



Reach, Acceptability, and Patient Preferences of a Mobile Health-Based Survey to Assess COVID-19 Vaccine Hesitancy Among Patients Receiving Dialysis

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Rationale & Objective: The majority of patients with kidney failure receiving dialysis own mobile devices, but the use of mobile health (mHealth) technologies to conduct surveys in this population is limited. We assessed the reach and acceptability of a short message service (SMS) text message-based survey that assessed coronavirus disease 2019 (COVID-19) vaccine hesitancy among patients receiving dialysis.

Study Design & Exposure: A cross-sectional SMS-based survey conducted in January 2021.

Setting & Participants: Patients receiving in-center hemodialysis, peritoneal dialysis, or home hemodialysis in a nonprofit dialysis organization in New York City.

Outcomes: (1) Reach of the SMS survey, (2) Acceptability using the 4-item Acceptability of Intervention Measure, and (3) Patient preferences for modes of survey administration.

Analytical Approach: We used Fisher exact tests and multivariable logistic regression to assess sociodemographic and clinical predictors of SMS survey response. Qualitative methods were used to analyze open-ended responses capturing patient preferences.

Results: Among 1,008 patients, 310 responded to the SMS survey (response rate 31%). In multivariable adjusted analyses, participants who were age 80 years and above (aOR, 0.49; 95% CI, 0.25-0.96) were less likely to respond to the SMS survey

compared with those aged 18 to 44 years. Non-Hispanic Black (aOR, 0.58; 95% CI, 0.39-0.86), Hispanic (aOR, 0.31; 95% CI, 0.19-0.51), and Asian or Pacific Islander (aOR, 0.46; 95% CI, 0.28-0.74) individuals were less likely to respond compared with non-Hispanic White participants. Participants residing in census tracts with higher Social Vulnerability Index, indicating greater neighborhood-level social vulnerability, were less likely to respond to the SMS survey (fifth vs first quintile aOR, 0.61; 95% CI, 0.37-0.99). Over 80% of a sample of survey respondents and nonrespondents completely agreed or agreed with the Acceptability of Intervention Measure. Qualitative analysis identified 4 drivers of patient preferences for survey administration: (1) convenience (subtopics: efficiency, multitasking, comfort, and synchronicity); (2) privacy; (3) interpersonal interaction; and (4) accessibility (subtopics: vision, language, and fatigue).

Limitations: Generalizability, length of survey.

Conclusions: An SMS text message-based survey had moderate reach among patients receiving dialysis and was highly acceptable, but response rates were lower in older (age \geq 80), non-White individuals and those with greater neighborhood-level social vulnerability. Future research should examine barriers and facilitators to mHealth among patients receiving dialysis to ensure equitable implementation of mHealth-based technologies.

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Mobile health (mHealth) technologies have numerous applications for patients with kidney failure receiving dialysis, including collecting patient-reported outcome measures, delivering patient education, and administering interventions to improve self-management.^{1,2} Over 80% of patients receiving dialysis own mobile phones, and 70% have intermediate to advanced proficiency using mobile technologies.³⁻⁶ mHealth-based technologies may be particularly promising as a mode of survey administration to assess symptoms, quality of life, and patient experience, particularly because these surveys have been plagued by low response rates.⁷ Furthermore, dialysis facilities have limited infrastructure and staff bandwidth to conduct surveys, and mHealth-based surveys may be a more scalable and low-cost option.⁸

Short message service (SMS) text messaging is the most frequently used mHealth technology and is often easier to use than mHealth mobile applications (“apps”), particularly for older and medically complex patients.^{3,4,9} SMS text messaging is also available to anyone with a mobile phone and does not require a smartphone, which may reduce disparities in who can participate in mHealth interventions.

