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Pilot Randomized Controlled Trial of a Syndemics Intervention With HIV-Positive, Cocaine-Using Women

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Abstract

This pilot randomized controlled trial examined the feasibility and acceptability of a Syndemics intervention targeting the intersection of stimulant use, trauma, and difficulties with HIV disease management in cocaine-using women. All participants received contingency management (CM) for three months with financial incentives for stimulant abstinence during thrice-weekly urine screening and refilling antiretroviral medications monthly. Sixteen participants were randomized to complete four expressive writing (n = 9) or four neutral writing (n = 7) sessions delivered during the CM intervention period. Completion rates for writing sessions were high (15 of 16 women completed all four sessions) and engagement in CM urine screening was moderate with women randomized to expressive writing providing a median of 11 non-reactive urine samples for stimulants. There were non-significant trends for those randomized to expressive writing to provide more CM urine samples that were non-reactive for stimulants, report greater decreases in severity of cocaine use, and display reductions in $\log_{10}$ HIV viral load at six months. Although the Syndemics intervention was feasible and acceptable to many women, qualitative interviews with eligible participants who were not randomized identified structural and psychological barriers to engagement. Further clinical research is needed to test the efficacy of Syndemics interventions with HIV-positive, cocaine-using women.

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Keywords

Cocaine; Contingency Management; Expressive Writing; Syndemics; Viral Load

Introduction

There is ample evidence that people who use stimulants such as powder cocaine and crack-cocaine display profound HIV-related health disparities. As many as 40% of HIV-positive persons report either current or past use of stimulants (1, 2) and active stimulant use undermines the benefits of HIV treatment as prevention (TasP). Research with HIV-positive men and women has consistently demonstrated that stimulant users are more likely to experience difficulties with anti-retroviral therapy (ART) adherence and persistence that contribute to elevated HIV viral load as well as faster clinical HIV progression (3–7). For example, HIV-positive women who are persistent users of crack-cocaine display a 3-fold faster AIDS-related mortality rate (7). There is a clear need to develop and test scalable, comprehensive interventions that address the complex care needs of stimulant users living with HIV/AIDS.

Substance use interventions are necessary but often not sufficient to optimize TasP with HIV-positive substance users. Contingency management (CM) interventions providing tangible incentives as positive reinforcement for stimulant abstinence display moderate effectiveness for reducing stimulant use (8). There is also some evidence that CM interventions can achieve short-term reductions in HIV viral load with substance users (9, 10), but these intervention-related reductions have not been maintained following its conclusion. Interventions designed to address co-occurring psychosocial health problems that are prevalent among substance users living with HIV/AIDS could boost and extend the effectiveness of CM (11).

In recent years, Syndemics has emerged as an overarching framework to account for the synergistic interactions of multiple, co-occurring psychosocial health problems fueling the HIV/AIDS epidemic that are largely driven by social and structural factors (12). For example, the substance abuse, violence exposures, and AIDS (SAVA) syndemic is theorized to be partially attributable to discrimination, marginalization, and poverty in low income, urban communities (13, 14). Consistent with the SAVA syndemic framework, there is increasing interest in trauma-informed approaches to address the enduring psychological effects of violence exposures among people living with HIV/AIDS (15). Two-thirds of people living with HIV will experience two or more traumatic events in their lifetime (16, 17), and 30% of HIV-positive women screen positive for recent Post-Traumatic Stress Disorder (PTSD) (16). Among women, prior research underscores that violence exposures and victimization are important determinants of risk taking behaviors (14). The experience of trauma is also associated with difficulties managing HIV treatment as well as faster clinical HIV progression (14, 17, 18). For example, HIV-positive persons who report a greater number of lifetime traumatic events display more than a 2-fold faster AIDS-related mortality rate (17).

