

Supportive-Expressive and Coping Group Teletherapies for HIV-Infected Older Adults: A Randomized Clinical Trial

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Abstract This clinical trial tested whether telephone-administered supportive-expressive group therapy or coping effectiveness training reduce depressive symptoms in HIV-infected older adults. Participants from 24 states ($N = 361$) completed the Geriatric Depression Scale at pre-intervention, post-intervention, and 4- and 8-month follow-up and were randomized to one of three study arms: (1) 12 weekly sessions of telephone-administered, supportive-expressive group therapy (tele-SEGT; $n = 122$); (2) 12 weekly sessions of telephone-administered, coping

effectiveness training (tele-CET; $n = 118$); or (3) a standard of care (SOC) control group ($n = 121$). Tele-SEGT participants reported fewer depressive symptoms than SOC controls at post-intervention ($M_{\text{SEGT}} = 11.9$, $M_{\text{SOC}} = 14.3$) and 4- ($M_{\text{SEGT}} = 12.5$, $M_{\text{SOC}} = 14.4$) and 8-month follow-up ($M_{\text{SEGT}} = 12.7$, $M_{\text{SOC}} = 14.5$) and fewer depressive symptoms than tele-CET participants at post-intervention ($M_{\text{SEGT}} = 12.4$, $M_{\text{CET}} = 13.6$) and 8-month follow-up ($M_{\text{SEGT}} = 12.7$, $M_{\text{CET}} = 14.1$). Tele-CET participants reported no statistically significant differences from SOC controls in GDS values at any assessment period. Tele-SEGT constitutes an efficacious treatment to reduce depressive symptoms in HIV-infected older adults.

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Abbreviations

AIDS	Acquired immunodeficiency syndrome
ANOVA	Analysis of variance
ASOs	AIDS service organizations
CET	Coping effectiveness training
GDS	Geriatric depression scale
GEE	Generalized estimating equations
FU	Follow-up
HAART	Highly active antiretroviral therapy
HIV	Human immunodeficiency virus
IRB	Institutional review board
MSM	Men who have sex with men
PTSD	Post-traumatic stress disorder
RCT	Randomized clinical trial
SEGT	Supportive-expressive group therapy
SOC	Standard of care

Introduction

Through 2010, slightly more than 1.1 million Americans had been diagnosed with AIDS [1]. Of these, 155,642 (or 13.8 %) were 50 years of age or older at the time of their AIDS diagnosis. In 2009, the rates of persons living with a diagnosis of HIV infection who were 50–54 years of age (568/100,000) or 55–59 years of age (409/100,000) actually exceeded the rate of persons living with a diagnosis of HIV infection between the ages of 30–34 years of age (336/100,000; [2]). Because of continued risky sex in HIV-infected older adults [3] and extended periods of survival due to increasingly efficacious antiretroviral regimens and improved clinical care [4], over 50 % of persons living with HIV/AIDS in the United States in 2015 will be 50 years of age or older [5].

HIV-infected older adults have complex medical and mental health needs. Compared to their younger counterparts, HIV-infected older adults tend to be diagnosed later in the course of their HIV disease, experience greater cognitive compromise, have significantly lower CD4 cell counts and higher plasma viral loads at the time of their HIV-serostatus identification, and survive for shorter periods of time after progressing to AIDS [6, 7]. HIV-infected older adults also experience more comorbid health conditions (e.g., cardiovascular, liver, and renal diseases) than HIV-infected younger persons [8].

Grov et al. [9] found that 39 % of community-dwelling HIV-infected older adults exhibited symptoms of major depressive disorder, while Kalichman et al. [10] found that 27 % of HIV-infected older adults had considered taking their own life in the past week. At the same time, HIV-infected older adults have fewer social supports, surviving peers, and family members to care for them, conditions likely to exacerbate already elevated levels of psychosocial distress in this group [11].

In addition to living with comorbid health conditions, many HIV-infected older adults have significant confidentiality concerns or are geographically-isolated from traditional mental health resources (e.g., support groups; [12]). Hence, face-to-face interventions may be impractical for some members of this group. Mental health support services delivered via teleconference technology (teletherapy) may reach large numbers of psychologically- and geographically-distant HIV-infected older adults.

