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Journal

Journal of Telemedicine and Telecare, 29(3)

ISSN

1357-633X

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Publication Date

2023-04-01

DOI

10.1177/1357633x20976036

Peer reviewed

HHS Public Access

Author manuscript

J Telemed Telecare. Author manuscript; available in PMC 2023 April 01.

Published in final edited form as:

J Telemed Telecare. 2023 April ; 29(3): 187–195. doi:10.1177/1357633X20976036.

Pragmatic randomized trial of a pre-visit intervention to improve the quality of telemedicine visits for vulnerable patients living with HIV

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Abstract

Introduction: The COVID-19 pandemic has required a shift of many routine primary care visits to telemedicine, potentially widening disparities in care access among vulnerable populations. In a publicly-funded HIV clinic, we aimed to evaluate a pre-visit phone-based planning intervention to address anticipated barriers to telemedicine.

Methods: We conducted a pragmatic randomized controlled trial of patients scheduled for a phone-based HIV primary care visit at the Ward 86 HIV clinic in San Francisco from 15 April to 15 May 2020. Once reached by phone, patients were randomized to either have a structured pre-visit planning intervention to address barriers to an upcoming telemedicine visit versus a standard reminder call. The primary outcome was telemedicine visit attendance.

Results: Of 476 scheduled telemedicine visits, 280 patients were reached by a pre-visit call to offer enrollment. Patients were less likely to be reached if virally unsuppressed (odds ratio (OR) 0.11, 95% confidence intervals (CI) 0.03–0.48), CD4 < 200 (OR 0.24, 95% CI 0.07–0.85), or were homeless (OR 0.24, 95% CI 0.07–0.87). There was no difference between intervention and control in scheduled visit attendance (83% v. 78%, OR 1.38, 95% CI 0.67–2.81).

Conclusions: A structured phone-based planning call to address barriers to telemedicine in a public HIV clinic was less likely to reach patients with poorly-controlled HIV and patients experiencing homelessness, suggesting additional interventions may be needed in this population to ensure access to telemedicine-based care. Among patients reachable by phone, telemedicine visit attendance was high and not improved with a structured pre-visit intervention, suggesting that standard reminders may be adequate in this population.

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De-identified data will be made available, on reasonable request, by contacting the corresponding author.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Supplemental material

Supplemental material for this article is available online.

Keywords

Telemedicine

Introduction

The COVID-19 pandemic has necessitated and accelerated adoption of novel modalities of healthcare delivery, such as telemedicine, to facilitate continuity of care while promoting physical distancing to reduce transmission of COVID-19.[1–4] Despite efforts to increase utilization of telemedicine, ambulatory visits in the USA have decreased by up to 60%,[5] potentially worsening care access and outcomes for chronic disease management, including HIV primary care.[6]

Though both phone- and video-based telemedicine have the potential to reduce some barriers to accessing routine health care,[7–10] telemedicine also introduces new barriers that may worsen care access and health disparities for those most vulnerable to disruptions in care.[11–13] Barriers to telemedicine for vulnerable populations include not having access to a phone, phone plan or wireless internet; a reliable power source to charge one's phone; and frequent phone turnover.[13–15] Each of these barriers is particularly steep for people experiencing homelessness.[16–18]

There is limited data describing implementation of telemedicine for people living with HIV. A 2019 survey of people living with HIV at an urban safety net clinic indicated that many patients were interested in incorporating telemedicine into future medical care, however none of these patients had previously participated in telemedicine and those with low educational attainment, low income and low digital literacy were more likely to express concerns about telemedicine-based care.[19] During the COVID-19 pandemic, solutions to concerns about worsening disparities in access to HIV care among vulnerable patients include ensuring that in-person care remains available for those facing additional barriers to telemedicine.[20] Beyond reducing access to medical care, barriers to telemedicine may also decrease access to social work services to address social determinants of health, such as food insecurity and housing instability.

