



The association between emotional and physical intimate partner violence and COVID-19 vaccine uptake in a community-based U.S. Cohort

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ABSTRACT

Objective: To estimate risk of being unvaccinated against COVID-19 by experience of intimate partner violence (IPV).

Methods: Among 3,343 partnered individuals in a community-based U.S. cohort, we quantified emotional and physical IPV experienced between March and December 2020 and estimated risk of being unvaccinated against COVID-19 through June 2021 by experience of IPV. Experience of recent IPV was defined as endorsement of more frequent or severe IPV since the start of the pandemic or report of any past-month IPV in at least one of four follow-up surveys conducted by the end of December 2020. We created a three-level composite variable – no experience of IPV, experience of emotional but not physical IPV, and experience of physical IPV.

Results: Cisgender women, non-binary, or transgender individuals who reported experiencing emotional, but not physical, IPV and those who reported experiencing physical IPV were both at significantly higher risk of being unvaccinated for COVID-19 compared to those who reported experiencing no IPV (ARR_{emotional violence}: 1.28 [95 % CI: 1.09 – 1.51]; ARR_{physical violence}: 1.70 [95 % CI: 1.41 – 2.05]). Cisgender men who reported experiencing physical IPV were also at significantly higher risk of being unvaccinated for COVID-19 (ARR_{physical violence}: 1.52 [95 % CI: 1.15 – 2.02]).

Conclusions: IPV may increase the risk of low vaccine uptake. Results highlight the need to incorporate IPV prevention and support into public health responses, with targeted resources and consideration for reducing barriers to public health interventions among those impacted.

1. Introduction

Intimate partner violence (IPV) refers to any psychological aggression, physical or sexual violence, or stalking by a current or former romantic or sexual partner (Breiding et al., 2015). According to data from the 2016/2017 National Intimate Partner and Sexual Violence Survey, 47 % of women and 44 % of men in the United States had experienced sexual violence, physical violence, and/or stalking in their lifetimes, with 7 % of women and 7 % of men experiencing IPV within

the past 12 months (Leemis et al., 2022). Increases in IPV have been noted during emergencies, such as during public health crises and after natural disasters (Meinhart et al., 2021; True, 2016). Based on a meta-analysis of 12 US-based studies conducted between 2020 and 2021, reported IPV increased by 8 % since the start of the COVID-19 pandemic in March 2020 (Piquero et al., 2021), potentially due to the effects of stay-at-home orders, including movement restrictions, isolation, loss of income, and increased stress and anxiety, particularly during the early days of the pandemic (Henke and Hsu, 2022; Peitzmeier et al., 2022).

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Another study found that IPV severity had increased since the start of the COVID-19 pandemic, as had the incidence of IPV in relationships that had previously experienced no abuse (Peitzmeier et al., 2022).

In addition to being directly harmful to the health and well-being of victims, IPV can have negative downstream effects on health-protective behaviors, including lower likelihood of a recent checkup with a doctor (Breiding et al., 2008; Massetti et al., 2018), or, among women, receiving cervical or breast cancer screening or adequate prenatal care during pregnancy (Cha and Masho, 2014; Cronholm and Bowman, 2009). In a cross-sectional representative sample of adults in Canada, Germany, the United Kingdom, and the United States collected in the summer of 2020, experience of domestic violence was associated with decreased use of social distancing and wearing masks in response to COVID-19 (Christopher Perry et al., 2022).

IPV may also have an impact on vaccine uptake, though research on the topic is sparse. One study among Mexican-American female adolescents found that a higher proportion of those who had experienced interpersonal violence were more accepting of the HPV vaccine (Champion, 2017), while a study among women and girls in Nigeria living with and at high risk for HIV found that being a survivor of physical IPV or emotional abuse was associated with higher odds of COVID-19 vaccine hesitancy (Folayan et al., 2022). A study of Canadian mothers found that those who reported experiencing IPV were significantly more hesitant toward the pediatric COVID-19 vaccine (Davidson et al., 2023). In addition, several studies in the United States, Bangladesh, and India have found that women who experience IPV are less likely to fully immunize their children (Bair-Merritt et al., 2008; Hasan et al., 2015; Paul and Mondal, 2021; Sabarwal et al., 2012).

