multi department Quick and Rapid response teams (Q/RRT) worked continuously as the pandemic passed through different stages. The objectives of the study was to compare the challenges faced during contact tracing and document good practices in place.

Methods: A cross –sectional study was done among contact tracers using a semi structured questionnaire in Google forms in three districts of Pali, Jodhpur and Barmer. Keeping power of study at 80%, 5% error and 95% confidence interval, assuming 50% prevalence of effective contact tracing and 10 % non-response total 400 , i.e 133 participants from each district.

Results: Major challenges faced by tracers were resistance to contact sampling (64%) lack of training (49%), and random sampling workload (47%). Overall 36% of contacts had downloaded the Aarogya setu app but among them only 68% were using the app. Trainings , workload distribution and inter-sectoral coordination was best in Jodhpur, Barmer and Pali respectively .

Conclusions: Trainings helped in better field management of resistance to sampling among contacts. Excessive workload of lab technicians lead to errors in reporting. Transport for sampling of contacts was a challenge in remote areas. The Aarogya setu app was not used by all contacts. Regular feedback meetings by local administration helped in effective contact tracing

Key words: Contact tracing, challenges, inter sectoral co-ordination

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Background

Coronavirus disease 2019 caused by the SARS-CoV-2 virus spreads from person-to-person through droplet and contact transmission¹. In order to break the chains of human transmission certain interventions are required to ensure that each confirmed case generating new cases is maintained below one

(effective reproduction number < 1)¹.

Contact tracing is the process of identifying, assessing, and managing people who have been exposed to a disease to prevent onward transmission. It is an essential public health tool for controlling outbreaks and requires systematic implementation². Contact tracing for COVID-19 required identifying persons who may have been exposed to COVID-19 and following them up daily for 14 days from the last point of exposure². In India as part of a comprehensive strategy following the WHO strategy of track, trace and treat the processes of case identification, isolation, testing, tracing contacts and ensuring their quarantine, were critical activities to reduce transmission and control the epidemic².

The Indian Government closed entry for all international travellers to contain the spread of COVID-19 by 22nd March, 2020³. This was done with an intention to focus on the second stage of control measures targeted to active case finding and contact tracing following the test, track and Isolate guideline of WHO within the Indian subcontinent⁴. The country went for total lockdown across all states on 24th March 2020 to stall the surge of cases⁵.

For effective contact tracing district authorities had to rapidly develop their capacity to test suspect cases in a timely manner⁶. Where this was not possible, testing and contact tracing strategies focussed on specific high-risk settings with vulnerable individuals, such as hospitals, care homes, or other closed settings (e.g. dormitories) and utilized the testing facility of neighbouring district. It was necessary to quarantine contacts to reduce secondary transmission as positive individuals could transmit COVID-19 in both pre-symptomatic and/or asymptomatic stage⁷.

The activities in Contact tracing included contacts to agree to daily monitoring, to be willing to report signs and symptoms of COVID-19 promptly, and

to be prepared to go into quarantine for at least 14 days or into isolation if they become symptomatic. Communications and inclusion of communities and their leaders helped to overcome challenges like language and literacy barriers, access to food and medical care for other illnesses, education, information, as well as stigma and marginalization during the 14 day home isolation period⁸. Special efforts had to be made for contact tracing of at-risk and vulnerable groups, minority groups, homeless persons, migrant workers, refugees, and others.

Communities had concerns about privacy and confidentiality of their personal health information⁹. Public health agencies implementing contact tracing for COVID-19 had to sometimes communicate how information was used, stored, and accessed, and how individuals were protected from harmful disclosure or identification. It was critical that contact tracing and associated steps, such as quarantine of contacts and isolation of cases, not be used punitively or be associated with security measures, immigration issues, or other concerns outside the realm of public health.

In the initial guidelines a contact was 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 with the following criteria^{2, 3}:

- Being within 1 metre of a COVID-19 case for >15 minutes;
- Direct physical contact with a COVID-19 case
- Providing direct care for patients with COVID-19 disease without using proper personal protective equipment (PPE);
- Other definitions, as indicated by local risk assessments were also outlined.

