

**Perspectives on COVID-19 vaccination among kidney and pancreas transplant recipients living in
New York City**

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Purpose. Solid organ transplant recipients are at increased risk of morbidity and mortality from coronavirus disease 2019 (COVID-19), but limited vaccine access and vaccine hesitancy can complicate efforts for expanded vaccination. We report patient perspectives and outcomes from a vaccine outreach initiative for a vulnerable population of transplant recipients living in New York City.

Methods. This was a retrospective review of qualitative perspectives from a COVID-19 vaccine outreach initiative. In the outreach effort, kidney and pancreas transplant recipients under care at the transplant center at NewYork-Presbyterian Hospital were initially contacted electronically with educational material about vaccination followed by telephone outreach to eligible unvaccinated patients. Calls were used to schedule vaccine appointments for patients who agreed, answer questions, and assess attitudes and concerns for patients not yet ready to be vaccinated, with conversational themes recorded.

Results. Of the 1,078 patients living in the 5 New York City boroughs who had not reported receiving COVID-19 vaccination, 320 eligible patients were contacted by telephone. Of these, 210 patients were scheduled for vaccination at our vaccine site (including 13 who agreed to vaccination after initially declining), while 110 patients were either not ready or not interested in being vaccinated. The total number of patients willing to be vaccinated was 554 when also including those already vaccinated. Unwillingness to be vaccinated was associated with younger age (median age of 47 vs 60 years, $P < 0.001$), Black race ($P = 0.004$), and residence in Bronx or Brooklyn counties ($P = 0.018$) or a zip code with a medium level of poverty ($P = 0.044$). The most common issues raised by patients who were ambivalent or not interested in vaccination were regarding unknown safety of the vaccines in general, a belief that there was a lack of data about the vaccines in transplant recipients, and a lack of trust in the scientific process underlying vaccine development, with 34% of the patients contacted expressing vaccine hesitancy overall.

Conclusion. Our qualitative summary identifies determinants of COVID-19 vaccine hesitancy in a diverse transplant patient population, supporting the need for transplant centers to implement tailored interventions to increase vaccine acceptance in this vulnerable population.

Keywords: COVID-19, kidney transplant, vaccine

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Solid organ transplant recipients have been significantly impacted by the coronavirus disease 2019 (COVID-19) pandemic with increased risk of morbidity and mortality.^{1,2} Vaccination represents an important strategy for prevention of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections and severe disease.^{3,4} However, limited vaccine access and vaccine hesitancy complicate efforts to rapidly expand vaccination.⁵ Herein we describe the outcomes and patient perspectives from a vaccine scheduling outreach effort for a particularly susceptible cohort of patients—transplant recipients living in New York City.

Methods

This was a retrospective review of qualitative perspectives of kidney and pancreas transplant recipients who were contacted as part of a vaccination outreach initiative. All kidney and pancreas transplant recipients with functioning allografts under the care of the Kidney and Pancreas Transplant Center at NewYork-Presbyterian Hospital Columbia University Irving Medical Center who lived in the 5 boroughs of New York City were contacted to schedule appointments to receive COVID-19 vaccine. Geographic restrictions on vaccine allocation precluded scheduling visits for patients living in other areas. Patients who had a medical indication to defer vaccination, including having undergone transplant surgery, treatment for rejection, or chemotherapy within the last 3 months, were excluded from the outreach initiative. The outreach effort began with electronic dissemination (email and patient portal-based communications) of educational materials that were formatted as “frequently asked questions” and coupled with a safety and efficacy summary, with this information shared in English and Spanish. In addition, patients were sent a letter indicating that they were transplant recipients and under the care of the transplant program, which they could share with vaccine sites should this become necessary to demonstrate eligibility at different stages of vaccine rollout. On March 1, 2021, the transplant department was authorized to schedule COVID-19 vaccine appointments for patients who lived in the 5 New York City boroughs at a centralized

