Received: 13 September 2021 | Revised: 18 October 2021 | Accepted: 24 October 2021

DOI: 10.1002/hsr2.485

Health Science Reports Open Access WILEY

RESEARCH LETTER

Reasons for COVID-19 vaccine hesitancy in individuals with chronic health conditions

Ann Marie Warren[1,2] | **Paul B. Perrin**[3] | **Timothy R. Elliott**[4] | **Mark B. Powers**[1,2]

[1]Baylor Scott & White Research Institute, Dallas, Texas, USA

[2]Division of Trauma, Critical Care and Acute Care Surgery, Baylor University Medical Center, Dallas, Texas, USA

[3]College of Humanities and Sciences, Psychology Department, Virginia Commonwealth University, Richmond, Virginia, USA

[4]College of Education and Human Development, Department of Educational Psychology, Texas A& M University, College Station, Texas, USA

Correspondence
Ann Marie Warren, Baylor Scott & White Research Institute, 3600 Gaston Avenue, Barnett Tower Suite 404, Dallas, TX 75246, USA.
Email: annmarie.warren@bswhealth.org

Funding information
Baylor Scott & White- Dallas Foundation; W.W. Caruth, Jr. Fund, Communities Foundation of North Texas

1 | INTRODUCTION

Hesitancy for COVID-19 vaccines is a concern for the population at large. Prior to the availability of COVID-19 vaccines in early 2021, a large study of adult Americans showed approximately one-fifth of those asked would be hesitant to take vaccines if they become available.[1] A recent comprehensive scoping review suggests across 48 studies conducted worldwide, 60% to 93% of individuals report the intention to be vaccinated against COVID-19[2] Although this trend is encouraging, vaccine hesitancy among those with chronic health conditions,[3] including those with intellectual and/or developmental disabilities,[4] is a concern, as these individuals are at a higher risk for COVID-19 incidence, severity, and mortality. In an online survey of 439 individuals with disabilities, concern about the COVID-19 vaccines, including concerns for safety and possible side effects, was the largest predictor of vaccine hesitancy among 25% of the sample.[5] Similar findings were seen in large studies of people with developmental or intellectual disabilities and their caregivers, who expressed concerns about side effects and the speed at which vaccines were developed were the primary contributors for not getting a vaccine.[4] Individuals with chronic health conditions are at a higher risk for COVID-19 incidence, severity, and mortality. To further our understanding of vaccine hesitancy in this at-risk group, the present cross-sectional observational survey study examined predictors and reasons for COVID-19 vaccine hesitancy in a representative sample of US adults with chronic health conditions.

2 | METHODS

This study was approved by the Institutional Review Board (IRB) at Baylor Scott & White Research Institute. Respondents (≥18 years) completed an online questionnaire distributed by the Qualtrics platform from January 4 to January 7, 2021. Recruitment for this study was done by use of the Qualtrics Panels, with 5023 participants enrolled representing all 50 states, Washington DC and Puerto Rico.[6] Participants selected for this analysis (n = 361) reported at least one chronic health condition, such as diabetes, cancer, cardiovascular disease, or any physical disability, among others. One item assessed COVID-19 vaccine intention: "If a COVID-19 vaccine were available today in sufficient supply to vaccinate everyone who wants to receive it, would you take the vaccine?" with answer options yes, no, or maybe. No or maybe responses elicited a list of possible reasons for not taking the vaccine. Participants were also provided an "other" option with the ability to free text response.

3 | DATA ANALYSIS

All analyses were conducted using IBM SPSS Statistics 28. Descriptives were calculated for demographics, COVID-19 vaccine hesitancy level, and reasons for vaccine hesitancy. A hierarchical linear regression was

TABLE 1 Participant demographics (n = 361)

Demographic variable	Value
Age, M (*SD*)	58.35 (11.70)
Biological sex, n (%)	
Male	183 (50.7)
Female	178 (49.3)
Education, n (%)	
High school graduate/GED	33 (9.1)
Vocational/technical school	23 (6.4)
Associate degree/some college	88 (24.4)
Bachelor's degree	115 (31.9)
Advanced degree	102 (28.3)
Employment status, n (%)	
Unemployed	86 (23.8)
Employed/Student	275 (76.2)
Race, n (%)	
White	302 (83.7)
Non-White	59 (16.3)
Number of Chronic Conditions, n (%)	
1	239 (66.2)
2	77 (21.3)
3	25 (6.9)
4	17 (4.7)
5	2 (.6)
8	1 (.3)
Would you get the COVID-19 vaccine?	
Yes	253 (70.1)
Maybe	52 (14.4)
No	56 (15.5)

computed with COVID-19 vaccine hesitancy as the outcome variable (responses to "…would you take the vaccine?"; 1 = Yes, 2 = Maybe, 3 = No). Demographics (age, biological sex [1 = female, 0 = male], education level, employment status (1 = employed or student, 0 = unemployed), race (1 = White, 0 = Non-White), and number of chronic health conditions) were included as Step 1 predictors. Step 2 predictors included potential reasons why participants might not receive the COVID-19 vaccine (1 = reason selected, 0 = reason not selected).

