ISSN- 0301-1216
Indian J. Prev. Soc. Med. Vol. 54, No.3, 2023

A sero-epidemiological study evaluating antibodies against COVID 19 infection in Andaman and Nicobar Islands, India

Avijit Roy[1], Rohit [2], Rajiv [3], Tapash Dakuya [4], Ilham Zaidi [5]

ABSTRACT

Introduction: Understanding the development of the pandemic has required analysis of patterns in COVID-19 reported cases, fatalities, emergency department visits, hospitalisations, and severe acute respiratory syndrome Corona virus 2 (SARS-CoV-2) infections. By examining evidence of earlier undiagnosed or unreported infections, sero-surveillance of SARS-CoV-2 antibody prevalence can offer an additional and distinctive indicator of disease burden. **Method:** A cross-sectional study was conducted among the general population to estimate the seroprevalence of COVID-19 antibodies. The study interviewed 4189 participants aged from 10 onwards and above using a pre-designed demographic form. Two-stage cluster sampling was done to draw participants. Descriptive statistics and bivariate analysis were applied to analyse the determinants of hypertension and stress. **Results:** The overall prevalence of antibodies among the participants was 26.5% (95% CI; 24.7 – 27.3). Out of 4189 individuals, 1088 (25%) had tested positive for COVID-19 antibodies. The seroprevalence of COVID-19 in the S. Andaman district was found to be 40.5%, 15.4% in north& middle Andaman and 17.1% in Nicobar participants. Ab test positive was highest amongst the children (55.1%) and lowest in the elderly age group (21%). Participants with normal with Ab test positive was 579 and in overweight participants 336 were Ab test positive. **Conclusion:** According to this study, Andaman & Nicobar seroprevalence has increased significantly over time and regionally, although more than one-third of the study population is sero-negative to the SARS-CoV-2 virus. Our estimated infection rates, which are based on seroprevalence, considerably outnumber the actual cases of COVID-19. To inform COVID-19 response, especially in resource-constrained areas, high-quality, standardized seroprevalence investigations are crucial.

Keywords: Seroprevalence, Andaman & Nicobar Islands, COVID-19 antibodies.

---

1 Deputy Director (Health)/ Nodal Officer (CoViD-19), Directorate of health Services, Andaman & Nicobar Islands Administration, India; +91 94742 80024; **Email:** dravijit@gmail.com

2 The Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala, India;; **Email:** rohitk520@gmail.com; (+91 89009 85225.

3 District Public Health Officer, South Andaman District, Directorate of health Services, Andaman & Nicobar Islands Administration, India; **Email: r**ajghosh1912@gmail.com; (+91 94342 70373

4 State Epidemiologist, State Health Systems – Integrated Disease Surveillance Program, Andaman & Nicobar Islands Administration, India; **Email:** drtapashbhms@gmail.com; 91 94760 51793

5 Advisor, International Society for Chronic Illnesses; **Email:** ilhamasgher@gmail.com; 91 98116 29859.

Corresponding Author: Dr. Ilham Zaidi, Advisor, International Society for Chronic Illnesses;
Email: ilhamasgher@gmail.com; 91 98116 29859.

Submission	21.08.2023	Revision	23.08.2023	Accepted	10.09.2023	Printing	30.09.2023

Prior Publication*: Nil*; Source of Funding:* Nil; *Conflicts of Interest*: None, *Article # 274

Introduction

The Severe Acute Respiratory Syndrome Corona virus 2 (SARS-CoV-2) virus, which is responsible for the Corona virus Disease 2019 (COVID-19) pandemic, continues to have a negative influence on population health and healthcare systems. The pandemic's worldwide toll is understated by the 604 million cases and 6.5 million fatalities documented as of September 7, 2022,[1] especially in low- and middle-income countries (LMICs) with insufficient infrastructure for contact tracing, diagnostic testing, and monitoring.[2]