Expressive writing is an evidence-based, trauma-informed intervention that has been shown to be modestly effective for improving psychological adjustment and physical health (19). The clinical relevance of expressive writing is supported by findings from a recent randomized controlled trial (RCT) where it was demonstrated to be non-inferior to cognitive processing therapy for PTSD (20). Informed by Pennebaker's General Theory of Disclosure and Language (21, 22), expressive writing interventions address psychological inhibition of traumatic events as a chronic, ruminative stressor that depletes psychological resources (23). Prior RCTs with HIV-positive persons provide some support for the efficacy of expressive writing interventions (24–28). Many of the small RCTs conducted to date have not provided evidence that expressive writing improves psychological adjustment in HIV-positive persons (26, 27, 29). However, one large RCT observed that expressive writing achieved greater reductions in symptoms of PTSD, depression, and HIV among women only (28). Although another small RCT observed that expressive writing improved CD4+ T-cell count and reduced HIV viral load (24), these effects have not been replicated (28). Interestingly, one pilot RCT observed that expressive writing achieved short-term reductions in stimulant use among HIV-positive, methamphetamine-using sexual minority men (26). Expressive writing is a scalable, trauma-informed intervention component that could be incorporated into Syndemics interventions targeting co-occurring stimulant use, trauma, and difficulties with HIV disease management.

This pilot RCT examined the feasibility and acceptability of a four-session, trauma-informed Syndemics intervention where expressive writing was delivered during CM with HIV-positive, cocaine-using women. Informed the SAVA syndemic framework, we hypothesized delivering expressive writing would lead women to derive greater benefits from CM by addressing traumatic stress as a potent trigger for stimulant use and assisting women in coping more effectively with cocaine withdrawal. Thus, the scientific premise of this Syndemics intervention was that there would be added benefits to simultaneously targeting the co-occurrence of traumatic stress and stimulant use versus stimulant use alone. Consistent with the most appropriate goals of a pilot RCT (30), our focus was primarily on examining the feasibility and acceptability of delivering this Syndemics intervention – Trauma Intervention for Affect Regulation, AIDS, and Stimulants (TIARAS). We also examined whether there was evidence to support the potential benefits of the TIARAS Syndemics intervention for decreasing cocaine use, PTSD and depressive symptoms, and $\log_{10}$ HIV viral load.

Methods

Design

Recruitment, screening, and enrollment.—This pilot RCT was conducted in Miami, Florida (www.clinicaltrials.gov;). All relevant procedures were approved by the Institutional Review Board for the University of Miami. A total of 126 individuals were recruited from the Jackson Memorial Hospital HIV clinic and the surrounding Miami-Dade community. Recruitment was facilitated by distributing palm cards and flyers at HIV medical clinics, AIDS service organizations, homeless shelters, and substance use disorder treatment

facilities. An incentivized snowball sampling method was implemented where eligible participants could receive up to $30 for referring eligible participants.

To be eligible for this RCT, participants were required to meet the following inclusion criteria: 1) be 18 years of age or older; 2) be a cisgender or transgender woman; 3) provide documentation of HIV-positive serostatus (i.e., letter of diagnosis or ART medications that are matched to their photo identification); 4) have self-reported difficulties with HIV care continuum (i.e., not taking ART, detectable viral load, any ART non-adherence in the past month, or did not attend a HIV medical care appointment in the past three months); 5) report a history of psychological trauma; and 6) report powder cocaine or crack-cocaine use in the past 60 days. Participants completed a brief telephone screen and those deemed to be potentially eligible were scheduled for an in-person screening visit. As shown in Figure 1, 28 participants (22%) who completed the telephone screen were invited to attend an in-person baseline assessment.

At the baseline assessment, 28 participants completed a signed informed consent. Those without evidence of recent cocaine use from urine screening provided a hair sample for toxicology testing. A peripheral venous blood sample was collected to measure HIV disease markers. Participants were excluded for the following reasons: 1) inability to provide consent; 2) non-reactive urine and hair toxicology results for cocaine; 3) unable to follow the study protocol. All participants received $40 cash for completing the assessment. Three participants were excluded because they did not provide a urine or hair sample that was reactive for cocaine metabolites. One participant was excluded because she was in renal failure and could not provide urine samples of toxicology testing during CM. One participant was excluded because she could not provide a hair sample for toxicology testing.