Teletherapy has been used successfully with patients with schizophrenia [13], obsessive compulsive disorder [14], agoraphobia [15], and PTSD [16] and has delivered care to persons in numerous settings, including patients' homes, hospital emergency rooms, nursing homes, and hospice [17]. Teletherapy also has considerable efficacy in the treatment of depressive disorders. Mohr et al.'s [18] meta-analysis found significant reductions in depressive

symptoms across all assessment periods for patients enrolled in telephone-administered psychotherapy compared to standard of care controls ($d = 0.26$); even greater symptomatic reductions were found when analyses were limited to changes from pre- to post-intervention ($d = 0.82$). A recent trial found telephone psychotherapy for depression to be equivalent to face-to-face psychotherapy at post-treatment; telephone psychotherapy also evidenced significantly lower attrition [19]. Within the domain of HIV/AIDS, teletherapy has reduced HIV transmission risk behaviors in HIV-positive older adults, HIV-positive rural persons, and HIV-seropositive and seronegative men who have sex with men (MSM; [20–22]), increased HAART adherence [23, 24], and reduced cigarette smoking [25].

Teletherapies for psychological treatments tend to be adaptations of existing treatments that are efficacious in face-to-face interactions and that lend themselves to telephone administration. Coping effectiveness training and supportive-expressive group therapy are two such treatments.

Face-to-face coping effectiveness training (CET) has successfully reduced depressive and psychiatric symptoms, improved quality of life, increased HAART adherence, and reduced alcohol and illicit substance use in HIV-infected persons [21, 26, 28, 29]. In a recently completed randomized clinical trial, Heckman and colleagues ([30]; $N = 295$) found that face-to-face coping effectiveness group training for HIV-infected persons 50-plus years of age produced greater reductions in depressive symptoms than treatment as usual. Moreover, in a pilot RCT ([31]; $N = 90$), telephone-based and age-contextualized coping effectiveness group training resulted in fewer psychological symptoms, lower levels of life-stressor burden, less frequent use of passive-maladaptive coping, and increases in coping self-efficacy in HIV-infected older adults compared to treatment as usual.

Supportive-expressive group therapy (SEGT; [32]) enables individuals to improve relationships with family members, friends, and physicians and express feelings about important existential issues, such as death, isolation, and loss of freedom, issues likely to affect many persons living with a chronic illness, such as HIV/AIDS. SEGT encourages people with life-threatening conditions to discuss these and other existential issues. SEGT has improved affect, reduced pain intensity, improved social functioning, and enhanced life quality in women with breast and ovarian cancer [33, 34]. In persons with HIV/AIDS, SEGT has reduced depression, psychiatric symptoms (e.g., anxiety, hostility, somatization), and unprotected intercourse in men [35] and increased CD4 cell counts and decreased viral loads in a mixed-gender sample [36]. Other research has not confirmed the efficacy of SEGT. Weiss et al. [37] found SEGT to be no more helpful in improving psychosocial well-being in HIV-infected gay men than an education-

only control condition. A large multi-site trial found SEG T to be ineffective for patients with systemic lupus erythematosus [38] and it was less efficacious than individual cognitive behavioral therapy for the treatment of depression in persons with multiple sclerosis [39].

This clinical trial tested whether telephone-based CET (tele-CET) and telephone-based SEG T (tele-SEG T), two treatments typically administered in face-to-face group settings, reduced depressive symptoms in HIV-infected older adults with elevated depressive symptoms. It was hypothesized that participants in the two active group teletherapies would report greater reductions in depressive symptoms through follow-up than participants receiving SOC.

Methods

Participants and Procedures

Between June 2008 and January 2010, AIDS service organizations (ASOs) in 24 states recruited participants into the RCT by distributing recruitment brochures to their HIV-infected clients through face-to-face interactions, regular mail, and by placing brochures in “high-traffic” areas of their facilities (e.g., reception areas). Participants were recruited through ASOs in Arkansas, California, Delaware, Florida, Georgia, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Texas, Washington and Wisconsin. Recruiting participants from these 24 states enabled the study team to assemble a sufficiently large sample that better generalized to older adults living with HIV/AIDS in the United States. The university’s IRB approved the project’s protocol, written informed consent was obtained from all participants, and no adverse events were reported during the trial.

Potential participants contacted the research office via a toll-free telephone number or a project-specific e-mail address listed in the recruitment brochure. During this initial contact, research staff scheduled a 30-min appointment to conduct a telephone-based, eligibility screening interview. The primary instrument in the screening interview was the Geriatric Depression Scale (GDS; [40]). Each of the 30 GDS items used a “yes–no” response scale to assess feelings of depression over the past week (potential range = 0–30). Advantages of the GDS over the Beck Depression Inventory included its simple yes/no response format (which translated well over the telephone environment) and the absence of somatically-oriented items. Summed GDS scores are categorized as: No Depression [0–9]; Mild [10–20]; and Moderate-to-Severe [21–30].

