

# A Fall Prevention Feasibility Trial for People With HIV and Alcohol Use

OTJR: Occupational Therapy Journal of Research  
2025, Vol. 45(1) 85–94  
© The Author(s) 2024  
Article reuse guidelines:  
[sagepub.com/journals-permissions](http://sagepub.com/journals-permissions)  
DOI: 10.1177/15394492241238956  
[journals.sagepub.com/home/otj](http://journals.sagepub.com/home/otj)



Simone V. Gill<sup>1</sup> , Danny Shin<sup>1</sup>, Theresa W. Kim<sup>1</sup>, Kara M. Magane<sup>1</sup>, Timothy Hereen<sup>1</sup>, Michael Winter<sup>1</sup>, Christine Helfrich<sup>2</sup>, and Richard Saitz<sup>1</sup>

## Abstract

Alcohol contributes to higher fall risk in people living with HIV (PLWH), yet fall prevention trials for PWH with alcohol use are lacking. To assess the feasibility of conducting a randomized controlled trial of a 10-week online fall prevention intervention tailored for PLWH with alcohol use. The intervention consisted of weekly virtual group discussions, individual phone check-ins, and home exercises. Of those eligible, 53.5% (23/43) enrolled (12 to the intervention and 11 to control). Mean age was 58 years; 82.6% had a past 6-month fall; 65.2% had alcohol use disorder; and 95.7% completed postintervention assessments. The intervention was highly rated (Client Satisfaction Questionnaire-8 score  $M = 30.4$ ,  $SD = 1.6$ ) with a wide range of group and individual phone session attendance. Preliminary analyses suggest the intervention may reduce the odds of falling and alcohol use frequency. Findings support the feasibility of a larger randomized trial. ClinicalTrials.gov Identifier: NCT04804579.

## Plain Language Summary

### A fall prevention feasibility trial for people with HIV and alcohol use

Alcohol contributes to higher fall risk in people living with HIV (PLWH), yet fall prevention studies for PLWH with alcohol use are lacking. We conducted a 10-week online fall prevention intervention for PLWH ( $n = 23$ ) with recent alcohol use to assess if the intervention was feasible and acceptable for PLWH. The intervention consisted of weekly virtual group discussions and individual phone check-ins with an occupational therapist and a customized home exercise program. The mean age was 58 years. Almost all fell in the past 6 months (82.6%), had impaired physical functioning (91.3%), and had alcohol use disorder (65.2%). Participants reported high intervention satisfaction. Preliminary analyses suggest that the intervention may reduce the odds of falling and alcohol use frequency. Findings support the feasibility of an online fall prevention intervention study for PLWH.

## Keywords

falls, HIV, substance use, fall intervention

## Background

People living with HIV (PLWH) are at a higher risk for falls at a younger age than those without HIV. In one study, 30% of PLWH between 45 and 65 years of age experienced at least one fall in the past year and over 18% had multiple falls (Erlandson et al., 2012). This rate is comparable to older adults' fall rate of 25% to 30% (Tinetti et al., 1988) and is associated with serious outcomes. Owing to reasons related to HIV infection, medications, and comorbid conditions (Pathai et al., 2014), PLWH experience health consequences common in older people at a younger age including frailty (Erlandson et al., 2014), deficits in motor function (Berner et al., 2017), and in cognition, which may drive fall risk whether or not a person is living with HIV (Sharma et al., 2016, 2018). Recurring falls are more likely in PLWH who

are frail and more frequent among those with poor balance, gait, and endurance (Erlandson et al., 2016).

There are several factors that increase fall risk for PLWH. Heavy alcohol use is associated with a 1.3 times greater likelihood of a fall (Womack et al., 2019). Other contributors include polypharmacy (T. W. Kim et al., 2018), illicit drug use (Womack et al., 2019), medical conditions (e.g., diabetes, neuropathy)

<sup>1</sup>Boston University, MA, USA

<sup>2</sup>American International College, Springfield, MA, USA

### Corresponding Author:

Simone V. Gill, Department of Occupational Therapy, Sargent College of Health & Rehabilitation Sciences, Boston University, 635 Commonwealth Avenue, Boston, MA 02215, USA.

Email: simvgill@bu.edu

(D. J. Kim et al., 2012), and mental health conditions (e.g., depression) (Jackson-Best & Edwards, 2018).

The focus of fall prevention for PLWH has been on addressing mediators of fall risk (Erlandson et al., 2019) with a lack of relevant occupational therapy (OT) literature on the topic. Exercise interventions improve aerobic capacity (Farinatti et al., 2010) and strength (Markov et al., 2022), but data on the impact of exercise interventions on fall risk in PLWH is limited. It is not clear whether fall prevention interventions effective in geriatric populations without HIV are generalizable to PLWH. Also, interventions requiring specific equipment such as weight machines are often not accessible. It is also unknown how to address alcohol to prevent falls. Effective yet practical fall prevention interventions are needed for PLWH that are customized to their needs.

Those at risk for falls often do not access known effective fall prevention interventions (Jacobson et al., 2021). PLWH may have unique needs that make accessing in-person interventions challenging such as limited social supports, alcohol and illicit drug use, and major depression and other psychiatric disorders (Jackson-Best & Edwards, 2018). PLWH also commonly experience poverty (Kalichman, 2023), housing instability (Cassimatis et al., 2021), and lack of transportation (Lankowski et al., 2014); all of which are intensified by crises such as COVID-19. Telehealth has been successfully used in fall prevention interventions for older adults (Bernocchi et al., 2019; Morano et al., 2019). Whether telehealth mitigates the difficulties PLWH have accessing interventions requiring in-person attendance has not been tested.

This study was a pilot randomized trial of an online OT fall prevention intervention for PLWH who consume alcohol. The primary objective was to examine the feasibility and acceptability of conducting an online fall prevention randomized trial in PLWH. The secondary objective was to provide preliminary data on effect sizes of the intervention on falls, physical function, and alcohol and drug use.

