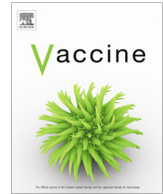




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Short communication

Preferences for COVID-19 vaccination information and location: Associations with vaccine hesitancy, race and ethnicity



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ABSTRACT

This study examined the association between preferences for being informed about the COVID-19 vaccine and where to receive it with vaccination intent and race/ethnicity. We conducted an online survey, oversampling Black and Latino panel members. The 1668 participants were 53.2% female, 34.8% White, 33.3% Black, and 31.8% Latino. Participants who were vaccine hesitant (answered “not sure” or “no” to vaccination intent) were more likely to prefer a conversation with their doctor compared to those who answered “yes” (25.0% and 23.4% vs 7.8%, $P < .001$, respectively). Among participants who responded “not sure”, 61.8% prefer to be vaccinated at a doctor’s office, compared with 35.2% of those who responded “yes” ($P < .001$). Preferred location differed by race/ethnicity ($P < .001$) with 67.6% of Black “not sure” participants preferring a doctor’s office compared to 60.2% of Latino and 54.9% of White “not sure” participants. These findings underscore the need to integrate healthcare providers into COVID-19 vaccination programs.

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1. Introduction

As the COVID-19 vaccine supply in the United States (US) increases, the plan for vaccinating the vast majority of the population becomes increasingly important. The Biden administration’s national COVID-19 vaccination strategy articulates priorities that include speed, widespread access, a focus on hard-to-reach populations, and equity.[1] It recognizes the need for concerted efforts to overcome COVID-19 vaccine hesitancy[2,3] and disparities in vaccination rates.[4,5] However, there are reasons to be concerned that the current US vaccination strategy may not achieve these priorities due to its reliance on mass vaccination sites and retail pharmacies with limited vaccine availability in physician offices, and lack of widespread primary care physician (PCP) communication with patients about the vaccine.[6,7] The goal of this report is to determine whether patient preferences for how to be informed about the COVID-19 vaccine and where to receive it differ according to vaccination intent and race/ethnicity. Defining and understanding the vaccination preferences of those most at risk for not

being vaccinated is essential to ensuring the US COVID-19 vaccination program is optimally structured to overcome vaccine hesitancy and reduce racial disparities in vaccination rates.

2. Methods

2.1. Participants and survey administration

We conducted a cross sectional survey using Prolific Academic Ltd, an online platform for research participant recruitment, with more than 80,000 active US panel members, from all US states. [8] Eligibility criteria included age ≥ 18 years, English-speaking, and US residency. We restricted the sample to panel members who identified as White, Black or Latino, with oversampling of Blacks and Latinos compared to their representation in the general US population, based on existing evidence of higher levels of vaccine hesitancy in these groups.[2,3] The electronic survey was released between January 12 – February 1, 2021, until the target sample ($n \sim 1800$) was reached. Participants received $\sim \$1.50$ consistent with Prolific recommendations. This study was reviewed by the UMass Chan Medical School Institutional Review Board and deemed exempt.

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2.2. Measures

The dependent variables, participants' preferences for being informed about a COVID-19 vaccine and vaccination location, were assessed with two questions: (1) *If your doctor's office wanted to inform you about a COVID-19 vaccine, how would you want them to do so?* Response options included *email; online portal message; telephone call; text message; mailed letter; conversation with my doctor when I come for an appointment; no preference*; and (2) *Where would you prefer to go to get the COVID-19 vaccine?* Response options included: *doctor's office; pharmacy; other; no preference*.

Primary predictors included vaccination intent and self-identified race/ethnicity. Vaccination intent was assessed by the question: *If you could get vaccinated for COVID-19 today, would you? Please assume enough vaccine for everyone.* Response options included *Yes; No; Not sure; I have already been vaccinated*. We defined vaccine hesitancy as responding "No" or "Not sure" to this question. Self-identified race/ethnicity was categorized as Latino, Black, and White. Additional demographic items included age, sex, and self-rated overall health. Survey items are shown in Supplemental Table 1.