All participants satisfied the following inclusion criteria: (i) 50 years of age or older; (ii) self-reported diagnosis of HIV infection or AIDS; (iii) a GDS score ≥ 10 at eligibility screening; and (iv) reliable access to a land-based or cellular telephone for the next 12 weeks. A threshold GDS value of 10 was used to ensure that participants had a sufficient number of depressive symptoms that could potentially respond to treatment. To assemble a more externally-valid sample, individuals were not excluded on the basis of alcohol or substance use disorders, active bipolar disorder, psychotic symptoms, or current receipt of psychotherapy or pharmacotherapy.

Assessment Instrument

Participants were mailed a self-administered, pre-intervention assessment and a self-addressed postage-paid envelope to return the survey. Participants completed the survey in approximately 1 h in their place of residence. The incentive payment schedule for each assessment was pre-intervention = \$40, post-intervention = \$50, 4-month follow-up (FU) = \$50, and 8-month FU = \$60. The study’s post-intervention assessment was administered immediately after the final intervention session, the 4-month follow-up was administered four months after the post-intervention assessment, and the 8-month follow-up was administered eight months after the post-intervention assessment. Measures used in intervention-outcome analyses are described below.

Geriatric Depression Scale (GDS)

The GDS was the study’s primary outcome measure. The GDS demonstrated good internal consistency and test-retest reliability (r_{tt}) in the study ($\alpha = 0.87$ based on all participants; $r_{tt} = 0.75$, $p < 0.001$ based on pre- and post-intervention GDS values from SOC controls).

Mental Health and Substance Use Services Utilization Scale

This retrospective recall scale collected information on whether the participant had received treatment for: (i) substance use problems in the past four months (e.g., individual therapy, group therapy, 12-step programs); or (ii) psychological difficulties in the past four months (e.g., individual therapy, group therapy).

Therapy Study Arms

A priori power analyses, informed by data obtained in previous research with HIV-infected older adults [31], indicated that 80 participants per study arm were needed to

achieve power of 0.80 or greater to detect meaningful changes in GDS values in outcome analyses that used generalized estimating equations (GEE).

Standard of Care (SOC) Comparison Study Arm

SOC participants received no active treatment but had access to community-based support services commonly available to people living with HIV/AIDS, such as AIDS-related support groups, “12-step” programs, and individual therapy.

Telephone Coping Effectiveness Training (Tele-CET) + SOC

This manualized intervention offered participants twelve 90 min sessions of telephone-administered coping effectiveness training. Groups of six to eight individuals participated in the intervention exclusively through teleconference technology. All tele-CET groups were facilitated by two co-therapists with Masters- or Ph.D.-level credentials. This study arm utilized separate therapy groups for MSM, heterosexual men, and women. The therapy was based on Lazarus and Folkman’s [41] Transactional Model of Stress and Coping and used cognitive-behavioral principles to appraise stressor severity; develop problem- and emotion-focused coping skills; determine the match between coping strategies and stressor controllability; and optimize coping through use of social supports. This therapy was selected for use with HIV-infected older adults given its established efficacy in previous face-to-face trials of AIDS mental health interventions [26–30] and because a pilot test of this treatment had produced significant reductions in psychiatric symptoms in HIV-infected older adults [31].

Telephone Supportive-Expressive Group Therapy (Tele-SEGT) + SOC

Similar to the tele-CET study arm, this manualized intervention consisted of twelve 90 min sessions, assembled six to eight participants per group, solely utilized teleconference technology, and was led by two co-therapists with Masters- or Ph.D.-level credentials. Separate groups were conducted for MSM, heterosexual men, and women. Dr. David Spiegel’s laboratory provided a copy of its “Supportive-Expressive Group Intervention Manual” which was contextualized by our research team for use with HIV-infected older adults. Using principles derived from humanistic psychology, including fostering empathy and positive regard, therapist transparency, and maintaining a present-moment focus, the adapted therapy asked participants to explore their feelings about (i) the

difficulties associated with normal aging, (ii) being HIV-positive, and (iii) living with HIV/AIDS as an older adult. This therapy was selected for use in the RCT because of its demonstrated efficacy [32] and its widespread use in clinical settings. Throughout the 12 sessions, group co-therapists sought to: (i) facilitate mutual support among group members; (ii) improve social and family support; (iii) encourage greater openness and emotional expressiveness both within and outside the group; (iv) integrate a changed self and body image into the person’s view of self; (v) improve doctor-patient relationships; (vi) detoxify feelings around death and dying; (vii) develop a life project; and (viii) define and enhance one’s quality of life.

General Procedures Across the Two Group Teletherapy Study Arms

Both teletherapies used “reserved conference calls” that began with each participant calling into a toll free telephone number at a prearranged time. Participants were then connected with the group’s co-therapists and other group members. Our past research with HIV-infected persons found that participants prefer the option of calling into the therapy session as opposed to being telephoned by research staff; this enables participants to phone in from any location. To ensure consistent attendance, participants received telephone reminder calls the day before their scheduled session.

