



## SEROSURVEY OF SARS- COV-2 IN BHOPAL

### Community Medicine

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### ABSTRACT

**INTRODUCTION:** Sero-survey involves testing of blood serum of people to check for the prevalence of antibodies against corona virus infection .The first sero survey, had shown pan-India prevalence of Sars-Cov-2 to be 0.73%. Similarly Sero-survey of Bhopal city was conducted in collaboration with District Administration and NCDC. **OBJECTIVE:** To estimate prevalence of existing SARS-CoV-2 burden in the general population of Bhopal Methodology: This was as a cross-sectional study of children aged 1 year onwards, distributed across 85 wards. Sample size was 8000, calculated with estimated prevalence of 8.25 % with 1% precision, 95% confidence interval and design effect of 2.5. All laboratory testing was done by Microbiology Department, Gandhi Medical College Bhopal. **RESULTS:** 39.6% were males, 34.5% were females and 25.9% were children. Overall seropositivity was found to be 18.22%. **CONCLUSION:** The study gave an insight to prevalence of infection in Bhopal.

### KEYWORDS

SARS-CoV-2, seropositivity, prevalence

#### INTRODUCTION:

The first cases of infection with a novel corona virus, emerged in Wuhan, China on 31st December 2019 (1). Since then the COVID-19 pandemic has so far affected 213 countries and have caused 33,865,157 cases and 1,012,940 deaths world wide.(2) Research has shown that many victims of Covid-19 remain asymptomatic or pre-symptomatic, displaying mild symptoms, through the course of their infection. Generally mildly affected or asymptomatic individuals are not screened. As a result, the number of confirmed SARS-Cov-2 infections is largely underestimated.(8)3. Since current ICMR guidelines do not allow using PCR tests on asymptomatic subjects, it is possible that many infected people are not being tested, and thus, the extent of the spread of the disease is being underestimated. "Instead of waiting for the end of the epidemic, repeated sero surveys carried out at regular intervals can be a useful tool to monitor the epidemic precisely". A serosurvey involves testing of blood serum of a group of individuals for the presence of antibodies against that infection to know who has been infected in the past and has now recovered .Serosurvey tests done across the country are giving us a good indication of the actual number of infected cases in the country, which are exponentially larger than the cases actually reported or tested. (4)

**Chennai Sero-results done in** August 2020 has revealed that one-fifth of the population has been exposed to COVID-19 ranging between 7.1% and 44.2 % A survey conducted by the **Ahmedabad Municipal Corporation (AMC)** showed 23.24% samples had antibodies against corona virus. (5)

In **Indore** 7.72 per cent were found to have developed antibodies to COVID-19. (5)

**Punjab** found 27.7% people in containment zones were found to be positive for COVID Pune's first serosurvey has found that 51.5 per cent of the 1,644 respondents from five highly-affected wards in the city have seroprevalence of antibodies against SARS-CoV-2(5)

Antibodies against COVID-19 infection were found in 29.1 per cent of people surveyed in the national capital **Delhi**(5).

A sero-prevalence survey by ICMR in **Kolkata** has revealed that 14.39% of populations have developed Covid-19 antibodies(6).

These evidences have prompted the call for adoption of antibody testing as a potential source of data to address the gap in data and inform public health and governance policies oriented towards COVID-19 .Antibody – based tests would be capable of detecting both

ongoing as well as past SARS-Cov-2 infections due to their capacity to detect IgG and IgM , thereby providing valuable clues about asymptomatic infections in the community.(3)

Within Madhya Pradesh, the cities of Bhopal, Indore and Ujjain have emerged as the epicentres of COVID-19, together accounting for almost half the total number of cases from Madhya Pradesh (7), (8). Although the number of cases detected in Madhya Pradesh are relatively low (around 17,130 as on 30<sup>th</sup> Sept, 2020), the testing rates (tests/million) remain lower than the national average (9). It might be argued therefore, that a substantial number of positive cases remain undiagnosed. Keeping this in mind a sero prevalence study was planned by Department of Community Medicine, Gandhi Medical College, Bhopal, to provide estimate of COVID -19 infection in Bhopal and to know the burden of such cases in the community. Therefore the intention and the scale of this survey would be the best evidence-based strategy concurrently guiding policy formulation and implementation."