In this study, we assessed the reach, acceptability, and patient preferences of using a single-item SMS-based survey to assess coronavirus disease 2019 (COVID-19) vaccine hesitancy among patients receiving dialysis. Patients receiving dialysis suffer high morbidity and mortality from COVID-19, but reports of the use of mHealth during the COVID-19 pandemic among patients receiving dialysis have been limited.¹⁰⁻¹² Understanding the implementation

PLAIN-LANGUAGE SUMMARY

We conducted a short message service (SMS) text message-based survey that assessed coronavirus disease 2019 (COVID-19) vaccine hesitancy among patients receiving dialysis in New York City. Overall response rate was 31%, and those with age ≥ 80 , non-White individuals, and participants with greater neighborhood-level social vulnerability were less likely to respond to the survey. Over 80% of participants found SMS-based surveys to be highly acceptable. Qualitative analysis showed that participants cared about the convenience, privacy, interpersonal interaction, and accessibility of surveys. Our results suggest that SMS text message surveys are a promising strategy to collect patient-reported data among patients receiving dialysis.

of SMS surveys among patients receiving dialysis can facilitate future efforts to leverage mHealth technologies in this population.

METHODS

Study Design and Population

We conducted an SMS text message-based single-item survey in January 2021 among patients with kidney failure in a nonprofit dialysis organization with 9 dialysis units in New York City. Methods of this survey have been reported previously.¹³ We included patients receiving in-center hemodialysis, peritoneal dialysis, or home hemodialysis with listed cell phone numbers in the electronic health record (EHR). The survey asked “An FDA-authorized vaccine for COVID-19 (coronavirus) will soon be available to you for free. Will you get the COVID-19 vaccine? Reply “1” for Yes or “2” for No.” One reminder was sent 10 days after the initial text message. The SMS survey was conducted in English or Spanish using Twilio, a Health Insurance Portability and Accountability Act-compliant programmable text messaging platform that interfaces with Research Electronic Data Capture (REDCap, Vanderbilt University) software. Twilio costs \$0.0075 US per SMS message. Our study was approved by the Weill Cornell Medicine Institutional Review Board with a full waiver of informed consent given minimal risk to participants.

Predictors and Covariates

We examined whether participant sociodemographics and dialysis-related medical history were predictors of SMS survey response. Sociodemographics were ascertained from structured data fields in the dialysis organization EHR and included age, sex (male or female), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, Asian or Pacific Islander, or other/unknown/missing), employment status (full-time or part-time,

retired because of age, retired because of disability, unemployed, or homemaker/medical leave/student), marital status (married, divorced or separated, widowed, or single), and census tract-level Social Vulnerability Index (SVI) classified into quintiles. SVIs were obtained by geocoding participant addresses using the United States Census Bureau website and linking them to census tract-level SVIs for New York State calculated from the 2014-2018 American Community Survey 5-year estimates.^{14,15} The SVI is a composite of 15 census indicators organized into 4 themes: (1) socioeconomic status (% of persons below poverty, % unemployed, percentile per capita income, % with no high school diploma), (2) household composition & disability (% aged 65 or older, % aged 17 or younger, % with a disability, % single parent households), (3) minority status and language (% minority, % who speak English “less than well”), and (4) housing type and transportation (% in multiunit housing, % in mobile homes, % households with more people than rooms [housing crowding], % households with no vehicle, % in group quarters). Employment, marital status, and SVI had a high prevalence of missingness (31%, 21%, and 11%, respectively). A missing indicator category was used for missing variables; multiple imputation was not employed because covariates were thought to be missing not at random because of facility-level variation in missingness. Dialysis-related medical history was captured from the EHR and included modality (in-center hemodialysis, peritoneal dialysis, or home hemodialysis) and primary cause of kidney failure by physician report and International Classification of Diseases-10 codes (diabetes, hypertension, glomerulonephritis, cystic kidney disease, human immunodeficiency virus, malignancy, post-transplant, or other/unknown).