Run-in period and randomization.—All 23 eligible participants completed a waiting period (i.e., run-in) where they were asked to attend three CM urine screening visits (regardless of toxicology results) prior to randomization. At the third CM urine screening visit, participants were randomized to complete four expressive writing or four neutral writing sessions. Participants who did not complete the run-in period were not randomized. Two participants withdrew from the study prior to randomization and five participants did not complete the run-in period. From February of 2017 through November of 2017, 16 (70%) participants completed the run-in period and were randomized to either expressive writing intervention (n=9) or neutral writing (n=7). Randomization was accomplished by using a computer-generated sequence with randomly permutated block sizes of two and four to guard against subversion. Only the study data manager had access to the computer-based randomization algorithm.

Assessment schedule.—Immediately following the conclusion of the 3-month CM intervention period, participants completed a follow-up assessment that included computer-based administration of self-report measures and a urine sample for on-site toxicology screening. This assessment was re-administered at the 6-month follow-up where a peripheral venous blood sample was also collected to measure HIV disease markers. To minimize demand characteristics, all follow-up assessments were administered by an interviewer who had not conducted expressive writing or neutral writing sessions with participants. All

participants received $40 cash for completing each assessment. Of the 16 participants randomized, 13 (81%) completed the 3-month follow-up assessment and 12 (75%) completed the 6-month follow-up assessment.

Interventions

Contingency Management.—All participants completed a 3-month CM intervention that included thrice weekly urine screening for stimulants (i.e., cocaine and methamphetamine). Participants received a cash incentive for each urine sample that was non-reactive for stimulants and the magnitude of this incentive increased every month. Participants received $4 during the first month, $5 during the second month, and $6 during the third month for each urine sample that was non-reactive for stimulants. The amount of the financial incentive was escalated over time to mitigate habituation to the reward schedule and this approach is consistent with our prior studies of CM for HIV/AIDS prevention (11, 31). Where participants provided three consecutive urine samples that were non-reactive for stimulant use, they received a cash bonus. The amount of the cash bonus also escalated over time (i.e., $5 in month 1, $10 in month 2, and $12 in month 3). Participants were also encouraged to refill their ART medications monthly and received a $30 cash incentive each month for bringing in recently refilled ART medications. The total possible incentives that could be received during the 3-month CM intervention was $458. In order to facilitate transportation to thrice-weekly urine screening visits, participants received weekly passes for public transportation. This also served as another incentive with a value of $11.25 each week ($135 during the 3-month period for CM).

Expressive writing condition.—Participants randomized to this condition completed four sessions where they were asked to write about the most upsetting or traumatic event in their life for 20 minutes. In each writing session, participants were asked to explore their deepest thoughts and feelings related to the event. Consistent with a prior RCT (28), participants also wrote for an additional 10 minutes in response to writing prompts that were designed to enhance cognitive processing of the event as well as examine the enduring effects of the event on feelings of self-worth and ability to solve problems. Participants received $20 cash for completing each expressive writing session during the 3-month CM intervention period.

Neutral writing condition.—Participants randomized to this condition completed four writing sessions about neutral topics. Each participant was asked to recall daily experiences in a factual manner and refrain from delving into her emotional responses. Participants received $20 cash for completing each neutral writing session during the 3-month CM intervention period.

Outcomes

HIV viral load.—The primary outcome for this pilot RCT was $\log_{10}$ HIV viral load. HIV-1 RNA viral load using the Real Time HIV-1 Assay (Abott Molecular, Des Plaines, IL).