The COVID pandemic with the variation in its course has caused the highest caseload globally during second wave.[3] According to the WHO, in August 15, 2020, India had the third highest number of corona virus disease (COVID-19) cases globally.[4] Through sero-prevalence studies, the prevalence of SARS-CoV-2 antibodies is calculated. These studies are crucial for figuring out the true infection frequency across all demographic groups, within particular geographic areas, and for case under ascertainment calculations. Since anti-SARS-CoV-2 antibodies are a very accurate predictor of immunological protection, seroprevalence investigations are essential for guiding scenario modelling, public health planning, and national policies in response to the pandemic.[5,6]

The emergence of severe acute respiratory syndrome corona virus 2 (SARS-CoV-2; previously provisionally named 2019 novel corona virus or 2019-nCoV) disease (COVID-19) in China at the end of 2019 has caused a large global outbreak and is a major public health issue. India saw a toll of 4 million registered cases as per MOHFW. Andaman & Nicobar Islands accounted for 10000 cases (approx) of COVID-19. One of the three districts of the Andaman & Nicobar Islands, South Andaman is situated in the Bay of Bengal region. The South Andaman District has a total area of 2980 square kilometers. Only 80 people per square kilometer live in this area, which is much fewer than the 324 people per square kilometer average throughout India. The inhabitants and terrain of the South Andaman district are distinctive. This paper explains the prevalence of antibodies against COVID-19 among the people of Andaman & Nicobar Island. By investigating the seroprevalence trends in various districts as well as in subgroups by age, sex & BMI.

Material and Methods

It is a community-based cross-sectional survey. The inclusion criterion in the study was individuals above age 10 onwards were considered for the study however individuals who were extremely ill and did not wish to participate were excluded from the study.

The sample size was calculated in ***Epi Info 2000 software***. The mean prevalence of COVID-19 antibodies from various studies across India was 23.5%. For a 95% confidence interval and 2.0% absolute precision, the sample size was calculated as 4299. However, the non-response rate was 2.5% (110 participants). Thus, the total sample size considered was 4189, which was a representative sample of people residing in Andaman & Nicobar Islands. The study participants were selected by simple random sampling through computer-generated numbers from the household number obtained from census data 2011. The sample size in each age group in each area was again calculated by probability proportional to size. The target sample per sampling unit is also calculated and is given in Table 1.

Pre-structured questionnaire consisting of demographic details was used to collect the data and 3-5 ml blood was drawn from each participant for antibody testing. Detection of SARS-CoV-2-specific IgG antibodies was performed using Erba Lisa ELISA-based kit. Antibody index was calculated by dividing each sample OD by cut-off value.

The interpretation of the antibody index depicts that:

<0.9: No detectable IgG antibody to COVID-19

<0.9-1.1: intermediate for COVID-19

>1.1Detectable IgG antibody to COVID-19

The intermediate results were documented separately for a better understanding of past immune responses against COVID-19 infection. The Erba Lisa ELISA-based test kit is based on the principle of indirect ELISA using recombinant Spike subunit antigens. It has a sensitivity of 99.12% and specificity of 99.33%

Statistical Analysis:

Primary data was entered in MS- Excel and were analysed in SPSS version 29.0. Descriptive analysis (percentage, mean, standard deviation) was done for the socio-demographic variables. The chi-square test was used to find the association between the categorical variables. A p-value of <0.05 was considered statistically significant.

