

## ORIGINAL RESEARCH

# Attitudes and Beliefs of Patients With Left-Ventricular Assist Devices Toward COVID-19 Vaccination and Willingness to Seek Care During the Pandemic

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## Abstract

Given the stalling improvement in vaccine hesitancy rates in the United States (US), it is important to understand why a chronically ill group, patients with left-ventricular assist devices (LVADs), might not get vaccinated and to delineate the barriers they may face in seeking care. We conducted an online survey to characterize the attitudes of patients with LVADs toward COVID-19 vaccination, identify their willingness to seek care during the pandemic, and characterize barriers to doing so. Our survey showed that the rate of vaccine hesitancy among LVAD patients is similar to that of the general population in the US. This rate is higher than expected for a chronically ill group at risk of severe COVID-19 infection. We also found that LVAD patients perceive barriers to seeking care during the pandemic. We recommend that LVAD care teams emphasize that patients should seek care for emergency medical conditions despite their fears of contracting COVID-19. Based on our results, we also recommend vaccine uptake education for this population focused on patients' concerns about serious side effects and not enough research done on the vaccine.

## Introduction

Patients with a left-ventricular assist device (LVAD) represent an ill, comorbid, functionally immunocompromised population at high chance of death due to COVID-19.<sup>1</sup> Limited data on COVID-19 infections in the LVAD population highlight morbidities such as refractory hypoxemia leading to tracheostomy and right-ventricular failure leading to multiorgan dysfunction.<sup>2,3</sup> Thus, this group would particularly benefit from vaccination against COVID-19. LVAD patients' practices regarding COVID-19 vaccination and willingness to seek out health care in the United

States (US) during the pandemic have not been assessed.<sup>4</sup> Our study sought to characterize the attitudes of patients with LVADs toward COVID-19 vaccination, identify their willingness to seek care during the pandemic, and characterize barriers to doing so.

## Methods

We conducted a crowdsourced research study<sup>5</sup> via an online survey of LVAD patients in March and April 2021. We recruited participants by posting the survey to the 2 most common online forums for LVAD patients and caregivers, the Facebook group "Left Ventricular Assist Device

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### Author Contributions

Holland Kaplan, MD, participated in data analysis, wrote the first draft of the manuscript, and submitted the final manuscript. Lauren Schoen participated in the study design, data collection, and data analysis. Jennifer Blumenthal-Barby, MA, PhD, Kristin Kostick, PhD, and Peter Ubel, MD, participated in study design, data analysis, and critical review of the manuscript. Bich N Dang, MD, participated in the study design, data collection and analysis, and manuscript preparation. All authors have given final approval to the manuscript.

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(LVAD) Support® and the website myLVAD.com. The survey included 32 items and can be found in online supplementary file 1. Data were collected from 48 LVAD patients. The survey included 13 fear-related questions about seeking health care for emergent and routine issues during the COVID-19 pandemic, 6 questions about patients' COVID-19 prevention behaviors, and 13 questions about attitudes surrounding vaccination in general and the COVID-19 vaccine specifically. These questions were based on a review of the literature and existing survey instruments on vaccine uptake.<sup>6-12</sup> We used the  $\chi^2$  test to compare attitudes and beliefs toward COVID-19 vaccination between vaccine-hesitant and vaccine-willing patients. We defined "vaccine-hesitant" as patients who said that, if they were eligible for the COVID-19 vaccine, they would "wait to get the vaccine" or were "not sure." We defined "vaccine-willing" as respondents who would "get the vaccine as soon as possible" if eligible or had "already received" the COVID-19 vaccine. In comparing attitudes between vaccine-hesitant and vaccine-willing patients, we excluded the 1 respondent who stated they would "never" get the vaccine. A p value of < 0.05 was considered statistically significant. Analyses were conducted using R software (version 4.0.3; R Foundation, Vienna, Austria). Each survey participant was given a \$5 electronic gift card. The survey stated that completion of the questions constituted implicit consent to participate in this research. The Baylor College of Medicine Institutional Review Board approved this study.