## Methods

### Design

This trial is reported according to the Consolidated Standards of Reporting Trials (CONSORT) guidelines for reporting randomized pilot trials (Eldridge et al., 2016). We conducted the study from October 2021 to August 2022. A protocol description has been published (Shin et al., 2022). Ethical approval was received from the Boston University Medical Center Review Board, and the study conformed to the Declaration of Helsinki. The study was conducted in conjunction with the protocol registered on ClinicalTrials.gov (NCT04804579).

### Participants

Eligibility for the pilot trial included any alcohol consumption in the last 30 days; a fall in the past 6 months or at high

risk for a fall, Centers for Disease Control Stopping Elderly Accidents, Deaths, and Injuries (CDC STEADI) Stay Independent Questionnaire score of  $\geq 4$  (Stevens & Phelan, 2013); internet access via phone or computer; and willingness and availability to participate in a 10-week intervention with weekly on-line group sessions, home exercises, and phone check-ins with an occupational therapist. People who used a wheelchair for mobility were excluded because one of the intervention goals was to improve unseated standing and balance.

### Instruments

The following instruments were administered at baseline by trained research associates to characterize the sample:

**Sociodemographic and Homelessness Questionnaire.** Self-reported questionnaires included questions about demographics (age, sex, race/ethnicity, living situation, and employment) and history of homelessness.

**U.S. Household Food Security Survey Module.** This validated and reliable module includes 18 questions, Likert-type scale and yes/no responses, measuring food insecurity (Carlson et al., 1999).

**The CDC STEADI & Stay Independent Questionnaire** (Stevens & Phelan, 2013) was used to determine fall risk defined as responding yes to any of three questions: do you feel unsteady when standing or walking, do you worry about falling, and have you fallen in the past year; or Stay Independent Questionnaire score of  $\geq 4$  (Stevens & Phelan, 2013). Both instruments are validated and reliable.

The following instruments were secondary or exploratory outcomes administered.

**Addiction Severity Index.** The Addiction Severity Index (ASI; McLellan et al., 1992) is well-validated instrument to assess self-reported past 30-day use of alcohol and illicit drugs that was administered pretest and posttest.

Alcohol use disorder was defined according to *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., text rev.; *DSM-5-TR*; American Psychiatric Association, 2022) criteria at pretest.

**Short Physical Performance Battery.** The Short Physical Performance Battery (SPPB; Welch et al., 2021) is a standardized assessment that assesses gait speed, balance, and speed of sitting/getting up from a chair administered pretest and posttest. Scores range from 0 (poor) to 12 (best).

**Frailty.** The Fried Frailty phenotype (Fried et al., 2001) is reliable in identifying a phenotype of frailty based on the presence of three or more components: (a) unintentional weight loss of  $\geq 10$  pounds or  $\geq 5\%$  of body weight in the prior year; (b) grip strength in the lowest 20% adjusted for

gender and body mass index; (c) self-reported exhaustion; (d) slow gait speed; and (e) low physical activity level and was administered pretest and posttest.

**Canadian Occupational Performance Measure.** The Canadian Occupational Performance Measure (COPM; Law et al., 1990) is a validated and reliable semistructured interview that assesses self-perception of performing activities of daily living and satisfaction with the level of ability in performing activities of daily living and was administered pretest and posttest.

**Client Satisfaction Questionnaire-8.** The Client Satisfaction Questionnaire (CSQ-8; Kelly et al., 2018) is valid and reliable with scores ranging from 8 to 32 (higher scores indicating greater satisfaction) and was administered to intervention participants at posttest to rate the intervention.

Psychometric and reliability statistics for the measures described can be found via the citations provided for each measure.

## Procedures

**Recruitment.** Participants were recruited from the Boston ARCH Frailty, Functional Impairment, Falls, and Fractures (4F) Study: an observational cohort study of 251 adults with HIV infection and risky alcohol use (AUDIT-C score of  $\geq 3$  for women,  $\geq 4$  for men; Bradley et al., 1998) or any illicit drug use in the past 12 months, or enrollment in a previous study, of which the eligibility criteria was past-year substance use disorder and/or a lifetime history of injection drug use. The objective of the Boston ARCH 4F study was to examine the association of alcohol with falls among PLWH.

Recruitment was done by phone to screen eligible participants. For efficiency, a list of eligible participants was generated based on their answers to questions about their alcohol use and falls at their most recent Boston ARCH 4F study follow-up. Eligible participants interested in enrollment were invited for an in-person pretest.

**Randomization.** While a pretest assessment was completed at enrollment, randomization did not occur until at least three participants had enrolled who could be randomized because three was the minimum number needed to comprise a group. When at least three participants enrolled, we called to reconfirm scheduling availability and willingness to participate. We did not base eligibility on availability for group sessions at a predetermined time. Instead, participants were informed that groups would be scheduled based on the availability of intervention participants and the OT. Participants were then randomized using a 1:1 allocation ratio with sex as the determining factor either to the online fall prevention intervention or control group. The control group received written educational information about fall prevention and substance use.

## Pretest and Posttest

A trained research assistant administered the instruments described in the previous section except for the COPM which was administered by a study licensed occupational therapist. Body mass index, CD4 count, and HIV viral load were collected from electronic medical records. The posttest assessment was performed 1 to 4 weeks after the intervention period concluded.

An in-depth description of the intervention has been published (Shin et al., 2022). We developed the intervention using a mixed-methods approach: qualitative interviews and focus groups with participants enrolled in the Boston ARCH 4F study who experienced multiple falls and quantitative analyses using data from the target population to assess factors associated with falls (Shin et al., 2022). The intervention, administered by a licensed OT, consisted of three parts: 10 weekly online 30- to 60-minute virtual group discussion sessions using a Health Insurance Portability and Accountability Act (HIPAA) compliant Zoom platform, a home exercise program, and one-on-one weekly phone calls. Virtual group sessions focused on topics related to falls in PLWH raised in prior qualitative analyses (Shin et al., 2022) and participant responses on the COPM. While the intervention was not focused on alcohol use, it was included in discussions about fall prevention among a range of topics: environmental impacts on falls, scheduling daily activities with a reminder system, resources for substance use disorder, medication management, support systems, community reintegration after COVID-19, managing relationships, use of adaptive equipment, and completing daily activities.