Table -1: Area-wise sample size estimation

S No	District Name	Name	TRU	TOT_POP	NO_HH
1.	Nicobar	Teetop	Rural	522	135
2.	Nicobar	Kimois	Rural	382	92
3.	Nicobar	Malacca	Rural	1637	368
4.	Nicobar	Perka_2	Rural	1264	356
5.	Nicobar	Kinyuka	Rural	1120	309
6.	Nicobar	Tapoiming	Rural	941	214
7.	Nicobar	Kinmai	Rural	574	152
8.	Nicobar	Chukmachi	Rural	237	69
9.	Nicobar	Mildera	Rural	1350	403
10.	Nicobar	Itoi*(HITUI)	Rural	181	41
11.	Nicobar	Kamorta/Kalatapu(Incl.Sanuh)	Rural	1885	513
12.	Nicobar	Joginder Nagar	Rural	693	208
13.	Nicobar	Campbell Bay_1	Rural	1912	536
14.	Nicobar	Campbell Bay_2	Rural	1912	536
15.	Nicobar	Campbell Bay_3	Rural	1912	536
16.	N&M A	Swarajgram (RV)	Rural	940	219
17.	N&M A	Deshbandhugram (RV)	Rural	638	148
18.	N&M A	Krishnapuri (RV)	Rural	355	75
19.	N&M A	Rabindrapalli (RV)	Rural	317	72
20.	N&M A	Subhashgram (RV)_2	Rural	1303	348
21.	N&M A	Diglipur (RV)_1	Rural	1898	535
22.	N&M A	Ramakrishnagram (RV)_1	Rural	1610	409
23.	N&M A	Ramakrishnagram (RV)_2	Rural	1611	409
24.	N&M A	Aerial Bay (RV)	Rural	820	226
25.	N&M A	Kalipur (RV)	Rural	545	126
26.	N&M A	Nabagram (RV)	Rural	2208	541

Contd… / Next Page

S.No.	District Name	Name	TRU	TOT_POP	NO_HH
27.	N&M A	Kishori Nagar (RV)	Rural	1328	336
28.	N&M A	Kalighat (RV)	Rural	1759	490
29.	N&M A	Sagar Dweep (RV)	Rural	337	97
30.	N&M A	Gandhi Nagar (Forest Beat)	Rural	502	112
31.	N&M A	Sitanagar, (EFA)	Rural	101	22
32.	N&M A	Smith (EFA)	Rural	260	61
33.	N&M A	Mayabunder (RV)_2	Rural	1423	403
34.	N&M A	Pokadera (RV)	Rural	1922	538
35.	N&M A	Karmatang (RV)	Rural	1229	258
36.	N&M A	Webi (RV)	Rural	654	129
37.	N&M A	Tugapur (RV)	Rural	1872	447
38.	N&M A	Basantipur (RV)	Rural	413	105
39.	N&M A	Jaipur (RV)	Rural	543	125
40.	N&M A	Harinagar (RV)	Rural	1902	465
41.	N&M A	Swadesh Nagar (RV)	Rural	956	228
42.	N&M A	Lauki Nallaha (EFA)	Rural	745	175
43.	N&M A	Padmanabhapuram (RV)	Rural	659	189
44.	N&M A	Nimbutala (RV)_1	Rural	1531	402
45.	N&M A	Janakpur (RV)	Rural	1000	262
46.	N&M A	Rangat (RV)_1	Rural	1892	528
47.	N&M A	Rangat (RV)_2	Rural	1892	528
48.	N&M A	Rampur (RV)	Rural	1349	360
49.	N&M A	Bharatpur (RV)	Rural	101	26
50.	N&M A	Saktigarh (RV)	Rural	707	151
51.	N&M A	Kadamtala (RV)_2	Rural	1504	369
52.	N&M A	Uttara (RV)	Rural	1164	279
53.	N&M A	Strait Island (AS)	Rural	39	14
54.	N&M A	Nilambur (RV)	Rural	1498	427
55.	N&M A	Foster Valley (EFA)	Rural	70	15
56.	N&M A	Bakultala (CT) WARD NO.-0001_1	Urban	1370	362
57.	South Andaman	Shoal Bay (RV)	Rural	1373	302
58.	South Andaman	Mannarghat (RV)	Rural	1259	282
59.	South Andaman	Wimberlygunj (RV)_2	Rural	2005	480
60.	South Andaman	Stewartgunj (RV)	Rural	1172	220
61.	South Andaman	Temple Myo (RV)	Rural	346	70
62.	South Andaman	Bindraban (RV)	Rural	1785	396
63.	South Andaman	Hope Town (RV)	Rural	1258	297
64.	South Andaman	Shore Point (RV)_1	Rural	1536	381
65.	South Andaman	Aniket (RV)	Rural	129	28