2.3. Analyses

Participants who were already vaccinated were excluded from these analyses. Participant characteristics were summarized using frequencies and percentages. We used crosstabulations and chi-square testing to estimate unadjusted associations of vaccination preferences with vaccination intent and race/ethnicity. We also stratified associations of vaccination preferences with vaccination intent by race/ethnicity. We calculated separate chi-square tests and associated *P*-values comparing "not sure" to "yes" and "no" to "yes".

We estimated adjusted associations between dependent variables and primary predictors using multinomial logistic regression, modeling "not sure" vs "yes" and "no" vs "yes". Gender, US census region, and self-rated overall health were not associated with preferences and so were not included in the models. Vaccination intent, race, and age were added in stepwise forward manner. To assess whether associations between vaccination intent and preferences varied by race/ethnicity, we tested for interactions between vaccination intent and race/ethnicity.

3. Results

There were 1706 responses to this survey, after removing those who failed the attention check ($n = 93$) and those who did not respond to the vaccination intent question ($n = 10$). After excluding 38 (2.3%) already-vaccinated participants, 1,668 were included in these analyses. Of these, 887 (53.2%) identify as female, 580 (34.8%) as White, 555 (33.3%) as Black, and 530 (31.8%) as Latino. The mean age of participants was 34.4 years (range 18–76). Participants were geographically diverse across US census regions with 755 (45.3%) from the South, 345 (20.7%) from the West, 284 (17.1%) from the Midwest and 281 (16.9%) from the Northeast. There was at least one participant from all US states except Alaska. At the time of the survey, almost half of the participants ($n = 756$; 45.3%) were vaccine hesitant with 341 (20.4%) responding "not sure" and 415 (24.9%) responding "no" when asked if they would get vaccinated for COVID-19.

Participants' preferences for how to be informed about a COVID-19 vaccine differed by vaccination intent and race (Table 1). Participants who answered "not sure" or "no" to vaccination intent were significantly more likely to prefer a conversation with their doctor compared to those who answered "yes" (25.0% vs 7.8%,

$P < .001$ and 23.4% vs 7.8%, $P < .001$, respectively). Preferences for how to be informed differed by race/ethnicity ($P = .001$). For example, Black participants were more likely to prefer a conversation with their doctor (20.0%), compared to Latino (14.0%) or White (11.7%) participants. Adjusting for vaccination intent and age attenuated this association (data not shown).

Nearly half of the participants (47.1%) did not have a preference for a vaccination location (Table 2). However, among participants who are not sure whether they will be vaccinated, almost two-thirds (61.8%) prefer to be vaccinated at a doctor's office, compared with 35.2% of those who intend to be vaccinated ($P < .001$). Preferred location differed by race/ethnicity ($P < .001$) with 67.6% of Black "not sure" participants preferring to be vaccinated at a doctor's office compared to 60.2% of Latino and 54.9% of White "not sure" participants. Adjusted differences in vaccination location preferences by intent and race were similar to unadjusted differences.

We did not detect race/ethnicity effect modification of associations of vaccine hesitancy with dependent variables.

4. Discussion

We describe significant differences in preferences for how to be informed about a COVID-19 vaccine and where to be vaccinated based on vaccine hesitancy and race. Our findings that vaccine hesitancy and Black race are associated with preferring to be informed about the COVID-19 vaccine via a conversation with one's doctor and to be vaccinated at a doctor's office underscore the need for healthcare providers to be integrated into COVID-19 vaccination programs, which has not been the case in the US to date. These findings are consistent with other studies that have shown that healthcare providers are the most trusted source of information regarding the COVID-19 vaccine and that an overwhelming majority of individuals say they will turn to healthcare providers when deciding whether to be vaccinated, across all demographic groups.[2] It is well established that a healthcare provider recommendation increases the uptake of influenza and human papillomavirus vaccines,[9,10] which suggests that incorporating preferences for healthcare provider involvement into vaccination strategies is likely to translate into increased vaccine uptake. Our study adds to an accumulating body of evidence indicating that healthcare providers play an essential role in promoting vaccine uptake, including for COVID-19.

