

## Abstract

### Objectives

To estimate levels of COVID-19 vaccine hesitancy among working age adults with disabilities in the UK.

### Study design

Cross-sectional survey

### Methods

Secondary analysis of data collected on a nationally representative sample of 10,114 respondents aged 16-64 years.

### Results

The adjusted relative risk for hesitancy among respondents with disability was 0.92 (95%CI 0.67-1.27)). There were stronger associations between gender and hesitancy and ethnic status and hesitancy among participants with a disability. The most common reasons cited by people with disabilities who were hesitant were: concern about the future effects of the vaccine, not trusting vaccines and concern about the side effects of vaccination.

### Conclusions

The higher rates of vaccine hesitancy among women with disabilities and among people from minority ethnic groups with disabilities are concerning.

**Key words:** disability, vaccine hesitancy, COVID-19, gender

**Word count:** 1,199

## Introduction

People with disabilities are at greater risk of infection from SARS-CoV-2 and, if infected, of serious illness or death.<sup>1,2</sup> As such, they should be prioritised in vaccination programs. It is important to understand the views of people with disabilities about COVID-19 vaccination. The only information we are aware of suggested no differences in hesitancy between adults (all ages) with/without disability in the UK (8% vs. 9%),<sup>3</sup> although adults with low cognitive ability were more likely to be vaccine hesitant.<sup>4</sup> This study aims to provide evidence on vaccine hesitancy among 'working age' adults with/without disability and the extent to which predictors of hesitancy observed in the general population generalise to people with disability.

## Method

Secondary analysis of data collected in Waves 9-11 of *Understanding Society* (US) and Waves *f-h* of US's online COVID-19 surveys. Full details of US are available elsewhere.<sup>5-8</sup> The number of full interviews conducted with respondents aged 16-64 (our target age range) at Wave 9 (2017-19) was 27,359 and at Wave 10 (2018-2020) 24,805. Interim data from Wave 11 (2019-) are available for 13,453 individuals aged 16-64.

Following the COVID-19 outbreak, US undertook eight online surveys on the experiences of participants during the pandemic. Vaccine hesitancy data were collected in Waves *f* (November 2020), *g* (January 2021), and *h* (March 2021). Responses were obtained from 10,435 adults aged 16-64 for whom disability data were available and who participated in at least one wave of COVID surveys (*f-h*); individual response rate approximately 50%.<sup>9</sup>

## Measures

### Disability

Disability data were not collected in the COVID surveys. As a result, we coded disability from the most recently available wave of the main survey in which the respondent participated (W11-9).<sup>10</sup>

Disability was ascertained by an affirmative response to two questions: (1) *'Do you have any long-standing physical or mental impairment, illness or disability? By 'long-standing' I mean anything that has troubled you over a period of at least 12 months or that is likely to trouble you over a period of at least 12 months'*; (2) *'Do these health problem(s) or disability(ies) mean that you have substantial difficulties with any of the following areas of your life?'* (disability was coded as present if the participant responded yes to any of the 12 possible response options). Disability data were missing for 1.2% of participants who responded to the COVID surveys.

### Vaccine Hesitancy

At Wf of the COVID survey, respondents were asked two questions.

1. *'Imagine that a vaccine against COVID-19 was available for anyone who wanted it. How likely or unlikely would you be to take the vaccine?'* (options; very likely/likely/unlikely/very unlikely recoded into as very likely/likely (not hesitant) vs. unlikely/very unlikely (vaccine hesitant)).
2. *'What is the main reason you would not take the vaccine?'*

At later waves, Q1 was changed to *'When you are offered the coronavirus vaccination, how likely or unlikely would you be to take it?'* and the following question was included.

3. *'Have you had a coronavirus vaccination?'* (options; Y, first vaccination only/Y, both/ N, but have an appointment/N). All respondents who reported that they had been vaccinated or had an appointment to be vaccinated were coded as not being vaccine hesitant.

Vaccine hesitancy data were derived from the most recent wave of COVID data collection (e.g., if Wh was missing, data from Wg were used, lastly Wf). These data were missing for 1.5% of COVID respondents for whom valid disability data were available.

## Covariates

We included four covariates in the model which previous research has shown to be predictive of COVID vaccine hesitancy.<sup>3,11</sup> Age (coded in 10-year age bands) and gender (male/female) were complete for all respondents. Ethnicity data were missing for 6.4% (coded white British/other/unknown). Highest level of educational attainment was missing for 9.4% (coded degree/lower/unknown).