Contd… / Next Page

Sl. No.	District Name	Name	TRU	TOT_POP	NO_HH
66.	South Andaman	Dundas Point (RV)	Rural	539	129
67.	South Andaman	Colinpur (RV)	Rural	449	99
68.	South Andaman	Ograbraij (RV)	Rural	1467	331
69.	South Andaman	Chouldari (RV)	Rural	2382	576
70.	South Andaman	Homfreygunj (RV)	Rural	424	103
71.	South Andaman	Hashmatabad (RV)	Rural	626	149
72.	South Andaman	Manglutan (RV)	Rural	2280	591
73.	South Andaman	Coffee Plot	Rural	8	5
74.	South Andaman	Bambooflat (CT) WARD NO.-0001_1	Urban	1990	476
75.	South Andaman	Bambooflat (CT) WARD NO.-0001_3	Urban	1990	477
76.	South Andaman	Bambooflat (CT) WARD NO.-0001_4	Urban	1991	477
77.	South Andaman	Govinda Nagar (RV)_1	Rural	1452	431
78.	South Andaman	Bejoy Nagar (RV)	Rural	1099	240
79.	South Andaman	Radha Nagar (RV)	Rural	637	161
80.	South Andaman	Ram Nagar (RV)	Rural	755	163
81.	South Andaman	Pahargaon part (RV)_2	Rural	1652	447
82.	South Andaman	Dollygunj (RV)_1	Rural	1975	525
83.	South Andaman	Dollygunj (RV)_2	Rural	1975	526
84.	South Andaman	Brichgunj (RV)	Rural	3412	562
85.	South Andaman	Teylorabad (RV)	Rural	1878	477
86.	South Andaman	Bimilitan (RV) & Kodiyaghat	Rural	2519	580
87.	South Andaman	Calicut (RV)_1	Rural	2016	483
88.	South Andaman	Calicut (RV)_2	Rural	2017	483
89.	South Andaman	Chidiyatapu (RV)	Rural	388	93
90.	South Andaman	Port Blair (M Cl) WARD NO.-0001_1	Urban	1963	505
91.	South Andaman	Port Blair (M Cl) WARD NO.-0001_3	Urban	1964	505
92.	South Andaman	Port Blair (M Cl) WARD NO.-0002_1	Urban	2443	621
93.	South Andaman	Port Blair (M Cl) WARD NO.-0002_2	Urban	2443	621
94.	South Andaman	Port Blair (M Cl) WARD NO.-0002_3	Urban	2443	622
95.	South Andaman	Port Blair (M Cl) WARD NO.-0003_1	Urban	2368	555
96.	South Andaman	Port Blair (M Cl) WARD NO.-0003_2	Urban	2368	555
97.	South Andaman	Port Blair (M Cl) WARD NO.-0003_3	Urban	2368	556
98.	South Andaman	Port Blair (M Cl) WARD NO.-0004_1	Urban	1875	481
99.	South Andaman	Port Blair (M Cl) WARD NO.-0004_3	Urban	1875	481
100.	South Andaman	Port Blair (M Cl) WARD NO.-0004_4	Urban	1876	481
101.	South Andaman	Port Blair (M Cl) WARD NO.-0005_1	Urban	1784	445
102.	South Andaman	Port Blair (M Cl) WARD NO.-0005_3	Urban	1784	446
103.	South Andaman	Port Blair (M Cl) WARD NO.-0006_1	Urban	2299	572
104.	South Andaman	Port Blair (M Cl) WARD NO.-0006_2	Urban	2299	573