Our findings suggest that the US vaccination program, in which PCPs are not currently at the center, needs to be adjusted to leverage the potential of healthcare providers to influence COVID-19 vaccine uptake among hesitant and minority individuals. As the COVID-19 vaccine is now widely available, a shift in delivery from mass vaccination sites and retail pharmacies to doctor's offices may be an important means of overcoming vaccine hesitancy and achieving equity. Our findings highlight the need to consider structural factors, such as how information is disseminated and where vaccinations are offered, that may influence whether vaccine hesitant individuals choose to be vaccinated.

The study has limitations, including the use of an online research panel and inclusion of English-speaking participants only which may limit generalizability and precludes response rate reporting. We did not include mass vaccination sites as a response option as these had not emerged as a predominant vaccination location at the time of survey administration. There are multiple possible reasons that someone who is hesitant to be vaccinated may prefer to be vaccinated at a doctor's office. Our study is not designed to elucidate the specific reasons individuals who are hesitant prefer to be vaccinated at a doctors' offices and it does not suggest specific communication strategies for providers to address

Table 1

Participant Responses to The Question, “If Your Doctor’s Office Wanted to Inform You about a COVID-19 Vaccine, How Would You Want Them to Do So?”, by Vaccination Intent and Race.

	Overall (n = 1668 ^a)	Yes (n = 912)	Vaccine Hesitant Participants		P Value (Not Sure vs Yes / No vs Yes)
			Not Sure (n = 341)	No (n = 415)	
All participants					
Email	515 (30.9)	321 (35.2)	87 (25.6)	107 (25.9)	<0.001/ <0.001
Conversation with my doctor	253 (15.2)	71 (7.8)	85 (25.0)	97 (23.4)	
Text message	252 (15.1)	176 (19.3)	38 (11.2)	38 (9.2)	
Telephone call	190 (11.4)	132 (14.5)	37 (10.9)	21 (5.1)	
Mailed letter	86 (5.2)	36 (4.0)	24 (7.1)	26 (6.3)	
Online portal message	83 (5.0)	39 (4.3)	20 (5.9)	24 (5.8)	
No preference	287 (17.2)	137 (15.0)	49 (14.4)	101 (24.4)	
Latino participants	N = 530	N = 353	N = 92	N = 85	
Email	176 (33.3)	128 (36.3)	27 (29.4)	21 (25.0)	0.001/ <0.001
Conversation with my doctor	74 (14.0)	34 (9.6)	22 (23.9)	18 (21.4)	
Text message	89 (16.8)	72 (20.4)	9 (9.8)	8 (9.5)	
Telephone call	49 (9.3)	34 (9.6)	11 (12.0)	4 (4.8)	
Mailed letter	31 (5.9)	17 (4.8)	9 (9.8)	5 (6.0)	
Online portal message	19 (3.6)	11 (3.1)	4 (4.4)	4 (4.8)	
No preference	91 (17.2)	57 (16.2)	10 (10.9)	24 (28.6)	
Black participants	N = 555	N = 226	N = 145	N = 184	
Email	162 (29.2)	81 (35.8)	34 (23.6)	47 (25.5)	< 0.001/ <0.001
Conversation with my doctor	111 (20.0)	19 (8.4)	41 (28.5)	51 (27.7)	
Text message	61 (11.0)	32 (14.2)	17 (11.8)	12 (6.5)	
Telephone call	73 (13.2)	49 (21.7)	15 (10.4)	9 (4.9)	
Mailed letter	25 (4.5)	7 (3.1)	7 (4.9)	11 (6.0)	
Online portal message	30 (5.4)	11 (4.9)	9 (6.3)	10 (5.4)	
No preference	92 (16.6)	27 (12.0)	21 (14.6)	44 (23.9)	
White participants	N = 580	N = 331	N = 104	N = 145	
Email	176 (30.3)	111 (33.5)	26 (25.0)	39 (26.9)	< 0.001 / <0.001
Conversation with my doctor	68 (11.7)	18 (5.4)	22 (21.2)	28 (19.3)	
Text message	102 (17.6)	72 (21.8)	12 (11.5)	18 (12.4)	
Telephone call	67 (11.6)	48 (14.5)	11 (10.6)	8 (5.5)	
Mailed letter	29 (5.0)	12 (3.6)	8 (7.7)	9 (6.2)	
Online portal message	34 (5.9)	17 (5.1)	7 (6.7)	10 (6.9)	
No preference	104 (17.9)	53 (16.0)	18 (17.3)	33 (22.8)	