Given the potential for telemedicine to worsen disparities in access to care during and after the COVID-19 pandemic, it is essential to understand barriers to telemedicine among vulnerable populations and to rapidly evaluate strategies to mitigate these barriers. At a large urban publicly-funded HIV clinic, we therefore sought to determine the proportion and characteristics of patients who could not be reached by phone prior to a scheduled phone-based telemedicine visit and to evaluate whether an augmented pre-visit planning intervention for those who could be reached could improve subsequent visit attendance and quality.

Methods

We made structured, pre-visit phone calls to patients with an upcoming HIV primary care telemedicine visit at the Ward 86 HIV clinic at San Francisco General Hospital. We

first describe characteristics of patients who could and could not be reached by phone prior to their visit. Among those reached by the pre-visit call, we conducted a pragmatic randomized trial comparing the effect of a structured phone-based planning intervention versus a standard reminder call on subsequent telemedicine visit attendance and perceived visit quality. The UCSF Human Research Protection Program determined that this study constituted quality improvement and did not require institutional review board oversight.

Study setting and participants

Ward 86 is the largest publicly-funded HIV clinic in San Francisco, California, serving approximately 2400 people with HIV. Following San Francisco's moratorium on routine medical appointments on 17 March 2020,[21] all HIV primary care visits were converted to telephone visits, except those that required in-person evaluation for medical indications. Similar to other safety-net settings,[14] our clinic conducted telemedicine visits by phone, as opposed to video, due to lack of clinic-based infrastructure for video visits and limited digital access among our patient population. Reminder calls for each visit were uniformly implemented as standard of care at our clinic during the transition to telemedicine. All adult patients living with HIV and scheduled for a primary care telephone visit at Ward 86 between 15 April and 15 May 2020 were eligible to participate. Clinic schedules were reviewed each Thursday to generate a list of eligible patients for the following week. Patients were excluded only if they had already been reached by a pre-visit call for a prior scheduled telemedicine visit.

Recruitment and randomization

We called eligible patients one to three days prior to their scheduled telemedicine visit, making up to four call attempts at various times of day. Calls were conducted in English or Spanish by clinical staff at Ward 86 (one licensed vocational nurse and one medical assistant). For patients with a primary language other than English or Spanish, staff used a phone-based medical interpreter. Once reached, patients were reminded of their telephone appointment, given information on ways to contact the clinic or access in-person care if needed, and offered study enrolment. Following verbal consent, participants were randomized 1:1 to intervention or control using simple randomization within the randomization module in REDCap. Once randomized, the assigned intervention was delivered during the same phone call.

Intervention

Using the PRECEDE framework,[22] we developed a phone-based pre-visit intervention to address knowledge, structural and communication barriers to phone visits (see Supplemental Table 1). The intervention included a reminder about the telemedicine appointment, assistance with identifying a location to conduct the phone visit, identification of agenda items to discuss with their provider, and instructions to have medications and a way to record action items available during the visit. To address structural and communication barriers, the intervention also screened for unmet social needs and identified care co-ordination needs from other interdisciplinary care team members. Items that were identified during the pre-visit call were communicated with the provider in advance through a message in the electronic medical record. Any other needs that were identified triggered scheduling

of a telephone visit with the appropriate interdisciplinary provider (e.g. unmet social need triggered a scheduled social work telephone visit).

Control

Patients randomized to the control group received only a standard reminder of their upcoming phone visit with their medical provider.

Measurements

Demographic and clinical characteristics were determined for all eligible participants through electronic chart abstraction. Baseline housing status was assessed through chart review and using San Francisco Department of Public Health housing data.

The primary outcome was visit attendance (telephone or in-person), measured by chart review. In order to evaluate the reach and impact of the intervention on disparities, visit attendance was assessed for all eligible patients, including those who could not be contacted for the pre-visit call (Figure 1).