Implementation Outcomes

We examined the implementation outcomes of reach and acceptability as key indicators of process and implementation success.¹⁶ Reach, defined as the “absolute number, proportion, and representativeness of individuals who are willing to participate,” was assessed using the SMS survey response rate.^{17,18} As a measure of representativeness, we assessed the sociodemographic and clinical predictors of survey response. Acceptability, defined as “the perception among implementation stakeholders that a given treatment, service, practice, or innovation is agreeable, palatable, or satisfactory,” was evaluated by surveying a random sample of 30 mHealth-based survey respondents and 30 survey nonrespondents.¹⁶ One investigator (SLT) contacted these participants by telephone in February 2021 to collect the 4-item Acceptability of Intervention Measure (AIM).¹⁹ AIM is a valid and reliable measure that assesses whether participants find an intervention appealing, likeable, and meeting their approval. We also transcribed verbatim qualitative responses to the question, “How would you prefer to do surveys – during dialysis, over the phone, or using text messaging?”

Table 1. COVID-19 Vaccine Hesitancy Mobile Health Survey Respondent and Nonrespondent Characteristics (n = 1,008).

	Overall n = 1,008	Respondents n = 310	Nonrespondents n = 698	P Value
Sociodemographics				
Age (y)				
18-44	136 (13%)	37 (12%)	99 (14%)	0.3
45-64	428 (42%)	138 (45%)	290 (42%)	
65-79	345 (34%)	111 (36%)	234 (34%)	
80 and above	99 (10%)	24 (8%)	75 (11%)	
Sex				
Male	597 (59%)	188 (61%)	409 (59%)	0.6
Female	411 (41%)	122 (39%)	289 (41%)	
Race/Ethnicity				
Non-Hispanic White	222 (22%)	95 (31%)	127 (18%)	<0.001
Non-Hispanic Black	427 (42%)	128 (41%)	299 (43%)	
Hispanic	173 (17%)	33 (11%)	140 (20%)	
Asian or Pacific Islander	146 (14%)	41 (13%)	105 (15%)	
Other, unknown, or missing	40 (4%)	13 (4%)	27 (4%)	
Employment				
Full-time or part-time	179 (18%)	65 (21%)	114 (16%)	0.7
Retired (age)	164 (16%)	50 (16%)	114 (16%)	
Retired (disabled)	193 (19%)	55 (18%)	138 (20%)	
Unemployed	114 (11%)	33 (11%)	81 (12%)	
Homemaker, medical leave, or student	49 (5%)	14 (5%)	35 (5%)	
Missing	309 (31%)	93 (30%)	216 (31%)	
Marital Status				
Married	357 (35%)	121 (39%)	236 (34%)	0.6
Divorced or separated	92 (9%)	27 (9%)	65 (9%)	
Widowed	55 (5%)	17 (5%)	38 (5%)	
Single	288 (29%)	82 (26%)	206 (30%)	
Missing	216 (21%)	63 (20%)	153 (22%)	
Census Tract-Level Social Vulnerability Index (SVI) ^a				
Quintile 1	179 (18%)	73 (24%)	106 (15%)	0.004
Quintile 2	180 (18%)	61 (20%)	119 (17%)	
Quintile 3	179 (18%)	47 (15%)	132 (19%)	
Quintile 4	179 (18%)	44 (14%)	135 (19%)	
Quintile 5	177 (18%)	45 (15%)	132 (21%)	
Missing	114 (11%)	40 (13%)	74 (11%)	
Dialysis-Related Medical History				
Modality				
In-center hemodialysis	815 (81%)	242 (78%)	573 (82%)	0.3
Peritoneal dialysis	145 (14%)	51 (16%)	94 (13%)	
Home hemodialysis	48 (5%)	17 (5%)	31 (4%)	
Primary kidney failure cause				
Diabetes	362 (36%)	102 (33%)	260 (37%)	0.4
Hypertension	276 (27%)	84 (27%)	192 (28%)	
Glomerulonephritis	126 (13%)	37 (12%)	89 (13%)	
Cystic kidney disease	31 (3%)	13 (4%)	18 (3%)	
HIV	16 (2%)	4 (1%)	12 (2%)	
Malignancy	16 (2%)	7 (2%)	9 (1%)	
Post-transplant	69 (7%)	27 (9%)	42 (6%)	
Other or unknown	112 (11%)	36 (12%)	76 (11%)	

Notes: Percentages may not add to 100% because of rounding. P values presented for Fisher exact tests for categorical variables.

