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Original Research Article

Dynamics of anti-SARS-CoV-2 IgG antibodies over four months period during pandemic in health care workers

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ABSTRACT

Background: Person infected with severe acute respiratory syndrome- coronavirus-2 (SARS-CoV-2) may develop virus specific IgG antibodies but antibody titers might decline over time, antibody titer decline, chances of HCWs getting re-infected may be higher.
Methods: Here we assessed status of Anti SARS-CoV-2 antibodies in HCWs over a four months period by detection of anti-SARS-CoV-2-IgG antibodies using a semi-quantitative enzyme-linked immunosorbent assay (ELISA).
Results: The present follow up study shows that during four months period sero-positivity in HCWs increased from 32% to 42%. Of 100 enrolled HCWs, 37 were RT-PCR positive at least once, of which only 31 were seropositive and six were seronegative. Two HCWs turned sero negative from sero positive and in five HCWs antibody titer increased.
Conclusions: Although HCWs are at a greater exposure risk, the sero-prevalence in them at places where adequate preventive measures are taken, is comparable to that of general population.

Keywords: Anti SARS-CoV-2, IgG antibodies, HCWs

INTRODUCTION

Person infected with severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) may develop virus specific IgG antibodies within 1 to 3 weeks but antibody titers might decline over time.[1]

Persistence of antibodies is also an indicator of protection status of host against COVID-19. if antibody titer decline over time, chances of HCWs getting re-infected are higher.[2]

Here we assessed status of decline of Anti SARS-CoV-2 antibodies in HCWs over a four months period.

METHODS

Total 100 randomly selected HCWs who consented to participate, were enrolled in first week of October 2020, at King George's Medical University India.

Anti–SARS-CoV-2 IgG antibodies at baseline and 4 month later were estimated. Serum specimens were tested for anti-SARS-CoV-2-IgG antibodies using a semi-quantitative enzyme-linked immunosorbent assay (ELISA) (Kavach, Trivitron Healthcare Private Limited, India) according to the manufacturer's instructions, both at the time of enrollment and at follow up.

All enrolled HCWs were tested for Covid-19 by RT-PCR at least once, either because of manifestations of

Covid-19's clinical symptom or during screening done for all HCWs in 2nd week of September 2020, as a hospital policy. All the participants were interviewed to collect clinical history of COVID-19 related symptoms.

RESULTS

Sero-positivity changed from 32% at baseline (32/100) to 42% (42/100) after period of 4 months. Of 100 enrolled HCWs, 37 were RT-PCR positive at least once, of which only 31 were seropositive and six were seronegative. Of 63 RT-PCR negative individuals, one was seropositive. The flow chart shows details of test results.

Total 32 (%) HCWs were seropositive in October 2020. Upon repeat serological testing after 4 months, of these 32 participants, eight participants (25%) showed no change in OD value and five (15.62%) participants showed increase in OD value. Total 17/32 (53.12%) participants showed a decline in antibody response indicated by lower OD value. Two of 32 (6.25%) participants became sero-negative. Both these participants did not report COVID-19 related symptoms during observation period. Sixty-eight out of 100 participant were negative at baseline visit. Of these 12 (17.64%) participants developed detectable IgG antibodies to SARS-CoV2, whereas 56 (82.35%) participants remained sero-negative. Of 12 seropositive participants, three reported RT-PCR positivity during follow up period but remaining 9 participants never complained of COVID-19 symptoms, hence were not offered RT-PCR test for SARS-CoV2.