Participants who enrolled in the trial and their providers completed a brief post-visit survey. Patient surveys were conducted by phone after the scheduled telemedicine visit and included questions about ease of contacting the clinic and accessing care, satisfaction with their recent phone visit, and preferences for phone versus in-person visits in the future. Participants also had the opportunity to offer additional open-ended feedback on their recent visit. Participants received a US$10 grocery store gift card after completion of the post-visit survey. Self-administered provider surveys inquired about the ability to address medical and psychosocial needs during the visit, overall satisfaction with the visit, ability to gather appropriate clinical data, and appropriateness of future phone visits for the patient. Provider surveys were only conducted for attended phone visits. Survey questions were developed using the National Quality Forum Telehealth Measurement Framework,[23] with care access questions adapted from the Primary Care Assessment Survey.[24]

Analysis

We describe baseline characteristics of patients who could and could not be reached for the pre-visit call. To evaluate factors associated with reaching patients prior to their scheduled visit, we conducted mixed-effects logistic regression accounting for clustering by participant. Baseline characteristics were included in an adjusted model if $p < 0.1$ in unadjusted analysis. We conducted unadjusted logistic regression to compare visit attendance between intervention and control arms. We then evaluated characteristics associated with visit attendance among enrolled participants and among all eligible participants using unadjusted logistic regression, with mixed effects to account for clustering by patient in the cohort of all eligible participants. We conducted adjusted models for each group, incorporating factors with $p < 0.1$. Additionally, we describe patient and provider perspectives on visit satisfaction and quality using the ‘top-box’ approach, dichotomizing 5-point Likert scale ratings to 5 versus < 5.[25]

Sample size estimates were based on the primary outcome of visit attendance. Telephone visit attendance rates were approximately 50% at study baseline; to detect a 20% absolute increase in visit attendance, with 80% power, 100 participants were required per study arm.

Results

Characteristics of all patients with a scheduled telemedicine visit

Of 476 scheduled telephone visits with a primary care provider among 458 unique patients, we reached 280 patients by phone prior to their visit. (Figure 1) Patients were reached for the pre-visit reminder call after a median of one attempt (IQR 1–2); those who could not be reached received a median of three attempts (IQR 2–4).

Viral non-suppression (HIV RNA ≥ 200 copies/ml) was 9% among those reached and 22% among those not reached for the pre-visit call (adjusted odds ratio (aOR) 0.13, 95% confidence interval (CI) 0.03–0.70). Of those reached 9% were homeless, compared to 17% of those not reached (aOR 0.34, 95% CI 0.09–1.30). There was no difference in ability to be reached for the pre-visit call by race/ethnicity. (Table 1 and Supplemental Table 2)

Visit attendance among all patients with a scheduled telemedicine visit

Visit attendance was higher for patients reached for the pre-visit reminder call than those who could not be reached (82 v. 53%, aOR 3.61, 95% CI 1.87–6.97; Table 2). Visit attendance was lower among Black patients compared to White patients who were not reached for the pre-visit call (aOR 0.47, 95% CI 0.22–1.01), though this disparity among Black patients was attenuated among those who were reached by the pre-visit call (aOR 0.93, 95% 0.31–2.76).

Characteristics of patients randomized

Among the 280 patients reached for the pre-visit reminder call, 201 consented to participate in the study and were randomized, 98 to intervention and 103 to control (Figure 1). Three intervention participants and two control participants subsequently cancelled or rescheduled their phone visits and were thus excluded from analysis. Among the 79 patients who were reached but did not enrol, 11 rescheduled their appointment, 19 converted to an in-person visit, and 49 declined study participation.

There were no significant baseline differences between intervention and control groups (Table 3). Overall, among the 196 participants enrolled and included in analysis, 65% were 50 years of age or older, 83% were cisgender men, and 51% were non-White. Most participants spoke English as their primary language (91%); the remaining 9% spoke Spanish. Nearly all had a CD4 count ≥ 200 cells/ml (91%) and were virally suppressed (92%).

Intervention implementation

The pre-visit planning call took an additional 7 min to deliver (95% CI 5.8–8.3) compared to the standard reminder call (average total 10.6 v. 3.6 min, including time for participant consent). Among 95 intervention participants, only one required assistance with identifying

a private location for their provider telephone visit; none required assistance identifying a location with free wireless internet. Thirty-eight participants (40%) identified at least one agenda item they wished to address during their provider telephone visit, with the most common issues relating to a medication (n = 18) or a new symptom (n = 17). Twenty-one participants (22%) identified needs from other multidisciplinary providers and were scheduled for a visit with that provider; the majority were scheduled with the patient's social worker (n = 18). Nearly a quarter of patients screened positive for food insecurity (n = 23) and were scheduled with a social work telephone visit. Notably, 18 (78%) of these patients did not identify a social work need on general questioning about needs from other providers. (see Supplemental Table 3)

Visit attendance

Overall, 83% of the intervention group and 78% of the control group attended their scheduled visit, with no significant difference between study arms (unadjusted OR 1.38, 95% CI 0.67–2.81; Table 2).