hospital vaccination site. Over a 2-week span, a systematic outreach call process to eligible unvaccinated patients was implemented to schedule vaccine appointments for interested patients, answer questions, and assess attitudes and concerns for patients who reported that they were not ready or not interested in the COVID-19 vaccine. A pharmacist used a semistructured approach that began by informing the patient that the transplant center was calling patients to schedule COVID-19 vaccine appointments at the hospital location. For patients who were agreeable to receiving the COVID-19 vaccine, an appointment was scheduled within a week of the call. For patients that were not ready to receive COVID-19 vaccination, a conversational approach was used to identify the underlying concerns and/or questions in order to be able to address them and also to understand how patients were making their choices with respect to vaccination. The conversation themes were recorded. In addition, existing data on COVID-19 vaccine administrations in transplant recipients both in published literature and from the transplant center experience, comments about how the vaccines work, adverse effects in transplant patients vs the general population, the risks and benefits of the vaccine vs COVID-19 infection, and other concerns raised by patients were discussed. Interpreter services were utilized to communicate with non-English-speaking patients.

To summarize the population demographics and COVID-19 vaccine perspectives, patients were stratified into 2 groups: (1) those agreeable to receiving COVID-19 vaccine and (2) those not ready to receive COVID-19 vaccine. The proportion of individuals living in zip codes with higher levels of poverty was obtained using data from the American Community Survey, and patients were divided into 3 groups with a low (0%-10%), medium (11%-20%), or high (>20%) level of poverty on the basis of the zip code of their primary address.⁶ Continuous variables were compared using the nonparametric Mann-Whitney *U* test, and categorical variables were compared using a χ^2 or Fisher's exact test as appropriate. *P* values less than 0.05 were considered statistically significant. Statistical analysis was performed using Stata 16.1 (Stata Corp, College Station, TX). This study was approved by the institutional review board at Columbia University Irving Medical Center.

Results

At the start of the vaccine outreach intervention, there were 3,067 patients under the care of the transplant program. Of these, 1,222 patients lived in 1 of the 5 New York City boroughs and 1,078 had not yet reported receiving COVID-19 vaccination and were contacted by telephone. Contact was made with 592 patients; of the 320 eligible patients, 210 were scheduled to receive the COVID-19 vaccine at our vaccine site during the outreach telephone calls and 110 patients were either not ready yet or not interested in receiving COVID-19 vaccine (Figure 1).

For comparative analysis of patient characteristics based on willingness to be vaccinated, patients who had informed us that they had been vaccinated for COVID-19 before the outreach effort ($n = 144$) were combined with patients who reported that they had already been vaccinated during the outreach call ($n = 200$) as well as those who were newly scheduled for vaccination ($n = 210$), for a total of 554 patients who were willing to be vaccinated and 110 patients who were not ready to be vaccinated. The characteristics of each group are summarized in Table 1. Patients who were not currently willing to be vaccinated were younger (median age of 47 vs 60 years), more frequently Black ($P = 0.004$), more frequently from the Bronx or Brooklyn ($P = 0.018$), and more commonly living in areas with medium levels of poverty ($P = 0.044$). Most patients contacted spoke English (80%) or Spanish (17%), but, when necessary, interpreter services were used to speak with patients in their native language (Bengali, Korean, Malayalam, Mandarin, or Spanish). Access to the hospital's patient portal was not associated with willingness to receive COVID-19 vaccine ($P = 0.199$). Of note, 13 patients who initially stated that they were not ready to be vaccinated called to request appointments after the initial conversation. These individuals are included in the group that was agreeable to COVID-19 vaccination and as a subgroup were predominantly Hispanic (46%) with high school and some college education (54%) from high-poverty areas (62%).

Patients who were contacted as part of the outreach effort in both groups expressed concerns and asked questions about vaccination during the telephone calls. The most common questions among patients who were scheduled for vaccination were about adverse effects (20%; $n = 41$), whether the transplant center had confirmed that vaccination was safe and was in support of the vaccine (8%; $n = 17$), which vaccine was being administered (7%; $n = 14$), and how many doses were going to be necessary (4%; $n = 9$). Patients also asked whether vaccination had any potential interactions with their transplant medications (3%; $n = 6$). The most common issues raised by patients who were ambivalent or not interested in vaccination were regarding unknown safety of the vaccine in general (20%; $n = 22$), a belief that there was a lack of data about the vaccines in transplant recipients (14%; $n = 15$), and a lack of trust in the scientific process that brought the vaccines to market (12%; $n = 13$), or the patient did not want to articulate a reason (Table 2).