#### AIM AND OBJECTIVE:

To estimate prevalence of existing SARS-CoV-2 burden in the general population of Bhopal

#### 1. Study Methodology

**TYPE OF STUDY** - Cross Sectional - Community based survey

**STUDY DURATION** - 20 days

**STUDY AREA**- Bhopal city (85 wards under Bhopal Municipal Corporation)

#### Study Unit - Household

#### 1.1 Sample Population

All individuals aged 1 to 18 with guardian's consent, 18 years and above with written consent for participation in the study.

#### 2.2 Inclusion Criteria –

Residents of Bhopal residing since 1<sup>st</sup> March 2020.

One representative from each eligible household, providing consent to participate in research was selected by stratified random sampling across all the wards of Nagar Nigam, Bhopal.

Survey Team comprised of Lab Technician, Nursing Staff, Police and Nagar Nigam personnel .During the visit, all participants answered a pre validated questionnaire, and mobile based android app in their local language, followed by the collection of a blood sample by the sample collection team.

**1.3 Sample Size: 8000**

Divided across 85 according to their population weightage .Additional 20% households (1400) ward-wise were randomized considering attrition and non-consent/ non-response.

Target Population- 19,23,884 (As provided by BMC Bhopal) Sero-Prevalence- 7.5% (Assumption- In May, 2020 protocol of ICMR, the sero-prevalence was considered as 5%. Hypothesizing 1% rise each for June, July, August and 0.25 % for 1<sup>st</sup> week of September, time taken for initiation of the study, it is taken as 8.25%) with Confidence Level-95%, Absolute Precision- 1% ,Design Effect- 2.5

- Sample Size obtained was 7259, which is rounded off to 8000 assuming 10% non response rate and sample wastage rate =7985.
- Kish Grid was used to randomly identify each candidate based on age and gender.

**Three groups were formulated:**

- 1/3<sup>rd</sup> males 18 years and above
  - 1/3<sup>rd</sup> females 18 years and above
  - And remaining 1/3<sup>rd</sup> children aged 1yrs to <18 years
- 3 ml of sterile venous blood was collected in a non-EDTA vial and were labeled and transported from the field to the laboratory at Department of Microbiology, Gandhi Medical College, Bhopal, maintaining cold chain and along with properly filled Performa. The data collected was transferred at the end of the day to the investigator. Real time monitoring was done from specially designated Zonal office Room to resolve any issues, problems, discrepancies, and technicalities being faced by field teams.

**1.4 Ethical Clearance Was Taken From Institutional Ethical Committee.**

**1.5 Observation**

**Tab No.1 – Distribution Of Participants According To Gender**

S. No.	Gender	Total	Percentage
1	Adult male	3158	39.6
2	Adult female	2752	34.5
3	Children < 18 years	2066	25.9
	Total	7976	100

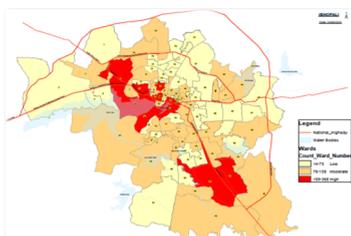
Gender wise distribution of the study participants. 39.6% were males, 34.5% were females and 25.9% were children.

**Tab No.2- Seroprevalence result**

S. No.	Gender	Negative %	Positive %	Total %
1	Adult male	2540 80.4	618 19.6	3158 39.6
2	Adult female	2260 82.1	492 17.9	2752 34.5
3	Less than 18 Female	777 84.6	141 15.4	918 11.5
4	Less than 18 Male	946 82.4	202 17.6	1148 14.4
TOTAL		6523 81.8	1453 18.2	7976 100

Above table shows the IgG antibody positivity of the seroprevalence study. Highest prevalence was amongst males ie 19.6% followed by females ie 17.9% and less than 18 males ie 17.6% .Lowest prevalence was amongst less than 18 females ie 15.4%. The overall prevalence was 18.2%. Study results indicate that 18.2% of the population of Bhopal has been infected with SARS Cov -2.It is a sign of growing herd immunity in the population. It has been documented that majority of COVID cases are either are very mild or asymptomatic which is quite evident from the study findings.

**1.6 Heat Map Of Bhopal According To Number Of Positive Cases In Each Ward.**



**CONCLUSION**

Community-level seroprevalence surveys of COVID 19 helps better

understand the percentage of previous infections in people who had few or no symptoms of infections in a community. Seroprevalence study results showed that 18.2% of the population of Bhopal has been infected with SARS COV -2. Such studies if conducted at periodic interval will reveal eventually the status of development of herd immunity in Bhopal over times to come.

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