Post-visit patient survey

Post-visit surveys were completed for 161 patients, of whom 137 (85%) attended their provider visit. There were no significant differences by study arm in perceived ease of contacting the clinic, accessing care, satisfaction with recent telephone visit, or future preference for phone visits (Supplemental Table 4) Among all enrolled participants, only half felt it was 'very easy' to contact the clinic by phone (74/156, 47%), contact a provider for medical advice over the phone (73/159, 46%), or see a provider in clinic if needed (53/156, 53%). Satisfaction with the recent visit was somewhat higher, with 77% of those who attended their recent visit reporting that all of their health concerns were addressed, 74% reporting that it was 'very easy' to understand what to do next for their health compared to an in-person visit, 72% reporting they were 'very satisfied' with communication about their recent visit, and 85% reporting that they were 'very satisfied' with the phone visit with their provider. Though only 32% (51/158) preferred phone visits to in-person visits in the future, 70% (107/153) wanted to replace at least some future in-person visits with phone visits.

In qualitative responses, some patients expressed that telemedicine provided continued high quality care (n = 17), while others cited difficulties communicating with clinic staff (n = 15), technological challenges (n = 4), a hearing or cognitive impairment that limited ability to participate in phone visits (n = 3), or depersonalization associated with phone visits (n = 3). Despite these challenges, other patients expressed hopes to incorporate video or visual tools into remote visits (n = 5) and ideas around incorporating other members of the care team or their social network into the visit (n = 2).

Post-visit provider survey

Providers completed a post-visit survey for 94% of patients who attended their visit (76/79 intervention, 72/79 control). There were no significant differences by study arm in provider perceptions that barriers to telemedicine were addressed prior to the visit, ability to address medical and social needs during the visit, or perception of patient's understanding of their

health after the visit (Supplemental Table 5). Providers reported directly completing a medication reconciliation with 79% of patients and ‘strongly agreed’ that 63% of patients could replace some future in-person visits with telephone visits. However, they only ‘strongly agreed’ that they could gather necessary clinical data in 41% of patient encounters and felt that 18% of patients needed additional in-person assessment within the next two weeks. Overall, 49% of providers were ‘very satisfied’ with the phone visit and 87% were at least ‘somewhat satisfied’. Major provider concerns with telephone visits included lack of labs or clinical assessment (n = 22); difficulties reaching patients at appointment time (n = 13); and complex medical, social, and/or psychiatric needs that make phone visits more challenging (n = 9).

Discussion

Among patients with a scheduled telemedicine visit at a large urban publicly-funded HIV clinic during COVID-19, patients with poorly controlled HIV and those experiencing homelessness were least likely to be reached by telephone prior to a scheduled telemedicine visit. In a pragmatic randomized trial among patients who could be reached, we did not find a difference in visit attendance or patient and provider visit satisfaction between those randomized to receive a structured pre-visit planning call versus a simple reminder call to prepare patients for an HIV primary care telemedicine visit.

People experiencing homelessness and those with HIV viremia were the least likely to be reached by our pre-visit call, translating to lower rates of visit attendance among these highly vulnerable groups. Homelessness is one of the most significant risk factors for viral non-suppression in San Francisco and other urban settings.[26,27] Recent analysis in our clinic also showed that people experiencing homelessness were less likely to be scheduled for a telemedicine visit and experienced even further worsening disparities in viral suppression compared to housed patients during the COVID-19 pandemic.[28] Programmes to support people experiencing homelessness with low-barrier in-person care options have shown effectiveness for improving viral suppression among this population prior to the COVID-19 pandemic.[29,30] In conjunction with appropriate safety protocols, these drop-in, in-person care models are likely important for maintaining access to essential medical care for populations who have difficulty engaging with telemedicine.