Discussion

COVID-19 vaccination is the most effective method to build widespread SARS-CoV-2 immunity to ensure the safety of the population. We found that 34% of transplant recipients who we contacted expressed vaccine hesitancy. Our results indicate that vaccine hesitancy in a highly vulnerable transplant population represents an area of opportunity for transplant programs to intervene.

We found that patient characteristics associated with vaccine hesitancy included younger age, Black race, and residence in Brooklyn or Bronx counties or a zip code with a poverty level between 10% and 20%. These results are similar to broader national questionnaire distributions in which younger individuals and Black and/or Hispanic individuals have indicated that they do not intend to be vaccinated.^{7,8} Although the majority of the patients contacted were scheduled for appointments, the findings from this outreach effort indicate a concern about vaccine hesitancy and

a need for intervention, particularly among individuals living in areas that have a medium level of poverty, ranging from 10% to 20%. We hypothesize that this is because individuals living in areas with low levels of poverty have more access to the healthcare system, whereas those in high-poverty areas were most impacted by COVID-19 and have directly experienced the impact of disease. We believe that it is important for healthcare providers to increase the confidence of patients about vaccination, for example, by sharing that the COVID-19 vaccines have undergone thorough testing and that safe administration has been demonstrated among transplant recipients in the early vaccine distribution phases in real-world experience.^{3,4,9} Clinicians should share objective data and expert opinions and provide the necessary autonomy for patients to make informed decisions.

It is also notable that hesitancy did not indicate vaccine refusal; using this approach, 13 patients who were initially hesitant about vaccination during our outreach effort called back and booked appointments. This observation indicates that an appropriate method to influence patients with respect to receiving a vaccine is by giving patients facts about vaccine safety and sharing what is known, as well as the perspective of the transplant program.

Patients should also be counseled on the risks of COVID-19 vaccination vs COVID-19 disease and the benefits of vaccination. It is known that transplant recipients have an increased likelihood of poor outcomes from SARS-CoV-2 infection in comparison to individuals who are not transplant recipients, owing to comorbidities or immunosuppression.^{1,2} We recommend that clinicians relay this information to patients in a realistic but sensitive way by informing them that, on the basis of the composition of currently available vaccines and their mechanism of action, we do not anticipate transplant patients experiencing any unique adverse effects different from those in the general population and our expert opinion is that the vaccines are safe in that they are unlikely to trigger a rejection episode or have a negative effect on allograft function.

Conclusion

Limitations of this report include the small study population in a single transplant center location. However, our qualitative summary characterizes determinants of COVID-19 hesitancy in a diverse transplant patient population and supports the need for transplant centers to implement tailored interventions to increase vaccine acceptance in this vulnerable population. The vaccine hesitancy rate in this study (18.6%) is similar to rates reported among adult individuals surveyed across the United States (18.6%) and higher than those in New York state (12.6%) when comparing to estimates that were obtained at the same time point as this intervention on March 1, 2021.¹⁰ New York state reporting from the general population during this period indicates that patients not willing to receive COVID-19 vaccination were concerned about adverse effects, preferred to wait and see, and did not trust the COVID-19 vaccines, while transplant patients were concerned about a lack of efficacy and safety data among transplant recipients. Thoughts and concerns shared by patients represent an opportunity for the healthcare community to mobilize to better educate the public and ensure a consistent and, more importantly, accurate message in conversations. Targeted interventions with structured talking points that are consistent and aligned across all multidisciplinary care team members are a critical component. Consideration should be given to ensure that individuals receive messaging from an individual who speaks the patient's native language who can best relay the message using appropriate word choices. In addition, transplant programs should invest resources for outreach to areas with lower socioeconomic backgrounds, as individuals in these areas are more likely to demonstrate vaccine hesitancy and may benefit the most from additional outreach. Although over 750 kidney transplant recipients at our institution have been vaccinated for COVID-19, this only represents 24% of the total kidney transplant population under active follow-up care at the transplant program, and thus additional work to vaccinate patients and ease concerns is ongoing.