A number of mechanisms have been posited to explain the pathways through which IPV may influence health-seeking behaviors such as vaccination, including through limiting access to material resources, limiting mobility and access to transportation, increased monitoring and control of activities, mental health impacts leading to reduced motivation, and medical mistrust (McCloskey et al., 2007; Sharpless et al., 2022; Wadsworth et al., 2018; Wilson et al., 2007). Research indicates that COVID-19 pandemic control measures may have increased controlling behaviors, further limiting access to resources and interactions with those outside of the home, and contributed to increased mistrust in authority, leading to reduced adherence to recommendations for disease prevention (Ragavan et al., 2022; Sabri et al., 2020).

Given the importance of vaccination to reducing the risk of severe outcomes and transmission of infectious diseases such as COVID-19 (Rahmani et al., 2022; Tan et al., 2023; Watanabe et al., 2023), it is crucial to identify and characterize risk factors for delayed vaccination, of which IPV is a potentially important but underexamined one. This study aims to describe the prevalence of emotional and physical IPV experienced during the first 10 months of the COVID-19 pandemic among partnered individuals in a large national cohort and evaluate the association between the types of IPV experienced and COVID-19 vaccination through June 2021, stratifying by gender. Understanding this relationship may help to inform future vaccine rollout and outreach strategies, as well as strategies to better support vulnerable groups during future public health emergencies.

2. Methods

2.1. Participants

The Communities, Households, and SARS-CoV-2 Epidemiology (CHASING) COVID Cohort study is a national prospective cohort study launched on March 28, 2020, during the emergence of the COVID-19 pandemic in the U.S. We used internet-based strategies to recruit a geographically and sociodemographically diverse cohort of participants ≥ 18 years old and residing in the U.S. or U.S. territories. Follow-up has occurred approximately quarterly since March 2020. Additional recruitment and follow-up details have been presented elsewhere

(Robertson et al., 2021). The study was approved by the Institutional Review Board of the City University of New York (protocol code 2020–0256). Participant consent was obtained electronically at baseline, with periodic re-consent over the course of the study.

For this analysis of the association between IPV and COVID-19 vaccine uptake, we included CHASING COVID study participants who reported the following at baseline and/or in at least one of four follow-up surveys conducted by the end of December 2020: 1) being in a relationship; and 2) information from which experience of IPV during the pandemic could be ascertained. Given that the first COVID-19 vaccines received emergency use authorization by the FDA in December 2020 (Fortner and Schumacher, 2021), we assumed that the majority of individuals reporting vaccine doses in 2020 had participated in a clinical trial and thus had access before the general public. Therefore, we excluded participants who reported receiving any COVID-19 vaccine doses prior to January 1, 2021. We also excluded individuals who otherwise met the eligibility criteria for the analysis but did not complete at least one of 12 follow-up surveys between February 2021 and April 2023, as vaccination status was not available for these individuals.

2.2. Outcome: Not receiving COVID-19 vaccination

Eligibility requirements for COVID-19 vaccination progressively broadened over the first part of 2021, with all individuals 16 years of age or older in the United States eligible to receive the vaccine since April 19, 2021 (Baack et al., 2021). As of the end of June 2021, about a third (33.8 %) of Americans over the age of 18 had not yet received at least one vaccine dose (National Center for Immunization and Respiratory Diseases, 2021). We chose not receiving at least one dose of the COVID-19 vaccine by June 30, 2021 as our outcome. On each follow-up survey since December 2020, individuals were asked to report COVID-19 vaccination status and, for those who had received at least one dose, the date each dose was received.