We furthermore observed a disparity in telephone visit attendance by race, with Black patients attending their phone-based HIV primary care visits at lower rates than White patients. However, Black and White participants were reached for the pre-visit reminder call at similar rates and, among those reached, there were similar visit attendance rates by race. This suggests that interventions such as reminder calls with multiple attempts at different times of day may address some, though certainly not all, racial disparities in telemedicine access. Further research is needed to define and understand racial disparities in telemedicine access among people living with HIV, as well as implications for long-term retention in care and clinical outcomes.[31]

Approximately one-third of patients in the intervention arm identified an unmet psychosocial need during the pre-visit call, including food insecurity, housing concerns, and

needs related to substance use or mental health. Though the pre-visit planning intervention sought to identify and address these needs, this did not translate to improved visit attendance or care experience for patients or medical providers. Given the extent of psychosocial needs identified, it is unlikely that limited differences between arms was due solely to enrolment of a population without need of assistance. Rather, the structured intervention may have offered limited additional benefit over simply connecting the patient to their telemedicine visit. Further, medical providers highlighted challenges in caring for medically and psychosocially complex patients via telemedicine, compared to in-person visits, when additional services – such as on-site social work – are readily available in clinic. Thus, the limited interventions offered through the pre-visit call may have been inadequate replacements for in-clinic services when medical or psychosocial needs are complex. Despite this, 70% of patients and 63% of their providers felt that phone visits could replace some in-person visits in the future, highlighting that phone visits may have an important role in providing convenient care when an in-person visit is not necessary.

Limitations to our study include our active control condition, our ability to conduct outreach only by phone and lack of clinical endpoints. We used a phone-based reminder call as our control condition because reminder calls are known to reduce clinic no-show rates,[32] and reminder calls were implemented as the standard of care in our clinic alongside implementation of telemedicine. Moreover, we were only able to conduct our pre-visit intervention by phone. Text messaging may have expanded our reach, though text-based reminders and support messages may have limitations in their ability to improve visit attendance among patients with pre-existing barriers to care engagement.[33] Finally, although the ultimate goal of interventions to improve continuity of care through telemedicine is to improve long-term retention in care and HIV viral suppression, the short time frame of this study limited our ability to assess these longer-term outcomes. Nonetheless, clinic visit attendance is an important behavioural outcome that has been shown in prior studies to predict important clinical outcomes.[34,35]

In conclusion, a telemedicine-focused model may not be an appropriate modality for HIV care for some vulnerable populations facing significant barriers to phone access. For others with significant clinical and psychosocial needs, telemedicine may provide desired and convenient care, but more intensive and targeted interventions may be necessary to ensure that complex medical and psychosocial needs are adequately addressed when care is provided via telemedicine. For more stable patients, simple appointment reminders may be adequate for supporting engagement in telemedicine. Efforts to proactively identify and address barriers introduced by telemedicine for vulnerable patients are urgently needed to prevent the widening of health disparities with expanded implementation of telemedicine.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