Prior to starting a new teletherapy group, research staff contacted participants and reviewed program objectives, outlined services that participants could expect to receive, and discussed possible benefits and risks associated with the program. An important part of this preliminary call was to discuss the setting in which the individual participated in group teletherapy. Research staff emphasized that the setting should be extremely private, call waiting should not be utilized during phone sessions (except in a possible emergency), therapy sessions should be scheduled when few outside telephone calls or interruptions were anticipated, and participants should not partake in teletherapy through cell phones when driving.

Therapist Training and Supervision

Unlike many clinical trials, no centralized or formal training of group teletherapists was conducted. Similar to study participants, group teletherapists were located in various regions of the United States. The research office mailed the appropriate intervention manual to each therapist (therapists administered only one therapy to reduce the threat of crossover) and asked him/her to review the manual prior to conducting teletherapy. We purposely employed this approach because, in all likelihood, this is

how many manualized teletherapies are (and will be) disseminated to community-based agencies for use in community settings. This approach was chosen to increase the external validity of the teletherapies tested in this RCT.

Our research team did provide telephone-based supervision for teletherapists. 1 h of individual tele-supervision for therapists in both the tele-SEGT and tele-CET study arms was provided per month. The intent of tele-supervision was to (i) provide therapists with an opportunity to discuss their administration of the therapy, (ii) enable therapists to discuss any clinical concerns they had, and (iii) permit the supervisor (a licensed clinical psychologist) to ensure that therapists administered the manualized treatment with fidelity. At the completion of each teletherapy session, therapists completed a “Therapy Content Checklist” to ensure that teletherapy content was covered.

Randomization and Participant Flow

After completing a pre-intervention measure, participants were randomly assigned to a study arm using a 1:1:1 assignment ratio. Participants were recruited in waves of 24 (e.g., 24 men who had sex with men, 24 heterosexual men, and 24 women) and assigned randomly to one of three study arms (i.e., eight participants per study arm) using a computerized random numbers algorithm. Teletherapists

were not blinded to the study arm to which the participant had been assigned but were blinded to data participants provided in their pre-intervention assessments. Participants were not blinded to their experimental study arm. The study’s research office received 796 telephone contacts from individuals inquiring into the study, 607 of whom returned signed informed consent forms. Of these 607 individuals, 533 were screened for potential enrollment into the study and 361 satisfied inclusion criteria and enrolled into the study (please see Fig. 1 for participant flow through the study).

Data Analysis Plan

Chi squared tests of association and one-way ANOVA compared demographic, clinical, and pre-intervention GDS values across study arms and compared participants who completed assessment instruments at post-intervention, 4-month follow-up, and 8-month follow-up to those who did not complete assessments. Chi squared tests of association and post hoc z-tests of independent proportions examined differences across study arms in the proportion of participants who utilized supportive services outside of the RCT’s protocol. One-way ANOVA compared the number of teletherapy sessions completed by tele-SEGT and tele-CET participants. Linear regression examined the

