

## STUDY OF EPIDEMIOLOGICAL DETERMINANTS OF COVID-19 PATIENTS: AHMEDABAD RURAL, GUJARAT

Dr. Hetal Y. Patel<sup>1</sup>, Dr. Rajshree Bhatt<sup>2</sup>, Dr. Hely B. Patel<sup>1</sup>,  
Dr. Shalini Singh<sup>3</sup>, Dr. Devang Raval<sup>4</sup>, Dr. Yogesh Mori<sup>5</sup>

1Third year residents, Department of Community Medicine, B. J. Medical College, Ahmedabad, Gujarat;

2Assistant Professor, Department of Community Medicine, B. J. Medical College, Ahmedabad, Gujarat;

3First year resident, Department of Community Medicine, B. J. Medical College, Ahmedabad, Gujarat;

4Head of the Department, Community Medicine, B. J. Medical College, Ahmedabad, Gujarat;

5First year resident, Department of Community Medicine, B. J. Medical College, Ahmedabad, Gujarat

### ARTICLE INFO

#### Article History:

Received 10<sup>th</sup> September, 2020

Received in revised form 2<sup>nd</sup>  
October, 2020

Accepted 26<sup>th</sup> November, 2020

Published online 28<sup>th</sup> December, 2020

#### Key words:

Ahmedabad, COVID-19, Prevalence,  
Rural, Socio-demography

### ABSTRACT

**Background:** Corona virus disease (COVID-19) imported in India through air traveler from foreign country which is further scattered through droplets of infected patients. Deep rural group which are far from city are less exposed to it but with time it hits profound rural area also and that is alarming to India as public health concern.

**Objective:** 1) to estimate the prevalence of COVID in Rural Ahmedabad

2) To find Case Fatality Rate (CFR)

3) To determine the epidemiological factors affecting outcome of COVID positive patients

**Method:** Being a Nodal Team of contact tracing for Ahmedabad Rural COVID-19 cases, we got list of COVID-19 positive patients on daily bases from Ahmedabad Zila Panchayat office. We included total 1817 Patients from 1<sup>st</sup> case of Ahmedabad Rural up till 31<sup>st</sup> August for this study. Detailed information of COVID-19 patients was obtained by telephonic interview of patients or their relative.

**Result:** Prevalence of COVID-19 was found 0.12% with CFR 3.19%. Lockdown period was aid to uphold spread of COVID-19 in population. As increase migration from city to rural area during unlock, there was spike in trend of daily cases.

**Conclusion:** Prevalence of COVID-19 in Rural is rock-bottom compare to City. We need to protect innocent rural population being infected from current pandemic disease as 2/3<sup>rd</sup> of Indian population is dwell in rural area, if we protect them we will be much safe.

Copyright © 2020 Hetal Patel et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### INTRODUCTION

Corona virus disease (COVID-19) widely believed to have originated from the Hubei province of China in November 2019. The infectious disease caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), is spreading fast across the world and was declared a pandemic by WHO on March 11, 2020. As of 1<sup>st</sup> September 2020, the number of confirmed cases of Covid-19 worldwide stood at more than 25,533,086 with more than 851,647 deaths. India rank 3<sup>rd</sup> with cases(3,691,166) as well as Death toll(65,288).<sup>[1]</sup> In India, the first case was reported on 30<sup>th</sup> Jan 2020, among a group of students who arrived in the southern state of Kerala from Wuhan, the epicenter of the outbreak at that time. 1<sup>st</sup> case of Gujarat was reported on 19<sup>th</sup> march 2020 in Surat as well as in Rajkot, Ahmedabad Rural 1<sup>st</sup> case was reported on the next day 20<sup>th</sup> March from Sanand (Sela).<sup>[2]</sup>

Even as India has reached a new level in COVID-19 with over Millions of positive cases, yet there is no clear idea on the incidence of the disease in the rural areas.

#### Added value of this study

To our knowledge, our study is the first to develop a composite measure of community-level vulnerability concerning the COVID-19 situation in Ahmedabad Rural. The main value of our study is inter-district and intra-district ranking for COVID-19 provided to policy makers to prioritize resource allocation and devise effective mitigation and reconstruction strategies for affected populations.