Abbreviations: HIV, human immunodeficiency virus; SVI, Social Vulnerability Index.

^aAmong patients with non-missing SVI. Higher quintile of SVI indicates greater neighborhood social vulnerability.

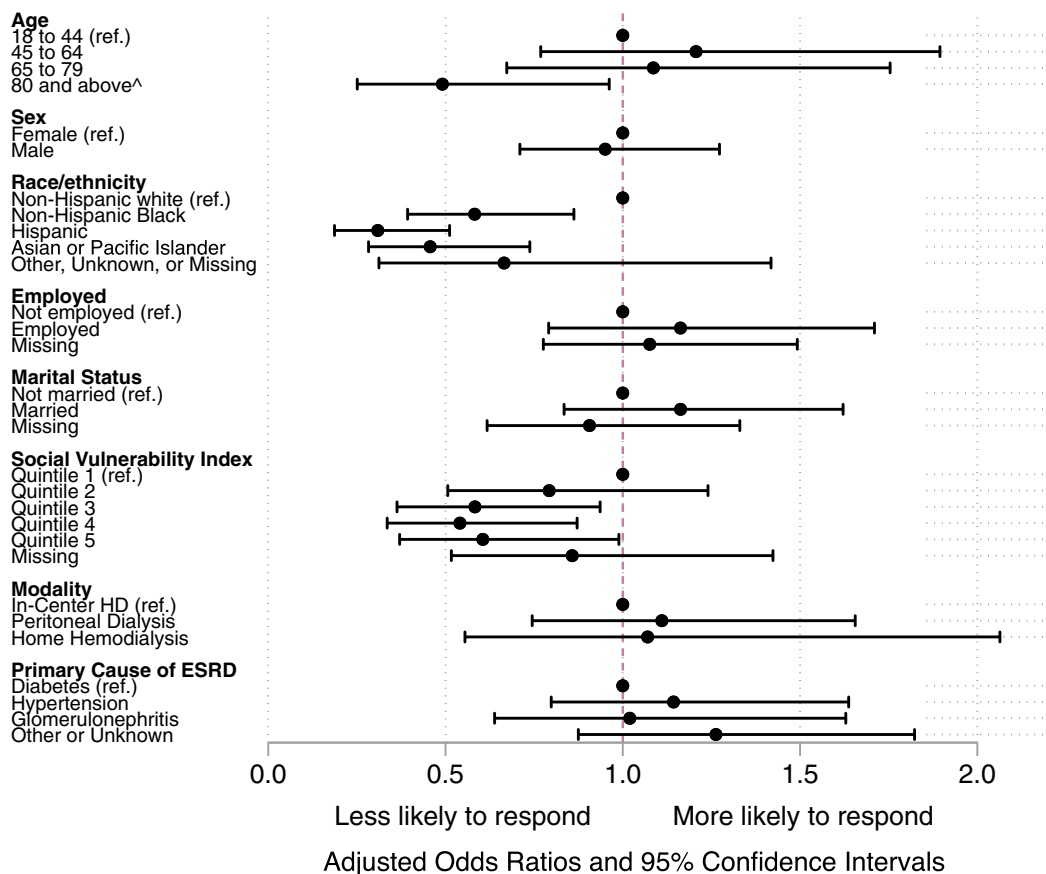


Figure 1. Predictors of response to mobile health survey, multivariable model (n = 1,008).

Telephone calls were conducted in English and were not audio-recorded.

Statistical Analysis

We compared characteristics of participants who did versus did not respond to the SMS survey using Fisher exact tests. A multivariable logistic regression model was used to assess predictors of survey response, independent of other participant characteristics. AIM responses and survey preferences were reported descriptively. Data analyses were performed using Stata/IC, version 15.1 (Stata-Corp), and an $\alpha < 0.05$ was considered statistically significant.

