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Agreement between pregnant individuals' self-report of Coronavirus Disease 2019 vaccination and medical record documentation

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Abstract

For public health research such as vaccine uptake or effectiveness assessments, self-reported Coronavirus Disease 2019 (COVID-19) vaccination status may be a more efficient measure than verifying vaccination status from medical records if agreement between sources is high. We assessed agreement between self-reported and medical record-reported COVID-19 vaccination status among pregnant individuals followed in a cohort during August 2020–October 2021. At end of pregnancy, participants completed questionnaires about COVID-19 vaccine receipt during pregnancy; staff verified vaccination status using medical records. Agreement was assessed between self-reported and medical record vaccination status using Cohen's kappa. There was high agreement between self-reported and medical record vaccination status (Kappa coefficient = 0.94, 95% CI 0.91–0.98), suggesting that self-report may be acceptable for ascertaining COVID-19 vaccination status during pregnancy.

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Précis—There was a high level of agreement between self-reported and medical record Coronavirus Disease 2019 vaccination status among pregnant individuals.

Introduction

Accurately classifying Coronavirus Disease 2019 (COVID-19) vaccination status is important for studies of vaccine effectiveness, safety, and uptake,[1–3] but verifying vaccination status from medical records may be more resource-intensive than obtaining self-reported status. Self-reported vaccination status could be an efficient method for classifying vaccination status for public health research and monitoring if agreement with medical record documentation is high. Recent studies showed high agreement between these two sources in the general population.[4–5] We assessed agreement between these two sources for COVID-19 vaccination during pregnancy when information about both receipt and timing are critical to identify antenatal vaccination.

Methods

The Epidemiology of Severe Acute Respiratory Syndrome Coronavirus 2 in Pregnancy and Infancy Community Cohort was approved by the Columbia University Institutional Review Board and enrolled pregnant individuals at three academic centers (New York, New York; Birmingham, Alabama; Salt Lake City, Utah) during August 2020–February 2021[6]; the last pregnancy ended October 2021. At 2–4 weeks postpartum, participants completed self-administered pregnancy questionnaires. Starting February 3, 2021, the questionnaire asked participants about COVID-19 vaccine receipt during pregnancy. Sites verified COVID-19 vaccination status using medical records, including electronic medical records (EMR) linked to state/local vaccine registries, a combination of EMR documentation of vaccine administration or state vaccine registry documentation, or participant vaccine cards.

This analysis was restricted to individuals who responded to vaccine questions with pregnancies ending on or after February 3, 2021. Agreement between self-reported and medical record-reported vaccination status, number of doses, and vaccine type were assessed using Cohen’s kappa. Agreement rate was assessed for timing of vaccination.

Results

Overall, 936 enrolled individuals reached end of pregnancy on or after February 3, 2021 and were eligible to receive COVID-19 vaccine questions; 521/936 (55.7%, 30.3–73.7% by site) responded (Appendix 1). Of the 521 respondents, 456 (87.5%) had their first vaccine dose verified with vaccine registry data or EMR linked to vaccine registry data, 54 (10.4%) using EMR documentation of vaccine administration, and 11 (2.1%) by participant-provided vaccine cards. Overall, 158/521 individuals received COVID-19 vaccine (30.3%, 95% CI 26.4–34.5%) based on self-report (n=156) or medical record (n=148). Most participants who self-reported vaccination received their first dose in the workplace (53.2%, 83/156) or a public health clinic (17.9%, 28/156) (Table 1).

Of 521 participants in this analysis, 509 had concordant vaccination status between sources; 10 self-reported vaccination without medical record agreement, and 2 had only

medical record-documented vaccination. All 10 participants who self-reported vaccine receipt without medical record agreement worked in healthcare-related industries suggesting plausible self-reports; 6 reported receiving vaccine through their workplaces.

There was high agreement between self-reported and medical record COVID-19 vaccination status (Kappa coefficient = 0.94, 95% CI 0.91–0.98), number of doses, vaccine type, and timing of receipt (range 0.92 – 0.94) (Table 2).

Discussion

We found high agreement between self-report and medical record documentation of COVID-19 vaccination status and other vaccine characteristics during pregnancy, suggesting that self-report may be an acceptable method for ascertaining COVID-19 vaccination during pregnancy. Medical records reported lower vaccination rates than self-report, which may reflect incomplete or delayed documentation in medical records and highlights the importance of timely data transfer between vaccine registries and medical record systems.