2.3. Exposure: Experience of IPV since the start of the pandemic

Emotional IPV was defined based on responses to a question about a partner yelling at them, making them feel bad about themselves, embarrassing them in front of others, or frightening them. Physical IPV was defined based on responses to a question about a partner pushing, grabbing, hitting, kicking, or throwing things at them. These questions drew from existing IPV screening tools (Bonomi et al., 2006; Ramaswamy et al., 2019), though were unique to this study. At baseline, individuals who indicated they were currently in a relationship were asked if they had experienced any physical or emotional IPV in the past 12 months, and, if so, whether the violence had become more frequent or severe since the start of the pandemic. In four subsequent surveys in 2020, individuals who indicated that they were in a relationship were asked whether they had experienced any physical or emotional IPV in the past month. Experience of recent emotional IPV was defined as endorsement of more frequent or severe emotional IPV since the start of the pandemic or report of any past-month emotional violence in at least one follow-up survey. Similarly, experience of recent physical IPV was defined as endorsement of more frequent or severe physical IPV since the start of the pandemic or report of any past-month physical violence in at least one follow-up survey. Given that physical violence is often an escalation from psychological aggression (Karakurt and Silver, 2013; Schumacher and Leonard, 2005), we created a composite variable with three levels – no experience of IPV, experience of emotional IPV only, and experience of physical IPV (with or without emotional IPV).

2.4. Moderators and confounders

Age, gender, sexual orientation, race/ethnicity, household annual income, geographic region of residence and presence of children under 18 in the household were collected at baseline between March 2020 and

July 2020. Gender and sexual orientation information was collected again and sex at birth was collected for the first time in April 2023 to fill in missing information for cohort participants; information about children under 18 in the household was collected in three follow-up surveys prior to the end of 2020.

2.5. Statistical analysis

Given that reported rates of IPV tend to be higher and more severe for cisgender women, non-binary, and transgender individuals (Leemis et al., 2022; Peitzmeier et al., 2020; Valentine et al., 2017), we stratified results into two groups to investigate whether gender modifies the relationship between reported experience of IPV and risk of being unvaccinated against COVID-19. Due to small numbers of non-binary and transgender individuals in our cohort, we combined them with cisgender women in statistical models in recognition of their increased risk of IPV. For cisgender men and cisgender women, non-binary, or transgender individuals, we conducted chi-square tests to compare experience of IPV by participant characteristics. We used robust Poisson models to estimate crude and adjusted risk ratios for not receiving at least one dose of the COVID-19 vaccine. Models were adjusted for age, sexual orientation, children under 18 in the household, race/ethnicity, region of residence at baseline, and household income. The adjusted model combining cisgender women, non-binary and transgender individuals also adjusted for gender. Statistical analyses were conducted using SAS 9.4 (Cary, North Carolina, USA).

3. Results

Among 6,633 CHASING COVID study participants who completed a baseline survey or any of four follow-up surveys by the end of December 2020, 4,506 (67.9 %) reported being in a relationship at some point between March and December 2020 (Fig. 1). Of these, 232 (5.1 %) did not have enough information to determine recent IPV status and/or 280 (6.2 %) reported receiving at least one dose of a COVID-19 vaccine prior to January 2021 and were thus excluded from the analytic population. Of the remaining 4,001 participants, 658 (16.5 %) did not complete a follow-up survey between February 2021 and April 2023. The analytic population (N = 3,343) used to assess risk of not receiving a vaccine included 1,875 cisgender women (56.1 %), 102 non-binary or transgender individuals (3.1 %), and 1,366 cisgender men (40.9 %) from all 50 states and Puerto Rico.

3.1. Experience of IPV between March and December 2020

Among 1,875 cisgender women who reported being in a relationship, 21.3 % reported experiencing emotional IPV only and 6.3 % reported experiencing physical IPV since the start of the pandemic; among 102 non-binary or transgender individuals who reported being in a relationship, 24.5 % reported experiencing emotional IPV only and 8.8 % reported experiencing physical IPV (Table 1). Approximately 92 % of cisgender women, non-binary or transgender individuals who reported experiencing recent physical IPV also reported experiencing recent emotional IPV. Higher proportions of those who reported recent physical IPV were younger, with children under 18 in the household, Black