Contd… / Next Page

Sl. No.	District Name	Name	TRU	TOT_POP	NO_HH
105.	South Andaman	Port Blair (M Cl) WARD NO.-0007_1	Urban	1725	454
106.	South Andaman	Port Blair (M Cl) WARD NO.-0007_3	Urban	1725	454
107.	South Andaman	Port Blair (M Cl) WARD NO.-0008_1	Urban	2671	619
108.	South Andaman	Port Blair (M Cl) WARD NO.-0008_2	Urban	2672	619
109.	South Andaman	Port Blair (M Cl) WARD NO.-0009_1	Urban	2091	513
110.	South Andaman	Port Blair (M Cl) WARD NO.-0009_2	Urban	2091	513
111.	South Andaman	Port Blair (M Cl) WARD NO.-0010_1	Urban	2135	552
112.	South Andaman	Port Blair (M Cl) WARD NO.-0010_2	Urban	2135	552
113.	South Andaman	Port Blair (M Cl) WARD NO.-0010_3	Urban	2135	552
114.	South Andaman	Port Blair (M Cl) WARD NO.-0010_4	Urban	2135	553
115.	South Andaman	Port Blair (M Cl) WARD NO.-0010_5	Urban	2135	553
116.	South Andaman	Port Blair (M Cl) WARD NO.-0011_1	Urban	1893	484
117.	South Andaman	Port Blair (M Cl) WARD NO.-0011_3	Urban	1894	484
118.	South Andaman	Port Blair (M Cl) WARD NO.-0012_1	Urban	2212	564
119.	South Andaman	Port Blair (M Cl) WARD NO.-0012_2	Urban	2212	564
120.	South Andaman	Port Blair (M Cl) WARD NO.-0013_1	Urban	2047	506
121.	South Andaman	Port Blair (M Cl) WARD NO.-0014_1	Urban	1968	470
122.	South Andaman	Port Blair (M Cl) WARD NO.-0014_2	Urban	1969	470
123.	South Andaman	Port Blair (M Cl) WARD NO.-0015_1	Urban	1955	517
124.	South Andaman	Port Blair (M Cl) WARD NO.-0015_2	Urban	1955	518
125.	South Andaman	Port Blair (M Cl) WARD NO.-0016_2	Urban	2188	541
126.	South Andaman	Port Blair (M Cl) WARD NO.-0017_1	Urban	2488	596
127.	South Andaman	Port Blair (M Cl) WARD NO.-0017_2	Urban	2488	596
128.	South Andaman	Port Blair (M Cl) WARD NO.-0017_3	Urban	2488	597
129.	South Andaman	Port Blair (M Cl) WARD NO.-0017_4	Urban	2488	597
130.	South Andaman	Port Blair (M Cl) WARD NO.-0018_1	Urban	2147	554
131.	South Andaman	Port Blair (M Cl) WARD NO.-0018_2	Urban	2148	554
132.	South Andaman	Port Blair (M Cl) WARD NO.-0018_3	Urban	2148	555
133.	South Andaman	Prothrapur (CT) WARD NO.-0001_1	Urban	2061	521
134.	South Andaman	Prothrapur (CT) WARD NO.-0001_3	Urban	2062	522
135.	South Andaman	Prothrapur (CT) WARD NO.-0001_4	Urban	2062	522
136.	South Andaman	Prothrapur (CT) WARD NO.-0001_5	Urban	2062	522
137.	South Andaman	Garacharma (CT) WARD NO.-0001_1	Urban	2403	622
138.	South Andaman	Garacharma (CT) WARD NO.-0001_2	Urban	2403	622
139.	South Andaman	Garacharma (CT) WARD NO.-0001_3	Urban	2403	622
140.	South Andaman	Garacharma (CT) WARD NO.-0001_4	Urban	2403	622
141.	South Andaman	Garacharma (CT) WARD NO.-0001_5	Urban	2403	622
142.	South Andaman	Garacharma (CT) WARD NO.-0001_6	Urban	2404	622
143.	South Andaman	Dugong Creek (OS)	Rural	109	23
144.	South Andaman	Rabindra Nagar (RV)	Rural	2108	519

Contd… / Next Page

Sl. No.	District Name	Name	TRU	TOT_POP	NO_HH
145.	South Andaman	Ramakrishnapur (RV)_2	Rural	2124	554
146.	South Andaman	Netaji Nagar (RV)	Rural	1001	260
147.	South Andaman	Hut Bay (RV)_1	Rural	1768	520
148.	South Andaman	Hut Bay (RV)_3	Rural	1769	520
149.	South Andaman	Hut Bay (RV)_4	Rural	1769	521
150.	South Andaman	Harmender Bay (NS)	Rural	1264	311

About 35 persons will be taken from each area by simple random sampling technique.