#### Demographic vulnerability

The nature of the COVID-19 epidemic is such that both the pace of transmission and mortality due to infection depend on

\*Corresponding author: Hetal Patel

College / Institute / University / Company Address: B.J. Medical College, Civil Hospital, Ahmedabad

the demographic composition of the population; hence demography should be part of a vulnerability index.

We considered the following indicators to represent the demographic composition of a population in the context of COVID-19: the proportion of the population according to age group, the proportion of the population living in rural areas.

**Epidemiological factors**

There are several known epidemiological factors that might put a population at risk of higher morbidity and mortality by COVID-19 infection and thus merit inclusion in the vulnerability index.

We captured epidemiological factors through the following variables: the proportion of patient who reported having any of cardiovascular disease, diabetes, lung disease or other co-morbid conditions

**Purpose:** The aim of this study is to know the prevalence of COVID-19 cases and to describe the demographics and health parameters of COVID-19 patients from Ahmedabad Rural.

**MATERIAL AND METHODS**

Ahmedabad zila panchayat office provided list of patients from Ahmedabad districts to Community Medicine Department for contact tracing on daily basis.

The patients were contacted telephonically. Verbal consents were taken from the patients/informant and subsequently we asked about various details of all their contacts in last 14 days. These contacts must be in close vicinity of cases (<6 feet) and for more than 15 minutes. The patients were also inquired about their symptoms, types of isolation provided by health care, co-morbid status and about their family members. We also asked about the past history of any social gathering, their occupation and any other relevant epidemiological determinants. Patients were further contacted for follow up after a week.

**Ethical Issues**

Being the Nodal Agency we were given the task by Government of Gujarat to do contact tracing of each COVID-19 patients of Ahmedabad Rural. So, those data were analyzed as a secondary data for this study.

**RESULT**

Overall, Total 1,817 patients were interviewed during the study period. With total population of 1,486,785 Ahmedabad Rural gross prevalence comes out to 0.12%.

As per Table-1, Most of the cases were from Dholka 422 (23.22%) followed by Sanand 409 (22.50%) and Daskroi 295(16.23%). But according to case load per 10,000 population Sanand (17.20) was at rank one followed by Dholka (16.89) and Bavla (12.90). Total contact were traced during telephonic interview was 9671.

**Table 1** Taluka wise Distribution of COVID-19 Patients

Taluka	Total Population	Cases	Case load/10000 population.	Contact Traced
Dholka	2,49,852	422	16.89	2641
Sanand	2,37,845	409	17.20	1812
Daskroi	3,21,817	295	9.17	1486
Viramgam	1,93,283	219	11.33	1381
Bavla	1,58,191	204	12.90	911
Dhandhuka	1,45,252	141	9.71	776
Mandal	70,346	76	10.80	373

Detroj	83,199	40	4.81	208
Dholera	27,000	11	4.07	83
Total	1,486,785	1817	97	9671

The mean age of the patients was 44 ± 33.14 years while the median age was 43(IQR: 30-57) years. There were 1275(70%) male and 542(30%) female patients. Among them, the mean and median age were 42.95 ± 32.66 and 42(IQR: 30 to 56) years for men and 45.33 ± 34.02 and 45 (IQR: 30 to 59) years for women, respectively.

Total Case Fatality Rate (CFR) among all case was 3.19% but according to age group it was dominating in high risk group like Older age more than 50 years (13.96%) and children less than 10 years (4.76%). The CFR is high in Male (3.37%) than Female (2.76%) according to Table-2.

**Table 2** Distribution of Case, Death & CFR among COVID-19 patients as per their Age group & Gender

Age Groups	Male	Female	Total Case	Percentage	Death	Case Fatality Rate (CFR)
0-10	17	4	21	1.16%	1	4.76%
11-20	64	30	94	5.17%	0	0.00%
21-30	246	107	353	19.43%	1	0.28%
31-40	292	73	365	20.09%	4	1.10%
41-50	228	112	340	18.71%	7	2.06%
51-60	214	104	318	17.50%	21	6.60%
≥60	214	112	326	17.94%	24	7.36%
Total	1275	542	1817	100.00%	58	3.19%

As seen in Table-3, nearly half of the total death due to COVID-19 in Ahmedabad Rural was reported from Dholka 26(44.82%). While 1(1.72%) death was reported each in Bavla, Dhandhuka and Mandal due to COVID-19. Death rate is high among Male (74.13%) than Female (25.86%).