## Ethical Approval

Approval was granted by the University of Essex Ethics Committee (ETH1920-1271).

## Analysis

Complete case analyses were undertaken in Stata 16 using the 'svy' routines and released sampling weights. The analytical sample comprised 10,114 respondents aged 16-64 years for whom valid disability and hesitancy data were available. First, we estimated the prevalence of people with/without disability reporting vaccine hesitancy. Second, we estimated adjusted prevalence rate ratios (APRR), using Poisson regression with robust standard errors for respondents with disabilities (respondents without disabilities being the reference group). We adjusted for between-group differences in age, gender, ethnicity, educational attainment and the wave in which disability status was ascertained. Third, we investigated potential moderating effects of disability on the association between the four covariates and hesitancy by entering interaction terms into the regression models. Finally, we explored between group differences in the stated reasons for vaccine hesitancy.

## Results

Of the respondents, 21.5% (95%CI 19.9%-23.1%) were identified as having a disability, 8.0% (6.8%-9.3%) were identified as being vaccine hesitant. Of those deemed non-hesitant, 68.1% (66.0%-70.1%) of participants with disability and 50.0% (48.8%-51.1%) of participants without disability

were coded as non-hesitant as they had either been vaccinated or had an appointment to be vaccinated.

Estimated prevalence of vaccine hesitancy was 7.1% (5.1%-9.7%) among respondents with disability and 8.2% (6.9%-9.8%) among respondents without disability (APRR for hesitancy among respondents with disability was 0.92 (0.67-1.27)). Testing for potential moderating effects of disability revealed trends toward statistical significance for interaction terms associated with gender (2.01 (0.99-4.10),  $p=0.054$ ) and ethnicity (1.84 (0.92-3.68),  $p=0.086$ ). Interaction analyses showed hesitancy was lower for people with disability compared to those without for men and White British, higher for ethnic minority groups, and there was no difference for women (Table 2). Examination of the reasons for hesitancy among respondents who were hesitant revealed no statistical evidence of differences between those with/without disabilities. The most common reasons cited by vaccine hesitant people with disabilities were: concern about the future effects of the vaccine (women 44.8% (27.4%-63.4%); men 65.5% (40.7%-84.1%); not trusting vaccines (women 26.0% (10.3%-51.1%); men 33.2% (11.8%-64.4%)) and concern about the side effects of vaccination (women 26.0% (11.3%-48.6%); men 10.8% (1.2%-36.0%)).

## Discussion

Overall levels of vaccine hesitancy are similar between people with and without disability. However, there may be stronger associations between gender and hesitancy and between minority ethnic status and hesitancy among participants with a disability. The relatively higher rates of hesitancy among women and people from minority ethnic groups with disabilities are concerning, indicating a need for public health agencies to address the specific worries of these two groups regarding vaccine safety and to ensure that accommodations are made to the vaccination process to ensure equitable access for women with disabilities and people from minority ethnic groups with disabilities.

The two main limitations of our study are: (1) the relatively low response rate; (2) the use of a cross-sectional design that does not allow for causal inferences to be tested; and (3) the use of online responding that may have reduced response rates among participants with disabilities associated with reduced cognitive capacity.<sup>4</sup> The main strengths are that US involves a UK representative sampling frame and is one of the few longitudinal studies with pre-COVID-19 data on participants. Taken together with other UK data, in a country with high vaccination rates (at the time of writing), vaccine hesitancy is low among people with disabilities. It will be important to understand hesitancy among disabled populations in countries with different vaccination rates.

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Table 1: APRRs for Interaction Effects with Gender and Ethnicity		
Gender	Men	Women
No disability (reference)	1.00	1.29 (0.95-1.75)
Disability	0.55 (0.30-1.01)	1.43 (0.95-2.15)
Effect of disability within gender groups	0.55 (0.30-1.01)	1.11 (0.76-1.62)
Ethnicity	White British	Other
No disability (reference)	1.00	2.78*** (1.94-3.99)
Disability	0.74 (0.50-1.09)	3.79*** (2.28-6.30)
Effect of disability within ethnic groups	0.74 (0.50-1.09)	1.36 (0.78-2.39)
Note: *** p<0.001		