Qualitative Analysis

Three authors (SLT, NCB, MRT), who are formally trained in qualitative inquiry, inductively categorized qualitative comments about survey preferences into 4 mutually exclusive categories: (1) Prefers text (SMS), (2) Prefers phone, (3) Prefers in-person during dialysis, and (4) No strong preference. Six responses could not be categorized given a lack of detail and were excluded. These authors performed a topical survey of the qualitative responses, as described by Sandelowski and Barroso, to identify drivers of survey administration preferences.²⁰ The 3 authors

(SLT, NCB, MRT) met as a group and inductively coded (labeled) concepts and iteratively identified topics and subtopics describing participant perspectives.^{20,21} Illustrative quotations were selected for each subtopic.

RESULTS

Survey Reach

A total of 1,055 patients receiving dialysis with listed cell phone numbers in the EHR were sent the SMS text message-based survey (Fig S1); 47 returned with errors (eg, unreachable or landline number). Of the remaining 1,008 patients, 310 responded to the survey (response rate 31%). Respondents were a median age of 61 years, majority male (61%), and receiving in-center hemodialysis (78%).

In unadjusted analyses, race/ethnicity and census tract-level SVI were associated with survey response versus nonresponse (Table 1). In multivariable adjusted analyses, participants who were age 80 years and above (adjusted odds ratio [aOR], 0.49; 95% confidence interval [CI], 0.25-0.96) were less likely to respond to the SMS survey compared with those aged 18 to 44 years (Fig 1). Non-Hispanic Black (aOR, 0.58; 95% CI, 0.39-0.86), Hispanic (aOR, 0.31; 95% CI, 0.19-0.51), and Asian or Pacific

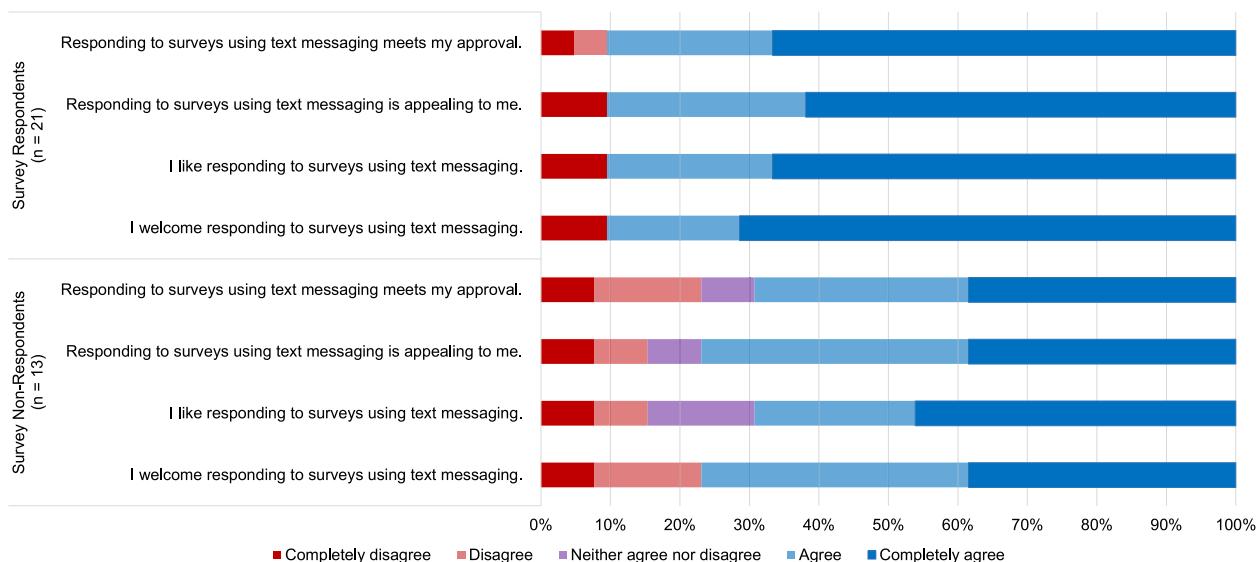


Figure 2. Mobile health survey acceptability among survey respondents and nonrespondents.

