



Original Research Article

COVID - 19 Pandemic Preparedness in Vadodara district of Gujarat in India

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ABSTRACT

Introduction: We described the COVID – 19 prevention and control activity done in Vadodara district of Gujarat.**Objective:** Study was done to describe the activities and to identify the gaps in prevention and control of COVID – 19 control activity.**Materials and Methods:** A cross sectional observational study was conducted between 09.05.2020 to 20.05.2020. Data was collected from urban and rural health units by interviewing officers and health workers involved in covid control activities. Relevant data was extracted from records and IDSP portal.**Results:** There was a huge increase of CCC beds and CHC beds and total tests from 9th May to 20th May 2020 to meet the demand of the district. There was nearly 14 times increase of CCC beds, nearly fifteen times enhancement of CHC beds and nearly three times enhancement of RT-PCR tests on 20th May 2020 in comparison to 14th May 2020. There was a 21% increase of CH-ICU beds.**Conclusion:** Motivated Health worker, timely decision by the District Administration, proactive approach and inter-sectoral communication had made the district successful in controlling the situation.© 2020 Published by Innovative Publication. This is an open access article under the CC BY-NC license (<https://creativecommons.org/licenses/by-nc/4.0/>)

1. Introduction

On 31st December, 2019 Chinese authorities alerted WHO to several cases of pneumonia of unknown etiology in Wuhan City, Hubei Province.¹ On 7 January, 2020, Chinese authorities confirmed identification of a new type of Coronavirus – Novel Coronavirus (2019-nCoV) as the causative agent.² The outbreak that was initially noticed in in Wuhan city in Hubei Province of China on in early December, 2019, then spread to all provinces of China. WHO declared this as Public Health Emergency of International Concern on 30th January 2020. A Pandemic was declared by WHO on 11th March, 2020. Cases had been reported from 214 countries/territories/areas. The overall CFR was about 6.8% globally and about 3.2% in India.

Based on current information, an animal source seemed the most likely primary source of this outbreak.

There was clear evidence of human-to-human transmission, primarily through respiratory droplets and through contact (direct/indirect) and Incubation period ranges from 1-14 days, with a median of just over 5 days. Many crucial epidemiological parameters like source of infection, role and extent of asymptomatic/pre-symptomatic infections etc. still remained elusive and under investigation. The patients affected with this disease had fever, cough, breathing difficulty and other respiratory symptoms with wide variation from mild to severe including development of severe acute respiratory illness (SARI). Most of the deaths had been reported in elderly individuals with comorbid conditions.

As per WHO (as of 2nd May 2020), worldwide, there has been a total of 32,67,184 confirmed cases and 2,29,971

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deaths reported from 214 countries/territories/areas. Community transmission was being reported from 51 countries. Clusters of cases were being reported by 89 countries. Most affected countries were USA, Spain, Italy, Germany, UK, Germany, France, Iran and China.³

In India, as on 3rd May 2020, a total of 39,980 cases and 1,301 deaths had been reported so far from 32 States/UTs. Local transmission was being observed in Maharashtra (particularly Mumbai, Pune), Madhya Pradesh (particularly Indore). Twenty districts account for more than 68% active cases in India. Top 20 districts account for 72% deaths in India. Vadodara had 247 cases and 12 deaths.⁴

In this scenario, Emergency Medical Relief (EMR) division, Ministry of Health and Family Welfare deployed the Central Rapid Response Teams (RRT) to support and advise the twenty most affected districts of India. The team consisted of two senior Public health Specialists.⁵

2. Objective

1. To identify the gaps in the implementation of Covid-19 control activity in Vadodara District of Gujarat.
2. To recommend regarding rectification of gaps and bottlenecks in controlling Covid-19.
3. To monitor containment measures in affected areas within the Districts.

3. Materials and Methods

We interacted with several officials District Collector, Additional District Collector, Commissioner of VMC, Chief Medical Officer of Health, VMC, Chief Medical Officer of Health (Vadodara- Rural), District Surveillance Officer, Vadodara etc.