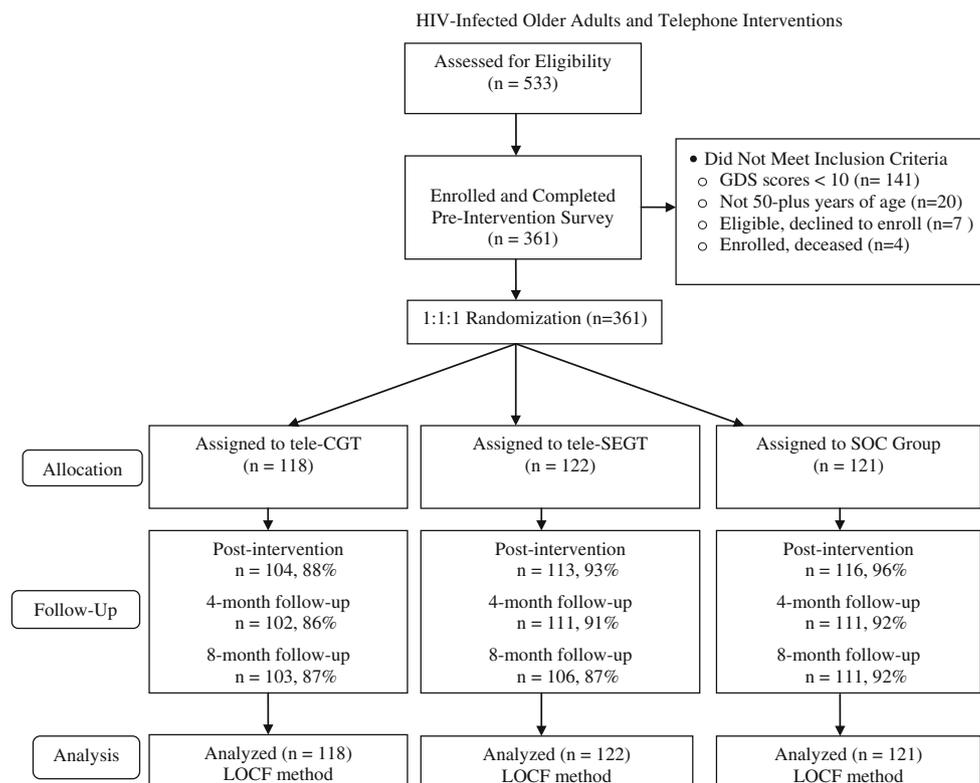


Fig. 1 The CONSORT flowchart of study participants. *SOC* standard of care, *LOCF* last observation carried forward

relationship between number of therapy sessions attended and GDS values at post-intervention and 4- and 8-month follow-up as well as changes in GDS values from pre- to post-intervention. Linear regression also examined the relationship between pre-intervention GDS values and changes in GDS values from pre- to post-intervention.

Longitudinal changes in depressive symptoms were modeled using GEEs. GEEs account for correlated data due to multiple assessments of individual participants in longitudinal study designs [42]. GEE models estimated the effects of (1) “Time” (not reported), (2) “Study Arm” (not reported), and (3) the “Time x Study Arm” interaction. Cohen’s *d* measured the effect size of mean differences in GDS values between treatment study arms. A GEE analysis was first conducted using data from all participants (an intent-to-treat approach) and then re-conducted using only data from participants who reported mild, moderate, or severe depressive symptoms at pre-intervention. Z-tests of independent proportions compared the proportion of participants who reported 50 % or greater reductions in depressive symptoms from pre-intervention through post-intervention and pre-intervention through 8-month follow-up. For missing data, a last-observation-carried-forward data imputation strategy was used [43]. All inferential analyses employed 2-tailed tests of significance and $\alpha = 0.05$.

Results

Study Cohort

Participants were similar across study arms on pre-intervention demographic and clinical variables (see Table 1). The mean GDS value at pre-intervention for all participants was 15.0 (SD = 7.4). Based on GDS cutoffs, 40 % had “mild” depression (GDS scores of 10–19) and 33 % had “moderate-to-severe” depressive symptoms (GDS scores of 20–30).

In terms of accessing SOC services independent of the RCT, comparable proportions of tele-CET (22 %), tele-SEGT (18 %), and SOC controls (17 %) received treatment for substance use in the past 4 months, $\chi^2(2) = 0.7$, $p = 0.71$. A marginally significant association was found between study arm and receipt of psychological services outside of the RCT. Specifically, 53 % of tele-CET, 40 % of tele-SEGT, and 36 % of SOC controls received psychological services in the 4 months prior to the pre-intervention assessment, $\chi^2(2) = 5.57$, $p = 0.06$. Post-hoc z-tests of independent proportions found that a greater proportion of tele-CET participants received treatment for psychological problems outside of the study’s protocol than did SOC controls, $z = 2.76$, $p = 0.01$.

Table 1 Demographic, clinical, and psychiatric characteristics at pre-intervention by treatment condition [mean \pm SD or % (*n*)]

Variable	Overall (<i>N</i> = 361)	Tele-CET (<i>n</i> = 118)	Tele-SEGT (<i>n</i> = 122)	SOC control (<i>n</i> = 121)
Age	59.0 \pm 5.1	58.8 \pm 5.4	59.5 \pm 4.9	58.7 \pm 5.0
Gender/sexual orientation				
MSM	41 % (149)	44 % (52)	37 % (45)	43 % (52)
Heterosexual men	20 % (71)	19 % (22)	15 % (18)	26 % (31)
Women	39 % (141)	37 % (44)	48 % (59)	31 % (38)
Race				
Caucasian	23 % (83)	24 % (28)	20 % (24)	26 % (31)
African-American	59 % (214)	57 % (67)	62 % (76)	59 % (71)
Latino/latina	11 % (39)	13 % (15)	10 % (12)	10 % (12)
Other/multi-racial	7 % (25)	7 % (8)	8 % (10)	6 % (7)
Annual household income				
\leq \$10,000	59 % (214)	58 % (68)	66 % (81)	54 % (65)
\$10,001–\$20,000	30 % (107)	28 % (33)	25 % (31)	36 % (43)
\$20,001–\$30,000	8 % (27)	10 % (12)	5 % (6)	7 % (9)
$>$ \$30,000	3 % (12)	3 % (4)	3 % (4)	3 % (4)
Years of education	12.7 \pm 2.2	12.9 \pm 2.4	12.7 \pm 2.1	12.6 \pm 2.2
Years with HIV	18.0 \pm 5.8	17.7 \pm 5.7	18.7 \pm 6.0	17.5 \pm 5.6
Progressed to AIDS	56 % (201)	55 % (65)	59 % (71)	54 % (65)
Taking HAART	83 % (299)	79 % (93)	84 % (103)	86 % (103)
Substance abuse Tx in the past 4 months	19 % (69)	22 % (26)	18 % (22)	17 % (21)
Psychological Tx in the past 4 months	43 % (155)	53 % (62)	40 % (49)	36 % (44)
GDS score at pre-intervention	15.0 \pm 7.4	15.5 \pm 7.4	15.7 \pm 6.9	13.7 \pm 7.9