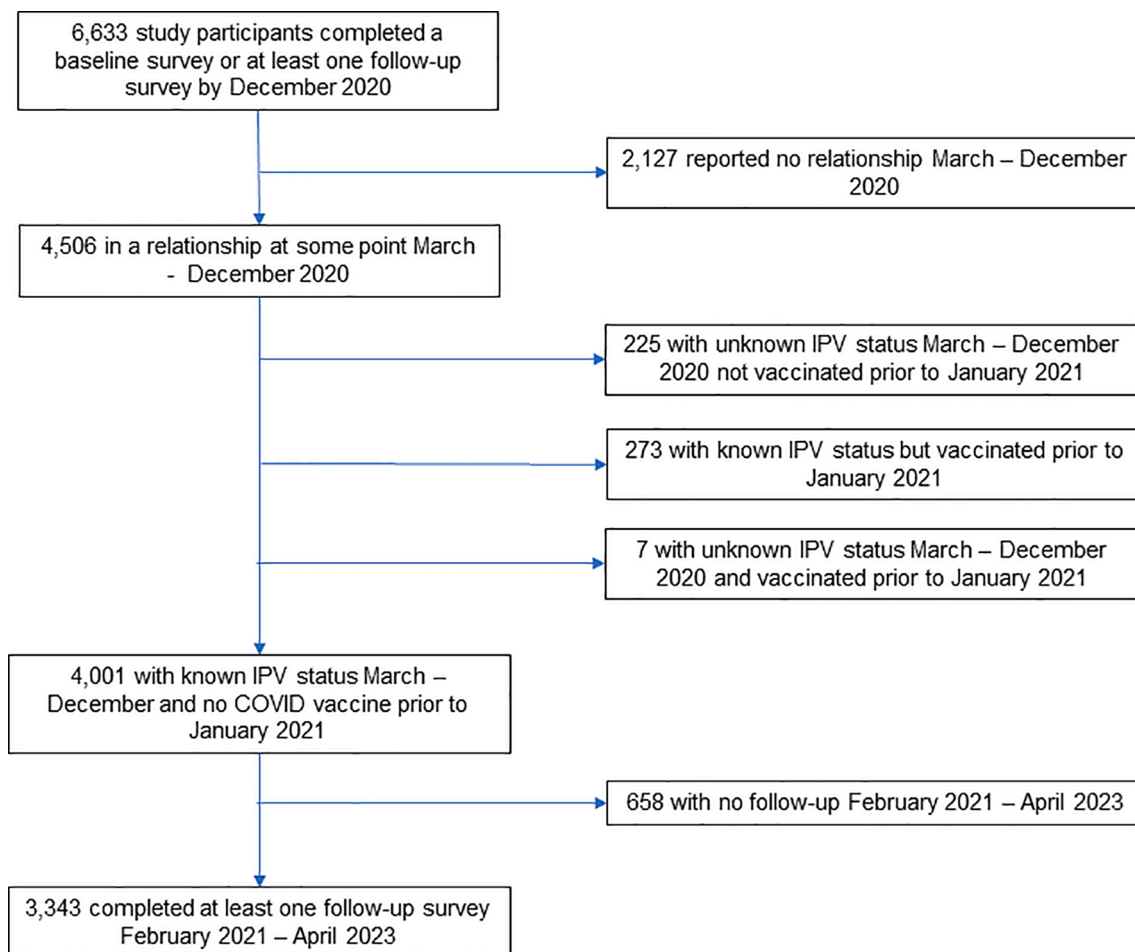


Fig. 1. Study flow for selection of partnered adult participants in the U.S. CHASING COVID Cohort who reported intimate partner violence (IPV) status between March and December 2020 and COVID vaccination information between January 2021 and April 2023.

Table 1

Characteristics of partnered adult cisgender women and non-binary or transgender participants in the U.S. CHASING COVID Cohort (N = 1,977) by category of intimate partner violence (IPV) experienced between March and December 2020 and tests of difference between those who experienced physical IPV versus no IPV.