Home exercise programs focused on increasing strength, balance, and endurance, and were customized to participants' needs for type of exercise, intensity, and frequency. Participants were asked to complete exercises for 30 minutes three times per week. Since participants were under-resourced, exercises did not require equipment or when required, was accessible as common household materials.

Each week, participants had a one-on-one phone check-in with the OT to debrief about the virtual group sessions, ask questions, and privately express concerns about falls other topics. The OT asked participants about challenges performing the exercises and determined if modifications were required. The OT also asked if they had experienced falls in the previous week and if there were changes in alcohol or drug use.

## Outcome Measures

Primary outcomes were measures of feasibility and acceptability of the intervention. We assessed feasibility with recruitment via the proportion eligible among those screened and the proportion who enrolled among those eligible. Another measure of feasibility was retention (follow-up rate as measured by the proportion who completed the posttest

assessment). Acceptability of the intervention was measured via the number of weekly virtual group sessions attended, weekly phone check-ins completed, and participant satisfaction with the intervention (CSQ-8 score).

The secondary outcome was any fall in the past 10 weeks, (i.e., to match the span of time of the intervention). We used the AIDS Clinical Trials Group (ACTG) definition of a fall as “an unexpected event, including a slip or trip,” in which the participant lost balance and “landed on the floor, ground or lower level, or hit an object like a table or chair,” not including falls that were from a major medical event or an overwhelming external hazard (Erlandson et al., 2016).

Exploratory outcomes were physical functioning impairment (SPPB score <10) (Fried et al., 2001; Treacy & Hassett, 2018), frailty (Fried et al., 2001), number of days of the following: alcohol use (McLellan et al., 1992), heavy alcohol use (National Institute on Alcohol Abuse and Alcoholism standard threshold of 4+ drinks in a day for women and 5+ drinks for men in one day), and illicit drug use (ASI) (McLellan et al., 1992).

## Data Analyses

Analyses were performed using SAS version 9.4 (SAS Institute Inc, Cary, NC). Summary statistics (mean, standard deviation [SD], median, and interquartile range [IQR]) and proportions were calculated to describe the sample, overall and by study arm. Analyses of secondary outcome measures were performed to generate parameter estimates of effect sizes, given that this pilot study was not powered to detect significant effects. Statistical testing was conducted to examine pretest and posttest outcomes within and across groups. First, we used exact McNemar's test to examine whether there was a statistically significant change in the proportion of the sample who experienced any fall at pretest compared to posttest in each intervention arm. The same method was used to evaluate change with the other dichotomous outcomes, that is, frailty and physical functioning impairment (SPPB score < 10).

To assess whether the intervention was associated with the odds of sustaining a fall compared to the controls, we calculated odds ratios (ORs) of the proportion with a fall at posttest adjusting for the proportion with a fall at pretest with logistic regression models. Analyses of the other dichotomous outcomes were performed similarly.

We compared change in days with alcohol use, heavy alcohol use, and illicit drug use for each randomization arm with paired *t*-tests. To examine the association of the intervention with these same continuous outcomes, we calculated incidence rate ratios (IRR) and 95% CIs for the number of days of use at posttest adjusting for the number of days at pretest with negative binomial regression models. ORs and IRRs were used as measures of effect size: a widely used index of effect size in epidemiological studies (Chu et al., 2021).

## Results

### Feasibility

Fifty-six people were screened for eligibility, of whom 43 (76.8%) were eligible (Figure 1). The most common reason for ineligibility was no alcohol use in the past 30 days (10 of 13 individuals). Of those eligible, 25 (58.1%) enrolled and completed the pretest assessment, and 23 (92.0%) were randomized, 12 to the intervention and 11 to the control group. Two participants who had enrolled in the study were not randomized because they were no longer available to participate in the intervention or were unable to be reached. Posttests were completed for 22 of 23 participants (95.7% retention rate).

### Pretest Sample Characteristics

The overall sample ( $n = 23$ ) was an average of 58 years old ( $SD = 8$ ), predominantly male (65.2%), non-Hispanic Black (56.5%), and not employed (91.3%) (Table 1). Some participants reported spending time in a shelter or on the street in the past 6 months ( $n = 3$ , 13.0%) and had experienced food insufficiency ( $n = 5$ , 22.7%).