The Aarogya Setu app launched by the Indian government evaluated users' risk of infection based

on location, and their medical and travel history¹⁰. It used Bluetooth and location services to trace a user's contacts. While authorities said use of the app is voluntary, it had been made mandatory for food-delivery workers and some other service providers, and all government employees. It also helped to access public transit and airports when the nationwide lockdown lifted, according to local media reports.

To identify contacts, a detailed case investigation form was filled and interview with the COVID-19 patient or their caregiver was done¹¹. Contact tracing commenced in all 3 districts of Western Rajasthan in March 2020 after the first cases got reported and was an ongoing process involving identification and isolation of positive contacts⁶. But contact tracing and sampling had its challenges and limitations and was abruptly stopped as a strategy in areas when cases subsided after September/October 2020.

On May 1 the Union Home Secretary issued new guidelines under section 10(2) (I) of the Disaster Management Act, 2005, that designated districts into Red, Orange, and Green Zones based on risk. Green Zones are those that had no cases as of the date of the guidelines or within the previous 21 days; Red Zones were designated based on the "total number of active cases, doubling rate of confirmed cases, extent of testing and surveillance feedback." Orange zones are those that do not fit the criteria for the Green or Red designations. Different districts faced different types of challenges in the execution of this important Public health intervention.

No study has yet been done on the challenges of contact tracing in difficult weather and terrain conditions of Western Rajasthan. This multi district study helps to identify the challenges faced by health care workers engaged in the activity of contact tracing and sampling in Western Rajasthan. It also helps to identify and document various local initiatives and good practices and strategies implemented by the

local administration and the effectiveness of these adopted strategies in different semi –arid districts to overcome the same.

Objectives of the study

1. To study the current challenges of contact tracing and sampling in semiarid urban and rural areas of 3 districts Pali, Jodhpur and Barmer
2. To identify the good practices in overcoming these challenges in each district by district authorities.

Methods

Study Setting- Health care workers (Doctors, ANMs, ASHAs, RRT /QRT members) in three districts of Pali , Jodhpur and Barmer

Study design- Cross –sectional study

Study Period - 5 months

Sample Size: Selection of the Health care workers /participants was done by convenient sampling. For keeping power of study at 80%, 5% error and 95% confidence interval, assuming 50% prevalence of effective contact tracing we got a sample size of 384. Adding the 10% non-response in this gave a final sample size of 400, i.e 133 participants from each district.

Sampling Method-Convenient sampling method

Inclusion criteria:

1. Person from any department involved in contact tracing for at least 2 months.

Exclusion criteria

1. Person from any department involved in contact tracing not giving consent

Data collection and analysis: Data was collected from contact tracers by a validated semi structured questionnaire and was analysed using excel and

SPSS 22 version software in terms of proportions, percentage and Chi-Square test was used for comparisons between district specific proportions .

Results

Major challenges faced by tracers were resistance to contact sampling by asymptomatic contacts (64%) lack of training (49%), and random sampling workload (47%). Overall 36% of contacts had downloaded the Aarogya setu app but among them only 68% were knowing or using the app. On comparison of Barmer, Jodhpur and Pali trainings were best in Jodhpur and hence field problems faced by contact tracers were significantly less [fig 1] .

In the initial phase outbreak clusters were identified and strict containment measures were best seen in Pali .Varied quarantine care facilities at designated COVID centres added to the fears of the positive cases to divulge information regarding their contacts. Barmer district showed better workload distribution among the lab technicians and the public was less resistant to contact tracing [Table1]. Inter-sectoral participation by Police department was best in all three districts followed by local administration

, ICDS department (18%) followed by traffic police cum home guards.[fig 2]

Comparison of output and outcome indicators [Table 3] of the three districts shows that although 80% of contacts were identified within 24 hours of declaration of a positive case only 40-60% among them were finally sampled and finally quarantined. As resistance to giving samples was high in Jodhpur and only 60% of contacts were tested as compared to 75% from Pali and Barmer. The positivity rate amongst contacts was 30%, 10% and 5% respectively in Jodhpur, Pali and Barmer.