PTSD and depressive symptom severity.—The PTSD Checklist for the Diagnostic and Statistical Manual of Mental Disorders – 5 is a validated, 20-item measure examining

the severity of PTSD symptoms (32). Total PTSD symptom severity was calculated with higher scores indicating greater severity (Chronbach's $\alpha = 0.94$). The Centers for Epidemiologic Study of Depression (CES-D) is a validated measure that was administered to assess the severity of depressive symptoms (33). Total depressive symptom severity was calculated with higher scores indicating greater severity (Chronbach's $\alpha = 0.87$).

Cocaine use severity.—The World Health Organization Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) was administered as a validated self-report measure of substance use (34, 35). We examined the cocaine use composite score, which provides a measure of the severity of cocaine use disorder symptoms.

Total non-reactive urine toxicology results for stimulants during CM.—During the 3-month CM intervention period, participants were asked to provide up to 36 urine samples that were tested for cocaine and methamphetamine. Urine samples were collected thrice weekly to index of continuous abstinence during CM. We calculated the total number of urine samples that were non-reactive for stimulants, which is also referred to as treatment effectiveness score (36).

Intensity of cocaine craving.—Before and after administering the four writing sessions, participants were asked to rate their current intensity of their craving for powder cocaine and crack-cocaine separately. We calculated the mean change in the intensity of craving by subtracting the pre-session score from the post-session score (i.e., Post – Pre). Negative scores reflect reductions in craving for powder cocaine and crack-cocaine on average over the four writing sessions.

Satisfaction with the writing experience.—To measure satisfaction, participants indicated whether they would recommend it to a friend who is HIV-positive on a Likert-type scale from 0 (Not at All) to 10 (Definitely) following each writing sessions. We calculated the mean satisfaction with the writing experience across all four sessions as a key measure of acceptability.

Writing content.—Writing exercises for participants were transcribed and coded using the Linguistic Inquiry Word Count (LIWC) software (29). LIWC provides quantitative indices of writing content, including negative and positive emotional expression as a measure of acceptability of the writing exercises.

Qualitative Interviews

In order to better understand barriers and facilitators to engagement in the CM and expressive writing interventions, otherwise eligible women who did not complete the run-in period were re-contacted to complete an in-depth qualitative interview. The interview guide focused on examining the experiences of women with the study team, identifying perceived structural barriers to engagement in the interventions, and delineating what concerns (if any) they had about the CM and expressive writing interventions. Women were also asked to provide feedback on aspects of their experience with the TIARAS project that enhanced their motivation to engage with the study team. Finally, women provided recommendations

for modifications to the CM and expressive writing interventions that would increase the likelihood of engagement. In total, five women completed in-depth qualitative interviews and received $40 cash for participating.

Analyses

For quantitative analyses, we examined intervention-related differences in the total non-reactive urine toxicology results for stimulants during CM using the non-parametric Wilcoxon rank-sum test. Intervention-related changes in primary and secondary outcomes were investigated by conducting independent samples t-tests at the three and six month follow-up assessments. Due to attrition, the final analytic sample was 13 at three months and 12 at six months. We conducted thematic analyses of in-depth qualitative interviews with participants who did not complete the run-in period. Interviews were transcribed verbatim, coded, and reviewed by two team members (O.O. and A.W.C.) to identify themes. The team followed protocol-driven procedures where each transcript was reviewed separately by each rater and then together to reconcile any discrepancies. Consensus was reached among the research team regarding the operational definition of each theme as well as representative quotations.

Results

As shown in Table 1, age for the 16 randomized participants ranged from 33 to 60 years old with a mean of 47.9 (SD = 8.7). There were 13 Black/African American participants, one was White, one who identified as Hispanic/Latina, and one was of multiracial or multicultural heritage. Twelve participants had a high school education or greater. The majority (n = 11) had an income of less than $5,000 per year. Participants had been living with HIV/AIDS for an average of 15 (SD = 9) years. Fourteen participants were currently taking ART at baseline and 10 of these had a suppressed HIV viral load (< 200 copies/mL).