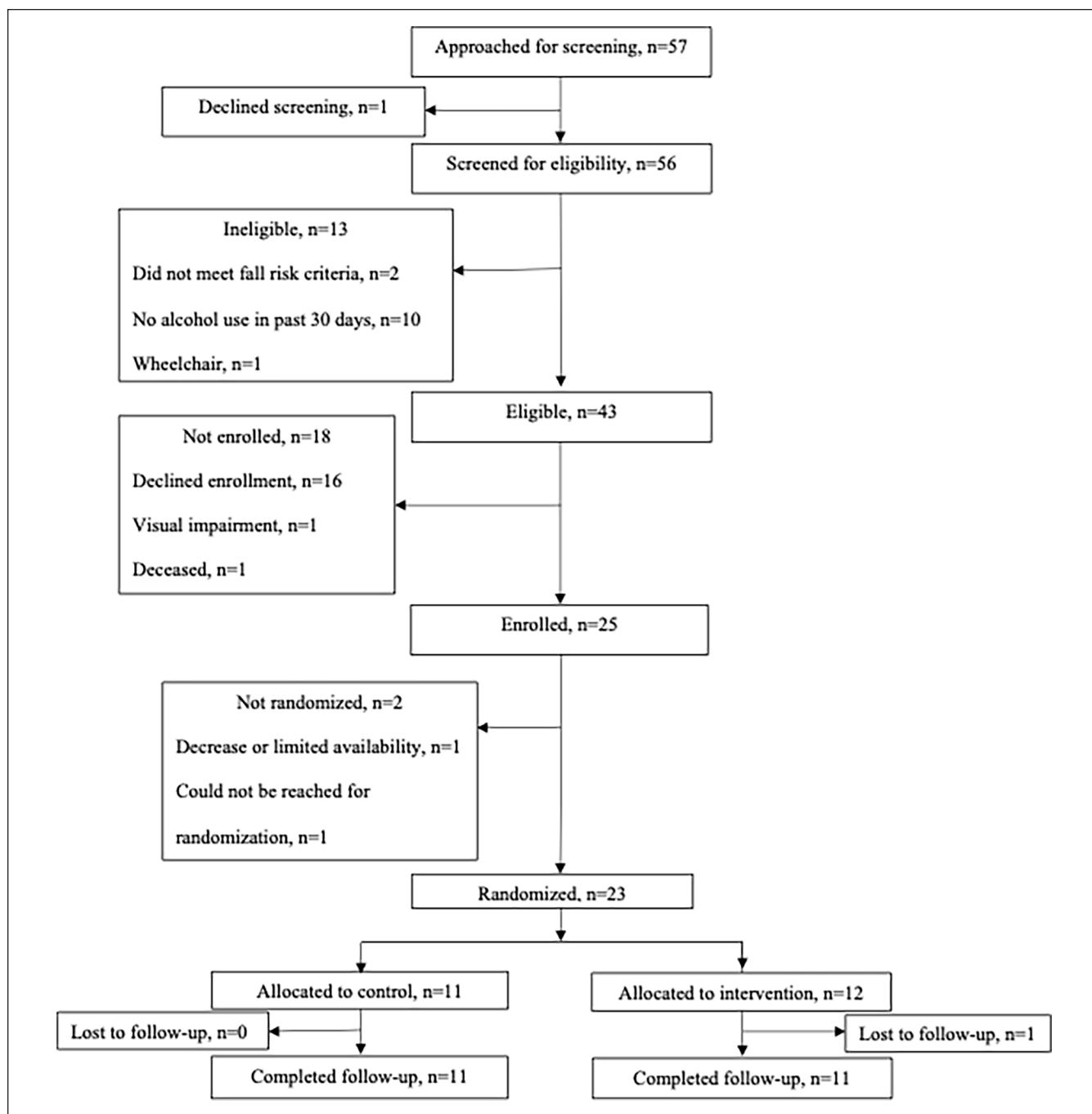
The majority reported falling in the past 6 months ( $n = 19$ , 82.6%). All intervention participants but only 63.6% (7/11) of controls reported a fall. Accordingly, almost all (10/12, 83.3%) intervention participants had a fear of falling compared to only four of the 11 controls (36.4%). Almost all participants in the total sample had SPPB scores  $\leq 10$  (21/23, 91.3%) indicating impaired physical functioning and were either frail or prefrail. Most had heavy alcohol use (18/23, 78.3%), met criteria for an alcohol use disorder (15/23, 65.2%), and had illicit drug use (14/23, 60.9%). Ninety-eight percent reported having phone or computer video capability (data not shown).

### Acceptability

The median number of virtual group sessions attended was 2 (IQR 1, 7) and phone check-ins was 7 (IQR 1, 9) (Table 2). There was a wide range in weekly virtual group sessions attended: 0–1 ( $n = 5$ , 45.4%), 2–6 ( $n = 3$ , 27.3%), and 7–10 ( $n = 3$ , 27.3%). Phone check-ins completed ranged from 0 to 1 ( $n = 3$ , 27.3%), 2–6 ( $n = 2$ , 18.2%), and 7–10 ( $n = 6$ , 54.5%) (Figure 2). Satisfaction with the intervention was high with an average CSQ-8 score of 30.4 ( $SD = 1.6$ ) and a range of 27.0–32.0 (Table 2).

### Secondary Outcome: Fall

When controlling for whether a participant had a fall at pretest, the odds of reporting a fall at posttest was nonsignificantly lower in the intervention arm compared to controls (OR = 0.22; 95% CI: 0.02, 2.46) (Supplementary Table 2). There was a significant decrease in the proportion of the intervention group who experienced a fall from pretest ( $n =$



**Figure 1.** CONSORT Diagram.

9/12, 75%) to posttest ( $n = 4/11$ , 36.4%)  $p < .05$ ), whereas 46% (5/11) of the control group reported a fall at both pretest and posttest (Supplementary Table 2).

### Exploratory Outcomes: Substance Use

Intervention participants had significantly fewer days with any alcohol use IRR = 0.58 (95% CI: 0.35, 0.99). Parameter estimates for the other substance use outcomes were in the

expected direction but did not quite reach statistical significance; intervention participants had fewer days with heavy drinking (IRR 0.33; 95% CI: 0.11, 1.04) and with any illicit drug use (IRR 0.62; 95% CI: 0.21, 1.86).