Treatment Participation by Study Arm

Tele-CET ($M = 6.4$, $SD = 4.6$) and tele-SEGT participants ($M = 7.4$, $SD = 4.4$) attended a similar number of teletherapy sessions, $F(1, 238) = 2.64$, $p = 0.11$. After controlling for pre-intervention GDS scores, number of therapy sessions attended was negatively related to GDS score in tele-CET and tele-SEGT participants at post-intervention ($B = -0.31$, $p = 0.01$), 4-month follow-up ($B = -0.17$, $p = 0.02$), and 8-month follow-up ($B = -0.18$, $p = 0.02$). HIV-infected older adults with fewer depressive symptoms participated in a greater number of teletherapy sessions.

Participant Attrition and Missing Outcome Data

Of the 361 participants enrolled, 333 (92 %) completed the post-intervention assessment, 324 (90 %) completed the 4-month follow-up assessment, and 320 (89 %) completed the 8-month follow-up assessment. Across all assessment periods, responders did not differ from non-responders by study arm or on any pre-intervention demographic, clinical, or psychiatric outcome variable (all p 's > 0.05).

Among participants who completed pre-intervention, post-intervention, 4-month follow-up, and 8-month follow-up assessments, some did not respond to all GDS items, thus precluding the calculation of a summative score for the primary outcome variable: pre-intervention ($n = 11$ non-completers), post-intervention ($n = 7$ non-completers), 4-month follow-up ($n = 3$ non-completers), 8-month follow-up ($n = 7$ non-completers). GDS completers did not differ from GDS non-completers by study arm or on any clinical variable across all assessments (all p 's > 0.10). However, at pre-intervention, GDS completers were significantly younger ($M = 58.9$ years) than non-completers (63.5 years), $F(1, 359) = 8.86$, $p < 0.01$.

Changes in Depressive Symptoms by Study Arm Across Assessment Period

Consistent with intent-to-treat principles, all randomized participants were included in the initial outcome analysis. A significant "Time x Study Arm" interaction was found

for GDS values, Wald $\chi^2(6) = 20.04$, $p < 0.01$. As Tables 2 and 3 illustrate, GDS values at post-intervention were significantly lower for tele-SEGT participants than SOC controls and tele-CET participants. Tele-CET participants did not differ from SOC controls at post-intervention. At 4-month follow-up, tele-SEGT participants had significantly lower GDS values than SOC controls and marginally lower GDS values than tele-CET participants. Tele-CET participants did not differ on GDS values from SOC controls at 4-month follow-up. At 8-month follow-up, tele-SEGT participants had significantly lower GDS values than both SOC controls and tele-CET participants, while tele-CET participants did not differ from SOC controls.

Post-hoc analyses were conducted to test if reductions in depressive symptoms from pre- through post-intervention (i.e., pre-intervention GDS minus post-intervention GDS) were associated with number of teletherapy sessions attended or GDS values at pre-intervention. For T-SEGT participants, the mean GDS reduction from pre- to post-intervention was 3.19 ($SD = 4.96$). Tele-SEGT participants who attended a greater number of teletherapy sessions reported greater reductions in GDS values from pre- through post-intervention ($B = 0.23$, $p = 0.04$). Among tele-CET participants, the mean GDS reduction from pre- to post-intervention was 0.75 ($SD = 5.77$). Although this difference score was not significant, tele-CET participants who attended more teletherapy sessions reported greater reductions in GDS values from pre- through post-intervention ($B = 0.34$, $p < 0.01$).

