

SHORT REPORT



Factors impacting vaccine hesitancy toward Coronavirus disease-19 (COVID-19) vaccination in Brooklyn, New York

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Abstract

The Coronavirus disease-2019 (COVID-19) pandemic led to the development of several candidate vaccines. However, current research suggests that the potential of successful vaccines is tempered by vaccine skepticism or hesitancy. If vaccine efficacy is 80%, then the herd immunity required from vaccination is about 75–90%. The aim of the current study was to study factors impacting COVID-19 vaccine hesitancy in a representative sample of adults (age ≥ 18 years) in a COVID-19 hotspot

Abbreviations: COVID-19: coronavirus disease-19

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The Coronavirus disease-2019 (COVID-19) pandemic led to the development of several candidate vaccines.¹ However, current research suggests that the potential of successful vaccines is tempered by vaccine skepticism or hesitancy.² If vaccine efficacy is 80%, then the herd immunity required from vaccination is about 75–90%.³ The aim of the current study was to study factors impacting COVID-19 vaccine hesitancy in a representative sample of adults (age ≥ 18 years) in a COVID-19 hotspot.

Structured interviews were conducted by health care personnel at a community center neighborhood in South Brooklyn, New York (September 2020–March 2021). Study participants were recruited consecutively as they were frequenting community center for various reasons and services. The population of this neighborhood in 2019 was 46,990 with median age of 35.4 years for males and 37.5 years for females, average household size of 5.4 people, and median household income of 60, USD 942.⁴ The percentage of the population below poverty level was 19.8%,⁴ compared to 13.0% for New York State.⁴

Demographic data collected included gender (female/male), age, respiratory problems, fatigue, history of COVID-19 infection, receipt of influenza vaccine (this year or the prior year), and intent to receive COVID-19 vaccine, followed by the response option “yes” or “no” (Table 1). All participants were Caucasian, lower to middle class, and high school graduates. Participant characteristics were summarized using multinomial logistic regression (SAS, version 9.4.3, SAS Institute, Cary, NC).

Fifty-three participants completed the survey. The median age was 28 (18–74) years, with 17 (32.1%) males, and 36 (67.9%) females. Thirty-three (62.3%) participants reported having past COVID-19 infection. For participants who had

previous COVID-19 infection compared to those who did not, no significant differences were observed in receiving the seasonal influenza vaccine (60.6% vs. 80.0%; Chi-square, $P = .14$) or intending to receive the COVID-19 vaccine (30.3% vs. 50.0%; $P = .15$); when participants were further subdivided into different age groups (less than median [18–27 years] vs. greater than median age [28–74 years]) no significant differences were observed (34.6% vs. 40.7%; Chi-square, $P = .646$). For participants who received seasonal influenza vaccine compared to those who did not, no significant differences were observed in COVID-19 vaccine acceptance (44.4 vs. 23.5%; $P = .14$); when participants were further subdivided into different age groups significant differences were observed (18–27 vs. 28–74 years: 53.85 vs 81.48%; $P = .031$ (Table 2).

The present study shows that people in this community with a prior infection with SARS-CoV-2 and hesitancy to the seasonal influenza vaccine were numerically more likely to report increased COVID-19 vaccine hesitancy. The definition of vaccine hesitancy is “the reluctance to be vaccinated or to have one’s children vaccinated against a disease, even if the vaccine is proven safe,”⁵ and may pose danger to the community. Possible reasons for hesitancy may include efficacy of the vaccine, side-effects, safety (based on newness of vaccine), cost to consumer, distrust/skepticism, or lack of correct information.^{5,6}

The impact of anti-vaccine propaganda and distrust of vaccines was demonstrated in a recent poll in February 2021 from the Associated Press–National Opinion Research Center (NORC) for Public Affairs Research that reported 67% of Americans plan to get vaccinated or have already received the vaccine, 15% are certain they will not receive the vaccine and 17% say they probably will not receive the vaccine, suggesting skepticism. Higher resistance was found among younger

Table 1. Demographics: epidemiologic and clinical features of participants.

Characteristic	Total (N = 53)
Age(y), median (range)	28 (18–74)
Age, subgroups (y) (%)	
18–27	26 (49.1%)
28–74	27 (50.9%)
Gender: male (%)	17 (32.1%)
Current symptoms (%)	
Respiratory	16 (30.2%)
Fatigue	8 (15.1%)
Past COVID-19 infection (%)	33 (62.3%)
Receipt of Seasonal Influenza Vaccine (%)	36 (67.9%)
Past COVID- 19 Infection	20 (55.5%)
No Past COVID-19 Infection	16 (44.4%)

Data are shown for all subjects (N = 53).

No statistical significance between subgroups ($P > 0.05$).

Table 2. Intention to take COVID-19 vaccine according to demographics.

Variable	COVID-19 vaccine		Total
	No	Yes	
Sex			
Female	25 (69%)	11 (31%)	36
Male	8 (47%)	9 (53%)	17
Smoker			
No	32 (62%)	20 (38%)	52
Yes	1 (100%)	0 (0%)	1
Age (years)			
18–27	17 (65%)	9 (35%)	26
28–74	16 (59%)	11 (41%)	27

No statistical significance observed between gender, smoking status and age subgroups ($P > 0.05$).

people, people without college degrees, Black Americans, and political affiliation. However, the population surveyed in this study was small, Caucasian, and mostly lower to middle class. Even though certain U.S. populations may experience vaccine hesitancy, past studies from the influenza vaccine showed that there is suboptimal vaccine acceptance.^{5,7} General vaccine hesitancy may play a role in COVID-19 vaccine hesitancy as there were numerically lower proportions of influenza vaccination in this population. However, in the current study, younger adults had less intent than older adults to receive the seasonal influenza vaccine.

It must be acknowledged that there are limitations to this study including small study/sample size, which is associated with decreased power and increased type II error. Future larger scale studies are needed to confirm the findings of this pilot study. It should be mentioned that this cohort was selected

randomly and was not based on vaccine belief. In this study, similar demographics to public neighborhood demographics are likely to reflect a representative community sample.

The causes of vaccine hesitancy may differ in different areas. In this geographic area, COVID-19 was very prevalent beginning with the first wave in March 2020, and this may contribute to perceptions of vulnerability to subsequent infections and utility of vaccination. National programs should look at the diversity of reasons for vaccine hesitancy to address this problem, including implementation of effective education.

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No potential conflicts of interest were disclosed.

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