**Table 3** Taluka and Gender wise distribution of number of death among COVID-19 patients

Taluka	Male	Female	Total
Dholka	20	6	26
Dascroi	8	6	14
Viramgam	9	3	12
Sanand	3	0	3
Bavla	1	0	1
Dhandhuka	1	0	1
Mandal	1	0	1
Grand Total	43(74.13%)	15(25.86%)	58

**Time of presentation**

**Interval between day of onset of first symptom and day of positive result** Mean day of interval: 3.57 days

Median: 3 days (IQR: 2-5)

**Interval between day of positive result and day of tracing by RRT**

Mean day of interval: 1.56 days

Median: 1 day (IQR: 1-2)

**Interval between day of positive result and admission at Health care facility**

Mean day of interval: 1.56 days

Median: 0 day.

According to figure-1, Out of total 1817 patients, 1300(71.54%) were symptomatic patients. Among the symptomatic patients majority reported with fever 885(68%) followed by Cough 464(35.69%) and Cold 163(12.53%).

Total 427 Patient were with co-morbid condition, Out of them the most common commodities identified were Hypertension

[HTN] 237(55.50%), Diabetes Mellitus[DM] 186(43.55%) and Heart disease 40(9.36%) as seen in figure-2.

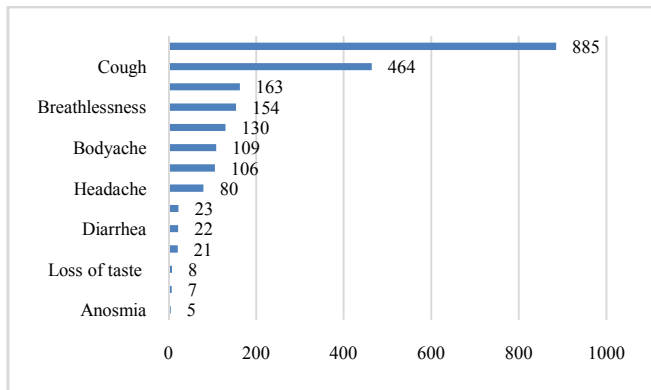


Figure 1 Symptoms reported by COVID-19 Patients

\*Multiple responses

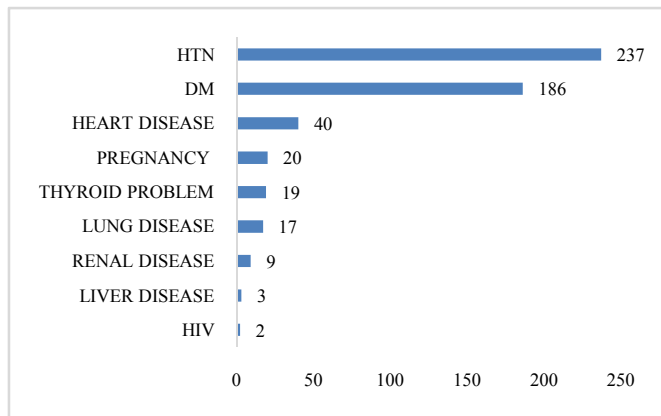


Figure 2 Co-morbidity in COVID-19 patients

\*Multiple responses

Most of the deaths were associated with Co-morbidity like Diabetes, Lung disease and Hypertension according to table-4. No known co-morbidity was found in 16(27.19%) of death reported among COVID-19 patients.

Table 4 Factors associated with Death among COVID-19 patients

Factors associated to Death	Count
Depression Due to Corona	1
Asthma	1
Kidney Diseases	1
Alcoholic	1
COPD	1
Diabetes, Cholesterol, Hypothyroidism	1
COPD, Hypertension, Hypothyroid	1
Diabetes, Dialysis	1
COPD, Diabetes, Gout	1
Diabetes, Hypertension, Pneumonia	1
Asthma & Chronic Alcoholic	1
Diabetes, Obesity	1
Diabetes	6
Age	6
Diabetes and Hypertension	7
Hypertension	11
No Co-morbidity Reported	16
<b>Total</b>	<b>58</b>