Miscellaneous feedbacks from respondents common to all districts: First level contacts were better traced than second level contacts. Many innovations in PPE kit material were initiated to make it comfortable for lab technicians doing contact sampling in scorching heat of summer months Intra and inter district contacts were traced with the help of administration. Twice a day meeting of nodal officers helped in streamlining local problems in contact tracing. Technical and operational guidance was always available from State headquarters through regular video conferencing .

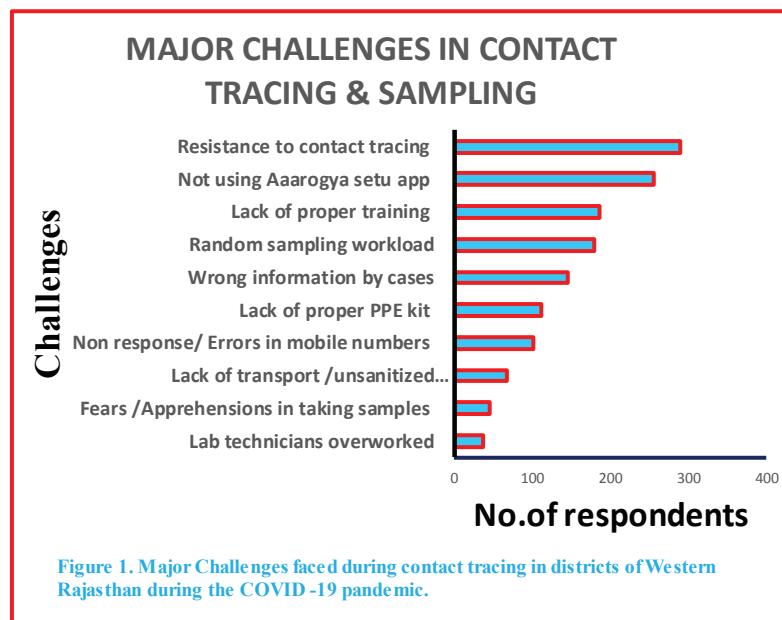


Table 1 Comparison of key factors of contact tracing in all three districts

Variables	Total(n=399)	NAME OF DISTRICT			χ^2 - Value		p value
		Barmer (n=133)	Jodhpur (n=133)	Pali (n=133)			
Training	318(79.7%)	103(77.4%)	125(94.0%)	90(67.7%)	29.091		0.000
Inter-Sectoral Department Involvement							
ICDS	70(17.5%)	29(21.8%)	17(12.8%)	24(18.0%)	3.777		0.151
Police	104(26.1%)	23(17.3%)	38(28.6%)	43(32.3%)	8.453		0.015
Fire/Security Department	8(2.0%)	1(0.8%)	6(5.4%)	1(0.8%)	5.116		0.056
Traffic Police	9(2.3%)	3(2.3%)	5(3.8%)	1(0.8%)	2.617		0.312
Medical College & Health Department	131(33.0%)	41(30.8%)	58(44.3%)	32(24.1%)	12.624		0.002
Local Administration	77(19.3%)	35(26.3%)	8(6.0%)	34(25.6%)	22.626		0.000
Work Load on LTs							
Over Work Load	247(61.9%)	56(42.1%)	127(95.5%)	64(48.1%)	96.434		0.000
Normal Work Load	152(38.1%)	77(57.9%)	6(4.5%)	69(51.9%)			
Problem Facing by Contact Tracers during Contact Tracing							
Language Related Obstructions	47(11.8%)	21(15.8%)	5(3.8%)	21(15.8%)	12.348		0.002
Hearing Obstructions	27(6.8%)	9(6.8%)	10(7.5%)	8(6.0%)	0.238		0.968
Obstacles in explaining the importance of CT	182(45.6%)	52(39.1%)	55(41.4%)	75(56.4%)	9.476		0.009
Non-Response Inhibition	83(20.8%)	22(16.5%)	29(21.8%)	32(24.1%)	2.404		0.301
Too many over the counter questions from infected person	114(28.6%)	31(23.3%)	34(25.6%)	49(36.8%)	6.853		0.033
Wrong Information	105(26.3%)	28(21.1%)	43(32.3%)	34(25.6%)	4.420		0.110
Lack of leadership and guidance	34(8.5%)	16(12.0%)	5(3.8%)	13(9.8%)	6.237		0.048
Complaints about isolation and quarantine centres facilities by cases	91(22.8%)	31(23.3%)	28(21.1%)	32(24.1%)	0.370		0.831
Resist to Download Aarogya Setu App	75(18.8%)	25(18.8%)	16(12.0%)	34(25.6%)	7.980		0.018
p≤0.05 considered statistically significant and p>0.05 considered statistically insignificant							