^a There are n = 2 missing responses to the dependent variable. There are n = 3 missing values for race/ethnicity.

Table 2

Participant Responses to the Question “Where Would You Prefer to Go to Get the COVID-19 Vaccine?” by Vaccination Intent and Race.

	Overall (n = 1634 ^a)	Yes (n = 902)	Vaccine Hesitant Participants		P Value (Not Sure vs Yes / No vs Yes)
			Not Sure (n = 335)	No (n = 397)	
All participants					
Doctor’s office	683 (42.0)	317 (35.2)	205 (61.8)	161 (40.7)	< 0.001 / < 0.001
Pharmacy	178 (10.9)	129 (14.3)	23 (6.9)	26 (6.6)	
No preference	767 (47.1)	454 (50.4)	104 (31.3)	209 (52.8)	
Latino participants	N = 523	N = 351	N = 89	N = 83	
Doctor’s office	204 (39.2)	119 (34.0)	53 (60.2)	32 (38.6)	< 0.001 / 0.31
Pharmacy	66 (12.7)	51 (14.6)	8 (9.1)	7 (8.4)	
No preference	251 (48.2)	180 (51.4)	27 (30.7)	44 (53.0)	
Black participants	N = 550	N = 226	N = 144	N = 180	
Doctor’s office	283 (51.7)	103 (45.8)	96 (67.6)	84 (46.7)	< 0.001 / 0.02
Pharmacy	44 (8.0)	27 (12.0)	9 (6.3)	8 (4.4)	
No preference	220 (40.2)	95 (42.2)	37 (26.1)	88 (48.9)	
White participants	N = 558	N = 323	N = 102	N = 133	
Doctor’s office	194 (34.8)	93 (28.8)	56 (54.9)	45 (34.1)	< 0.001 / 0.09
Pharmacy	68 (12.2)	51 (15.8)	6 (5.9)	11 (8.3)	
No preference	295 (53.0)	179 (55.4)	40 (39.2)	76 (57.6)	

^a Participants who responded ‘other’ (n = 34) were excluded because the open-ended responses in this category differed by vaccination intent. There are n = 6 missing responses to the dependent variable. There are n = 3 missing values for race/ethnicity.

vaccine hesitancy. While these are important topics for further study, our finding of an association between COVID-19 vaccine hesitancy and preference to be vaccinated at a doctor’s office and to be informed about the COVID-19 vaccine through a conversation with one’s doctor nonetheless indicates that making the COVID-19

vaccine widely available at doctor’s offices is likely to be an important factor in overcoming vaccine hesitancy even as efforts to better understand reasons for vaccine hesitancy are ongoing. The strength of this study is the identification of timely and actionable preferences of vaccine hesitant individuals and racial minorities

that can be used to modify vaccination programs to increase the likelihood of reaching hesitant individuals and achieving equity.

5. Conclusions

Incorporating healthcare providers in the COVID-19 vaccination process in the US may increase vaccination among vaccine hesitant individuals and racial minorities.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2021.09.058>.

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