Results

The overall prevalence of antibodies among the participants was 26.5% (95% CI; 24.7 – 27.3).

Table- 2: Descriptive statistics Height, Weight, BMI

Descriptive Statistics					
	Total number of participants	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Height	4189	103.6 cm	198 cm	158.6 cm	10.2
Weight	4189	21 Kg	115 Kg	61.6 Kg	12.0
BMI	4189	15.2	47.	24.5	4.3

In the total of 4189 participants, the minimum height recorded was 103.6 cm and the maximum was 198 cm considering the standard deviation of 10.2. The participants with a 15.2 BMI were the least BMI and 47 was the maximum BMI among the participants with the standard deviation of 12 (Table- 2).

Table -3: Sero Positive district wise

Ab Test Result * District Cross tabulation								
Ab Test Result	**District**						**Total**	
	South Andaman		**North & Middle Andaman**		**Nicobar**			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Negative	975	57.2	1450	82.5	592	81.0	3017	72.0
Positive	691	40.5	272	15.4	125	17.1	1088	25.0
Undetermined	36	2.1	35	1.9	13	1.7	84	2.0
Total	**1702**	**40.6**	**1757**	**41.9**	**730**	**17.42**	**4189**	**100.0**

The results obtained for sero-positive district wise is 57.2% of south Andaman participants got Ab test results as negative while North & Middle Andaman has the highest per cent of Ab test negative (82.5%). Nicobar District had the

least positive Ab test results (17.1%) and 40.5% of participants from South Andaman were positive in Ab test results. While 2.1% of South Andaman participants were undetermined for the same test results. Out of 4189 individuals, 1088 (25%) had tested positive for COVID-19 antibodies (Table 3).

Table -4: Sero Positive Sex wise

Ab Test Result * Sex Cross tabulation						
Ab Test Result	**Sex**					
	Male		**Female**		**Total**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Negative	1482	72.1	1535	71.9	3017	72.0
Positive	528	25.6	560	26.2	1087	25.9
Undetermined	45	2.1	39	1.8	84	1.2
Total	**2055**	**49.0**	**2134**	**51.0**	**4189**	**100.0**

As per Table 4 the results obtained sero-positivity for male and female gender was 72.1% Ab test results were negative in male participants and 26.2% females were positive in the Ab test results. Only 2.1% of males and 1.8% of female participants were undetermined (Table-4).

Table- 5: Sero Positivity age category wise

Age category		**Ab Test Result**				**Total**
		Negative	**Positive**		**Undeter-mined**	
		No.	**No.**	**%**	**No.**	**No.**
Age category	Children	16	13	55.1	0	29
	Early working age	351	112	23.8	7	470
	Prime Working age	2253	808	25.8	67	3128
	Mature working age	305	130	29.3	8	443
	Elderly	92	25	21.0	2	119
Total		3017	1088	25.9	84	4189

Age category-wise seropositivity results are, Ab test positive was highest amongst the children (55.1%) and lowest in the elderly age group (21%). However, 67 participants in the prime age group were undetermined in Ab test results **(Table 5).**

Table - 6: Sero Result vs Body Mass Index (BMI)

BMI category	Ab Test Result			Total
	Negative	Positive	Undeter-mined	
Underweight	193	53	3	249
Normal Weight	1609	579	46	2234
Overweight	927	336	25	1288
Obesity	288	120	10	418
Total	**3017**	**1088**	**84**	**4189**

Participants with normal with Ab test positive was 579 and in overweight participants 336 were Ab test positive. The least sero test positive was found in 3 participants who were underweight (Table 6).

Discussion

The study's objectives are to determine the prevalence of COVID-19 antibodies among residents of India's Andaman & Nicobar Island. For an infectious viral disease like COVID-19, understanding the shift in population antibodies requires taking into account both the frequency of new infections and the waning of antibody titres over time when antibody levels fall below detectable threshold levels in the previously infected and recovered individuals.

