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*Full Length Research Paper*

# Seroprevalence of anti SARS-CoV-2 antibody among asymptomatic and apparently healthy individuals attending in the department of microbiology, Dhaka Medical College

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## Abstract

**Objectives: SARS-CoV-2 is an emerging corona virus, was first recognized as the causative agent of COVID-19 and WHO declared COVID-19 as a global pandemic. For better control of COVID-19 pandemic, identifying and quarantining of asymptomatic individuals are urgently needed. The objective of study was to determine the Anti SARS-CoV-2 antibody (IgG) among asymptomatic and apparently healthy individuals attending the department of microbiology, Dhaka Medical College. Methods: Blood samples were collected from asymptomatic and apparently healthy individuals attending the department of microbiology, Dhaka Medical College. Antibody responses were measured using the Chemiluminescence Immunoassay, ADVIA Centaur (Siemens, Munich, Germany) SARS-CoV-2 IgG (COV2G) assay. Results: Among 200 blood samples, 49% were from male and 51% were from female. Out of 200 samples, 39% showed reactive results for anti SARS-Cov-2 IgG assay. Most of the participants were from 21-40 years of age and 41-60 years of age group (52%) were mostly affected. We did not observe significant differences in seroprevalence between gender and age. Conclusion: The results will help to know the percentage of population having anti SARS-Cov-2 antbodies which may help the policy makers to control pandemic and make policy regarding vaccination strategy.**

**Key words**: Anti SARS-CoV-2 antibody; Asymptomatic; Bangladesh; IgG, SARS-CoV-2; Covid-19; Seroprevalence.

## INTRODUCTION

Coronaviruses are enveloped RNA viruses that are distributed broadly among humans, other mammals, and birds that cause respiratory, enteric, hepatic, and neurologic diseases (Weiss and Leibowitz, 2011). The SARS-CoV-2 virus is a betacoronavirus, named for the crown-like spikes on their surface, causes coronavirus disease 2019 (COVID-19) (Bonelli et al., 2021). Corona virus Study Group (CSG) of the International Committee name the new corona virus as SARS-CoV-2 on 11 February

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2020 and WHO officially named the disease as corona virus disease 2019 (COVID-19) (Lu et al., 2020). The disease was first identified in December 2019 in Wuhan, the capital of China's Hubei province and WHO declared COVID-19 a pandemic in March 2020 (Amiri and Akram, 2020).

The clinical manifestations of infection with SARS-CoV-2 range from asymptomatic infection to severe disease which can lead to death (Pollán et al., 2020). Asymptomatic COVID-19 infection has been defined as a person infected with SARS-CoV-2 who has no clinical symptoms yet but is nucleic acid testing (NAT) positive for SARS-CoV-2. Asymptomatic persons are potential sources of COVID-19 infection and several studies reported that asymptomatic COVID-19 infections play important roles in the transmission of COVID-19 (Zhang et al., 2020; Li et al., 2020). Asymptomatic infections are increased from 1.2% to 5.9% (Wu and McGoogan, 2020) and about 5% of COVID-19 infections were asymptomatic in Beijing, China (Tian et al., 2020). The familial cluster infected with COVID-19 has been reported in homes or hospital, especially without obvious symptoms (Chan et al., 2020). Asymptomatic cases will spread the virus to other close contacts quickly if they are not detected and isolated appropriately for medical observation. Therefore, identification and control of asymptomatic cases, as well as early quarantine for their close contacts, especially in families, are important measures to limit the transmission of COVID-19 infection (Zhang et al., 2020).

Currently, reported cases of COVID-19 are mainly limited to symptomatic individuals. The diagnosis is usually based on reverse transcription polymerase chain reaction (RT–PCR) that appears to be sensitive to the assay method and the timing of specimen collection, transportation and storage (Xu et al., 2020). About 30% of COVID- 19 patient has been reported as false-negative by RT–PCR (Ai et al., 2020). As such, a large number of subclinical and asymptomatic infected individuals might have been undetected by RT-PCR (Xu et al., 2020). Molecular and rapid antigen tests are targeted for early diagnosis while immunoassays have a larger role in epidemiological studies, understanding longitudinal immunity, vaccine development and response (Bonelli et al., 2021).

Report suggests detection of anti-SARS-CoV-2 IgG antibodies as an acceptable approach to confirm infection (Zhang et al., 2020). Anti-SARS-CoV-2 antibody testing may play an essential role in the public health response to COVID-19 and in understanding the outbreak of the COVID-19 pandemic (Kaku et al., 2021). About 6·92% of population of Wuhan developed IgG antibodies against SARS-CoV-2, with 39·8% of this population seroconverting to have neutralizing antibodies (He et al., 2021).

To better control of COVID-19 pandemic, early identification of asymptomatic individuals are urgently needed so that needful measures could be taken. This study was conducted to assay anti SARS-CoV-2 antibody among asymptomatic and apparently healthy individuals attending in the department of microbiology, Dhaka Medical College, to detect seroprevalence of COVID-19 asymptomatic cases.

## MATERIAL AND METHODS

### Study design and participants

This cross sectional study was conducted in the department of Microbiology, Dhaka Medical College, Dhaka, Bangladesh from February 2021 to June 2021. A total of 200 apparently healthy individuals attending in the Department of Microbiology of Dhaka Medical College to collect reports of blood and urine culture and having no symptoms like fever cough, runny nose, body ache and had no history of symptoms suggestive of covid-19 before, were participated in this study. All were close family members of patients whose blood and urine samples were sent for culture and sensitivity.