We visited different health care and quarantine facilities e.g. Urban Primary Health Center, Rural Primary Health Center, Covid Care Centre, Covid Hospital etc.

We visited several containment zones with a view to see the following things.

1. Stringent perimeter control-Establish clear entry and exit point,
2. Active search for cases through house to house.
3. Testing of all cases as per sampling guidelines
4. Contact Tracing.
5. Clinical management of all confirmed cases.
6. Ensuring low case fatality.

We checked the Key focus areas of Surveillance e.g. Identify if sufficient special teams are formed for active case surveillance, whether they have been oriented with the task at hand, Ensuring high adoption of Aarogya Setu app, Verifying if teams are visiting the allotted households for Active case search and identification of contacts & Verifying compliance with home quarantine/home isolation guideline, Verifying if daily report of special teams is being compiled

at the supervisory level etc. The team observed the quality of ILI / SARI surveillance activities at household level. We also checked all relevant records/ documents/ registers.

3.1. Study type

Cross sectional observational

3.2. Study period

From 09.05.2020 - 20.05.2020

3.3. Sampling

We purposively selected one UPHC from each of the four Vadodara Municipal Corporation based on high number of cases, deaths, cluster of cases etc. In Vadodara rural we purposively selected the PHC based on the distance from Head quarter. The selection was from farthest to nearest distance.

3.4. Data collection

We interviewed several officials e.g. District Collector, Additional District Collector, Commissioner of VMC, Chief Medical Officer of Health, VMC, Chief Medical Officer of Health (Vadodara- Rural), District Surveillance Officer, Vadodara etc. with a semi-structured questionnaire. All total we interviewed 24 Doctors and 240 Health workers from Urban and Rural PHCs. We also reviewed the records at different levels from PHC upwards and extracted data in a data extraction sheet. We also collected the IDSP data. We observed the functioning of ASHA, ANM etc. at the ground level.

3.5. Case definition

We used NCDC Guidelines regarding Case definition of COVID-19⁶ & ICMR guideline regarding Testing criteria.⁷ Regarding definition of Covid care centre, Covid Health Centre and Covid Hospital we used EMR guideline.^{8,9}

3.6. Definition of Containment zone

We used VMC guideline regarding containment zone.¹⁰

1. Red zone-Confirmed cases. Entry and exit closed. door-to-door screening. Daily recording temperature. Nagarwada and Tandalja were in this zone.
2. Orange zone-It included Suspected cases. The orange zone included areas surrounding the already declared red zones like the old city area of Mogulwada, Yakutpura, Doodhwala Mohalla, Bahar colony Ajwa road and Navapura.
3. Yellow zone- It included susceptible person in Slum or slum like Area. Yellow zone is the protected zone, which will include mainly slums and clustered

homes where it is almost impossible to have social distancing and self-isolation. Even one case emerging in such areas can result in a big problem. Such areas will be similar to the red and orange zones as no one from outside will be allowed to enter into a yellow zone area. The yellow zone included cluster areas of the old city like Fatehpura, Kishanwadi, Ekta Nagar, Ramdev Nagar, Soma Talav, Kumbharwada, Ghaghretiya, Adarsh Nagar and Navayard.

4. Green zone-No cases were detected. The green zone included the other parts of the city not falling under the first three zones, where people must maintain self surveillance and precaution. They should visit a doctor for any symptoms and seek immediate medical help and report their symptoms.