Inter-sectoral involvement in contact tracing

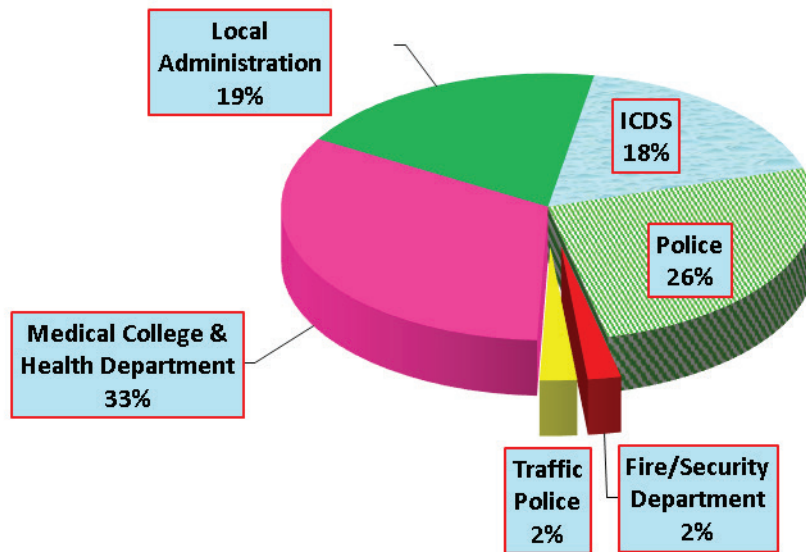


Figure 2: Inter-sectoral involvement in contact tracing

Comparison of output and outcome indicators of contact tracing in three districts

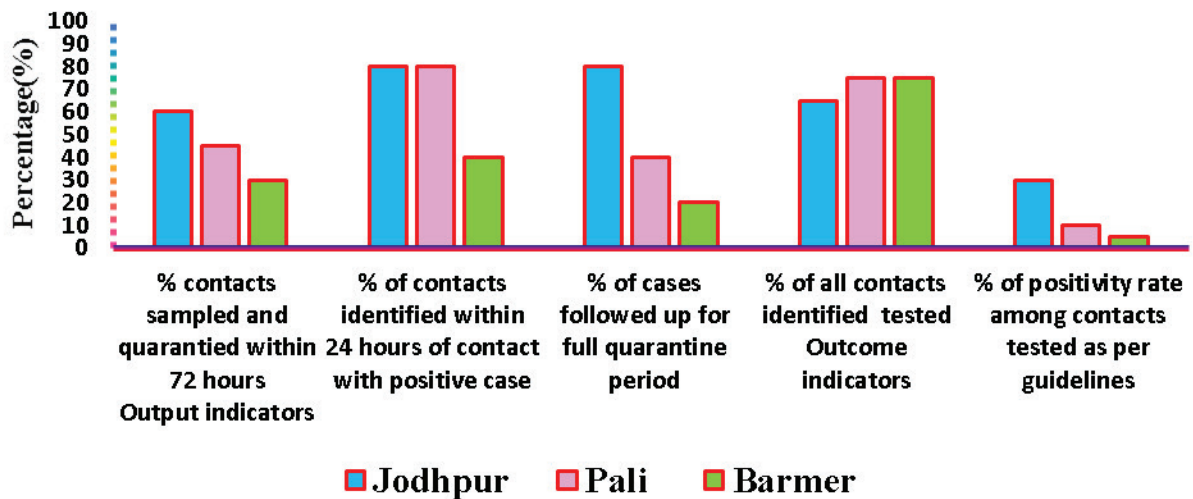


Figure 3. Comparison of output and outcome indicators of contact tracing in three districts

Discussion:

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Contact tracing, which is the most basic and important method of stopping transmission in infectious diseases even in developed nations during the Covid 19 pandemic has been riddled with challenges. In a study done in United kingdom tracers failed to get in touch with one in eight contact tracers and 18% of those who were reached provided no details of close contact¹². Similarly in our study 31.5% did not provide correct information of their immediate contacts. Changing guidelines further complicated this exercise as the first released in India by ICMR and NCDC along with MOHFW on 17th March 2020 was followed by several revisions of the criteria used for identifying contacts^{1,2}.