Islander (aOR, 0.46; 95% CI, 0.28-0.74) individuals were less likely to respond compared with non-Hispanic White participants. Participants residing in census tracts with higher SVI, indicating greater neighborhood social vulnerability, were less likely to respond to the SMS survey in adjusted analyses (fifth vs first SVI quintile aOR, 0.61; 95% CI, 0.37-0.99). Likelihood of survey response did not statistically differ by sex, employment status, marital status, dialysis modality, or cause of kidney failure in unadjusted or multivariable adjusted analyses.

Survey Acceptability

A total of 21 SMS survey respondents and 13 nonrespondents were reached by telephone for acceptability surveys. Characteristics of acceptability survey participants were similar to the overall sample (Table S1). The SMS survey was highly acceptable among both survey respondents and nonrespondents (Fig 2). Across the 34 participants surveyed about acceptability, 28 (82%) completely agreed or agreed that responding to surveys using text messaging met their approval, 29 (85%) completely agreed or agreed it was appealing, 29 (85%) completely agreed or agreed they liked it, and 28 (82%) completely agreed or agreed they welcomed responding to surveys using text messaging. The proportion who completely agreed or agreed with each question was not statistically different between survey respondents and nonrespondents using Fisher exact tests.

Patient Preferences for Survey Administration

Thirty-six percent of participants preferred responding to surveys by text message, whereas 11% preferred phone, 25% preferred in-person during dialysis, and 29% did not have a strong preference (Table 2). Qualitative analysis identified 4 drivers of patient preferences for survey

administration: (1) convenience, (2) privacy, (3) interpersonal interaction, and (4) accessibility. Drivers of patient preferences, subtopics, and illustrative quotations are presented in Table 3. Convenience was the most frequently reported driver of survey preferences. Some participants thought that text messaging was the most efficient (“I do it at my leisure”), whereas others thought that in-person at the dialysis unit was more convenient. Multitasking was a benefit of completing surveys at the dialysis unit, whereas comfort was a benefit of text and phone administration (“comfort in their own home”). Two participants preferred the asynchronicity of text messages (“you can think about it and have time to respond”).

Privacy was viewed as a benefit of text messages and phone (“Dialysis you’re not alone, you don’t have privacy”). Although 3 participants preferred the in-person interaction at the dialysis unit (“I would prefer in person because I like to see the person I’m talking to”), another participant viewed the interpersonal interaction as a deterrent (“Text is way better. I’d rather not speak to people.”). Accessibility of surveys was important to several participants. Two individuals reported vision impairment and stated that responding to text messages was easier than paper surveys (“I’m completely blind and my phone actually talks to me”; “My phone I can open it up wider”). Limited English proficiency and fatigue were noted as barriers to completing surveys (“...if I have dialysis that day, who knows how I am going to feel.”).

Additional topics elicited included altruism and survey hesitancy. Although one participant reported willingness to respond to surveys (“If it helps the institute...”), 6 participants endorsed survey hesitancy (“I’m really not interested in surveys, I have too much going on in my life, I have kids, my phone is constantly ringing, I don’t have time for all that.”; “I really don’t like responding to surveys. I’m always in a rush when I’m at dialysis.”; “I get a lot of junk mail.”)

Table 2. Patient Preferences for the Mode of Survey Administration

	Total (n = 28)	Respondents to COVID-19 Vaccine Hesitancy mHealth Survey (n = 17)	Nonrespondents to COVID-19 Vaccine Hesitancy mHealth Survey (n = 11)	P Value
Prefers text (SMS)	10 (36%)	6 (35%)	4 (36%)	0.2
Prefers phone	3 (11%)	1 (6%)	2 (18%)	
Prefers in-person during dialysis	7 (25%)	3 (18%)	4 (36%)	
No strong preference	8 (29%)	7 (41%)	1 (9%)	

Notes: A total of 6 (18%) of respondents had missing or unclear responses and were excluded. Percentages may not add to 100% because of rounding.