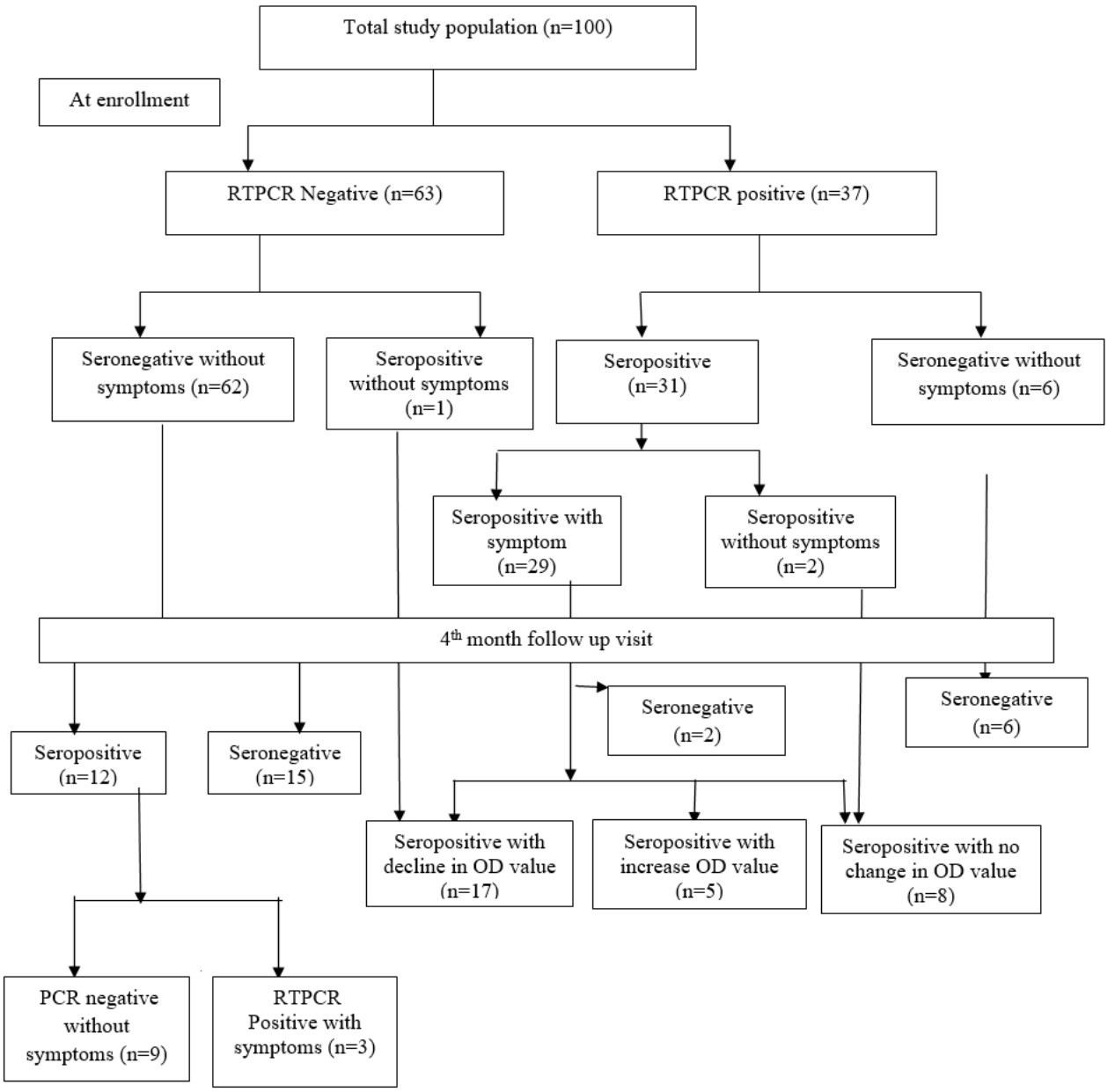

Figure 1: The flow chart showing Sero-positivity status of Health Care Workers at the time of enrollment and after four months.

DISCUSSION

The present study shows that sero-positivity in HCWs increased from 32% to 42% in 4 months period. A similar study done in Milan Italy on health care workers in early phase of pandemic has also shown the increase in seropositivity over time though the levels were lower. Like our data they have also shown that the rates were similar to that of the rest of the population. All RT-PCR positive persons did not seroconvert.[3] Seroconversion was seen in 31/ 37 cases, findings similar to one of the recently published study. Although we did not analyse factors associated with seroconversion, others have reported that the seroconversion was found to be inversely related to viral load and time to viral clearance. A positive correlation of SARS-CoV-2 viral load with ferritin, LDH, levels of C-reactive protein, and fibrinogen and an inverse association with the blood lymphocyte and neutrophil is also reported.[4]

In present study, antibody titers were maintained in most of the HCWs for a period of 4 months with minimal decrease in antibody titers. Only two cases turned sero negative from sero positive while five cases showed increase in antibody titer. Several studies are done world over to show the immunology of COVID-19. All of them have shown that IgG dynamics follows a pattern of peak, plateau, and persistence at lower levels. IgG titres rose to a peak between three to eight weeks post symptom onset. A decrease in antibody levels was reported in the eighth week post symptom onset by some studies.[5]

Limitations

The present study does not include any corresponding data in the general population. We did not follow HCWs more than once. More over only one hundred HCWs were available for follow up study.

CONCLUSION

The present data of this follow up study done in HCWs over a period of 4 months, shows the increase in prevalence of anti SARS-CoV-2 IgG antibody positivity. The antibodies persistence was also seen. Although HCWs are at a greater exposure risk, the sero-prevalence in them at places where adequate preventive measures are taken, is comparable to that of general population.

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