South Andaman is a popular tourist destination in India due to its combination of lush beaches, an expanding hinterland, and deep tropical rainforest.[7] The inhabitants and terrain of the South Andaman district are distinctive.[7] The study determines district-wise Ab test results in Andaman & Nicobar Islands. Maximum participants of the South Andaman district had antibodies whereas in the Nicobar District participants, only 17.1% had Ab test positive. Similar results were shown in COVID-19 seroprevalence in the South. Andaman area in the study conducted in the year 2021.[7] In addition they also analysed the prevalence of the COVID-19 antibody was substantially greater in urban areas (44.09%) than in rural areas (34.27%) of South. Andaman District.

Males and females were further divided from the study population. Out of the total participants, 51% of women and 49% of men were present. According to Table 3, the antibody positivity was comparable in both sexes. Similar findings were obtained in the study carried out by Kumar D et al, although the study also indicated Additionally, it was shown that while antibody positivity in men was similar across all age groups (p-value 0.624), it was greater in females in the age range of 41 to 60 years compared to other female age groups (p-value 0.014).[7]

This paper also offers more specific proof of a measurable difference in infection by age per 10-year band. Around 55.1% seropositivity was found in children above 10 years of age whereas in the elderly group (Aged 60+) positive antibody was just 21%. For the participants falling in the prime working age or mature working age group AB test results were positive for 25- 29% of them. A systematic review published in the year 2022 showed similar results. Children under 10 years old, but not those between the ages of 10 and 19, had a lower seropositivity rate than adults between the ages of 20 and 29. In a similar vein, people over 60 years old had a lower seropositivity rate than those between the ages of 30 and 39, 40 to 49, or 50 to 59.[8,14] Differences in seroprevalence by age identified in earlier research now have more depth and specificity due to these findings. Adults 60 and older have lower seroprevalence, which may be explained by immuno senescence, which can hasten seroreversion.[9]

Association of BMI with the seropositivity obtained from the study was obese and overweight participants (927, 288) respectively were found to be Ab test negative. However, in this investigation even the normal-weight participants around 1609 were seronegative. The site, the month of enrolment, female sex, black African ethnicity, being overweight or obese, having respiratory symptoms, age group, and seropositivity were all linked to a higher risk of being seronegative.[10]Similar results were obtained and discussed in several other types of research conducted globally, thereby strengthening the evidence.[11,12,13]

We have identified high-seroprevalence risk groups that need to be the focus of treatments. Non-virally suppressed PLWHIV should be given priority in COVID-19 preventive programmes, such as vaccination and early referral and treatment because they have a lower serologic response to SARS-CoV-2 infection. Numerous reasons, such as milder illnesses, are frequently associated with lower antibody titers. Andaman and Nicobar Islands of India has experienced a large burden of SARS-CoV-2 infections. Lower seroprevalence among persons living in Nicobar District is likely a result of inadequate antibody production, this highlights the need to prioritize this group for intervention.

Conclusion

Seroprevalence is an essential indicator of population-level infection dynamics, but it should be noted that it does not reflect immunity against infection, making it an ineffective way to track the development of herd immunity. In conclusion, we discovered that protection against repeat SARS-CoV-2 infection is strong and measurable in the majority of people, preventing reinfections in naturally infected populations under the age of 60. We did find that those 60 and older had lesser protection against recurrent SARS-CoV-2 infection, though. This finding emphasises the necessity of implementing protective measures for the older population in the form of efficient vaccines, enhanced physical distance, and infection control, even in those who are known to have previously been infected. The older age group is more susceptible to a serious clinical course of illness.

References

1. World Health Organization. *WHO Coronavirus Disease (COVID-19) Dashboard* [Internet]. 2021. [cited 2021 Jun 11]. Available from: https://covid19.who.int

2. Bergeri I., Lewis HC, Subissi L, Nardone A, Valenciano M, Cheng B, Glonti K, Williams B, Abejirinde I.O.O., Simniceanu, A. and Cassini, A.. Early epidemiological investigations: World Health Organization UNITY protocols provide a standardized and timely international investigation framework during the COVID- 19 pandemic. *Influenza and other respiratory viruses*, *16*(1), pp.7-13, 2022.