We would like to thank Jaime Velasco for his assistance with translating study documents into Spanish, Ward 86 clinic leadership for their support and our participants for their time and insightful feedback.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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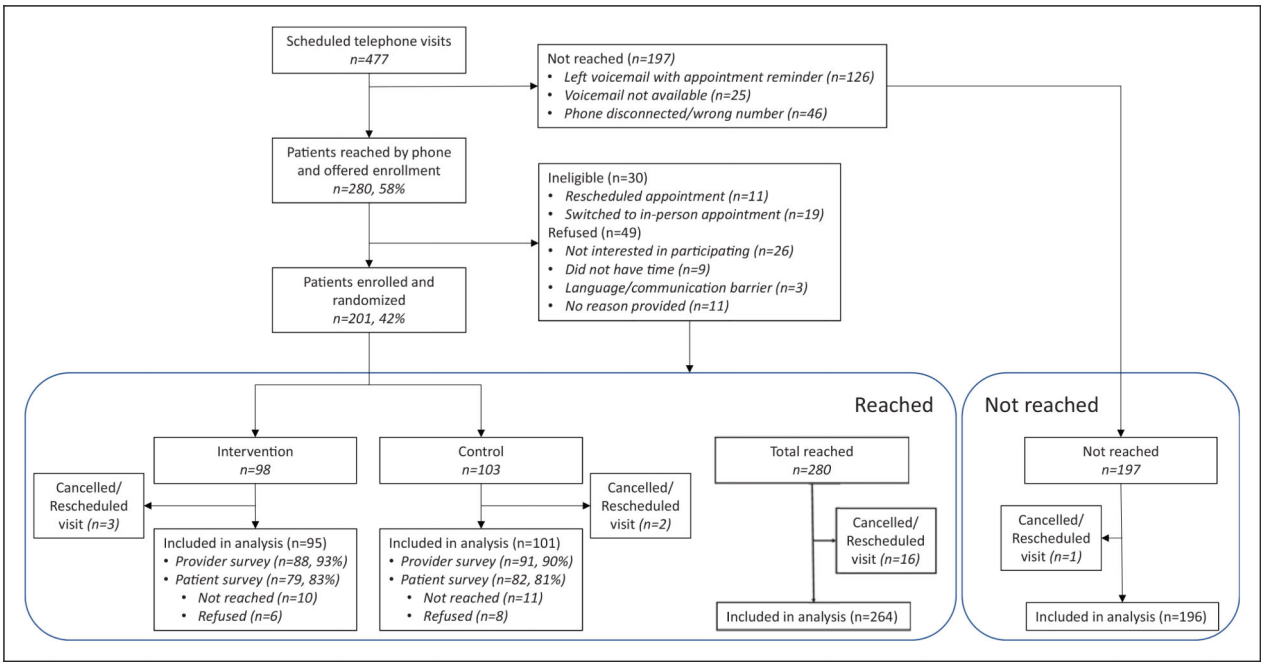

Figure 1.
Participant flow.

Table 1.

Characteristics of enrolled, reached and not-reached participants.

	Reached, enrolled (*n* = 201)		Reached, not enrolled (*n* = 79)		Total reached (*n* = 280)		Not reached (*n* = 196)	
	n	**%**	***n***	**%**	***n***	**%**	***n***	**%**
Age								
18–34	26	13	8	10	34	12	25	13
35–49	44	22	21	27	65	23	53	27
50–64	99	49	37	47	136	49	97	49
≥65	32	16	13	16	45	16	21	11
Gender								
Cisgender man	167	83	59	75	226	81	159	81
Cisgender woman	16	8	10	13	26	9	25	13
Transgender man	1	0	1	1	2	1	1	1
Transgender woman	6	3	2	3	8	3	2	1
Other/Prefer not to disclose	16	8	7	9	23	8	9	5
Race/ethnicity								
Black/African American	42	21	18	23	60	21	39	20
White	98	49	31	39	129	46	93	48
Hispanic/Latinx	47	23	22	28	69	25	40	20
Other/multi-racial	14	7	8	10	22	8	24	12
Language								
English	183	91	70	89	254	91	184	94
Spanish	18	9	6	8	24	9	9	5
Other	0	0	3	4	3	1	3	2
Housing status at enrolment								
Stable housing	179	89	76	96	255	91	163	83
Homelessness or unstable housing	22	11	3	4	25	9	33	17
Patient portal access								
Yes	51	25	18	23	69	25	44	22
Baseline CD4 count (cells/mm^3)								
<200	18	9	8	10	26	9	36	18

J Telemed Telecare. Author manuscript; available in PMC 2023 April 01.

	Reached, enrolled (*n* = 201)		Reached, not enrolled (*n* = 79)		Total reached (*n* = 280)		Not reached (*n* = 196)	
	n	**%**	***n***	**%**	***n***	**%**	***n***	**%**
200–499	70	35	40	51	110	39	67	34
≥500	111	55	29	37	140	50	87	44
No CD4 data	2	1	2	3	4	1	6	3
Baseline HIV-1 RNA								
Virally suppressed (<200 copies/ml)	186	93	70	89	256	91	146	75
Viremic (≥200 copies/ml)	15	7	9	11	24	9	44	22
No viral load data	0	0	0	0	0	0	6	3

Table 2.

