Utilizing Quantitative COVID-19 Serological Testing to Determine Current Immune status and Predict Future Protection

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Background: Coronavirus disease 2019 (COVID-19 caused by SARS-COV-2) was first detected in China in late 2019 and has become a global pandemic. While there are many studies of COVID-19 including the creation of a vaccine, no study has yet determined the strength and length of antibody response to the disease, or the potential modifying effects on developing an antibody response.

Methods: We have an ongoing prospective cohort study of 166 participants which included healthcare workers, and those patients with a COVID diagnosis. The participants filled out a demographic survey which included COVID-19 related questions and had baseline blood samples collected to determine antibody status. ELISAs to purified receptor binding domain of SARS-COV-2 were performed. Seropositivity was defined as values greater than 3 standard deviations above the average of serum collected prior to 2018. Factors related to seropositivity were investigated using SPSS Chi-square analysis to determine significance using $p < 0.05$ as threshold for significance.

Results: Overall, the study population was primarily comprised of healthcare workers (46%). The participants were mostly female (56%) and white (78%). Furthermore, 43% of the study participants had taken care of COVID-19 positive patients at their job. 44% of the study population was antibody positive. Participant categories (ie, healthcare workers, patients, etc.) were significantly related to a positive antibody serology (p<0.000). Gender was not correlated with antibody serology (p= 0.984). Hispanic or Latino participants had significantly more positive antibody response than non-Hispanics (p=0.001). Race was significantly related to antibody response (p=0.011). Age of the participants was divided equally into three categories: less than 35, 35 to 55, and greater than 55 years old and was not related to antibody positivity (p=0.143). Participants having cared for COVID-19 patients at work was not correlated with antibody response (p=0.361).

Conclusion: Participants in the patient's category were more likely to have a positive antibody serology. Furthermore, Hispanic ethnicity and being of Black or African American race were also positively correlated with having COVID-19 antibodies. Gender and age were not related to antibody positivity. Interestingly, participants who have taken care of COVID-19 patients at work were no more likely to have positive antibodies than those who haven't. Future studies will follow those who are seropositive over time as well as measuring the response to the current vaccines