	Recent experience of IPV						Physical IPV vs. no IPV chi-square p-value
	None		Emotional IPV only		Physical IPV (w/ or w/o emotional IPV)		
	N	row %	N	row %	N	row %	
Total	1,426	72.13	424	21.45	127	6.42	
Age categories							<0.0001
18–29	354	75.97	84	18.03	28	6.01	
30–39	392	67.70	126	21.76	61	10.54	
40–49	262	73.80	68	19.15	25	7.04	
50–59	184	70.50	68	26.05	9	3.45	
60+	234	74.05	78	24.68	4	1.27	
Gender							0.25
Cis Woman	1,358	72.43	399	21.28	118	6.29	
Non-binary/Transgender/Other	68	66.67	25	24.51	9	8.82	
Sexual orientation							0.65
Straight/Heterosexual	1,118	71.94	339	21.81	97	6.24	
Lesbian/Gay/Bisexual/Queer/Asexual/Other	250	72.89	67	19.53	26	7.58	
Unknown	58	72.50	18	22.50	4	5.00	
Children under 18 in household							<0.0001
No	798	74.79	228	21.37	41	3.84	
Yes	628	69.01	196	21.54	86	9.45	
Race and ethnicity							<0.0001
Asian/Pacific Islander Non-Hispanic	116	76.32	29	19.08	7	4.61	
Black Non-Hispanic	108	60.00	44	24.44	28	15.56	
Hispanic	243	72.97	61	18.32	29	8.71	
White Non-Hispanic	919	73.64	273	21.88	56	4.49	
Other Non-Hispanic/Unknown	40	62.50	17	26.56	7	10.94	
Region of residence at baseline							<0.0001
Midwest	265	74.02	69	19.27	24	6.70	
Northeast	433	76.64	116	20.53	16	2.83	
South/Puerto Rico	380	65.74	139	24.05	59	10.21	
West	348	73.11	100	21.01	28	5.88	
Household income at baseline							<0.0001
<\$50,000	500	68.40	156	21.34	75	10.26	
\$50,000–\$99,999	445	74.41	124	20.74	29	4.85	
\$100,000+	438	74.87	126	21.54	21	3.59	
Unknown	43	68.25	18	28.57	2	3.17	

Non-Hispanic or Hispanic, residing in the South or Puerto Rico, and with an annual household income of less than \$50,000.

Among 1,366 cisgender men who reported being in a relationship, 21.7 % reported experiencing emotional IPV only and 8.7 % reported experiencing physical IPV between March and December 2020 (Table 2). Approximately 93 % of those who reported experiencing recent physical IPV also reported experiencing recent emotional IPV. Higher proportions of cisgender men who reported recent physical IPV were younger, heterosexual, with children under 18 in the household, and Black Non-Hispanic or Hispanic.

3.2. Risk of being unvaccinated against COVID-19 by June 30, 2021

Among cisgender women, non-binary or transgender cohort members, 24.5 % had not received at least one COVID-19 vaccine dose by June 30, 2021 (Table 3). While 20.3 % of those who reported experiencing no IPV between March and December 2020 had not been vaccinated by June 2021, 28.3 % of those who reported experiencing recent emotional IPV only and 59.1 % of those who reported experiencing recent physical IPV had not been vaccinated within the first six months of 2021. Adjusting for possible confounders, those who reported experiencing recent emotional IPV only or reported experiencing recent physical IPV (with or without emotional IPV) were both at significantly higher risk of being unvaccinated than those who reported experiencing no IPV since the start of the pandemic (ARR_{emotional violence}: 1.28 [95 % CI: 1.09 – 1.51]; ARR_{physical violence}: 1.70 [95 % CI: 1.41 – 2.05]).

Among cisgender men in a relationship who had participated in at least one survey since February 2021, 15.2 % had not received at least one COVID-19 vaccine dose by June 30, 2021 (Table 3). While 13.7 % of those who reported experiencing no IPV since the start of the pandemic

had not been vaccinated by June 2021, 11.8 % of those who reported experiencing emotional IPV only and 35.3 % of those who reported experiencing physical IPV had not been vaccinated within the first six months of 2021. Adjusting for possible confounders, those who reported experiencing physical IPV, but not those who reported experiencing emotional IPV (without physical IPV) had higher risk of being unvaccinated than those who reported experiencing no IPV since the start of the pandemic (ARR_{physical violence}: 1.52 [95 % CI: 1.15 – 2.02]; ARR_{emotional violence}: 0.93 [95 % CI: 0.67 – 1.28]).