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A study conducted by ICMR on Covid 19 testing conducted between 22 January and 30 April 2020 found 35.9% of patients found positive from testing were comprised of contacts of positive cases¹³. In

our study positivity rate from among contacts was between 5-30%. In some foreign countries like South Korea, Vietnam, Japan and Taiwan who isolated infected people early and then used data such as mobile based signals to track obedience¹⁴. Call log tracking by the Police department used for contact tracing in this area was successful only for 5% of the time due to blocking of numbers by the contacts to avoid quarantine or the sim was found to be no longer in use. In some countries authorities used data from credit cards, mobile phones and closed circuit TVs to trace a person movements and contacts¹⁵. However in our study it was found that although call log tracing by the police authorities was used no other means were adopted to do contact tracing especially in rural areas. No National or International monitoring was done or data taken from countries to monitor contact tracing efforts or compare failures and document successes. Many Governments suspended the permit for this practice¹⁵.

As the definition of close contacts was those who have spent more than 15 minutes close to the infected person often lead to the exclusion of contacts who did not fit in but repeated cumulative contact time made them a vulnerable lot. In such circumstances they were not sampled as per the given history of the positive case. The WHO criteria were that for successful contact tracing 80% of close contacts should be traced within 3 days¹⁷. In fact in a single day 75% of cases needed to be isolated and 70% of contacts needed to be quarantined to reduce the R_0 to less than one and slow down transmission. Contacts of contacts were not traced in our areas as per the guidelines due to limited logistics and few COVID quarantine centre facilities. In Rajasthan tracing and being able to quarantine even the first level of contacts was tough and hence the guideline changed to home isolation

Internet connectivity was poor and erratic mobile connections, call dropping, non-response lead to incomplete information. Many times calls were not picked up the second time. Many people did not self-isolate themselves after giving their sample and they became spreaders. No measures were in place to avoid duplicate or repeated phoning of people who were contacts of multiple cases which led to annoyance and resistance from the public. The term 'super spreaders' was used for grocers, milkmen, courier persons, delivery boys etc. as they were the ones who could spread the infection to an entire family or community they catered¹⁶.

Reverse contact tracing measures were employed wherein super spreaders were traced on the basis- especially useful for cluster tracing, tracing of some big social event¹⁸. The early lockdown ensured community transmission was substantially delayed. Staff from multiple departments were involved in contact tracing. Undertrained and non health staff found the task difficult but did their best. Containment of a street, locality into zones red, green, orange was a good strategy to grade high risk areas¹⁹. As cases decreased contact tracing measures also received a set back which perhaps led to reduced surveillance on the transmission and non preparedness for the second wave which hit the area with a vengeance²⁰.

Conclusions

Trainings helped in better field management of resistance to sampling among contacts. Excessive workload of lab technicians leads to errors in reporting. Transport for contact tracers was a challenge in remote areas. Contact tracing was continued in spite of community transmission in many areas causing unnecessary diversion of resources. The Aarogya setu app was not used by all contacts. Regular feedback meetings by local administration helped in stream lining multiple contact tracing modalities.

More awareness about contact tracing in pandemics will reduce challenges of tracers. Good trainings and optimal workload to contact tracers and lab technicians would give better outcomes. Regular feedback meetings to ensure inter sectoral co-ordination by local administration helps in effective contact tracing. Limited data was available to monitor contact tracing in various states of India and comparison of contact tracing performances has not been done seriously to document lessons learnt for future pandemics. More effective apps to enable self filled information among literates and semi literates as an investment in our Public health system is the need of the hour.

Conflict of Interest : There are no conflicts of interest

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Ethical Clearance: Institutional Ethical Clearance (from GMC Pali) was obtained and informed written consent was taken from all participants.

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