This analysis was conducted among individuals willing to participate in COVID-19 research during the early months of COVID-19 vaccine availability when a primary series of vaccine was recommended. Findings may not generalize to all pregnant individuals or to later pandemic phases when vaccine recall may be less reliable and verification more prone to missing information as booster doses are recommended. Only 55.7% of participants provided information about vaccination; non-response was associated with premature questionnaire discontinuation. Nevertheless, we found high agreement between self-report and medical record vaccination status, suggesting self-reported COVID-19 vaccination status may be valid for identifying COVID-19 vaccination during pregnancy for public health research.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1:

Characteristics of ESPI analytic population, enrolled August 2020-February 2021 with end of pregnancy on or after February 3, 2021; responded to postpartum questionnaire and had vaccine verification

Baseline characteristics	All Participants N = 521		Vaccinated Participants N = 158		Unvaccinated Participants N = 363	
	n	column %	n	row %	n	row %
Site						
Site A	258	49.5	104	40.3	154	59.7
Site B	146	28.0	42	28.8	104	71.2
Site C	117	22.5	12	10.3	105	89.7
Age, median (interquartile range)	31	27 – 34	32	29 – 35	30	25 – 34
Age group						
18–24 years	82	15.7	12	14.6	70	85.4
25–34 years	325	62.4	100	30.8	225	69.2
≥35 years	114	21.9	46	40.4	68	59.7
Self-reported race and ethnicity *						
Black, Non-Hispanic	66	12.7	5	7.6	61	92.4
Hispanic/Latina	120	23.0	17	14.2	103	85.8
White, Non-Hispanic	287	55.1	120	41.8	167	58.2
None of the above	20	3.8	7	35.0	13	65.0
Missing	28	5.4	9	32.1	19	67.9
Underlying medical conditions †						
None	377	72.4	109	28.9	268	71.1
At least one	144	27.6	49	34.0	95	66.0

*Race and ethnicity are based on participant self-report. Participants who self-identified as Hispanic/Latina are categorized as Hispanic/Latina, regardless of self-reported race. Participants who self-identified as non-Hispanic are categorized based on their self-reported races. The category of 'none of the above' includes participants who self-identified as non-Hispanic and Asian, Native Hawaiian or other Pacific Islander, American Indian or Alaskan Native, or multiracial.

†Underlying medical conditions classified by the Centers for Disease Control and Prevention as conferring an increased risk for severe COVID-19, including cancer, chronic kidney disease, chronic lung disease, dementia or neurological conditions, diabetes (types 1 or 2), Down syndrome, heart conditions including hypertension, HIV infection, immunocompromised state, liver disease, sickle cell disease or thalassemia, solid organ or blood stem cell transplant, and stroke or cerebrovascular disease. Centers for Disease Control and Prevention list available here: https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html.

Table 2:

Agreement on receipt of vaccine and other vaccine characteristics among fully enrolled ESPI participants with end of pregnancy on or after February 3, 2021 who responded to question on receipt of SARS-CoV-2 vaccine, by source of information[‡]

Vaccine Characteristic	Source: self-report	Source: medical record	Agreement between sources	Kappa (95% CI)
Receipt of vaccine, n = 521				0.94 (0.91 – 0.98)
Yes	156	148	146	
No	365	373	363	
Number of doses, n = 146				0.92 (0.83 – 1.00)
1	23	22	21	
2	123	124	122	
Type of vaccine, dose 1, n = 145				0.94 (0.88 – 1.00)
BNT162b2 [§]	111	114	111	
mRNA-1273 [§]	28	25	25	
Ad26.COV2.S [§]	6	6	6	
Type of vaccine, dose 2, n = 119				0.94 (0.86 – 1.00)
BNT162b2 [§]	98	100	98	
mRNA-1273 [§]	21	19	19	
Vaccine Timing				
Agreement between date of vaccination, dose 1: within one week from either source, n = 140			137	97.9% [‖]
Agreement between date of vaccination, dose 2: within one week from either source, n = 115			113	98.3% [‖]

[‡]Row n indicates number of individuals included in the analysis. For number of doses, type of vaccine, and vaccine timing, analyses were restricted to individuals that had data available by both self-report and medical records among individuals who self-reported receipt of vaccine.

[§]On the postpartum questionnaire, the BNT162b2 vaccine was referred to as the Pfizer vaccine, the mRNA-1273 vaccine was referred to as the Moderna vaccine, and the Ad26.COV2.S vaccine was referred to as the Johnson & Johnson/ Janssen vaccine.

[‖]Rate of agreement, where dose dates agree if they are +/− 1 week between sources.