In terms of GDS values at pre-intervention, tele-SEGT participants who initiated teletherapy with greater GDS values reported greater reductions in GDS values from pre- through post-intervention ($B = 0.42$, $p < 0.01$). Similarly,

Table 2 Geriatric depression scale estimated marginal means by assessment period and condition; mean (SE)

Intervention condition	Post-intervention	4-month follow-up	8-month follow-up
Tele-CET	14.36 (0.47)	13.63 (0.46)	14.07 (0.49)
Tele-SEGT	11.94 (0.47)	12.45 (0.46)	12.67 (0.50)
SOC control	14.34 (0.47)	14.39 (0.46)	14.48 (0.50)

Table 3 Post-hoc comparisons and effect sizes between treatment conditions across assessment periods

	Post-intervention			4-month follow-up			8-month follow-up		
	B	P	d	B	P	d	B	P	d
Tele-CET versus SOC	0.02	0.99		-0.75	0.25		-0.42	0.56	
Tele-SEGT versus SOC	-2.40	0.01	0.46	-1.94	0.01	0.38	-1.82	0.01	0.33
Tele-SEGT versus tele-CET	-2.41	0.01	0.47	-1.19	0.07		-1.40	0.05	0.26

"d" not shown for non-significant pairwise comparisons

tele-CET participants who reported more depressive symptoms at pre-intervention reported greater reductions in depressive symptoms from pre- through post-intervention ($B = 0.42$, $p < 0.01$).

Outcome Analyses for Participants with Mild to Severe Depression

Some participants (28 tele-CET, 32 tele-SEGT, and 44 SOC participants) who reported GDS values of 10 or greater at eligibility screening reported GDS values of 10 or lower on pre-intervention assessments. All of these participants were included in outcome analyses presented above (i.e., full sample analyses). Because this study sought to determine whether the two teletherapies could reduce depressive symptoms in HIV-infected older adults with more serious depressive symptomatology, intervention outcome analyses were re-conducted using data only from participants with pre-intervention GDS values of 10 or greater (i.e., only participants with at least “mild” depression; the reduced sample). Reduced sample results were the same as full sample results with two exceptions. In reduced sample analyses, tele-SEGT participants reported marginally fewer depressive symptoms than (i) SOC controls at 4-month follow-up ($B = -1.45$, $p = 0.08$), and (ii) tele-CET participants at 8-month follow-up ($B = -1.47$, $p = 0.07$). In full sample analyses, both of these comparisons had been significant at $p < 0.05$. It is likely that the differences between the two sets of analyses were due to decreased power associated with the smaller sample size in the reduced sample analysis.

Proportion of Participants Who Responded Favorably to Therapy

The proportion of the 361 participants randomized to study arm (i.e., the full sample) who reported 50 % or greater reductions in GDS scores from pre-intervention to post-intervention and from pre-intervention to 8-month follow-up was calculated. A reduction of 50 % or more in depressive symptoms has been used as a binary outcome variable in prior research to determine the proportion of participants who “responded” to a therapy [44].

From pre- to post-intervention, 20.7 % of tele-SEGT, 14.5 % of tele-CET, and 10.4 % of SOC control participants responded. No differences in response rates were observed across the three study arms (all p 's > 0.10). From pre-intervention to 8-month follow-up, the proportions of responders were: tele-SEGT (25.0 %); tele-CET (10.3 %); and SOC controls (10.3 %). Significantly more tele-SEGT participants responded favorably compared to SOC controls, $z = 2.35$, $p = 0.02$, and tele-CET participants, $z = 2.35$, $p = 0.02$. No differences were observed between tele-CET

and SOC controls in response from pre-intervention to 8-month follow-up ($p = 0.98$).

Discussion

As continued high rates of risky sexual behavior and longer survival periods yield a greater number of older adults living with HIV/AIDS—many of whom will be diagnosed with depressive disorders—mental health interventions contextualized for this group are urgently needed. This is the first RCT to test whether empirically-validated group psychotherapies administered using teleconference technology reduce depressive symptoms in HIV-infected middle-aged and older adults. At post-intervention and both follow-ups, HIV-infected older adults who participated in tele-SEGT reported significantly fewer depressive symptoms than participants who had access to community-based services available to HIV-infected older adults. Post-hoc analyses found that tele-SEGT was particularly efficacious for participants who attended a greater number of teletherapy sessions and who initiated teletherapy with elevated depressive symptomatology. Conversely, at post-intervention and 4- and 8-month follow-up, HIV-infected older adults who participated in tele-CET reported depressive symptoms that were comparable to their peers who had access to only community-based SOC services.