4. Discussion

More than one in four cohort participants in a relationship reported experiencing emotional and/or physical IPV between March and December 2020. Slightly more than 20 % of cisgender men and cisgender women reported experiencing emotional IPV only (without physical IPV) (21.3 % and 21.7 %, respectively). Reporting physical IPV (with or without emotional IPV) was less common, with 8.7 % of cisgender men and 6.3 % of cisgender women reporting recent physical IPV. These findings call further attention to the need for incorporating IPV prevention and response into future public health emergency planning and programming in order to avoid exacerbating existing risks and ensure availability of high-quality support services for victims (Gordon et al., 2022; Meinhart et al., 2021; UN Women, 2020).

Risk of being unvaccinated by the end of June 2021 was highest for all genders among individuals who reported experiencing physical IPV. In addition, among cisgender women, non-binary or transgender individuals, those who reported emotional IPV only (without physical IPV) had significantly higher risk of being unvaccinated than those who reported no IPV since the start of the pandemic. However, this did not

Table 2
 Characteristics of partnered adult cisgender male participants (N = 1,366) in the U.S. CHASING COVID Cohort by category of intimate partner violence (IPV) experienced between March and December 2020 and tests of difference between those who experienced physical IPV versus no IPV.

	Recent experience of IPV						Physical IPV vs. no IPV chi-square p-value
	None		Emotional IPV only		Physical IPV (w/ or w/o emotional IPV)		
	N	row %	N	row %	N	row %	
Total	951	69.62	296	21.67	119	8.71	
Age categories							<0.0001
18–29	138	69.00	34	17.00	28	14.00	
30–39	302	68.48	94	21.32	45	10.20	
40–49	181	65.82	64	23.27	30	10.91	
50–59	141	70.85	49	24.62	9	4.52	
60+	189	75.30	55	21.91	7	2.79	
Sexual orientation							0.02
Straight/ Heterosexual	479	68.72	142	20.37	76	10.90	
Lesbian/Gay/ Bisexual/ Queer/ Asexual/ Other	438	70.42	145	23.31	39	6.27	
Unknown	34	72.34	9	19.15	4	8.51	
Children under 18 in household							<0.0001
No	700	72.84	211	21.96	50	5.20	
Yes	251	61.98	85	20.99	69	17.04	
Race and ethnicity							0.0004
Asian/Pacific Islander Non- Hispanic	61	74.39	15	18.29	6	7.32	
Black Non- Hispanic	86	72.88	19	16.10	13	11.02	
Hispanic	150	67.57	36	16.22	36	16.22	
White Non- Hispanic	623	69.53	216	24.11	57	6.36	
Other Non- Hispanic/ Unknown	31	64.58	10	20.83	7	14.58	
Region of residence at baseline							0.4
Midwest	171	70.95	54	22.41	16	6.64	
Northeast	277	68.91	91	22.64	34	8.46	
South/Puerto Rico	265	68.65	80	20.73	41	10.62	
West	238	70.62	71	21.07	28	8.31	
Household income at baseline							0.07
<\$50,000	251	67.29	78	20.91	44	11.80	
\$50,000– \$99,999	333	70.40	99	20.93	41	8.67	
\$100,000+	354	70.24	117	23.21	33	6.55	
Unknown	13	81.25	2	12.50	1	6.25	

appear to be the case for cisgender men in the cohort. These findings lend support to the idea that not only may public health emergencies increase the risk of IPV, but IPV may increase susceptibility to infectious disease (Meinhart et al., 2021). A retrospective case-control study of women in the United Kingdom conducted between January 2020 and February 2021 found that, compared to age- and sex-matched unexposed controls, those exposed to IPV were at an increased risk of contracting COVID-19 (Chandan et al., 2021). The authors called for those experiencing IPV to be prioritized for vaccination, though acknowledged that some of the factors that may have put women experiencing

IPV at increased risk for SARS-CoV-2 infection might also act as barriers to COVID-19 vaccination, including financial difficulties, displacement, controlling behaviors, and mistrust of authorities.