Disclosures

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Figure 1. Population summary. An asterisk indicates 13 patients who were originally not ready to receive the COVID-19 vaccine. COVID-19 indicates coronavirus disease 2019; NYC, New York City.

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Table 1. Demographic Characteristics

| Characteristic | Agreeable to Receive COVID-19 Vaccine (n = 554) | Not Ready to Receive COVID-19 Vaccine (n = 110) | P value |
|-----------------------------|--|--|----------------|
| Age, median (IQR), years | 59.6 (47.7-67.9) | 46.6 (35-63.6) | <0.001 |
| Age, years | | | |
| 18–39 | 68 (12) | 40 (36) | <0.001 |
| 40–59 | 215 (39) | 34 (31) | |
| ≥60 | 271 (49) | 36 (33) | |
| Male, No. (%) | 323 (58) | 57 (52) | 0.21 |
| Race/ethnicity, No. (%) | | | |
| Asian | 50 (9) | 4 (4) | 0.004 |
| Black | 119 (21) | 40 (36) | |
| Hispanic | 227 (41) | 38 (34) | |
| White | 155 (28) | 26 (24) | |
| Other | 3 (1) | 2 (2) | |
| Preferred language, No. (%) | | | |
| English | 437 (79) | 93 (84) | 0.278 |
| Spanish | 100 (18) | 13 (12) | |
| Other | 17 (3) | 4 (4) | |
| Poverty level, No. (%) | | | |
| Low | 121 (22) | 14 (13) | 0.044 |
| Medium | 217 (39) | 54 (51) | |
| High | 214 (39) | 39 (36) | |
| County, No. (%) | | | |
| Bronx | 119 (22) | 29 (26) | 0.018 |

| | | | |
|---|----------------|----------------|-------|
| Kings | 83 (15) | 28 (26) | |
| New York | 221 (40) | 30 (27) | |
| Queens | 102 (18) | 16 (15) | |
| Richmond | 29 (5) | 7 (6) | |
| Priority zip code for site, No. (%) | 212 (38) | 40 (36) | 0.707 |
| Education status, No. (%) | | | |
| Grade school (grades 0-8) | 51 (9) | 9 (14) | 0.071 |
| High school (grades 9-12) or GED/some college | 225 (41) | 53 (48) | |
| College degree (associate, bachelor, or postgraduate) | 137 (25) | 15 (14) | |
| Unknown | 141 (25) | 33 (30) | |
| Patient portal access, No. (%) | 420 (76) | 77 (70) | 0.199 |
| Time after transplantation, median (IQR), years | 6.8 (2.9-11.8) | 5.9 (2.4-10.8) | 0.196 |