There were high overall completion rates in the expressive writing and neutral writing conditions with 15 women completing all four writing exercises (see Figure 1). As shown in Table 2, participants randomized to receive expressive writing included significantly more negative emotion words in their transcribed writing samples ($t(14) = -3.74$, $p = 0.002$), but there were no significant differences in writing content related to positive emotion ($t(14) -1.16$, $p = 0.26$) or health ($t(14) = -2.04$, $p = 0.61$). Women randomized to receive expressive writing reported increases in crack-cocaine craving on average immediately after the writing experience compared to those in the neutral writing condition ($t(14) = -2.58$, $p = 0.02$) but there were no concurrent differences in powder cocaine craving ($t(14) = 0.42$, $p = 0.68$). At the same time, participants randomized to receive expressive writing provided more urine samples that were non-reactive for stimulants (Median = 11 versus 0), but this difference was not statistically significant ($p = 0.054$). Although participants randomized to expressive writing were more satisfied with their writing experience on average than women in the neutral writing condition, this difference was also not statistically significant ($t(14) = -1.16$, $p = 0.26$).

As shown in Table 3, women randomized to expressive writing reported moderate, non-significant increases in PTSD and depressive symptoms at three months relative to those in

the neutral writing condition. Only small differences in these outcomes between the experimental conditions were observed at six months. At the same time, those randomized to expressive writing displayed non-significant trends towards moderate to large reductions in cocaine use severity at three and six months as well as substantially lower $\log_{10}$ HIV viral load at six months relative to participants in the neutral writing condition.

Findings from in-depth qualitative interviews conducted with participants who did not complete the run-in period elucidated key structural and psychological barriers to engagement in the CM and expressive writing interventions (See Table 4). Perceived inadequacy of the financial incentives was one important barrier to engagement, particularly in CM urine screening visits. Participants also described competing demands that made it difficult to prioritize engagement in the CM and expressive writing interventions. Some women noted concerns about their ability to tolerate the distress they would experience during expressive writing exercises. One salient critique of the TIARAS intervention was the lack of individual educational or counseling experiences that could be tailored to the unique needs of each participant. Facilitators of engagement in the interventions were having social support, anticipating reward from CM incentives, and persistent follow-up from the study team. Interestingly, two of the five women who completed qualitative interviews re-initiated the TIARAS project. The participant who initially expressed concerns about tolerating distress was randomized to receive expressive writing and completed all four sessions.

Discussion

Findings from the TIARAS project underscore the potential benefits of Syndemics intervention approaches for cocaine-using women living with HIV. High completion rates for writing exercises, greater negative emotional expression during expressive writing sessions, and moderate engagement in the CM urine screening visits provide tangible support for the feasibility and acceptability of TIARAS. Although this pilot RCT did not have sufficient statistical power to examine efficacy of the TIARAS intervention approach, women randomized to expressive writing provided more urine samples during CM that were non-reactive for stimulants and reported decreases in cocaine use disorder symptom severity. Interestingly, there was also provocative trend towards lower $\log_{10}$ HIV viral load at six months for women randomized to expressive writing during CM. Taken together, findings highlight the need for further clinical research to test the efficacy of the TIARAS Syndemics intervention to optimize the benefits of TasP with this marginalized, underserved population.

There was also some indication that the expressive writing experience contributed to transient increases in crack-cocaine craving as well as led to moderate increases in PTSD and depressive symptoms that appeared to resolve at six months. These results are consistent with a prior pilot RCT with HIV-positive, methamphetamine-using sexual minority men where there were increases in PTSD symptoms that paralleled concurrent reductions in methamphetamine use (26). It may be that expressive writing short circuits patterns of cognitive and affective avoidance that are prominent among those with substance use disorders (37). Thus, the seemingly paradoxical effects of expressive writing could reflect increased insight and awareness regarding the enduring effects of psychological trauma as well as the role of PTSD symptoms as a potent internal trigger for cocaine use. Taken

together, it is plausible acute exacerbation of craving and mental health symptoms is necessary to meaningfully address the SAVA Syndemic among HIV-positive stimulant users.