4 | RESULTS

Participant demographics and COVID-19 vaccine hesitancy data appear in Table 1. In the linear regression, Step 1 was statistically significant, $F(6, 354) = 5.05$, $R^2 = .079$, $P < .001$. Higher vaccine hesitancy was uniquely associated with younger age ($\beta = -.16$, $P = .003$) and lower education ($\beta = -.16$, $P = .004$) but not the other predictors. Adding the reasons why participants might not receive the COVID-19 vaccine as predictors at the second step of the equation, the model accounted for a significant amount of additional variance in vaccine hesitancy, $F(13, 347) = 49.99$, $R^2 = .652$, $P < .001$ (Table 2). Within this model, greater number of chronic health conditions was now associated with lower vaccine hesitancy, and the effect of education was no longer significant. Of the reasons for vaccine hesitancy, concerns about safety, concerns about potential side effects, and not feeling at risk for getting COVID-19 exerted the largest unique effects on vaccine hesitancy. These were followed by believing the risks of COVID-19 infection were lower than that from the vaccine and want to wait a few weeks or months until others have taken the vaccine. The most common reasons for not wanting to receive the COVID-19 vaccine mirrored the two largest predictors in the regression, although wanting to wait a few weeks or months was the third most common, followed by having

TABLE 2 Multiple regression predicting COVID-19 vaccine hesitancy with standardized β-weights from the final model that included both steps

Predictor	*β*	*P*-value	% Endorsed
Step 1			
Age	−.08	.018	-
Female Sex	.01	.689	-
Education Level	−.06	.067	-
Employed	−.03	.428	-
White Race	−.01	.796	-
Number of Chronic Conditions	−.07	.029	-
Step 2			
I have concerns regarding safety	.36	<.001	18.6
I have concerns regarding potential side effects	.29	<.001	20.5
I want to wait a few weeks or months until others have taken it	.11	.005	12.5
I have concerns regarding how effective the vaccine is	.03	.410	11.1
I have religious reasons	.04	.267	1.1
I do not feel at risk for getting COVID-19	.18	<.001	2.8
I believe the risks from the COVID-19 infection are lower than from the vaccine	.12	<.001	3.0

concerns regarding the vaccine's effectiveness. The other reasons were reported at 3% or lower.

5 | DISCUSSION

The most predictive reasons for COVID-19 vaccine hesitancy among individuals with chronic health conditions were the safety of the vaccine and potential side effects, which has been observed in previous research.[4,5] Although younger age and lower education initially predicted vaccine hesitancy, personal reasons for not getting the vaccine accounted for over 50% of unique variance in hesitancy, obviating the relationship of education to the criterion variable. Concerns about vaccine safety and side effects may reflect a sense of fear and a lack of trust in the vaccine and its development; in contrast, a lower sense of risk for contracting COVID-19 can reflect an optimism bias that might serve to minimize negative emotions.[7]

6 | CONCLUSION

To facilitate vaccine acceptability among individuals with chronic health conditions personal concerns about safety, side effects and personal risk should be addressed in health communications that appreciate these concerns, promoting trust and credibility in the vaccine and its development, and a patient's sense of self-efficacy in their personal health.[7]

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

AUTHOR CONTRIBUTIONS

Conceptualization: Ann Marie Warren, Paul B. Perrin, Timothy R. Elliot, Mark B. Powers

Data Curation: Ann Marie Warren, Mark B. Powers

Formal Analysis: Paul B. Perrin

Methodology: Ann Marie Warren, Mark B. Powers

All authors (equal) were responsible for writing, editing, review, and response to reviewers comments.

FUNDING

This work was supported by funding from Baylor Scott & White-Dallas Foundation and W.W. Caruth, Jr. Fund, Communities Foundation of North Texas.

ORCID

Ann Marie Warren https://orcid.org/0000-0002-3753-5573

Paul B. Perrin https://orcid.org/0000-0003-2070-215X

Timothy R. Elliott https://orcid.org/0000-0002-6608-7714

Mark B. Powers https://orcid.org/0000-0001-7898-073X

REFERENCES

1. Khubchandani J, Sharma S, Price J, et al. COVID-19 vaccination hesitancy in the United States: a rapid national assessment. *J Community Health*. 2021;46:270-277.
2. AlShurman BA, Khan AF, Mac C, Majeed M, Butt ZA. What demographic, social, and contextual factors influence the intention to use COVID-19 vaccines: a scoping review. *Int J Environ Res Public Health*. 2021;18(17):9342. doi:10.3390/ijerph18179342
3. Ejaz H, Alsrhani A, Zafar A, Javed H, et al. COVID-19 and comorbidities: deleterious impact on infected patients. *J Infect Public Health*. 2020 Dec;13(12):1833-1839. doi:10.1016/j.jiph.2020.07.014
4. Iadarola S, Siegel JF, Gao Q, McGrath K, Bonuck KA. COVID-19 vaccine perceptions in New York State's intellectual and developmental disabilities community. *Disabil Health J*. 2022;15(1):101178. https://doi.org/10.1016/j.dhjo.2021.101178
5. Myers A, Ipsen C, Lissau A. COVID-19 vaccination hesitancy among Americans with disabilities aged 18-65: an exploratory analysis. *Disabil Health J*. 2022;15(1):101223. https://doi.org/10.1016/j.dhjo.2021.101223
6. Warren AM, Zolfaghari K, Fresnedo M, et al. Anxiety sensitivity, COVID-19 fear, and mental health: results from a United States population sample. *Cogn Behav Ther*. 2021;50(3):204-216. doi:10.1080/16506073.2021.1874505
7. Bavel JJV, Baicker K, Boggio PS, et al. Using social and behavioural science to support COVID-19 pandemic response. *Nat Hum Behav*. 2020;4(5):460-471. doi:10.1038/s41562-020-0884-z

How to cite this article: Warren AM, Perrin PB, Elliott TR, Powers MB. Reasons for COVID-19 vaccine hesitancy in individuals with chronic health conditions. *Health Sci Rep*. 2022;5:e485. doi:10.1002/hsr2.485