Visit attendance among enrolled and all eligible participants.

	Enrolled participants (n = 196)[a]		All eligible participants (n = 460)[a]	
Visit attendance (phone + in person)	**Unadjusted OR (95% CI)**	**Adjusted OR (95% CI)**	**Unadjusted OR (95% CI)**	**Adjusted OR (95% CI)**
Intervention	1.38 (0.67–2.81)	1.43 (0.69–2.97)		
Reached for pre-visit call			5.15 (1.90–13.9)	3.61 (1.87–6.97)
Age (per 10-year increase)	1.22 (0.92–1.60)		1.21 (0.95–1.53)	
Gender v. cisgender man				
Cisgender woman	1.03 (0.28–3.82)		1.02 (0.46–2.28)	
Transgender/nonbinary/other/prefer not to disclose	0.83 (0.25–2.69)		0.73 (0.30–1.77)	
Race/Ethnicity v. white if not reached by pre-visit call[b]				
Black			0.44 (0.19–0.99)	0.47 (0.22–1.01)
Latinx			0.63 (0.29–1.36)	0.71 (0.33–1.54)
Other			0.48 (0.18–1.33)	0.54 (0.21–1.39)
Race/Ethnicity v. white if reached by pre-visit call[b]				
Black	0.65 (0.27–1.59)		1.00 (0.34–2.95)	0.93 (0.31–2.76)
Latinx	0.92 (0.38–2.25)		1.31 (0.43–4.01)	1.22 (0.39–3.84)
Other	1.31 (0.27–6.39)		2.12 (0.40–11.38)	1.86 (0.37–9.44)
Non-English speaker v. English speaker	0.83 (0.26–2.67)		0.91 (0.37–2.21)	
Homeless v. Housed	1.09 (0.35–3.44)		0.68 (0.32–1.45)	
CD4 count <200 v. ≥200 cells/ml	0.34 (0.12–0.94)	0.36 (0.13–1.04)	0.60 (0.32–1.10)	0.92 (0.47–1.80)
Viral load ≥200 copies/ml v. Viral load <200 copies/ml	0.32 (0.11–0.97)	0.35 (0.11–1.10)	0.36 (0.16–0.81)	0.67 (0.37–1.24)

OR, odds ratio; CI, confidence interval

[a]Excluding those who cancelled or rescheduled their appointment in advance

[b]Interaction term between race/ethnicity and being reached for a phone call.

Table 3.

Characteristics of participants in randomized trial.

	Intervention (*n* = 95)		Control (*n* = 101)	
Characteristic	***n***	**%**	***n***	**%**
Age				
18–34	14	15	12	12
35–49	20	21	22	22
50–64	44	46	52	51
≥65	17	18	15	15
Gender				
Cisgender man	82	86	80	79
Cisgender woman	7	7	9	9
Transgender woman	1	1	5	5
Transgender man	1	1	0	0
Other/prefer not to disclose	4	4	16	16
Race/ethnicity				
Black/African American	15	16	25	25
White	50	53	45	45
Hispanic/Latinx	23	24	24	24
Asian	2	2	2	2
Other/multi-racial	5	5	5	5
Language				
English	82	86	96	95
Spanish	13	14	5	5
Housing status at enrolment				
Stable housing	88	93	86	85
Homelessness or unstable housing	7	7	15	15
Patient portal access				
Yes	25	26	24	24
Baseline CD4 count (cells/mm^3)				
<200	9	9	9	9

J Telemed Telecare. Author manuscript; available in PMC 2023 April 01.

Characteristic	Intervention (n = 95)		Control (n = 101)	
	n	**%**	***n***	**%**
200–499	30	32	39	39
≥500	55	58	52	51
No CD4 data	1	1	1	1
Baseline HIV-1 RNA				
Virally suppressed (<200 copies/ml)	87	92	94	93
Viremic (≥200 copies/ml)	8	8	7	7