

Abstract

COVID-19 is the most significant public health crisis of modern times, with over 78 million cases and over 933,000 deaths as of February 20, 2021. COVID-19 vaccines reduce the probability of death and severe infections, making vaccines one of the most important tools for fighting the COVID-19 pandemic and enabling communities to transition to normalcy. Using county-level data, this study explores the relationship between social vulnerability and resource utilization during COVID-19 to examine social equity in response to COVID-19. These findings can provide lessons on how to improve equity during current and future public health emergencies.

Introduction

- COVID-19 is the biggest public health crisis of modern times, with over 78 million cases and over 933,000 deaths in the United States as of February 20, 2022 (Anwar et al., 2020; New York Times, 2022).
- Existing research found that a relationship between social vulnerability and COVID-19, where socially vulnerable communities have experienced more significant consequences from the pandemic than communities with greater resources.
- The COVID-19 vaccines reduce the probability of death and severe infections, making vaccines one of the most important tools for fighting the COVID-19 pandemic (Liang et al., 2021; Phillips, 2012), and as such, vaccines enable communities to transition to normalcy, as much as possible.
- During emergencies and crises, such as the COVID-19 pandemic, governments provide interventions and resources to improve community responses. Through these services, ideally, community resilience would be enhanced, and communities could return to normalcy following the event. However, past research found that resources provided after an emergency or crisis were not always distributed or utilized equitably, which can impact the ability of all communities to be resilient (Emrich et al., 2020).

Literature Review

Social vulnerability refers to the risk of harm that a community faces when confronted with an emergency or disaster which is the result of community characteristics (Flanagan et al., 2011). A single measure, is insufficient to measure risk because there are multiple intersecting and overlapping factors that impact risk (Cutter & Finch, 2008; Nukpezah, 2020). Instead, social vulnerability captures multiple constructs in one measure (Cutter & Finch, 2008). When confronted with a disaster, the risk of harm is related to the extent to which these factors are present or absent (Nukpezah, 2020).

Social vulnerability and social equity are inherently interconnected. Although social vulnerability captures risk, Cutter and Finch (2008) argue that these vulnerabilities exist because of "inequality and its social and political consequences" (p. 2305). Consistent with Domingue and Emrich (2019), this study defines social equity in terms of resource utilization. Specifically, a social equity issue arises when areas with high social vulnerability utilize fewer resources when compared with areas with low social vulnerability. Examining social equity through resource utilization is especially important because when socially vulnerable areas are not provided resources following an emergency or crisis, they are more vulnerable to future emergencies (Domingue & Emrich, 2019).

Preliminary results from the COVID-19 vaccine utilization in the United States suggest inequities could exist in the administration process. Although past studies have examined the relationship between social vulnerability and vaccine administration, more research is needed. The existing studies do not cover the entire first year of vaccine administration, which the current study will address. This is important because early in the pandemic, vaccines were scarce and over time, they became more easily accessible (American Journal of Managed Care, 2021). Most prior research focus on time periods where vaccines were scarce, and this study will focus on one year after the vaccine was released, a time where vaccines were still needed, and resources were available.

Equal Access: An Analysis of Equitable Emergency Responses in COVID-19 Vaccine Utilization

Rebecca Entress

University of Central Florida

College of Community Innovation and Education

Department of Public Administration

Email Address: rmentress@knights.ucf.edu

Hypothesis and Research Method

Hypothesis

- Counties with higher social vulnerability will receive fewer vaccines compared to counties with lower social vulnerability.

Research Method

- This study uses cross-sectional county-level data to answer the research question.
- Data for the research question was analyzed with OLS regression to determine whether there is a relationship between community social vulnerability and COVID-19 vaccine utilization.
- Because of the large number of variables, the researcher used exploratory factor analysis as a data reduction strategy to limit the number of variables in the model.

Results

After developing four social vulnerability indices (wealth-related social vulnerability, age-related social vulnerability, employment-related social vulnerability, and ethnicity-related social vulnerability), the study found the wealth-related social vulnerability, employment-related social vulnerability, and ethnicity-related social vulnerability indices were related to vaccine utilization. In the case of the wealth-related social vulnerability index, higher vulnerability scores was related to lower vaccine utilization, but the opposite was observed for the employment-related and ethnicity-related social vulnerability indices.

Factor	Variables Contained	Factor	Variables Contained
Wealth-related social vulnerability	Median value of owner-occupied housing units	Employment-related social vulnerability	% of households spending more than 40% of their income on housing costs
	% households earning over \$200,000 annually		% female participation in labor force
	Median gross rent		% employment in extractive industries
	% of housing units with 10 or more units in the structure		% employed in service industry
Age-related social vulnerability	Per capita income	Ethnicity-related social vulnerability	% Black
	% Asian		% Hispanic
	Median age		% that speak English less than well
	% of people under the age of 5 and over 65		
	% of people in a county who are under the age of 17		
Vaccine hesitancy	% households receiving social security benefits		
	% vacant housing units		
	% renters		

	Coef.	St.Err.
Wealth-related social vulnerability	-3.536***	(.358)
Age-related social vulnerability	.212	(.288)
Employment-related social vulnerability	1.611***	(.273)
Ethnicity-related social vulnerability	2.087***	(.251)
Vaccine hesitancy	-34.895***	(5.675)
Political Affiliation (0=Republican, 1=Democrat)	3.858***	(.801)
Divided state government (0=not divided, 1=divided)	3.334***	(.447)
Health department structure (0=local control, 1=not local control)	-5.476***	(.473)

Number of observations: 3,032

R-squared: .328

*** p<.01, ** p<.05, * p<.1

Conclusion

- Community resilience can be improved by providing resources that make communities better able to absorb shocks and return to normalcy (Comfort et al., 2020; Kapucu et al., 2013; Kapucu & Sadiq, 2016) and higher vaccine (resource) utilization in communities with high levels of wealth-related vulnerabilities would enhance resilience.

Limitations

- The study uses data on individuals who received a complete vaccine series, rather than data on individuals who have been vaccinated and boosted. Booster shots provide better protection would provide a better picture of resilience (Centers for Disease Control and Prevention, 2022) and this can be examined in the future.
- The current study does not account for employment changes during the pandemic, limiting our ability to fully understand the relationship between vaccinations and employment.

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