Antibodies to SARS-CoV-2 in a Medical School Department of Pediatrics

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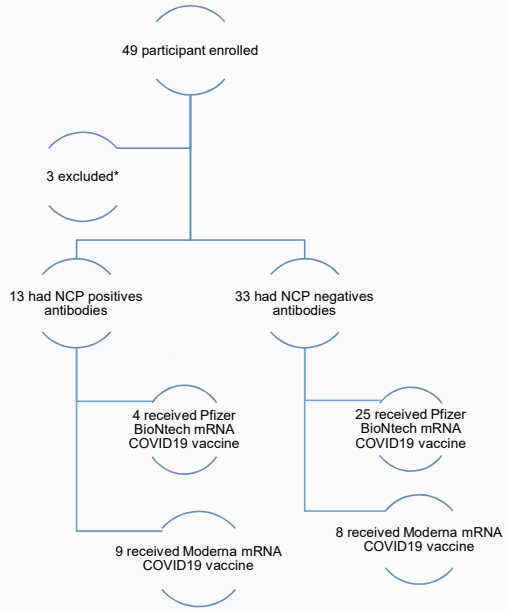
ABSTRACT updated

Background
Healthcare workers are at high risk of Covid-19 (C19) infection and received priority for C19 vaccinations. Therefore, we conducted a serosurvey to determine anti-C19 antibodies and evidence of C19 infection in health care employees who did or did not have direct contact with patients.
Methods
49 participants provided finger stick blood samples collected onto filter papers and tested for antibodies to C19 using Bio-Plex Pro Human SARS-CoV-2 IgG reagents. Antibodies to C19 nucleocapsid (N), receptor-binding domain (RBD), spike 1 (S1), and spike 2 (S2) were measured. Samples were collected 8 to 11 months after C19 vaccines were made available
Results
All participants received two doses of Pfizer BioNTech or Moderna RNA-based C19 vaccines, and all showed serological evidence of antibodies to C19 RBD, S1, and S2. Antibodies to N, considered a marker of C19 infection, were detected in 13 individuals, of whom 7 reported having a PCR documented C19 infections. 7 individuals had evidence of C19 infection of which they were not aware. 1 participant with proven PCR documented C19 infection lost antibodies by the time of sample collection.
Conclusion
This vaccinated population had significant rates of strong antibody responses to C19 infection, most notable in those providing direct patient care.

MATERIALS AND METHODS

- Prospective observational study that enrolled 49 participants in the department of pediatrics at McGovern Medical School between 7/21/2021 and 12/02/2021.
- 46 participants enrolled and qualified were vaccinated with 2 doses of either Pfizer BioNTech or Moderna mRNA vaccine and included clinicians and non-clinicians (laboratory technicians, administrative employee).
- Participants were asked to provide blood obtained through finger stick onto filter paper as Dry Blood Spot (DBS).
- Each participant completed a questionnaire that included demographics and previous SARS-CoV-2 vaccination/infection characteristics.
- This study was approved by the Institutional Review Board of UTHealth CPHS.

MATERIALS AND METHODS



*Participants were excluded due to history of multiple documented C19 infections or infection after C19 vaccine.

- The analysis of SARS-CoV2 antibodies was performed using the Bio-plex Pro Human IgG SARS-CoV2 serology assays (Bio-Plex Pro Human IgG SARSCoV-2 N/RBD/S1/S2 4-Plex Panel; and Virotrol SARS-CoV2 single level control; Bio-Rad Hercules, CA).
- Given the lack of symmetry of antibody titers, decision was made to use logarithmic transformation of titers.
- All tests are Student's T's, having passed Shapiro-Wilk test for Normality, and Levene's test for homogeneity of variances

RESULTS

Figure1. IgG antibodies RBD,S1,S2 against SARS-CoV-2 in all participants

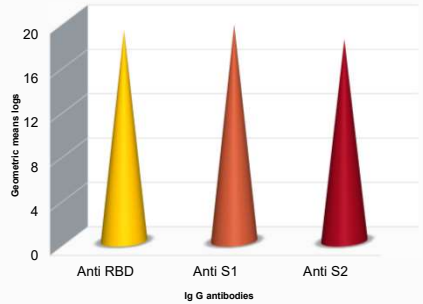


Table 1. Characteristics of the study group

Age (mean)	46.2 years
Female	34 (74%)
Hispanic Ethnicity	17 (37%)
History of PCR proven SARS-CoV2 infection	7 (15%)
Direct patient care	32 (70%)
N	46

Table 2. IgG Antibodies to SARS-CoV2 in all participants

Anti-RBD	19.04
Anti-S1	19.54
Anti-S2	18.21
N	46

Antibodies are expressed in Log2 transform as mean

Table 4.IgG Antibodies to SARS-CoV2 grouping NCP negatives and positives by vaccine

	NCP positives Antibodies (N=13)			NCP negatives Antibodies (N=33)		
	Mean Difference between Pfizer BioNtech and Moderna	p-value	95%CI	Mean Difference between Pfizer BioNtech and Moderna	p-value	95%CI
Anti -RBD	2.09	**0.047** *	[0.0358, 4.14]	-0.786	0.384	[-2.60, 1.03]
Anti-S1	1.94	0.063	[-0.128, 4.01]	-0.867	0.344	[-2.70, 0.971]
Anti-S2	1.87	**0.041** *	[0.0934, 3.64]	-0.265	0.689	[-1.60, 1.07]

Table 3.IgG Antibodies to SARS-CoV2 by vaccine

	Moderna	Pfizer BioNtech	p-value
Anti-RBD	19.18	18.96	0.29
Anti-S1	19.59	19.50	0.30
Anti-S2	18.32	18.15	0.67
N	17	29	

Antibodies are expressed in Log2 transform as mean

CONCLUSION

- All participants showed significant antibody response.
- No significant difference was found between participants who received Moderna or Pfizer BioNtech vaccine
- Among participants who had antibodies to NCP detected, antibodies to RBD and S2 were significantly higher in Moderna than in Pfizer recipients.

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