Qualitative interviews with participants who were not randomized yielded important insights for further refining the TIARAS Syndemics intervention. Perceived inadequacy of financial incentives was a barrier to engagement in CM. Further clinical research is needed to identify optimal reward structures for CM, test less intensive CM schedules, or leverage technology-based approaches that do not require in person urine screening visits. Some women also expressed a desire for individual counseling that could be tailored to meet their needs. Future research should develop and test brief psychological interventions that can be delivered concurrent with expressive writing sessions. These results will inform further clinical research to refine and augment the TIARAS Syndemics intervention approach.

HIV-positive women who use substances are faced with physical and emotional problems as well as complex legal, social, and health consequences resulting from substance use. Other RCTs testing different intervention approaches highlight novel directions for further clinical research. Structural Ecosystem Therapy (SET) is a family-based intervention that has been shown to reduce risk of relapse (relative to an attention-control condition) and improve ART medication adherence in HIV-positive women (38–40). SET-related reductions in relapse risk were partially mediated by decreases in family hassles, which supports the benefits of addressing the stressful and often strained familial experienced by many women (39). Women randomized to SET were also more likely to initiate substance use disorder treatment in response to relapse and separate from substance-using family members (40). There are also important gender-specific barriers such as intimate partner violence to reducing substance use and optimizing HIV/AIDS prevention. One RCT with women who use crack-cocaine observed that a woman-focused intervention improved housing and employment as well as reduced condomless sex relative to a revised standard intervention and a wait-list control condition (41). These beneficial effects were despite the fact that the revised standard intervention was most effective at reducing crack-cocaine use. Further clinical research is needed to test family-based and woman-focused approaches to optimize the benefits of TasP with HIV-positive, cocaine-using women.

Findings from this pilot RCT should be interpreted in context of some important limitations. Because our primary objective was to examine feasibility and acceptability, there was not adequate statistical power to test the efficacy of the TIARAS Syndemics intervention. Furthermore, it is well established that effect size estimates from pilot RCTs should be interpreted with caution (30). A full-scale RCT is needed to determine the efficacy of the TIARAS Syndemics intervention for optimizing the clinical and public health benefits of TasP. Future RCTs should have adequate statistical power not only to examine efficacy with respect to HIV viral suppression but also to detect intervention-related changes in the number of co-occurring syndemic conditions. Although acceptable, our follow-up rate at six months was 75%, which highlights the need for expanded retention efforts in subsequent clinical research to optimize long-term follow-up rates. In addition, the focus of expressive writing was on the most salient lifetime trauma experienced by women. Further research is needed to clarify the benefits of expressive writing in this population for addressing distinct types of trauma that occur across the life course such as childhood sexual abuse versus adult

intimate partner violence. Finally, we enrolled a heavily impacted population of cocaine-using women with HIV who had a history of psychological trauma and reported difficulties with navigating the HIV care continuum. Further clinical research is needed to examine whether Syndemics interventions like TIARAS are best delivered using a stepped-care approach to the broader population of HIV-positive women.

Despite these limitations, findings from this pilot RCT provide support for the potential benefits of Syndemics intervention approaches with HIV-positive, cocaine-using women. Delivering expressive writing with CM represents a potentially scalable approach to targeting the intersection of stimulant use, trauma, and difficulties with HIV disease management in cocaine-using women. The study will inform more definitive RCTs with sufficient statistical power to establish the efficacy of the TIARAS interention approach with this high priority population.