DISCUSSION

In this cross-sectional study of patients receiving dialysis, an single-item SMS text message-based survey had moderate reach and was a highly acceptable mode of survey administration. Approximately one-third of patients preferred responding to surveys by text message, one-quarter preferred in-person during dialysis, and one-third did not have a strong preference. Patients considered convenience, privacy, interpersonal interaction, and accessibility when deciding how they would prefer to respond to surveys. Our results are promising to improve the speed, scalability, and costs of survey administration among chronically ill populations with multiple comorbid conditions, particularly during the COVID-19 pandemic. However, SMS survey response rates were lower in older individuals (age ≥ 80 years), racial and ethnic minorities, and patients residing in socially vulnerable neighborhoods.

Our study adds to the growing body of evidence surrounding the use of mHealth technologies in the dialysis population.^{2,22-27} Our findings suggest that SMS text messaging may be a feasible and acceptable method to collect patient-reported data, including symptom, quality of life, and patient experience data. Although mHealth interventions have become increasingly sophisticated over the last decade, our results suggest that SMS text message remains an important modality with unique benefits, including increased simplicity, scalability, and accessibility compared to more complex mHealth interventions. It is important to recognize that our survey's context, namely, its relation to COVID-19, may have positively influenced its response rate. There was heightened attention surrounding the COVID-19 vaccine, and surveys that are part of routine care, are of longer length, or are repeated may elicit lower response rates.

Patients receiving dialysis respond to several surveys as part of regulatory requirements through the Centers for Medicare & Medicaid Services, including the Kidney Disease Quality of Life Instrument (KDQOL), In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS), and depression questionnaires. The Kidney Care Choices payment model requires Patient Activation Measure and Patient Health Questionnaire (PHQ)-2/9 administration.²⁸ Text messaging could be explored as a potential option to collect depression surveys like the PHQ-2/9 either by SMS or a link to a web-based

portal, but further research is necessary to ascertain the feasibility of using SMS text messaging for longer surveys. KDQOL and depression surveys are typically administered in-person, whereas ICH CAHPS is administered through a third-party vendor by telephone or mail. In our study, telephone was the least preferred option to complete surveys, and text messaging was about equally preferred to in-person administration. Notably, one-quarter of participants preferred in-person data collection, indicating that online-only collections of measures in this population may not be appropriate, particularly given the frequent (thrice weekly) visits for in-center hemodialysis.

Given the increasing emphasis on patient-reported outcome measure collection, our qualitative analysis suggests that administering surveys in ways that respect patient preferences for convenience, privacy, interpersonal interaction, and accessibility will become increasingly important. Multimodal methods of survey administration could overcome privacy issues in the dialysis unit, which are of concern to patients but remain largely unaddressed.²⁹ Dialysis units will be incentivized to collect social needs information through the ESRD Quality Incentive Program starting in 2025, which may pose privacy concerns for patients.³⁰ Text messaging could be explored as a way of performing social needs screening as well as to engage patients for navigation services, as was done in the Accountable Health Communities Model.³¹ Dialysis facilities and federal agencies should also be cognizant that survey responses often differ based on the mode of survey administration.³²

Our findings that patients with social risk factors were less likely to respond to the SMS survey has important equity implications. The sociodemographic variables we investigated capture all 5 dimensions of social risk factors, as outlined in a conceptual framework by the National Academies of Sciences, Engineering, and Medicine: (1) socioeconomic position, (2) race, ethnicity, and cultural context, (3) gender, (4) social relationships, and (5) residential and community context.³³ Our findings are concordant with Hussein et al,⁵ who found that older adults and racial/ethnic minorities had lower mHealth proficiency.⁵ These populations may face increased barriers to text messaging that deserve further investigation, including physical or cognitive limitations, reduced health literacy, specific phone plans/phone types owned by these