Key actions to be carried out in containment zones:

Preparing micro-plan, Surveillance, Testing, Hospital preparedness and patient management (including critical care management), Risk communication and Data management – reporting, analysis and dissemination to field unit for timely action

4. Results

4.1. Description of the Area

Vadodara, formerly also known as Baroda, is the third largest city in the Indian state of Gujarat. It is the administrative headquarters of Vadodara District and is located on the banks of the Vishwamitri river, 141 kilometres from the state capital Gandhinagar.¹¹ The Vadodara Municipal Corporation or VMC, was established in July 1950 under the Bombay Provincial Corporation Act, 1949. They were responsible for the civic infrastructure and administration of the city of Vadodara.¹²

Vadodara district had a population of 41.7 lakhs of which 49.6% is urban population residing in VMC area and 50.4% of the population are in 8 Talukas (Rural Blocks) of the District. About 80% of the Corona cases were from urban area. Vadodara Municipal Corporation covers about twenty lakh urban population of Vadodara. Vadodara Municipal Corporation (VMC) has 12 wards. The urban area is divided into four zones e.g. Eastern, Western, Southern and Northern. Most of the Corona cases of the municipality have been reported from the Northern zone. North zone was very overcrowded and dominated by Muslim population. North zone had cluster of cases. Index case came from Sri Lanka.

Thirty four (34) Urban Primary Health Centres, headed by Medical Officer, were catering primary health care needs to the population residing in the urban area Vadodara. Each zone has 9 UPHC except East zone which has 7 UPHC. The first Corona case occurred on 17th March 2020 in VMC Area (South Zone). Travel history from Spain was there. Till 20-05-20 total cases reported was 750.

4.2. Urban & Rural PHC visit

We visited the Urban Primary Health Centers (UPHC) such as Navidharti (North Zone), Gajwarwadi (South Zone), Tandalja (West Zone), Atladara (West Zone). We visited following PHCs in the Vadodara Rural eg Vadodara (Vadodara Taluka), Bhailali (Vadodara Taluka), Methi (Block-Karjan) and Mujpur. There were 42 PHCs in the rural area of Vadodara. Cases were very less in comparison to Vadodara urban. Manpower of UPHC- Generally there were three Doctors (Medical Officer-1, Ayush Doctor-1, RBSK (Rashtriya Bal Suraksha Yojana) Doctor-1) and nearly 30 health workers (ANM-5, ASHA-11, Public Health Worker-5, Field worker-9). Sometimes additional manpower were also deputed. Generally there were one or more containment zones under each UPHC.

All the Healthworkers were given Hydroxychloroquin. Two Ayurvedic drugs were also provided eg Samshamani bati and Guduchyadiquath powder. Surveillance teams were formed with two persons and they were to cover 100 houses.

We observed the following parameters and found acceptable.

1. Displaying banner, poster etc. regarding COVID-19
2. Preparing micro-plan
3. Manpower adequacy
4. Knowledge of ICMR Guidelines
5. Attending online training.
6. Availability of Thermal gun & pulse oxymetry
7. Distribution of Hydroxychloroquin among the Health care worker.¹³
8. Availability of PPE.¹⁴
9. Covid 19 sample collection
10. Running immunisation & Antenatal clinic
11. Running DOTS programme

4.3. Containment area visit

We also visited the containment zone in their Urban/Rural Primary Health Centre Area and monitored several parameters. The area of operation was defined clearly and perimeter control was proper. Active search of cases, early isolation, contact listing and tracking, quarantine and follow up of contacts were done. Data management e.g. reporting, analysis and dissemination to field unit for timely action was in operation.

There was a huge increase of CCC beds and CHC beds and total tests from 9th May to 20th May 2020 to meet the demand of the district. There was nearly 14 times increase of CCC beds, nearly fifteen times enhancement of CHC beds and nearly three times enhancement of RT-PCR tests on 20th May 2020 in comparison to 14th May 2020. There was a 21% increase of CH-ICU beds. Figure 1

As they have developed huge infrastructure and their utilisation rate was very less e.g. CCC beds (0.44%), CHC