### Discussion

The purpose of this study was to determine the feasibility and acceptability of a randomized OT virtual fall prevention

**Table I.** Baseline Study Sample Characteristics Overall and by Study Arm<sup>a</sup>.

Characteristics	Total sample <i>n</i> = 23	Study arm assignment	
		Intervention <i>n</i> = 12	Control <i>n</i> = 11
Age, mean (standard deviation)	58 (8)	57 (8)	58 (8)
Male sex	15 (65.2%)	8 (66.7%)	7 (63.6%)
Race/ethnicity			
White, non-Hispanic	7 (30.4%)	3 (25.0%)	4 (36.4%)
Black, non-Hispanic	13 (56.5%)	8 (66.7%)	5 (45.5%)
Hispanic or Latino	2 (8.7%)	1 (8.3%)	1 (9.1%)
Multiracial/Other	1 (4.3%)	0 (0.0%)	1 (9.1%)
Unemployed	21 (91.3%)	10 (83.3%)	11 (100.0%)
Lives alone	11 (47.8%)	5 (41.7%)	6 (54.5%)
At least one night in shelter or on street in past 6 months	3 (13.0%)	1 (8.3%)	2 (18.2%)
Body Mass Index			
Underweight (<18.5)	1 (4.5%)	1 (8.3%)	0 (0.0%)
Ideal/overweight (18.5 to <30)	12 (54.5%)	6 (50.0%)	6 (60.0%)
Obese ( $\geq 30$ )	9 (40.9%)	5 (41.7%)	4 (40.0%)
Immune suppression (CD4 <sup>b</sup> <200)	3 (13.0%)	1 (8.3%)	2 (18.2%)
HIV viral suppression (HVL < 200 copies)	18 (78.3%)	11 (91.7%)	7 (63.6%)
Any fear of falling <sup>c</sup> in past 6 months	14 (60.9%)	10 (83.3%)	4 (36.4%)
Frailty <sup>d</sup>			
Prefrail	12 (52.2%)	6 (50.0%)	6 (54.5%)
Frail	11 (47.8%)	6 (50.0%)	5 (45.5%)
SPPB <sup>e</sup> score			
<10	21 (91.3%)	12 (100.0%)	9 (81.8%)
10–12	2 (8.7%)	0 (0.0%)	2 (18.2%)
Any falls in past 6 months	19 (82.6%)	12 (100.0%)	7 (63.6%)
Number of falls in past 6 months			
0	4 (17.4%)	0 (0.0%)	4 (36.4%)
1	7 (30.4%)	3 (25.0%)	4 (36.4%)
2	3 (13.0%)	3 (25.0%)	0 (0.0%)
3 or more	9 (39.1%)	6 (50.0%)	3 (27.3%)
Low or very low food security <sup>f</sup> (2–6)	5 (22.7%)	3 (27.3%)	2 (18.2%)
Depressive symptoms <sup>g</sup>	14 (60.9%)	9 (75.0%)	5 (45.5%)
Any heavy drinking days <sup>h</sup> , past month	18 (78.3%)	10 (83.3%)	8 (72.7%)
Alcohol use disorder, past year	15 (65.2%)	8 (66.7%)	7 (63.6%)
Past month use:			
Any illicit drugs	14 (60.9%)	9 (75.0%)	5 (45.5%)
Marijuana	11 (47.8%)	7 (58.3%)	4 (36.4%)
Cocaine	6 (26.1%)	3 (25.0%)	3 (27.3%)
Illicit opioids <sup>i</sup>	3 (13.0%)	2 (16.7%)	1 (9.1%)
Sedatives	2 (8.7%)	1 (8.3%)	1 (9.1%)
Drug use disorder, past year	15 (65.2%)	9 (75.0%)	6 (54.5%)

<sup>a</sup>Number of participants (proportion of sample) unless otherwise specified. <sup>b</sup> Cells of differentiation. <sup>c</sup> Responded quite a bit or very much to question, "Have you been concerned with losing your balance and falling while doing your usual daily activities?" <sup>d</sup> Fried's frailty criteria. <sup>e</sup> Short physical performance battery. <sup>f</sup> U.S. Household Food Security Survey Module: Six-Item Short Form. <sup>g</sup> Center for Epidemiologic Studies Depression Scale score 10+. <sup>h</sup> Four or more drinks for women, five or more drinks for men, on one occasion. <sup>i</sup> Heroin, methadone, buprenorphine, other opioids.

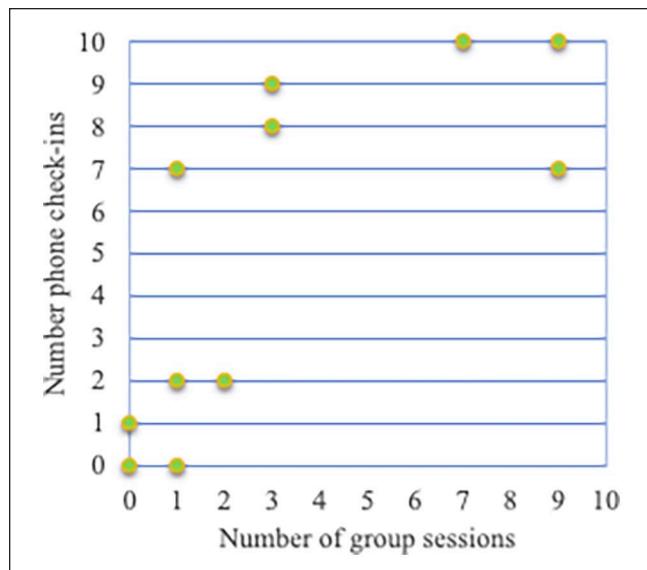
trial for PLWH at high risk of falling with any alcohol use. The trial was feasible in terms of recruitment and retention. Most individuals met eligibility criteria. Most ineligible

individuals met fall risk but not alcohol use criteria. Over half of those eligible agreed to enroll in a study requiring a relatively high level of commitment to participate in the

**Table 2.** Falls Pilot Intervention Group Participants' Weekly Attendance for Virtual Group Sessions and Phone Check-Ins.

Label	Minimum	25th percentile	Median	75th percentile	Maximum	Mean	SD
Number of virtual group sessions attended	0.0	1.0	2.0	7.0	9.0	3.3	3.4
Number of phone check-ins attended	0.0	1.0	7.0	9.0	10.0	5.1	4.1
CSQ-8 score <sup>a</sup>	27.0	29.0	31.0	32.0	32.0	30.4	1.6

<sup>a</sup>Client Satisfaction Questionnaire (Note that one participant had no follow-up data and one participant did not attend any group sessions).