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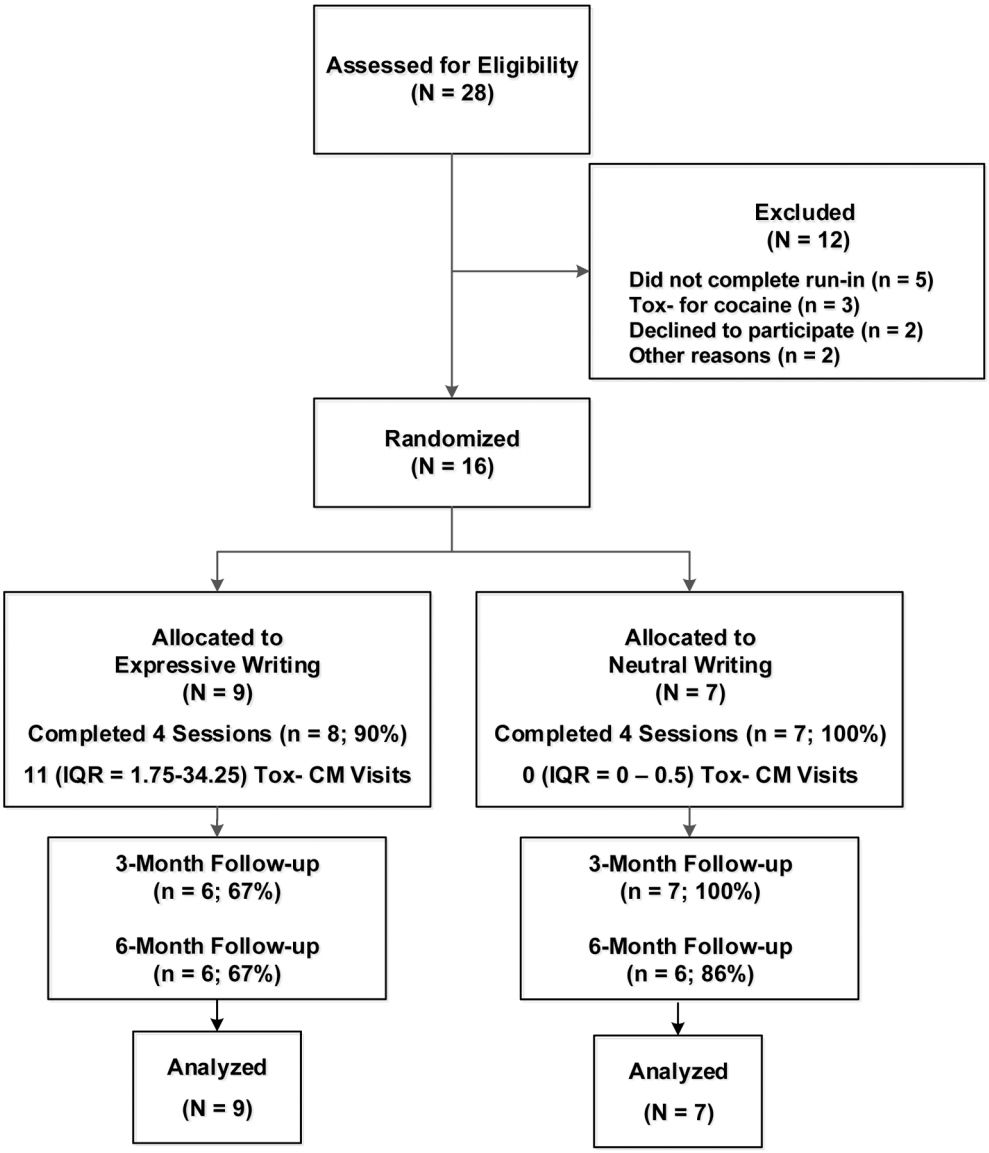

Figure 1.
Screening, randomization, and follow-up for participants

Table 1.

Baseline characteristics for randomized participants (N = 16).

	Expressive Writing (n = 9)	Neutral Writing(n = 7)
	M (SD)	M (SD)
Age	46.1 (10.9)	50.2 (4.4)
Time Since HIV Diagnosis	14.8 (10.5)	16.8 (7.6)
CD4+ T-cell Count (cells/mm^3)	647.7 (300.7)	472.3 (342.5)
	n (%)	n (%)
Race/Ethnicity		
Black/African American	7 (77.8)	6 (85.7)
White	1 (11.1)	0
Hispanic/Latina	1 (11.1)	0
Multiracial/Multiethnic	0	1 (14.3)
Education		
Less than High School	2 (22.2)	2 (28.6)
High School Graduate	2 (44.5)	3 (42.8)
At Least Some College	3 (33.3)	2 (28.6)
Income		
< $4,999	6 (66.7)	5 (71.4)
$5,000 – $11,999	3 (33.3)	2 (28.6)
Prescribed ART	7 (77.8)	7 (100.0)
HIV Viral Load < 200 copies/mL	5 (55.6)	5 (71.4)

Table 2.