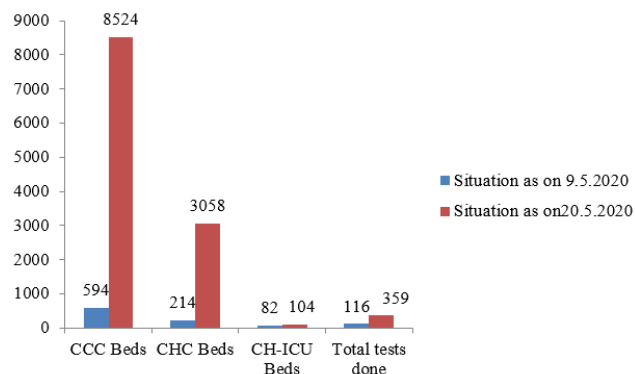


Fig. 1: Situation of Covid care beds and RT-PCR tests in Vadodara district as on 9.5.2020 and 20.5.2020.

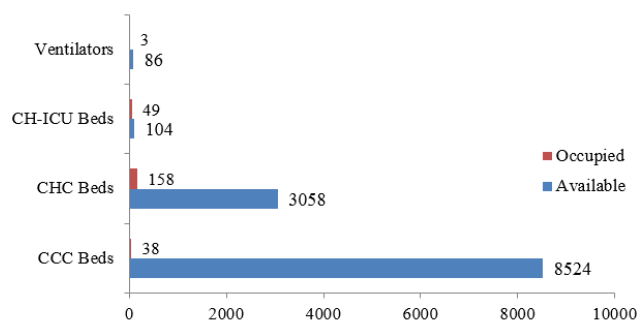


Fig. 2: Covid 19 related Hospital infrastructure utilisation of Vadodara District as on 20.5.2020

beds (5.16%), CH-ICU beds (47.1%), Ventilators (3.4%) as on 20.5.2020. Figure 2

More than 90% of the cases and deaths were from the urban area. More than 85% of the containment zone were from the urban area.

4.4. Monitoring of Covid 19 related indicators

Daily tests ranged from 200 to 359. The test positivity rate ranged from 9-10%. The case fatality rate was 5.6%. The case contact ratio was 1:2. The Recovery rate was nearly 60%.

4.5. Mass sampling

Mass sampling was done in Nagerwada Area. Out of 300 people 99 were Found positive RT-PCR test. Test positivity rate was 33%.

4.6. Information Education and communication

Pamphlets, Banner, Posters, Community leaders and doctors from Muslim community were sensitised, One to one communication, Local psychiatry help line.

4.7. Corona corner

Vadodara Municipal Corporation has got a website www.vmc.in. It gives information to the community on daily Positive Covid cases, Active cases, Patient recovered, Total death, Containment zone etc.

4.8. Laboratory support

They have identified designated referral labs both private and public for diagnosis of COVID-19 patients by RT-PCR method and they were maintaining ICMR protocol. They have adopted RT-PCR app for specimen referral. They have ensured adequate and timely collection, transport (including linkage with courier facility to ship samples) and processing of samples (maximum 24hrs) and reporting of laboratory data.¹⁵ Daily nearly 200 tests were done and test positivity rate was 8.3%.^{15,16}

4.9. Self reporting mobile app

The district has developed a Form for early detection of Covid-19. It includes Name, Address, Zone, Mobile number, travel type, Travel country, Travel city, Return date, Passport number, suffering from fever, have cough, difficulty in breathing, other details.

4.10. Involvement of Indian Medical Association

They have obtained a good support from local Indian Medical Association and Baroda Muslim Doctors Association for all Covid related activities eg testing, quarantine, isolation etc.

4.11. Testing of super-spreaders

They have started testing the persons who has probability of disease transmission eg Vegetable vendors, delivery boys etc.

4.12. Post lock down readiness

The district has taken following measures for easing out the Lockdown.

