SARS-COV-2 ANTIBODY RESPONSES POST INFECTION IN PREGNANCY BY VACCINATION STATUS

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BACKGROUND

Natural SARS-CoV-2 infection results in anti-nucleocapsid (N) and anti-spike (S) antibody (Ab) development. Anti-S and neutralizing Ab response (conferred by infection and/or vaccination) is more closely associated with protection.

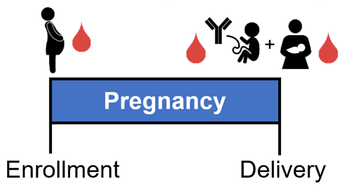
We evaluated SARS-CoV-2 Ab binding and neutralization at delivery among pregnant persons with prior SARS-CoV-2 infection by vaccine status.

METHODS

Cross sectional analysis of an ongoing prospective cohort of pregnant people with prior SARS-CoV-2 infection, enrolled from December 2020 - July 2022 in the Seattle metropolitan area.

- Participants eligible if anti-N IgG+ on enrollment or prior RT-PCR+ or antigen+ from medical record.
- Maternal enrollment, delivery, and cord blood samples tested per below (Fig. 1).
- Participants with maternal and cord blood anti-S results at delivery were included in this analysis.
- Chi-squared test was used to compare proportions; Wilcoxon rank sum test was used to compare medians.

Figure 1. Timing of samples collected



Tests performed per sample

- SARS-CoV-2 anti-S IgG
- SARS-CoV-2 anti-N IgG
- Pseudovirus neutralizing assay

RESULTS

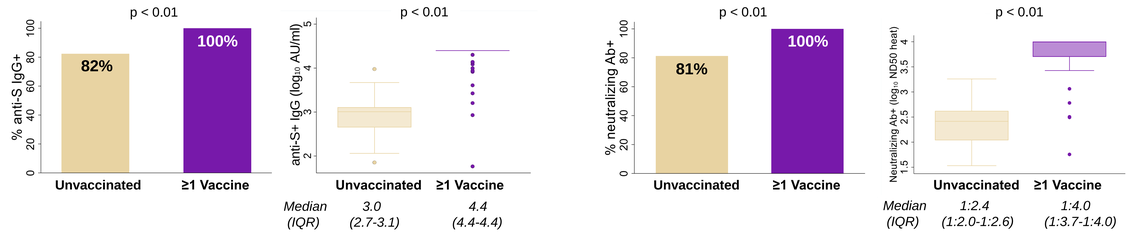
Table 1. Baseline characteristics of participants

	n (%) or Median (IQR) N=71
Age (years)	33 (30-35)
Gestational age (weeks)	32 (18-38)
Time from infection* to enrollment (weeks) (n=61)	6 (4-12)
Anti-N IgG+†	51 (72)
Anti-S IgG+† (n=69)	64 (93)
Neutralizing Ab+ (n=59)	53 (90)
Vaccine status¶	
No vaccine	24 (34)
Partial	1 (1)
Completed primary series	18 (25)
Boosted	28 (39)

*RT-PCR+ or antigen+ result
† Anti-N IgG+ Abbott index ≥1.4; anti-S IgG+ ≥50 AU/mL; pseudo-neutralization ND50 (heat) ≥20 and R^2 ≥0.9.
¶ Partial: one dose of mRNA vaccine; complete: two doses of mRNA vaccine or one dose of viral vector vaccine; boosted: three doses of mRNA vaccine (or at least one dose plus a viral vector vaccine) or two doses of viral vector vaccine.

Among pregnant people with <u>prior SARS-CoV-2 infection during pregnancy</u>, maternal and cord blood antibody binding and neutralization responses ***were higher among those receiving SARS-CoV-2 vaccination prior to delivery.***

Figure 2. Anti-S IgG binding and neutralization responses among pregnant people with prior SARS-CoV-2 infection by vaccination status



Pregnant people with prior SARS-CoV-2 infection and ≥1 vaccine were more likely to have anti-S IgG+ binding and neutralizing Ab with higher responses

Cord blood from pregnant people with prior SARS-CoV-2 infection and ≥1 vaccine were more likely to have anti-S IgG+ binding and neutralizing Ab with higher responses

Table 2. SARS-CoV-2 antibody binding and neutralization responses at delivery

	Unvaccinated N=17	≥1 Vaccine N=54*	p-value
	n (%) or median (IQR)		
Time from infection to delivery (weeks) (n=61)	24 (16-27)	16 (10-24)	0.27
Maternal			
Anti-N IgG+†	9 (53)	24 (44)	0.54
Anti-S IgG+	14 (82)	54 (100)	<0.01
Neutralizing Ab+ (n=54)	13 (81)	38 (100)	<0.01
Cord blood			
Anti-N IgG+	8 (47)	29 (54)	0.63
Anti-S IgG+	14 (82)	54 (100)	<0.01
Neutralizing Ab+ (n=52)	12 (75)	36 (100)	<0.01

*Partially vaccinated (n=1); completed primary series (n=20); boosted (n=33).
†Positivity thresholds: anti-N IgG+ Abbott index ≥1.4; anti-S IgG+ ≥50 AU/mL; pseudo-neutralization ND50 (heat) ≥20 and R^2 ≥0.9.

~18% unvaccinated pregnant people with prior SARS-CoV-2 and their infants (via cord blood) did not have sustained anti-S IgG+ binding or neutralizing Ab by delivery

CONCLUSIONS

Among pregnant people with prior SARS-CoV-2 infection:

- Vaccination was associated with higher likelihood of pregnant people maintaining anti-S binding and neutralizing antibodies through delivery, with higher median responses than those unvaccinated.
- Similarly, cord blood from pregnant persons with vaccine prior to delivery was more likely to be anti-S IgG+ and have neutralizing antibodies with higher median responses than those unvaccinated.
- Vaccination in pregnant persons with prior SARS-CoV-2 enhances immune responses for mothers and infants compared with infection alone.

Collaborators

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