3. WHO. Situation Report [Internet]. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200814-covid-19-sitrep-207.pdf

4. Selvaraju, S., Kumar, M.S., Thangaraj, J.W.V., Bhatnagar, T., Saravanakumar, V., Kumar, C.P.G., Sekar, K., Ilayaperumal, E., Sabarinathan, R., Jagadeesan, M. and Hemalatha, M.S., 2021. Population-based serosurvey for severe acute respiratory syndrome coronavirus 2 transmission, Chennai, India. *Emerging Infectious Diseases*, *27*(2), p.586.

5. Khoury DS, Cromer D, Reynaldi A, Schlub TE, Wheatley AK, Juno JA, Subbarao K, Kent SJ, Triccas JA, Davenport MP. Neutralizing antibody levels are highly predictive of immune protection from symptomatic SARS-CoV-2 infection. Nature medicine. 2021 Jul;27(7):1205-11.

6. Earle KA, Ambrosino DM, Fiore-Gartland A, Goldblatt D, Gilbert PB, Siber GR, Dull P, Plotkin SA. Evidence for antibody as a protective correlate for COVID-19 vaccines. Vaccine. 2021 Jul 22;39(32):4423-8.

7. Kumar D, Burma A, Mandal AK. A seroprevalence study of Covid 19 antibody after 1st wave of the pandemic in South Andaman district, India. Clinical Epidemiology and Global Health. 2021 Oct 1;12:100901.

8. Chen X, Chen Z, Azman AS, Deng X, Sun R, Zhao Z, Zheng N, Chen X, Lu W, Zhuang T, Yang J. Serological evidence of human infection with SARS-CoV-2: a systematic review and meta-analysis. The Lancet Global Health. 2021 May 1;9(5):e598-609.

9. Hansen CH, Michlmayr D, Gubbels SM, Mølbak K, Ethelberg S. Assessment of protection against reinfection with SARS-CoV-2 among 4 million PCR-tested individuals in Denmark in 2020: a population-level observational study. The lancet. 2021 Mar 27;397(10280):1204-12.

10. Wolter, N., Tempia, S., von Gottberg, A., Bhiman, J.N., Walaza, S., Kleynhans, J., Moyes, J., Buys, A., McMorrow, M.L., Aitken, S. and Magni, S., 2022. Seroprevalence of Severe Acute Respiratory Syndrome Coronavirus 2 After the Second Wave in South Africa in Human Immunodeficiency Virus–Infected and Uninfected Persons: A Cross-Sectional Household Survey. *Clinical Infectious Diseases*, *75*(1), pp.e57-e68.

11. Mahallawi WH, Alsarani MA, Aljohani RH, Alluhaibi AA, Alamri TH, Ibrahim NA, Mahallawi KH, Khabourd OF. Seroprevalence of SARS-Cov-2 IgG antibodies in patients at a single center in Saudi Arabia. Annals of Saudi medicine. 2022 Mar;42(2):69-74.

12. Sharma P, Chawla R, Basu S, Saxena S, Mariam W, Bharti PK, Rao S, Tanwar N, Rahman A, Ahmad M, Mariam W. Seroprevalence of SARS-CoV-2 and Risk Assessment Among Healthcare Workers at a Dedicated Tertiary Care COVID-19 Hospital in Delhi, India: A Cohort Study. Cureus. 2021 Dec 29;13(12).

13. Yanai H. Significant correlations of SARS-CoV-2 infection with prevalence of overweight/obesity and mean body mass index in the SARS-CoV-2 endemic countries. Cardiology research. 2020 Dec;11(6):412.

14. Ansari N, Nisar MI, Khalid F, Mehmood U, Usmani AA, Shaheen F, Hotwani A, Begum K, Barkat A, Yoshida S, Manu AA. Prevalence and risk factors of Severe Acute Respiratory Syndrome Coronavirus 2 infection in women and children in peri-urban communities in Pakistan: A prospective cohort study. Journal of global health. 2022; 12.

Citation: Koran Hiral, Chande P: COVID-19 pandemic learning: An opportunity for planning for the management of uncorrected refractive errors in rural India?**. Indian J Prev Soc Med, 2023; 54 (3): 116-126.**