Process measures for writing sessions (N = 16).

	Expressive Writing (n = 9)	Neutral Writing (n = 7)	Cohen's *d*
	M (SD)	M (SD)	
Writing Content			
Negative Emotion	3.0 (1.4) **	1.0 (0.3) **	2.0
Positive Emotion	2.3 (0.9)	1.8 (0.9)	0.6
Health-Related	1.4 (0.8)	0.7 (0.3)	1.2
Change in Powder Cocaine Craving (Post – Pre)	−1.3 (9.7)	0.5 (5.4)	−0.2
Change in Crack-Cocaine Craving (Post – Pre)	7.9 (12.4) *	−6.1 (8.0) *	1.3
Recommend Writing to Friend with HIV	8.0 (3.8)	5.9 (3.2)	0.6

* $p < .05$

** $p < .01$

Table 3.

Preliminary outcomes of expressive writing delivered during CM.

		Expressive Writing	Neutral Writing	Cohen's *d*	p-value
	N	M (SD)	M (SD)		
PTSD Symptoms					
Baseline	16	36.9 (23.0)	31.9 (22.8)	-	0.67
3 Months	13	40.5 (26.2)	28.7 (18.7)	0.51	0.37
6 Months	12	24.7 (23.3)	27.5 (21.2)	−0.12	0.83
Depressive Symptoms					
Baseline	16	27.3 (13.4)	28.0 (12.3)	-	0.92
3 Months	13	31.2 (13.1)	21.4 (16.0)	0.64	0.26
6 Months	12	25.0 (13.4)	20.8 (14.1)	0.29	0.61
Cocaine Use Severity					
Baseline	16	19.4 (10.9)	20.7 (6.8)	-	0.79
3 Months	13	7.7 (8.3)	16.6 (8.6)	−1.0	0.09
6 Months	12	9.5 (9.7)	17.8 (11.0)	−0.75	0.19
HIV Viral Load (Log_{10})					
Baseline	16	1.7 (1.8)	2.0 (1.9)	-	0.76
6 Months	11	1.56 (0.64)	3.41 (1.95)	−1.3	0.14

CM = Contingency Management

Table 4.

Barriers and facilitators to engagement in the interventions

Theme	Representative Quotation	Demographics
Barriers		
Perceived Inadequacy of CM Financial Incentives	Four dollars, [is that] what I am going to get up out of my bed for? Are you serious?	44 years old African American
Competing Demands	My son went to jail [and] I went over to Daytona… He had his wife and the baby, so I went over there to help… I totally had forgotten about the research.	46 years old Hispanic/ Latina
Distress Tolerance DuringExpressive Writing	[It's] taken me a really long time just to be ok… yeah you could offer me a million dollars and I don't know if I would have been ready to deal with my childhood	32 years old White
Desire for Counseling	If I was running around doing things and I have something that means something I might stop what I am doing. I wanted something that was more productive… maybe something more educational or something…	32 years old White
Facilitators		
Social Support	But if I stay up too late, then I have a hard time getting up in the morning. If I sleep early, I'm okay. Especially if my friend comes, she makes sure I don't do no drugs, like 'come on, let's go.' That helps. She helps me out a lot	50 years old African American
Expectation of Reward	It's rewarding, and it also helps to motivate you to try to not do anything and you get more money.	50 years old African American
Persistent Follow-up	After I came back, I had forgotten about the study…then you called.	46 years old African-American

CM = Contingency Management