The finding that tele-SEGT produced statistically significant reductions in depressive symptoms compared to SOC controls across all assessment periods is consistent with several studies showing that face-to-face SEGT improved psychosocial functioning in women with cancer [33, 34]. The efficacy of tele-SEGT in the current study contradicts Weiss et al.'s [37] report that face-to-face SEGT and education-only treatments produced comparable changes in psychosocial functioning in HIV-infected gay men. Differences in intervention outcomes between this study and that of Weiss et al. [37] may be due, at least in part, to the fact that participants in the Weiss et al. [37] study had relatively lower levels of depressive symptoms at baseline (71 % reported BDI values < 14). In addition, Weiss et al.'s sample consisted exclusively of gay men, while the current study assembled a more heterogeneous sample in terms of sexual identity.

In the current study, tele-CET yielded very modest reductions in depressive symptoms in HIV-infected older adults. Tele-CET participants reported significantly more depressive symptoms at post-intervention and 8-month follow-up than tele-SEGT participants. The inability of tele-CET to reduce depressive symptoms in this sample relative to SOC unexpectedly contradicted findings from our pilot RCT of tele-CET for HIV-infected older adults [31].

In the current clinical trial, 25 % of tele-SEGT participants reported 50 % or greater reductions in depressive symptoms from pre-intervention through 8-month follow-up. This rate is lower than those reported in other RCTs of teletherapy. For example, Ruskin and colleagues [44] found that 49 % of patients who received telepsychiatric services for depression reported ≥ 50 % reductions in depressive symptoms. Similarly, Ransom and colleagues [45] found that 39 % of HIV-infected rural persons who received telephone-administered interpersonal psychotherapy reported clinically-meaningful or reliable reductions in depressive symptoms. The 25 % of tele-SEGT participants who responded favorably to treatment in the current study is, however, comparable to recovery rates reported in the NIMH Treatment of Depression Collaborative Research Program [46]. In the NIMH Collaborative Program, 30 % of participants who received cognitive behavior group therapy and 26 % who received interpersonal group therapy recovered from depression. It is possible that the lower rate of responders in the current RCT compared to Ruskin and colleagues [44] and Ransom and colleagues [45] occurred because the current RCT used a group format while the aforementioned studies [44, 45] used an individual format.

This study had several limitations. All participants were recruited through AIDS-related organizations and, as such, had access to at least some HIV-related services. Future research should include larger numbers of HIV-infected older adults who are less well connected with social service organizations and likely to have even more serious psychosocial needs. Approximately one-half of participants were receiving concurrent mental health treatments independent of the study's protocol, such as participation in individual therapy, group therapy, and/or 12-step programs. Some gains reported by participants may be attributable to these outside services and not the study's interventions. Many participants attended teletherapy sessions only infrequently; 26 % of tele-SEGT and 39 % of tele-CET participants attended 4 or fewer of the 12 sessions. While many teletherapy groups began with 6–8 participants, high rates of therapy attrition resulted in some groups functioning with as few as three to four members. As Yalom [47] cautions, groups that include fewer than five participants lose opportunities to interact, analyze, and validate each other and group therapists often find themselves engaging in individual therapy with group members. Research is needed that can mitigate barriers to participation in teletherapy in HIV-infected older adults.

It is also possible that the two teletherapies would have been more efficacious if the sample consisted solely of HIV-infected older adults diagnosed with Major Depressive Disorder. This study did not assess the co-occurrence of other psychiatric disorders (e.g., bipolar disorder). If one study arm contained a greater proportion of participants

with psychiatric disorders other than depression, this could have influenced study findings. One additional limitation of the study may be that teletherapists received relatively little structured training in the teletherapy they administered and relied largely on the manual for the administration of their teletherapy. While this increases the study's external validity, it may have reduced both teletherapies' efficacy.

Despite these limitations, this study also had several strengths. These included relatively high rates of assessment follow-up at post-intervention and 4- and 8-month follow-up (87–92 % at 8-month follow-up across study arms), few exclusion criteria, and considerable geographic diversity among participants.

To conclude, this is the first randomized clinical trial to test two empirically-validated psychotherapies administered using a teleconference-call format for HIV-infected older adults. Among all study participants, tele-SEGT was superior to tele-CET at post-intervention and 8-month follow-up and superior to the receipt of SOC services alone at post-intervention and 4- and 8-month follow-up. AIDS service and gerontological organizations should consider offering tele-SEGT to their older clients living with HIV/AIDS—particularly those who cannot access face-to-face mental health support services due to geographic distance, confidentiality concerns, or physical limitations. As the numbers of new HIV infections and AIDS cases continue to increase, there is an urgent need to identify efficacious and easily translatable interventions that can reach the growing population of middle-aged and older adults living with HIV/AIDS, many of whom will be living with elevated levels of depression, psychiatric symptoms, and loneliness.

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