## Results

### ATTITUDES TOWARD COVID-19 VACCINATION

In our survey, 79% (n = 38) of respondents stated that they would get the COVID-19 vaccine "as soon as possible" or had "already received" the COVID-19 vaccine. Nineteen percent (n = 9) reported they would "wait to get the vaccine" or were "not sure." Only 1 respondent said they would "never" get the vaccine. As seen in Table 1, vaccine-hesitant respondents were significantly less likely to believe vaccines were safe (p < 0.01) and effective (p = 0.04), more likely to believe they might have a "serious side effect from the COVID-19 vaccine" (p = 0.02) (but not from vaccines in general, p = 0.28), and more likely to believe "there has not been enough research done on the COVID-19 vaccine" (p < 0.01). However, there was no significant difference between vaccine-hesitant and vaccine-willing respondents regarding their worries about getting COVID-19 or receiving the flu vaccine in the last year.

### PREVENTIVE PRACTICES

LVAD patients embrace public preventive strategies against COVID-19: 94% (n = 45) of respondents reported wearing a mask in public "a lot" or "quite a bit," 85% (n = 41) ensured that they were physical distancing in public "a lot" or "quite a bit," and 81% (n = 39) reported washing their hands "a lot" or "quite a bit." To a lesser extent, 79% (n = 38) of respondents reported avoiding a social event they wanted to attend.

### ATTITUDES TOWARD SEEKING MEDICAL CARE DURING THE PANDEMIC

As seen in Table 2, patients who were "slightly likely" to "extremely likely" to "wait it out as long as possible" if they were experiencing an emergency (eg, chest pain) were more likely to be worried about getting COVID-19 by going to the lab for bloodwork (p = 0.01) or hospital (p = 0.07).

A total of 23% (n = 11) of LVAD patients stated that they missed a scheduled appointment with a health care provider during the COVID-19 pandemic. Most often, the clinic had cancelled the appointment because of COVID-19 (27%, n = 3) or the clinic was closed because of COVID-19 (27%, n = 3). Other reasons were that the patient wanted "to avoid being around others" (36%, n = 4) or "did not want to be in a healthcare setting" (36%, n = 4).

## Discussion

LVAD patients are more likely to develop life-threatening COVID-19 infection if not vaccinated.<sup>1</sup> Despite this, the rate of vaccine hesitancy that we identified among LVAD patients was actually higher than that of the general population in the US at the time this survey was taken.<sup>13</sup> Our survey respondents had high uptake of the flu vaccine, at 92% (n = 44). Increasing the COVID-19 vaccine uptake in this population is likely feasible given that 88% (n = 42) of our respondents considered vaccination in general to be important for LVAD patients. Despite our respondents' acceptance of flu vaccines, however, they did display hesitancy toward the COVID-19 vaccine. Our data showed that 19% (n = 9) of surveyed LVAD patients were hesitant toward getting the COVID-19 vaccine. Nudges to increase vaccination uptake may be particularly effective in LVAD patients who are vaccine-hesitant but do not state that they will "never" get the vaccine. An intervention as simple as sending a text-message-based nudge prior to an outpatient appointment could increase vaccine uptake.<sup>14</sup> LVAD patients'

## Attitudes and Beliefs of Patients With LVADs Toward COVID-19 Vaccination

	Total sample	If you were eligible for a COVID-19 vaccine, would you...		
		"Get the vaccine as soon as possible" or "I've already received a COVID vaccine"	"Wait to get the vaccine" or "Not sure"	P value
How strongly do you agree or disagree with the following?	47	38	9	
<i>Vaccine safety and importance</i>				
I am completely confident that vaccines are safe <sup>a</sup>	74% (35)	84% (32)	33% (3)	< 0.01
Overall, I think vaccines are safe <sup>a</sup>	91% (43)	97% (37)	66% (6)	< 0.01
Overall, I think vaccines are effective	87% (41)	92% (35)	66% (6)	0.04
I think vaccines are important for patients with a left-ventricular assist device to have	87% (41)	92% (35)	66% (6)	0.04
My closest friends and family are getting the COVID-19 vaccine	72% (34)	79% (30)	44% (4)	0.27
<i>Vaccine concerns</i>				
I am concerned about serious adverse events of vaccines	30% (14)	26% (10)	44% (4)	0.28
I am concerned I might have a serious side effect from the COVID-19 vaccine <sup>a</sup>	34% (16)	26% (10)	66% (6)	0.02
There has not been enough research done on the COVID-19 vaccine <sup>a</sup>	32% (15)	21% (8)	78% (7)	< 0.01
<i>Preventive behaviors</i>				
I worry that I may get COVID	47% (22)	48% (18)	44% (4)	0.87
I have gotten a flu shot in the last year	72% (34)	76% (29)	56% (5)	0.21