Table 3. Drivers of Survey Preferences Reported by Patients Receiving Dialysis

Drivers	Subtopics	Number of Participants Reporting Topic or Subtopic (n = 34)	Example Quotations
Convenience	Efficiency	6	"Text is easiest, seems easy and faster." (75 y/o male, in-center hemodialysis)
			"Text is more convenient, I do it at my leisure." (52 y/o male, in-center hemodialysis)
			"The most efficient would be at the center, it's face-to-face with somebody." (65 y/o male, in-center hemodialysis)
	Multitasking	1	"Maybe in dialysis unit because I'm there anyway, otherwise I'm at work." (62 y/o male, peritoneal dialysis)
Convenience	Comfort	3	"Talking to me on the phone is best, I think when you're in dialysis and you're doing a survey, I don't think you're getting the right answer rather than in the comfort in their own home." (42 y/o male, in-center hemodialysis)
	Synchronicity	3	"I'm always in a rush when I'm at dialysis. On the phone you get distracted. Over text you can think about it and have time to respond." (48 y/o female, in-center hemodialysis)
Privacy	N/A	4	"Dialysis you're not alone, you don't have privacy." (68 y/o female, in-center hemodialysis) "Text message, I think it's more private." (72 y/o female, in-center hemodialysis) "Over the phone, it's between who is asking me the questions, I feel comfortable in my home speaking on the phone to the person, instead of being at the center." (58 y/o female, in-center hemodialysis)
Interpersonal interaction	N/A	4	"In person is much better, when I'm in person I can explain much more." (51 y/o Spanish-speaking female, in-center hemodialysis) "I would prefer in person because I like to see the person I'm talking to." (77 y/o female, in-center hemodialysis) "Text is way better. I'd rather not speak to people. That's just my preference." (47 y/o female, in-center hemodialysis)
Accessibility	Vision	2	"I can't see the papers because I'm completely blind and my phone actually talks to me. I would prefer the text." (33 y/o female, in-center hemodialysis)
			"I just prefer text message, I can't see it really good, the writing, on surveys. My phone I can open it up wider." (57 y/o female, in-center hemodialysis)
	Language	1	"On the paper is ok because my English not good so sometimes I have to look up in the dictionary." (71 y/o Cantonese-speaking female, in-center hemodialysis)
	Fatigue	1	"Text message, normally they do surveys during the day, and if I have dialysis that day, who knows how I am going to feel." (54 y/o female, in-center hemodialysis)

Abbreviations: N/A, not applicable as none were identified; y/o, year old.

patients, or the need for culturally tailored text messages and translations to multiple languages.^{34,35} Further engaging these participants to better understand preferred modes of survey administration and address modifiable barriers could increase response rates and patient-centeredness and mitigate the risk of exacerbating disparities.³⁶

Our results have several limitations. Our study was conducted in a single geographic area, which may limit generalizability. Certain variables in the SVI, such as

multiunit housing, mobile homes, and vehicle ownership, may not be relevant in New York City or associate differently with social vulnerability. A small sample size was used to determine acceptability, and we had a higher number of respondents versus nonrespondents who contributed acceptability and patient preference data. We did not assess preferences for mail- or e-mail-based surveys. Misclassification of race/ethnicity data may have occurred if race/ethnicity was not entered based on patient

self-report. The SMS survey was conducted in English and Spanish only, which may have contributed to lower response rates particularly among non-English-speaking Asian and Pacific Islander patients.

In summary, our single-item SMS text message-based survey had moderate reach and was highly acceptable among patients receiving dialysis. Text messaging is a promising strategy to collect patient-reported data in this medically complex population, but further interventions are needed to engage older individuals, racial and ethnic minorities, and patients residing in socially vulnerable neighborhoods.

SUPPLEMENTARY MATERIALS

Supplementary File (PDF)

Figure S1: Mobile health survey text messages.

Table S1: Acceptability Survey Respondents Versus Remaining Participants (n = 1,008).

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