Figure-3 shows nearly 50% of the patients were factory workers or a small business holder or were doing job. 7% of Health care workers were affected during their COVID-19 duty. 10% of COVID-19 patients were belonging to super spreader community (Vendor/Farmer). Super spreaders are infection carriers who, by virtue of the nature of their jobs, can

pass on the infections to large groups of people. Vegetable vendors, retail shop owners, milk van owners are among the list of super spreaders.<sup>[3]</sup>

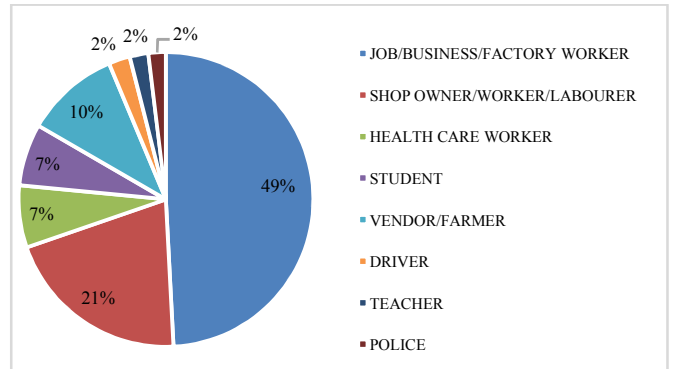


Figure 3 Occupation of COVID-19 patients

After reporting of COVID-19 cases India implemented lockdown strategies from 25<sup>th</sup> March which were strictly followed up till 3<sup>rd</sup> May. Later on during 3<sup>rd</sup> and 4<sup>th</sup> lockdown few essential services including many factories were allowed to work. This leads to public movement spreading corona from city area to virgin rural counterpart. As per the figure-4 we can see sudden spike after Unlock-1.

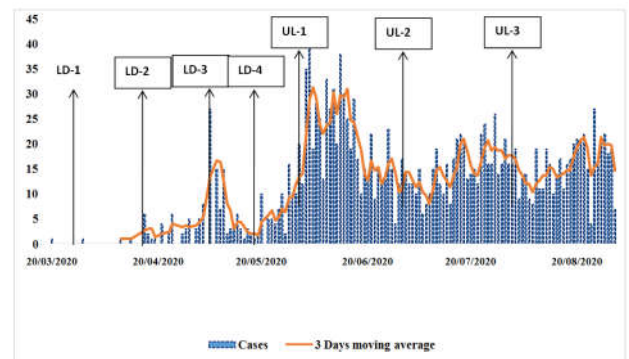


Figure 4 Trend of daily cases with different Lockdown & Unlock phases  
\*LD: Lockdown, UL: Unlock.

## DISCUSSION

Rural Ahmedabad contribute about 21% of COVID-19 case among total 31,678 of Ahmedabad city as on 1<sup>st</sup> September 2020.<sup>[4]</sup>

The top five COVID-19 cities, Mumbai, Delhi, Ahmedabad, Pune and Chennai were alone accounted for nearly 53% of India's cases. If the other towns/cities from elsewhere are clubbed with these, urban areas would account for an overwhelming proportion of COVID-19 so far. In Maharashtra, villages and small towns together accounted for only 6%. Similarly, in Karnataka rural areas shows share of 8%.<sup>[5]</sup>

The epidemic appears to be concentrated in more affluent and industrialized districts. Similarly most of the Ahmedabad Rural cases found from industrialized taluka like Dholka (23.22%) and Sanand (22.50%).

Worldwide, data categorizing risk across age and gender helps people make informed choices about their own disease risk and take measures to protect themselves. Similarly, age remains a strong predictor of the risk of death from COVID-19, which hits people in their mid-fifties, sixties and seventies the hardest.

A majority of the COVID-19 cases in India affect people between age group 45 to 74 years. Patients in age group of 60 to 74 years had the highest share of deaths during the measured time period which was similar to our study findings.<sup>[6]</sup> In our study, case load was found highest in age group of 31 to 40 years (20.09%) which was very young to get infected.

A report of the World Health Organization(WHO)- China Joint Mission on COVID-19 gave CFR of 3.8% in China<sup>[7]</sup> and The global COVID-19 fatality rate is 3.3%<sup>[8]</sup> which is similar to Ahmedabad Rural CFR 3.19%.

