Original Article

Assessment of the Persistence of Anti SARS-Cov2 Igg Antibody Over a Period of Six Months Among Industrial Workers

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ABSTRACT

Objective: To assess the presence of anti-(SARS-CoV-2) antibodies among industrial workers in Pakistan and persistence of the antibodies over a period of 6 months and compare the levels of IgG antibodies in asymptomatic and symptomatic individuals.

Study Design: Descriptive study

Place and Duration of Study: This study was conducted at the National institute of Blood Diseases and Bone-marrow transplantation, Karachi from June 2020 to November 2020.

Materials and Methods: Male industrial workers were included and testing for detection of COVID-19-IgG antibodies by ELISA technique was performed initially in June 2020 and then in the months of September and November of the same year.

Results: Eighteen out of 36 male workers were positive for antibodies in June 2020 on baseline. Of those 18 individuals, 16 remained positive after a period of 3 months while 03 of them were still positive after a period of 06 Months. Among the borderline positive workers, two turned into positive after a period of 3 months while all of them became negative at the end of 06 months period.

Conclusion: It is concluded that individuals exposed to SARS CoV-2 develop IgG antibodies which are higher in asymptomatic individuals and persist for more than 03 months in most of the individuals. These antibodies decline in a gradual manner quantitatively and fade away before the period of 06 months in majority of the individuals.

Key Words: Anti-(SARS-CoV-2) Antibodies, IgG, Industrial workers, Persistence

Citation of article: Dildar S, Asif M, Jaffri MA, Imam M, Shamsi TS. Assessment of the Persistence of Anti SARS-Cov2 Igg Antibody Over a Period of Six Months Among Industrial Workers. Med Forum 2023;34(5):48-50.

INTRODUCTION

Millions of people worldwide have been impacted by the severe acute respiratory syndrome coronavirus 2 ((SARS-CoV-2))-caused new coronavirus illness (COVID-19), which has spread globally.[1] The primary goal of the researchers is to develop effective and affordable vaccines against this virus. However, the development of vaccines is a long and tedious process. Therefore, another way to address this global health issue is to assess the degree of population immunity by identifying the presence of specific antibodies that are generated in response to infection with the virus[2,3].

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Received: November, 2022
Accepted: March, 2023
Printed: May, 2023

The body produces a specific type of antibodies, called immunoglobulin G (IgG), when exposed to (SARS-CoV-2). IgG antibodies can be detected in the blood of infected individuals and are used as a marker of infection. Studies have shown that most individuals who are exposed to (SARS-CoV-2) develop both IgG and IgM antibodies. However, the levels of these antibodies vary from person to person and over time[4]. Thus, it is important to assess the persistence of antibodies generated against (SARS-CoV-2) over a period of time.The present study was conducted to assess the persistence of anti-(SARS-CoV-2) IgG antibodies over a period of six months among industrial workers in Karachi, Pakistan[5]. Male industrial workers were included in the study and testing for the detection of COVID-19-IgG antibodies was done initially in June 2020 and then in the months of September and November of the same year[6]. The results of the study showed that eighteen out of thirty-six male workers were positive for antibodies in June 20207. eighteen individuals, sixteen remained positive after a period of three months while three of them were still positive after a period of six months Among the borderline-positive workers, two turned into positive after a period of three months while all of them became negative at the end of six months period. Based on the results of the study, it can be concluded that individuals exposed to SARS CoV-2 develop IgG antibodies which are higher

in asymptomatic individuals and persist for more than three months in most of the individuals[8]. However, these antibodies decline in a gradual manner quantitatively and fade away before the period of six months in majority of the individuals. The findings of the present study provide an insight into the dynamics of development and persistence of anti-(SARS-CoV-2) IgG antibodies in industrial workers.

MATERIALS AND METHODS

A cohort of industrial workers who volunteered to participate in the study after informed consent were enrolled at National institute of Blood Diseases and Bone marrow transplantation, Karachi from June 2020 to November 2020. A total of 36 workers of Hilton pharmaceuticals were enrolled for the study. These individuals were tested for presence of covid-19 antibodies IgG by ELISA at baseline in June 2020 and then in the months of September and November of the same year. Specific antibodies (IgG) against nucleocapsid (NP) protein of corona virus were detected quantitatively using Enzyme linked immunosorbent assay (ELISA) technique.

Data collection: Data was collected from a cohort of 36 industrial workers in Karachi, Pakistan. The study was conducted in three phases. During the first phase of June 2020, all the participants were tested for the presence of IgG antibodies against (SARS-CoV-2) through ELISA test. The second phase of the study was conducted in September 2020 where the participants were tested again for the presence of IgG antibodies and the third phase of the study was conducted in November 2020. During each testing period, participants were also asked to fill out a questionnaire regarding their symptoms and medical history.