Five ml venous blood without any anticoagulant were collected from median anti-cubital vein and processed immediately at room temperature by centrifugation at 2000 X g for 10 min. Serum was separated and stored at - 20ºC until further analysis. Antibody responses were measured using the Chemiluminescence Immunoassay, ADVIA Centaur (Siemens, Munich, Germany) SARS-CoV-2 IgG (COV2G) assay. Serum samples were considered reactive when the output index was ≥1·00 and nonreactive when the output index was <1·00.

### Ethical issues:

Written informed consent was taken from all the participants and the protocol was approved by ethical review committee of Dhaka Medical College. Confidentiality of data was maintained.

### Statistical analysis

Statistical analysis was performed using the SPSS statistical software (version 25; IBM). Qualitative variables are expressed as percentages and quantitative variables as means, standard deviation (SD), and range. A p-value of <0.05 was considered statistically significant.

## RESULTS

In total, 200 blood samples were analyzed. Among them,

**Table 1: Distribution of Age and Sex of participants**

| Variable | Number | Percentage |
|---|---|---|
| **Sex** | | |
| Male | 98 | 49 |
| Female | 102 | 51 |
| **Total** | **200** | **100** |
| | | |
| **Age (years)** | | |
| ≤20 | 58 | 29 |
| 21-40 | 68 | 34 |
| 41-60 | 50 | 25 |
| >60 | 24 | 12 |
| **Total** | **200** | **100** |

**Table 2: Distribution of reactive level of Anti SARS-CoV-2 IgG in different age group**

| Age Group (years) | No. of total samples | Reactive Anti SARS-CoV-2 IgG n (%) |
|---|---|---|
| **≤20** | 58 | 20 (34.5) |
| **21-40** | 68 | 26 (38.2) |
| **41-60** | 50 | 26 (52.0) |
| **>60** | 24 | 06 (25.0) |

98 (49%) were male and 102 (51%) were female. The mean age was 34.06 years (±18.3 years). Most of the participants were from 21-40 years of age group (Table 1).

Out of 200 participants, reactive level of antibody for anti SARS-Cov-2 IgG was found in 78 (39%) participants. The mean antibody titer was 4.38±7.33, 95% CI: 2.90-5.86. The seroprevalence rate in male was 19.1% and in female was 19.6%.

Among the participants who had reactive level of anti SARS-Cov-2 IgG, 52% were from 41-60 years age group (Table 2).

## DISCUSSION

In this study, the seroprevalence was 39% among asymptomatic and apparently healthy individuals. In Denver, 29% of seroprevalence was detected which is consistent with our study (Grossberg et al., 2021). In contrast to the present findings, 55% of seroprevalence was reported in asymptomatic infections in Tongji Hospital, Wuhan, China in 2020 (Lei et al., 2020) which is higher than the present study. On the other hand, about 5% - 6.92% of seroprevalence was reported in Beijing as well as Wuhan of China and in Spain which are lower than present study (Pollan et al., 2020; Tian et al., 2020; He et al., 2021). In USA 2.5% and 2.8% of seroprevalence for SARS-CoV-2 antibodies were reported (Tanne, 2020; Menachemi et al., 2020). The reason for this relatively low prevalence in those studies might be due to the fact that those studies were carried out in 2020 which was the early period of pandemic. The other reason might be due to the authority of China took strict measures in maintaining social distancing (e.g. stay-at-home orders) that likely minimized community spread (Menachemi et al., 2020). But rate of transmission of the SARS-Cov-2 virus was high at Dhaka during the present study period which may be the reason of higher proportion of anti-SARS-Cov-2 IgG antibodies among the asymptomatic individuals in the study. Moreover, all the participants of the present study came to the hospital with symptoms unrelated to Covid-19 and many of them might have been infected but presented with mild symptoms unrelated to covid-19 which might be overlooked by the patients as well as the attending physicians.

No significant difference in sero-prevalence was observed between male and female in the present study (19.1% in males and 19.6% in females) which is consistent with other studies (Xu et al., 2020; Grossberg et al., 2021; Bingham et. al., 2022). However, higher proportion of anti-SARS-Cov-2 antibodies among asymptomatic male and female might be due to higher infection rate during this study period.

In this study, most seropositive age group was 41-60 years (52%) followed by 21-40 years (38.2%). Seropositivity was significantly higher in individuals older than 65 years (2% in participants ≥65 years versus 1.3% in participants <65 years, $P < 0.01$) (Xu et al., 2020).On the other hand, no significant differences in seropositivity was observed between different age groups (Sotgiu et al., 2020; Grossberg et al., 2021; Bingham et al., 2022).

The reason behind higher seroprevalence among this older age group in some studies might be due to the fact that the prevalence of diabetes mellitus and other

morbidities are increased as age advances. Also suppression of immune status may play role in higher seroprevalence in older people. The lower prevalence rate among children might be due to many children have antibodies against other corona viruses due to previous infection. In UK, it was reported that 47% children under 10 years of age and 53% children over 10 years of age developed antibodies consistent with previous SARS-CoV-2 infection, 50% of them reported no previous symptoms consistent with SARS-Cov-2 (Waterfield et al., 2021).

## CONCLUSION

Anti SARS-CoV-2 IgG (COV2G) assay is important in understanding the prevalence of the SARS-CoV-2 in the community and to identify those who have gained immunity. If we know the percentage of population who have anti SARS Cov-2 antibodies, the policy makers can make policy regarding vaccination strategy which ultimately help in control of pandemic.

### Conflicts of interest

The authors declare no conflicts of interest.

### Funding source

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### Ethical approval statement

Ethical clearance was taken from ethical review committee (ERC) of Dhaka Medical College.

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