According to health ministry data, twice as many men have died of the COVID-19 as women in India, with men accounting for 69% of all fatalities. And more than 90% of the people who died, both men and women, were above 40 years of age.<sup>[8]</sup>

The CFR of Ahmedabad Rural was high in Male than Female (3.37% vs. 2.76%) comparable to china (4.7% vs. 2.8%).<sup>[7]</sup>

As per the Indian state Health minister, A 76 years old men who had returned from Saudi Arabia having co-morbidity like HTN, DM and Asthma died on 12<sup>th</sup> March in Karnataka making India's first fatality due to global COVID-19 pandemic.<sup>[9]</sup> First victim of Gujarat was 69 year old man who died on 22<sup>nd</sup> March in Surat due to COVID-19.<sup>[10]</sup>

Present study found that a 55 year old female having COPD died on 2<sup>nd</sup> May due to COVID-19 contributing first death of Ahmedabad rural from Daskroi taluka.

Symptoms of COVID-19 are non-specific and the disease presentation can range from no symptoms (asymptomatic) to severe pneumonia and death. In our study majority of patients had Fever, Cough, Cold and breathlessness as their initial symptoms. As per the report of WHO-China joint mission on Covid-19 typical signs and symptoms include: Fever (87.9%), Dry cough (67.7%), Fatigue (38.1%), Sputum production (33.4%), shortness of breath (18.6%), Sore throat (13.9%), Headache (13.6%), Myalgia or Arthralgia (14.8%), Chills (11.4%), Nausea or Vomiting (5.0%), Nasal congestion (4.8%), diarrhoea (3.7%), Haemoptysis (0.9%) and Conjunctivitis(0.8%).<sup>[7]</sup>

According to data from the Indian Government, more than 80% of confirmed cases in India are asymptomatic.<sup>[11]</sup> In present study only 21.35% patients were asymptomatic and 119 did not give reliable answer during interview.

The risk of dying from corona virus disease is also linked to underlying health conditions such as cardiovascular disease, diabetes, hypertension and kidney disease, and the capacity of health-care systems. In Ahmedabad Rural 237(55.50%), Diabetes Mellitus[DM] 186(43.55%) and Various heart ailments 40(9.36%) were commonly found as co-morbid condition in Covid-19 patients. But factor associated with that varies markedly.

A meta-analysis study on COVID-19 co-morbidities, as depicted by Subodh Sharma<sup>[12]</sup> had a total of 1786 patients, of which 1044 were male and 742 were female with a mean age of 41 years old. The most common co-morbidities identified in those patients were Hypertension (15.8%), cardiovascular and cerebrovascular conditions (11.7%), and Diabetes (9.4%). The less common co-morbidities were coexisting infection with HIV and Hepatitis B(1.5%), Malignancy(1.5%), Lung Disease(1.4%), Renal disease(0.8%), and Immunodeficiency

(0.01%).<sup>[12]</sup> In present study less common co-morbidity were Renal Disease 9(2.10%), Liver Disease 3(0.70%) and HIV 2(0.46%).

In present study 16(27.19%) death were reported in COVID-19 patients with no known Co-morbidity. US and India Shows diverge trend in death due to Covid.<sup>[13]</sup> The US's Centre for Disease Control and Prevention (CDC) released its findings in mid-June based on the data of 17 lakh+ COVID cases and 1 lakh+ deaths. It concluded that COVID-19 patients with underlying conditions were 12-times more likely than healthy patients to die of the virus. Conversely, an analysis of the data reported in India until July 2 by the Integrated Disease Surveillance Programme (IDSP) revealed no known co-morbidity in 43% of deaths due to COVID-19. The 43% of decease were also in the age group of 30-60 years.<sup>[13]</sup>

Lockdown is meant to prevent the spread of infection from one person to another, to protect ourselves and other. Realizing the gravity of the threat, the Indian Government put in place several measures, including stopping all international passenger flights (effective March 22, 2020), implementing strict nationwide lockdown (from March 25, 2020), which was extended by 12 more weeks with some relaxation and steps towards boosting health infrastructure and a large mass media campaign on the importance of social distancing and personal hygiene measures were taken.<sup>[14]</sup>

By restricting traffic for only essential goods and travel needs, we were able to contain it because that was our biggest asset, two-thirds of our population is in rural areas, if we protect them, we will be much safe.