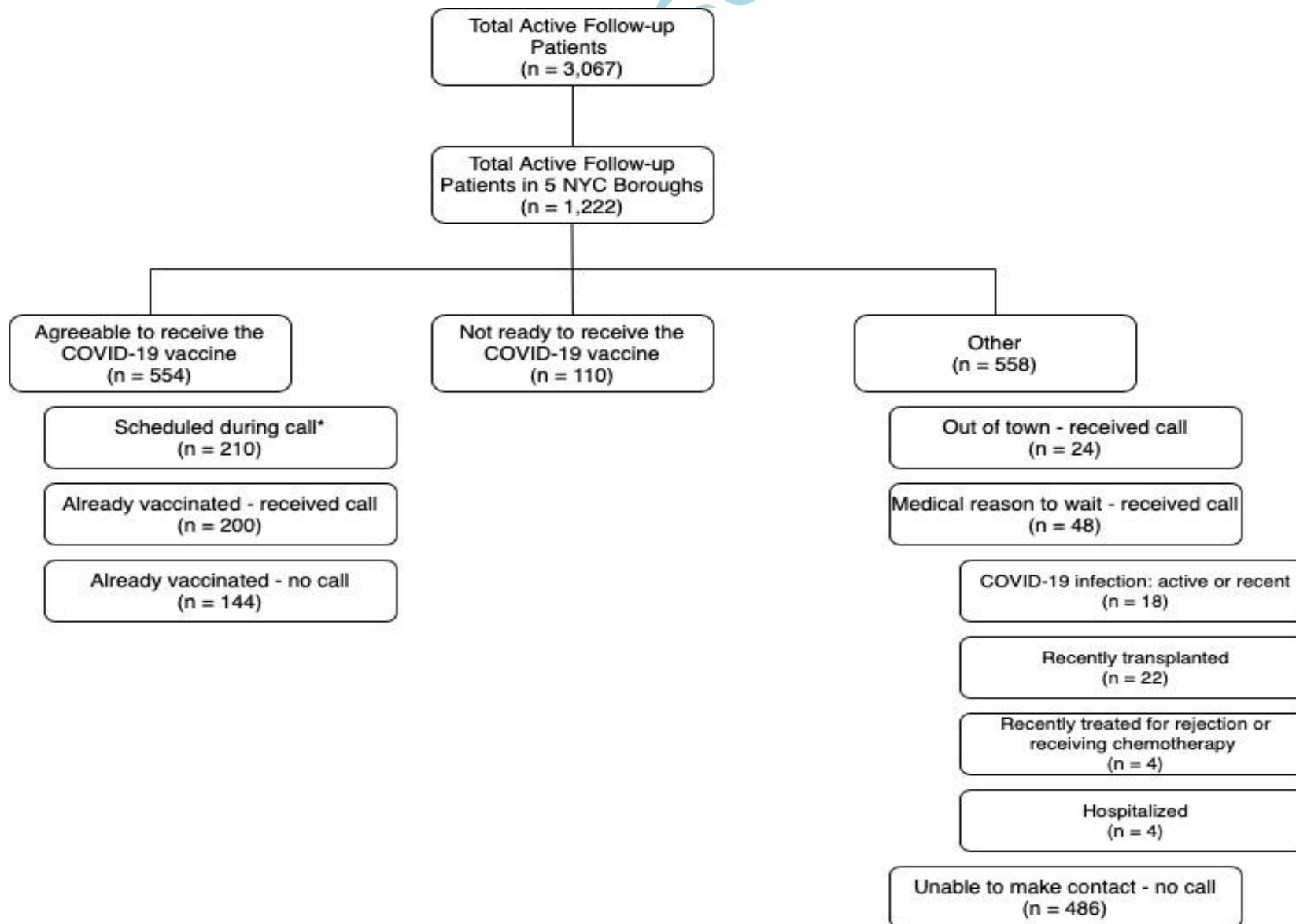
Abbreviations: COVID-19, coronavirus disease 2019; GED, general educational development; IQR, interquartile range.

Table 2. Vaccine Concerns Among Patients Who Were Not Willing to Receive COVID-19 Vaccination

| Comment | Patients Not Willing to Receive Vaccine (n = 110)^a |
|--|--|
| Concerned about safety in transplant recipients | 22 (20) |
| Lack of data in transplant recipients | 15 (14) |
| Rushed development | 13 (12) |
| No reason shared | 13 (12) |
| Prefers Janssen/Johnson & Johnson | 12 (11) |
| Adverse effect concerns | 12 (11) |
| Concerned about drug interactions with immunosuppressants | 12 (11) |
| General skepticism | 11 (10) |
| Wanted to hear from physician | 10 (9) |
| Does not receive vaccines in general | 10 (9) |
| Concerned about the unknown long-term effects | 9 (8) |
| Had COVID-19 infection and feels protected by antibodies | 4 (4) |
| Believes that the vaccine is a test for society and does not want to participate | 3 (3) |
| Concerns about vaccine ingredients | 2 (2) |
| Does not want to leave the house | 2 (2) |
| Anxious and not mentally prepared | 1 (1) |

Abbreviation: COVID-19, coronavirus disease 2019.

^aAll data are shown as No. (%).



*Includes 13 patients who were initially not ready to receive the COVID-19 vaccine