It is important to note that, though research and advocacy around IPV prevention and response often focus on women, our study highlights the potential impact of IPV on men’s health-protective behaviors as well. Though physical IPV was associated with higher risk of being unvaccinated among cisgender men as well as among cisgender women, non-binary, and transgender individuals, emotional IPV only (without physical IPV) was not significantly associated with higher risk of being unvaccinated among cisgender men. Further research is needed to explore gender-specific mechanisms through which IPV might influence vaccine uptake. Research that examines the severity and frequency of IPV experienced may provide additional insight into the association between IPV and vaccination generally, as well as into any gender-specific differences. It is important to note that though 2016/2017 national 12-month prevalence estimates of sexual violence, physical violence and/or stalking in the U.S. were similar between women and men (7.3 % vs. 6.8 %, respectively), the prevalence of reported IPV-related impact (e.g., concern for safety, injury, PTSD symptoms, missing work) differed meaningfully by gender. Overall, 62.5 % of women who reported experiencing IPV also reported at least one IPV-related impact compared to 40.5 % of men (Leemis et al., 2022). Though we did not have the sample size for a more in-depth exploration of the characteristics of non-binary and transgender individuals who experience IPV and the relationship between IPV and vaccine uptake separately among this group, our findings emphasize the importance of including non-binary and transgender individuals in research to further our understanding of the ways in which these individuals are affected by IPV and the ways in which IPV may have differential impacts on health-protective behaviors such as vaccination (Peitzmeier et al., 2020).

This study has several limitations worth noting. IPV tends to be stigmatized and thus underreported (Overstreet and Quinn, 2013), but our study design and data collection may have further contributed to uncertainty in our IPV estimates. Though we used a web-based tool, which has been shown to lead to less hesitation in reporting on sensitive or stigmatized subjects, such as IPV, compared to an in-person or phone-based interview (Ahmad et al., 2009), one recent systemic review of studies examining IPV during the COVID-19 pandemic found that IPV prevalence estimates were higher in studies conducted face-to-face versus online or using the telephone (Costa et al., 2024). Though our IPV measures were informed by existing tools, the use of unvalidated measures may have also contributed to misclassification. However, we expect that any misclassification in IPV status would be non-differential with respect to vaccination status.

Our analytic sample may also have been subject to selection bias. Individuals without reliable internet access, including low-income individuals, were likely underrepresented in our cohort, though we did control for factors like income that might also be associated with IPV risk and vaccination. Access to the internet may be monitored or limited as a form of controlling behavior (Pentaraki and Speake, 2020). Thus, individuals experiencing controlling behavior and other forms of IPV may have been less likely to join our cohort and participate consistently in online surveys. Though roughly 15 % of cisgender women, non-binary or transgender individuals and 17 % of cisgender men who did not experience IPV were lost to follow-up, 31 % of cisgender women, non-binary or transgender individuals and 35 % of cisgender men who reported experiencing physical IPV between March and December 2020 were lost to follow-up (Table A1). Individuals lost to follow-up on a COVID-19-specific survey may have also been more likely to be unvaccinated. This likely would have led to an underestimate of the size of the association between IPV and COVID-19 vaccination.

4.1. Public health implications

Though advocates supported inclusion of additional funding for the

Table 3

Crude and adjusted risk of no COVID-19 vaccination between January and June 2021 among partnered adult U.S. CHASING COVID Cohort participants (N = 3,343), by gender and category of intimate partner violence (IPV) experienced between March and December 2020.