To support economic crisis during pandemic government of India release lockdown in phases with 1<sup>st</sup> unlock on 1<sup>st</sup> Jun. With relaxation in the lockdown and the return of migrants, there was some reversal of the scenario. We should note here that the number of tests done so far was relatively low in rural areas, which may be partly concealing the true incidence.

#### Acknowledgments

We would like to thanks Department of Community Medicine, B.J. Medical College, Ahmedabad for supporting.

**Conflict of interest:** None

#### Reference

1. Global COVID-19: Tracking countries with the most cases, deaths on Sept. 1 [Internet]. Available from: <https://www.clickondetroit.com/news/world/2020/09/01/global-covid-19-tracking-countries-with-the-most-cases-deaths-on-sept-1/>
2. COVID-19 pandemic in Gujarat - Wikipedia [Internet]. Available from: [https://en.wikipedia.org/wiki/COVID-19\\_pandemic\\_in\\_Gujarat](https://en.wikipedia.org/wiki/COVID-19_pandemic_in_Gujarat)
3. Coronavirus India: 334 COVID-19 "Super-Spreaders" Found In Ahmedabad, Gujarat: Officials [Internet]. Available from: <https://www.ndtv.com/ahmedabad-news/coronavirus-india-334-covid-19-super-spreaders-found-in-ahmedabad-gujarat-official-2226442>
4. Ahmedabad reports 159 new cases of COVID-19; 4 more die [Internet]. Available from: <https://www.outlookindia.com/newscroll/ahmedabad-reports-159-new-cases-of-covid19-4-more-die/1927349>
5. How is Covid-19 playing out in rural India? - The Hindu BusinessLine [Internet]. Available from:

- <https://www.thehindubusinessline.com/opinion/how-is-covid-19-playing-out-in-rural-india/article31671013.ece>
6. India - COVID-19 cases by age group 2020 | Statista [Internet]. Available from: <https://www.statista.com/statistics/1110522/india-number-of-coronavirus-cases-by-age-group/>
  7. WHO, Aylward, Bruce (WHO); Liang W (PRC). Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). WHO-China Jt Mission Coronavirus Dis 2019 2020;2019(February):16–24.
  8. 90% of those killed by Covid in India are older than 40, 69% are men - india news - Hindustan Times [Internet]. Available from: <https://www.hindustantimes.com/india-news/90-of-those-killed-by-covid-in-india-are-older-than-40-69-are-men/story-glg0Ct4rHQ1YVvZgnckUcM.html>
  9. Karnataka announces India's first coronavirus death, Health News, ET HealthWorld [Internet]. Available from: <https://health.economictimes.indiatimes.com/news/industry/state-minister-announces-indias-first-coronavirus-death/74604253>
  10. 380 new coronavirus cases in Gujarat, tally 6,625, 28 deaths | Ahmedabad News - Times of India [Internet]. Available from: <https://timesofindia.indiatimes.com/city/ahmedabad/380-new-coronavirus-cases-in-gujarat-tally-6625-28-deaths/articleshow/75583227.cms>
  11. Asymptomatic patients less likely to infect others: Govt [Internet]. Available from: <https://www.livemint.com/news/india/asymptomatic-patients-less-likely-to-infect-others-govt-11589998055866.html>
  12. Paudel SS. A meta-analysis of 2019 novel corona virus patient clinical characteristics and comorbidities. 2020;
  13. Who Dies of COVID-19? Explaining the US's and India's Divergent Estimates - The Wire Science [Internet]. Available from: <https://science.thewire.in/health/covid-19-fatality-likelihood-comorbidities-idsp-cdc/>
  14. MOHFW. Minding our minds during the COVID-19. 2554;5–7.

**How to cite this article:**

Hetal Patel *et al* (2020) 'Study of Epidemiological Determinants of Covid-19 Patients: Ahmedabad Rural, Gujarat', *International Journal of Current Medical and Pharmaceutical Research*, 06(12), pp 5431-5435.

\*\*\*\*\*