**Figure 2.** Utilization of Group Sessions and Phone Check-Ins by Each Participant.

intervention. Most participants had access to a cell phone or computer with video capability. The high enrollment, randomization, retention, and completion rates suggest that the study design is feasible.

Acceptability as measured by engagement in two intervention components (virtual group sessions and phone check-ins) was mixed. There was a wide range of attendance for the virtual sessions and phone check-ins despite overall high reported satisfaction. High satisfaction might suggest that competing scheduling was a factor affecting engagement rather than interest in the intervention. One participant was randomized but never attended virtual sessions or phone check-ins. The gap between enrollment and randomization may have affected attendance. Because the pool was limited to participants enrolled in the Boston ARCH 4F study, it was not possible to recruit based on availability for specific times. Instead, groups were not scheduled until participants had enrolled and were randomized. One explanation for virtual session attendance rates is participants' changing schedules after randomization. The findings suggest that offering sessions virtually may not result in better attendance than

in-person groups and that adherence support for online interventions may still be needed.

Intentionality in implementing intervention components is critical (Blase & Fixen, 2013). We paired online virtual sessions with one-on-one phone check-ins because each component served a different purpose. Online virtual sessions provided emotional support, encouragement to pursue personal goals (e.g., minimize substance use), ideas for achieving goals, and a sense of social connection, which facilitates behavior change (Fleury & Lee, 2006). In contrast, one-on-one phone check-ins provided individualized support including personalized modifications for exercises and addressing questions privately.

There was comparatively higher attendance for one-on-one phone check-ins. Many factors could be involved, such as preference for the one-on-one format due to social anxiety and more flexibility in scheduling phone calls than attending a group session with a fixed time. It is possible that phone check-in attendance was higher than group session attendance because phone was easier to use than Zoom, although we were not aware of anyone experiencing technological problems connecting to Zoom. It is also possible that the intervention was potent enough with a 3- to 5-week format rather than 10.

### Secondary Outcomes

We obtained preliminary intervention effect estimates on our secondary outcomes to inform the consideration of a larger-scale randomized trial. Our intervention effect estimate suggests that intervention might be associated with a 78% reduction in their odds falling at posttest compared to controls. However, with a small sample size, our effect estimates had large confidence intervals, and all but one was not significant. The intervention effect estimate of fewer days of alcohol use was the one significant estimate. Overall, analyses of secondary outcomes were exploratory, given that we were not powered by design to detect statistically significant differences. Still, most parameter estimates were in the hypothesized direction.

Even in populations like PLWH who experience more falls relative to the rest of the population (Erlanson et al., 2016), preventing infrequent events such as falls is

a challenge (Ruchinskas, 2003). There were no significant differences in physical function and frailty, which is not unexpected, given that change in these outcomes occur over a longer period (Wilson et al., 2023).

The intervention was associated with less-frequent alcohol use for the intervention group. This suggests that addressing fall prevention may be one way to impact alcohol use. Fall prevention could be a harm reduction strategy not primarily focused on drinking, but rather on practical measures to mitigate fall risk. These approaches may educate and engage participants and mitigate stigma associated with discussions about alcohol use (Perera et al., 2022).

### **Strengths and Limitations**

This trial has several limitations. The CSQ-8 may be limited in assessing satisfaction because of ceiling effects (Pedersen et al., 2022). We do not have information about why participants did not attend more group sessions. We also do not know if results on recruitment, enrollment, and intervention participation are generalizable to other PLWH not already enrolled in a study on falls. Generalizability may be limited by the small sample size. The lack of manualization limits the replicability of the study.

Despite these limitations, our study has several strengths. This is one of the few randomized trials of a fall prevention intervention for PLWH. To our knowledge, there are very few, if any, randomized fall prevention intervention studies for people with alcohol use. The intervention is innovative in being delivered by OTs, online, based on mixed-methods data with PLWH. We used validated measures of falls, physical functioning, and alcohol use. The study sample resembled patients in a “real-world” setting, most of whom had an alcohol or drug use disorder and low socioeconomic resources, often not found in research settings.

### **Conclusions and Lessons Learned**

Findings support the feasibility and acceptability of a randomized trial of an online fall prevention OT intervention for PLWH at risk of a fall who consume alcohol. Future studies should consider modifications such as additional adherence support for group attendance, a prespecified target adherence rate, and reducing the number of group sessions. Preliminary analyses suggest a potential reduction in falls and alcohol use for this intervention. A larger-scale randomized trial powered to detect a reduction in falls is needed, given the elevated risk of falls and morbidity associated with falls among PLWH with alcohol use and the dearth of research on fall prevention interventions tailored for this high-risk group.

### **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.

### **Ethical Approval**

This study was approved by Institutional Review Board of Boston University Medical Campus, (approval Id. #H-41041).

### **Funding**

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was supported by the National Institutes of Health under Awards: U01AA020784, U24AA020778, U24AA020779, and UL1TR001430.

### **ORCID iD**

Simone V. Gill  <https://orcid.org/0000-0003-4019-1609>

### **Supplemental Material**

Supplemental material for this article is available online.