**Table 1:** Attitudes of patients with left-ventricular assist devices toward COVID-19 vaccination in respondents who "agree" or "strongly agree" with statements regarding vaccine safety and importance, concerns, and preventive behaviors

<sup>a</sup> Value of  $p < 0.05$  by the  $\chi^2$  test.

main concerns about the COVID-19 vaccine revolved around serious side effects and insufficient research. Our results suggest that interventions to increase

COVID-19 vaccine uptake, such as targeted education and counseling, should focus on these areas. Given the high chance of hospitalization or death

	Total sample	If you were experiencing what you think might be an emergency heart-related health concern (eg, chest pain), how likely would you be to try to wait it out?		
		"Not at all likely" to wait it out	"Slightly likely" to "Extremely likely" to wait it out	P value
How worried would you be about getting COVID-19 if you had to go to...	48	31	17	
Lab for bloodwork <sup>a</sup>	38% (18)	22% (7)	65% (11)	0.01
Cardiologist's office	29% (14)	23% (7)	41% (7)	0.31
Hospital	35% (16)	23% (7)	59% (9)	0.07

**Table 2:** Likelihood of patients with left-ventricular assist devices to defer emergency among patients "very worried" or "extremely worried" about getting COVID-19

<sup>a</sup> Value of  $p < 0.05$  by the  $\chi^2$  test.

among LVAD patients, it would be desirable for this group to have a rate of vaccine uptake higher than that of the general population.

Thirty-five percent of patients (n = 17) would delay seeking emergency care in the case of an emergency such as chest pain. Given the high morbidity and mortality of life-threatening problems for patients with LVADs, these data should prompt concern from LVAD coordinators and clinicians. It may be particularly important for physicians and coordinators to emphasize that patients should seek care for emergency medical conditions despite their fears of contracting COVID-19. LVAD centers might consider having an emergency help line available for their patients to call for questions about whether certain symptoms should prompt the patient to seek out emergency care.

Our data also suggest that patients may not follow up with routine outpatient care during the pandemic. Telehealth for LVAD patients, which data have shown to be feasible,<sup>15</sup> may address patients' concerns about being around others for routine outpatient appointments. LVAD coordinators may need to provide assistance to patients who do not have the means (eg, webcam, internet access) or digital literacy to attend telehealth appointments.

Our findings show that LVAD patients have perceived barriers to seeking out inpatient and outpatient care during the COVID-19 pandemic. Our survey data were collected in March and April 2021, and it is possible that the attitudes surrounding COVID-19 vaccination and care-seeking during the pandemic have evolved. However, there is an unfortunate possibility of further COVID-19 surges occurring, new viral strains evolving, and the need for development of additional COVID-19 vaccines and boosters. Our data and findings thus likely remain applicable now and in the future.

## Limitations

Our survey was conducted in March and April 2021, before the delta and then omicron variants of SARS-CoV-2 were the dominant strains in the US. However, data from the US Census Bureau show that vaccine hesitancy (defined as segments of the population stating that they would “probably not” get the COVID-19 vaccine or were “unsure”) between April 2021 and October 2021 decreased only from 8.0% to 6.5%.<sup>13</sup> This minimal incremental change suggests that data gathered from our survey might continue

to represent present attitudes surrounding COVID-19. Additionally, the attitudes and beliefs of patients who completed this survey may differ from those of individuals who chose not to complete it. Limited information is known about the attitudes and beliefs of LVAD patients. Although this is a small sample size, it provides a glimpse into LVAD patients' beliefs regarding COVID-19 vaccination and behaviors regarding seeking out health care during the pandemic. Future studies and a larger sample size are warranted.

## Conclusion

Given the continued risk of new COVID-19 variants evolving and stalling improvement in vaccine hesitancy rates in the US, it is important to understand why LVAD patients might not get vaccinated and to delineate the barriers they face in seeking care. As we strive to care for this chronically ill group of patients, we must continue to provide education on the benefits of COVID-19 vaccination and work to break down the barriers to receiving appropriate care that these patients face.

### Supplementary Materials

Supplemental Material is available at: <https://www.thepermanentejournal.org/doi/10.7812/TPP/21.207#supplementary-materials>

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## Attitudes and Beliefs of Patients With LVADs Toward COVID-19 Vaccination

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