1. As on 19.5.2020, the district have adequate number of CCC beds (8524, Percentage of occupancy 0.7%); CHC beds (3058, Percentage of occupancy-4.25%); CH-ICU beds (104, Percentage of occupancy 49.03%); Ventilators (86, Percentage of use 5.81%). Table 1
2. Line listing of High risk cases (Aged, Diabetic, Hypertensive, immunocompromised etc.) and taking special care for their protection from infection.
3. Mobilisation of school teachers as Covid Army for home isolation
4. Govt of Gujarat by notification has made all medical practitioners as covid care consultant

Table 1: Vadodara urban and rural scenario as on 9.5.2020 and 20.5.2020

	9.5.2020			20.5.2020		
	Urban	Rural	Total	Urban	Rural	Total
Tests Done	4956 (79%)	1314 (21%)	6270	6175 (77.6%)	1773 (22.4%)	7948
Covid Cases	515 (97.5%)	13 (2.5%)	528	725 (96.6%)	25 (3.4%)	750
Deaths	27 (93.1%)	2 (6.9%)	29	33 (94.2%)	2 (5.8%)	35
Containment Zone	61 (85.9%)	10 (4.1%)	71	91 (88.3%)	12 (21.7%)	103

- Going to start pooled sampling in Green Zone for early detection of Covid 19 in a cost effective way.

5. Discussion

Vadodara district consists of two parts eg urban and Rural. Urban areas were far more congested than rural areas. Maintaining Social distancing was very difficult as overcrowding was prevalent in some of the urban areas. This has resulted more than 90% of the total Covid cases and deaths in the urban area of Vadodara District. The district has repeatedly conducted sensitisation/training programmes/video conferences for different category of health personnel.

As the doctors and health-workers were well conversant with case definition and ICMR guidelines so early diagnosis of cases and contacts were the rule. As they have used pulse oxymetry in their PHCs so early diagnosis of low oxygen level was possible. This has contributed to triaging and early hospital admission without unnecessary panic. The district has taken positive steps for enhancement of the number of different categories of Covid beds. This is evident from that only 50 to 60 percent of CCC and CHC beds are occupied.(Figure-3).

The test positivity rate ranged from 9-10 % .It was higher than the National level. Testing rate was 160 per lakh population whereas in Rajasthan it was 246 per lakh population. This was also low in comparison to National level. They had taken measures to enhance five more laboratories in private and Govt. capacities. The case fatality rate was 5.6%.It was higher than the National level of 3%. The case contact ratio was 1:2. Case management in the District was very good as the Recovery rate was nearly 60%.

They had also taken a new approach of mapping from high risk areas to high risk persons eg diabetic, chronic kidney disease, Immunocompromised persons etc. The District has readied short video film for elderly and high risk personnel. They had taken a step of screening super-spreaders to reduce the transmission.

Initially most of the Corona cases of the municipality had been reported from the Northern zone. It was a congested zone with majority of muslim population. VMC had taken an appropriate approach of taking the help of ‘Muslim doctor association’ to bring the community into confidence. Their active involvement eased the situation a lot. As many persons did not have android mobile phone so Arogya setu

app implementation was not up to the mark.

The district had taken an innovative step regarding formation of yellow containment zone containing slums or slum like areas which are outbreak prone. They had also started an App for Line listing of High risk cases (Aged, Diabetic, Hypertensive, Chronic kidney disease, immunocompromised etc.) and taking special care for their protection from Covid-19 infection. They had taken help of the police in contact tracing. Mobilisation of school teachers as Covid Army for home isolation was a great step by the district. Maintenance and use of data were found to be satisfactory at every level.

6. Conclusion

Motivated Health worker, timely decision by the District Administration, proactive approach and inter-sectoral communication had made the district successful in controlling the situation.

7. Recommendation

- Number of RT-PCR test had to be increased. Implementation of wearing mask by women in the rural area had to be enforced.

- Awareness of the community, enforcing people to wear mask, use hand sanitiser and maintaining social distance would have to be continued for a long time.

8. Limitation

The case fatality rate calculated was not proper as many asymptomatic or pre-symptomatic cases were not tested and diagnosed leading to an improper denominator in calculation. At that time ICMR had no testing guidelines for indoor hospital patients. Detailed community survey was not done.

9. Acknowledgement

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10. Conflict of Interest

None.

11. Source of Funding

None.

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