### **References**

- American Psychological Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.).
- Berner, K., Morris, L., Baumeister, J., & Louw, Q. (2017). Objective impairments of gait and balance in adults living with HIV-1 infection: A systematic review and meta-analysis of observational studies. *BMC Musculoskeletal Disorders*, 18, 325–351.
- Bernocchi, P., Giordano, A., Pintavalle, G., Galli, T., Ballini Spoglia, E., Baratti, D., & Scalfini, S. (2019). Feasibility and clinical efficacy of a multidisciplinary home-telehealth program to prevent falls in older adults: A randomized controlled trial. *Journal of the American Medical Directors Association*, 20(3), 340–346. <https://doi.org/10.1016/j.jamda.2018.09.003>
- Blase, K., & Fixen, D. (2013). *Core intervention components: Identifying and operationalizing what makes programs work*. <https://aspe.hhs.gov/reports/core-intervention-components-identifying-operationalizing-what-makes-programs-work-0>
- Bradley, K. A., McDonell, M. B., Bush, K., Kivlahan, D. R., Diehr, P., & Fihn, S. D. (1998). The AUDIT alcohol consumption questions: Reliability, validity, and responsiveness to change in older male primary care patients. *Alcoholism: Clinical and Experimental Research*, 22(8), 1842–1849. <https://doi.org/10.1111/j.1530-0277.1998.tb03991.x>
- Carlson, S. J., Andrews, M. S., & Bickel, G. W. (1999). Measuring food insecurity and hunger in the United States: development of a national benchmark measure and prevalence estimates. *The Journal of Nutrition*, 129(2), 510S–516S. <https://doi.org/10.1093/jn/129.2.510S>
- Cassimatis, I. R., Miller, E. S., Benes, L., Levesque, J., & Yee, L. M. (2021). Housing instability is associated with failure to achieve virologic control among pregnant individuals with HIV. *American Journal of Obstetrics & Gynecology MFM*, 3(5), 100406. <https://doi.org/10.1016/j.ajogmf.2021.100406>
- Chu, B., Liu, M., Leas, E. C., Althouse, B. M., & Ayers, J. W. (2021). Effect size reporting among prominent health journals: a case study of odds ratios. *BMJ Evidence-Based Medicine*, 26(4), 184–184. <https://doi.org/10.1136/bmjebm-2020-111569>
- Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., & Lancaster, G. A. (2016). CONSORT 2010 statement: Extension to randomised pilot and feasibility trials. *BMJ*, 355, Article i5239. <https://doi.org/10.1136/bmj.i5239>

- Erlandson, K. M., Allshouse, A. A., Jankowski, C. M., Duong, S., MaWhinney, S., Kohrt, W. M., & Campbell, T. B. (2012). Risk factors for falls in HIV-infected persons. *Journal of Acquired Immune Deficiency Syndromes*, 61(4), 484–489.
- Erlandson, K. M., Plankey, M. W., Springer, G., Cohen, H. S., Cox, C., Hoffman, H. J., Yin, M. T., & Brown, T. T. (2016). Fall frequency and associated factors among men and women with or at risk for HIV infection. *HIV Medicine*, 17(10), 740–748.
- Erlandson, K. M., Schrack, J. A., Jankowski, C. M., Brown, T. T., & Campbell, T. B. (2014). Functional impairment, disability, and frailty in adults aging with HIV-infection. *Current HIV/AIDS Reports*, 11, 279–290.
- Erlandson, K. M., Zhang, L., Ng, D. K., Althoff, K. N., Palella, F. J., Kingsley, L. A., Jacobson, L. P., Margolick, J. B., Lake, J. E., & Brown, T. T. (2019). Risk factors for falls, falls with injury, and falls with fracture among older men with or at risk of HIV infection. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 81(4), e117–e126. <https://doi.org/10.1097/QAI.00000000000002074>
- Farinatti, P. T., v Borges, J. P., Gomes, R. D., Lima, D., & Fleck, S. J. (2010). Effects of a supervised exercise program on the physical fitness and immunological function of HIV-infected patients. *Journal of Sports Medicine and Physical Fitness*, 50, 511–518.
- Fleury, J., & Lee, S. M. (2006). The social ecological model and physical activity in African American women. *American Journal of Community Psychology*, 37(1–2), 141–154. <https://doi.org/10.1007/s10464-005-9002-7>
- Fried, L. P., Tangen, C. M., Walston, J., Newman, A. B., Hirsch, C., Gottdiener, J., Seeman, T., Tracy, R., Kop, W. J., Burke, G., & McBurnie, M. A. (2001). Frailty in older adults: Evidence for a phenotype. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 56(3), M146–M157. <https://doi.org/10.1093/gerona/56.3.M146>
- Jacobson, C. L., Foster, L. C., Arul, H., Rees, A., & Stafford, R. S. (2021). A digital health fall prevention program for older adults: Feasibility study. *JMIR Formative Research*, 5(12), Article e30558. <https://doi.org/10.2196/30558>
- Jackson-Best, F., & Edwards, N. (2018). Stigma and intersectionality: a systematic review of systematic reviews across HIV/AIDS, mental illness, and physical disability. *BMC Public Health*, 18(1), Article 919. <https://doi.org/10.1186/s12889-018-5861-3>.
- Kalichman, S. C. (2023). Ending HIV hinges on reducing poverty. *AIDS and Behavior*, 27(1), 1–3. <https://doi.org/10.1007/s10461-022-03766-7>
- Kelly, P. J., Kyngdon, F., Ingram, I., Deane, F. P., Baker, A. L., & Osborne, B. A. (2018). The client satisfaction questionnaire-8: Psychometric properties in a cross-sectional survey of people attending residential substance abuse treatment. *Drug and Alcohol Review*, 37(1), 79–86. <https://doi.org/10.1111/dar.12522>
- Kim, D. J., Westfall, A. O., Chamot, E., Willig, A. L., Mugavero, M. J., Ritchie, C., Burkholder, G. A., Crane, H. M., Raper, J. L., Saag, M. S., & Willig, J. H. (2012). Multimorbidity patterns in HIV-infected patients: The role of obesity in chronic disease clustering. *Journal of Acquired Immune Deficiency Syndromes*, 61(5), 600–605.
- Kim, T. W., Walley, A. Y., Ventura, A. S., Patts, G. J., Heeren, T. C., Lerner, G. B., Mauricio, N., & Saitz, R. (2018). Polypharmacy and risk of falls and fractures for patients with HIV infection and substance dependence. *AIDS Care*, 30(2), 150–159.
- Lankowski, A. J., Siedner, M. J., Bangsberg, D. R., & Tsai, A. C. (2014). Impact of geographic and transportation-related barriers on HIV outcomes in sub-Saharan Africa: A systematic review. *AIDS and Behavior*, 18(7), 1199–1223. <https://doi.org/10.1007/s10461-014-0729-8>
- Law, M., Baptiste, S., McColl, M., Opzoomer, A., Polatajko, H., & Pollock, N. (1990). The Canadian occupational performance measure: An outcome measure for occupational therapy. *Canadian Journal of Occupational Therapy*, 57(2), 82–87. <https://doi.org/10.1177/000841749005700207>
- Markov, A., Chaabene, H., Hauser, L., Behm, S., Bloch, W., Puta, C., & Granacher, U. (2022). Acute effects of aerobic exercise on muscle strength and power in trained male individuals: A systematic review with meta-analysis. *Sports Medicine*, 1–14. <https://doi.org/10.1007/s40279-021-01615-6>
- McLellan, A. T., Kushner, H., Metzger, D., Peters, R., Smith, I., Grissom, G., Pettinati, H., & Argeriou, M. (1992). The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment*, 9(3), 199–213. [https://doi.org/10.1016/0740-5472\(92\)90062-S](https://doi.org/10.1016/0740-5472(92)90062-S)
- Morano, J. P., Clauson, K., Zhou, Z., Escobar-Viera, C. G., Lieb, S., Chen, I. K., KIrk, D., Carter, W. M., Ruppel, M., & Cook, R. L. (2019). Attitudes, beliefs, and willingness toward the use of mHealth tools for medication adherence in the Florida mHealth adherence project for people living with HIV (FL-mAPP): Pilot questionnaire study. *JMIR Mhealth Uhealth*, 7(7), 1–14.
- Pathai, S., Bahillian, H., Landay, A. L., & High, K. P. (2014). Is HIV a model of accelerated or accentuated aging? *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences*, 69(7), 833–842.
- Pedersen, H., Havnen, A., Brattmyr, M., Attkisson, C. C., & Lara-Cabrera, M. L. (2022). A digital Norwegian version of the client satisfaction questionnaire 8: Factor validity and internal reliability in outpatient mental health care. *BMC Psychiatry*, 22(1), Article 671. <https://doi.org/10.1186/s12888-022-04281-8>
- Perera, R., Stephan, L., Appa, A., Giuliano, R., Hoffman, R., Lum, P., & Martin, M. (2022). Meeting people where they are: Implementing hospital-based substance use harm reduction. *Harm Reduction Journal*, 19(1), Article 14. <https://doi.org/10.1186/s12954-022-00594-9>
- Ruchinskas, R. (2003). Clinical prediction of falls in the elderly. *American Journal of Physical Medicine & Rehabilitation*, 82(4), 273–278. <https://doi.org/10.1097/01.PHM.0000056990.35007.C8>
- Sharma, A., Hoover, D. R., Shi, Q., Holman, S., Plankey, M. W., Tien, P. C., Weber, K. M., Floris-Moore, M., Bolivar, H. H., Vance, D. E., Golub, E. T., Holstad, M. M., & Yin, M. T. (2018). Longitudinal study of falls among HIV-infected and uninfected women: The role of cognition. *Antiviral Therapy*, 23(2), 179–190. <https://doi.org/10.3851/IMP3195>
- Sharma, A., Hoover, D. R., Shi, Q., Holman, S., Plankey, M. W., Wheeler, A. L., Weber, K., Floris-Moore, M., Bolivar, H. H., Vance, D. E., Mack, W. J., Golub, E. T., Holstad, M. M., & Yin, M. T. (2016). Falls among middle-aged women in the