Statically Analysis: The data was analyzed using SPSS version 16.0. Descriptive statistics was used to present the demographic characteristics of the participants. Frequency and percentage were used to present the categorical variables like gender, baseline and three months results. Chi-square test ($\chi 2$) was used to compare the baseline and three months results of the participants.

RESULTS

A total of 36 industrial workers were included. At the baseline in the month of June, 18(50%) individuals had positive Anti(SARS-CoV-2)IgG levels, 9(25%) had borderline positive values and 25% had negative values for antibody testing as shown in Table no 1. Eighteen (50%) individuals, who had positive antibody testing in June, 15 were still positive for IgG in September. In November 12 become nonreactive while 3person refused further testing and three individuals remained positive for IgG. While two had turned into borderline positive values and one person refused further testing. While ten of them had turned into Negative values and 05 individuals refused testing. Interestingly, the three individuals who were still positive at the end of 06 months included the two individuals with highest IgG titers at baseline of the overall study population and one case which had initially low value in months of June, then a peak at September and subsequent decline (although still positive value). The values decreased on subsequent testing. The mean value of IgG in the study population decreased from 27 U/mL in the month of June to 23 U/mL in September and 06 U/mL in November. The p-values of pair of observations in the month of June/September and September/November (Table 1). The p-value of June/September results was found to be more than 0.05 (0.172). However, the values obtained in the month of November were high correlated to those of September and the resultant p-value was lower than 0.05 showing a significant statistical correlation results shows table 01 to 03.

Table No. 1: Finding of parameters Mean IgG Level, percentage positive and negive IgG

Parameters	June 2020	Sep 2020	Nov 2020
Mean IgG levels (log2)	5.89	5.41	5.09
Percentage of positive IgG antibodies	50%	44.4%	33.3%
Percentage of negative IgG antibodies	50%	55.6%	66.7%

Table No. 2: Parameters of asymptomatic and symptomatic

Parameters	Asymptomatic	Symptomatic
Mean IgG levels (log2)	5.91	5.84
Percentage of positive IgG antibodies	50.0%	44.4%
Percentage of negative IgG antibodies	50.0%	55.6%

Table No. 3: Parameters jan-sep and sep-nov Mean change in IgG Levels

Parameters	June-Sep	Sep-Nov
Mean Change in IgG levels (log2)	-0.48	-0.32

Outcomes: Parameters Outcome Persistence of IgG antibody03 out of 18 individuals had positive IgG antibodies after a period of 6 months.Mean IgG levels Mean IgG levels decreased from 5.89 in June 2020 to 5.09 in November 2020. Association between symptoms and IgG levelsNo significant association was found between the presence of symptoms and IgG levels

DISCUSSION

The present study was conducted to assess the persistence of anti-(SARS-CoV-2) IgG antibodies over a period of six months among industrial workers in Karachi, Pakistan[9]. The results of the study showed that eighteen out of thirty-six male workers were positive

for antibodies in June 2020[10]. Of these eighteen individuals, sixteen remained positive after a period of three months while three of them were still positive after a period of six months. Among the borderline positive workers, two turned into positive after a period of three months while all of them became negative at the end of six months period[11].The findings of the present study are consistent with the results of similar studies conducted in different parts of the world. A study conducted in the United States showed that IgG antibodies declined gradually over a period of six months in health care workers who had been exposed to (SARS-CoV-2). Similarly, another study conducted in China showed that the levels of IgG antibodies declined significantly over a period of six months in individuals with mild or asymptomatic COVID-19 infection[12]. The findings of the present study provide an insight into the dynamics of development and persistence of anti-(SARS-CoV-2) IgG antibodies in industrial workers[13]. The results of the study suggest that individuals exposed to SARS CoV-2 develop IgG antibodies which are higher in asymptomatic individuals and persist for more than three months in most of the individuals. However, these antibodies decline in a gradual manner quantitatively and fade away before the period of six months in majority of the individuals[14].

CONCLUSION

Our study was conducted to assess the persistence of anti-(SARS-CoV-2) IgG antibodies over a period of six months among industrial workers in Karachi, Pakistan. The results of the study showed that eighteen out of thirty-six male workers were positive for antibodies in June 2020. Of those eighteen individuals, sixteen remained positive after a period of three months while three of them were still positive after a period of six months. Among the borderline-positive workers, two turned into positive after a period of three months while all of them became negative at the end of six months period. It is concluded that individuals exposed to SARS CoV-2 develop IgG antibodies which are higher in asymptomatic individuals and persist for more than three months in most of the individuals. These antibodies decline in a gradual manner quantitatively and fade away before the period of six months in majority of the individuals. The findings of the present study provide an insight into the dynamics of development and persistence of anti-(SARS-CoV-2) IgG antibodies in industrial workers.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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