Gender		Total		No dose of vaccine by June 30, 2021			
		N	col %	N	row %	Crude Risk Ratio (95 % CI)	Adjusted Risk Ratio (95 % CI) ^a
Cisgender woman, non-binary, or transgender	Total	1,977	100.00	484	24.48		
	Recent experience of IPV						
	None	1426	72.13	289	20.27	REF	REF
	Emotional IPV only	424	21.45	120	28.30	1.40 (1.16—1.68)	1.28 (1.09—1.51)
Cisgender man	Physical IPV (w/ or w/o emotional IPV)	127	6.42	75	59.06	2.91 (2.44—3.48)	1.70 (1.41—2.05)
	Total	1,366	100.00	207	15.15		
	Recent experience of IPV						
	None	951	69.62	130	13.67	REF	REF
	Emotional IPV only	296	21.67	35	11.82	0.86 (0.61—1.23)	0.93 (0.67—1.28)
	Physical IPV (w/ or w/o emotional IPV)	119	8.71	42	35.29	2.58 (1.93—3.45)	1.52 (1.15—2.02)

^a Adjusted for age, gender, sexual orientation, children in the household, race/ethnicity, region of residence, and household income.

Family Violence Prevention and Services Act and the National Domestic Violence Hotline in the 2020 Coronavirus Aid, Relief, and Economic Security (CARES) Act, they also called for more targeted funding and policies to address IPV and those affected by it (Brewer, n.d). Our findings call further attention to the need for incorporating IPV prevention and response into public health emergency planning and programming in order to avoid exacerbating existing risks and to ensure availability of high-quality support services for victims. We believe these findings may help inform future vaccination rollout and outreach strategies including, for example, offering vaccination services at community locations that provide services and support to individuals who may be experiencing IPV, though it is not clear the extent to which the relationship between IPV and vaccination is COVID-specific or could extend to attitudes and behaviors around vaccination for other infectious diseases. There is a paucity of research looking at the relationship between IPV and vaccination decisions. In a recent study to better understand maternal attitudes towards pediatric vaccination in Canada, IPV experience was significantly associated with maternal hesitancy toward the COVID-19 vaccine, but not with hesitancy toward routine childhood vaccines (Davidson et al., 2023). Furthermore, though beyond the scope of this analysis, others have highlighted the ways in which IPV, especially during a public health emergencies, can limit survivors' abilities to meet their daily needs (Ragavan et al., 2022). Additional research to explore how patterns of IPV relate to factors such as mental health status, substance use, and housing insecurity can advance understanding of the mechanisms by which IPV can lead to undervaccination.

CRedit authorship contribution statement

Kate Penrose: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Ansu Abraham:** Writing – review & editing, Methodology, Conceptualization. **McKaylee Robertson:** Writing – review & editing, Methodology. **Amanda Berry:** Writing – review & editing, Conceptualization. **Bai Xi Jasmine Chan:** Writing – review & editing, Conceptualization. **Yanhan Shen:** Writing –

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Denis Nash discloses consulting fees from Abbvie and Gilead, and a research grant from Pfizer paid to his institution. Kate Penrose, Yanhan Shen, McKaylee Robertson, Avantika Srivastava, and Subha Balasubramanian report support from Pfizer through a research grant paid to their institution.

Data availability

Data will be made available on request.

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Appendix

Table A1

Proportion of loss to follow-up between February 2021 and April 2023 among partnered adult U.S. CHASING COVID Cohort participants (N = 4,001) who completed an assessment between March and December 2020, by gender and category of intimate partner violence (IPV) experienced between March and December 2020.

Gender		Total ^a		Loss to follow-up (no surveys Feb 2021 – April 2023)	
		N	col %	N	row %
Cisgender woman, non-binary, or transgender	Total	2,347	100	370	15.76
	Recent experience of IPV				
	None	1,684	71.75	258	15.32
	Emotional IPV only	480	20.45	56	11.67
Cisgender man	Physical IPV (w/ or w/o emotional IPV)	183	7.8	56	30.60
	Total	1,654	100	288	17.41
	Recent experience of IPV				
	None	1,147	69.35	196	17.09
	Emotional IPV only	325	19.65	29	8.92
	Physical IPV (w/ or w/o emotional IPV)	182	11	63	34.62

^a Individuals without IPV information and/or those vaccinated prior to Jan 2021 have already been removed from the total.

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