- women's interagency HIV study. *Antiviral Therapy*, 21(8), 697–706. <https://doi.org/10.3851/IMP3070>
- Shin, D., Gill, S. V., Kim, T. W., Magane, K. M., Mason, T., Heeren, T., Winter, M., Helfrich, C., & Saitz, R. (2022). Study protocol for a pilot randomized trial of a virtual occupational therapy fall prevention intervention for people with HIV and alcohol use. *Substance Abuse: Research and Treatment*, 16, Article 117822182211455. <https://doi.org/10.1177/11782218221145548>
- Stevens, J. A., & Phelan, E. A. (2013). Development of STEADI. *Health Promotion Practice*, 14(5), 706–714. <https://doi.org/10.1177/1524839912463576>
- Tinetti, M. E., Speechley, M., & Ginter, S. F. (1988). Risk factors for falls among elderly persons living in the community. *New England Journal of Medicine*, 319, 1701–1707.
- Treacy, D., & Hassett, L. (2018). The short physical performance battery. *Journal of Physiotherapy*, 64(1), Article 61. <https://doi.org/10.1016/j.jphys.2017.04.002>
- Welch, S. A., Ward, R. E., Beauchamp, M. K., Leveille, S. G., Travison, T., & Bean, J. F. (2021). The short physical performance battery (SPPB): A quick and useful tool for fall risk stratification among older primary care patients. *Journal of the American Medical Directors Association*, 22(8), 1646–1651. <https://doi.org/10.1016/j.jamda.2020.09.038>
- Wilson, D., Driller, M. W., Johnston, B., & Gill, N. D. (2023). A contactless app-based intervention to improve health behaviors in airline pilots: A randomized trial. *American Journal of Preventive Medicine*, 64(5), 666–676. <https://doi.org/10.1016/j.amepre.2022.12.011>
- Womack, J. A., Murphy, T. E., Rentsch, C. T., Tate, J. P., Bathulapalli, H., Smith, A. C., Bates, J., Jarad, S., Gibert, C. L., Rodriguez-Barradas, M. C., Tien, P. C., Yin, M. T., Gill, T. M., Friedlaender, G., Brandt, C. A., & Justice, A. C. (2019). Polypharmacy, hazardous alcohol and illicit substance use, and serious falls among PLWH and uninfected comparators. *Journal of Acquired Immune Deficiency Syndromes*, 82(3), 305–313.