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## Substance Abuse Treatment for HIV Infected Young People: An Open Pilot Trial

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### Abstract

The purpose of this study was to test an integrated cognitive behavioral and contingency management (CBT/CM) intervention for young people living with HIV (YPLH) with an alcohol and/or cannabis use disorder in an open pilot trial. Seventeen participants (ages 18–24) were recruited from three HIV community clinics. Assessments were completed at pre-and post-treatment as well as three month follow-up. Eighty percent of participants were retained in the study. Results suggest that the CBT/CM intervention was acceptable, feasible, and could be delivered with fidelity. Further, participants reported significant reductions in alcohol use, withdrawal symptoms, dependence symptoms and related problems, as well as co-occurring depressive symptoms and delinquent behavior across assessment periods. A trend was evident for reductions in marijuana use and related problems. Overall, these preliminary results suggest that a substance abuse CBT/CM intervention tailored to YPLH is acceptable, feasible, and holds promise for symptomatic improvement. Further testing of this type of protocol is warranted.

### Keywords

alcohol; cannabis; cognitive-behavioral; contingency management

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## 1. Introduction

Young people living with HIV (YPLH) report high rates of substance use and associated problems. In a sample of YPLH (ages 16–24) who presented to an HIV clinic, three-quarters reported alcohol use and more than half acknowledged marijuana use in the last month (Hosek, Harper &, Domanico, 2005). In a second study conducted with 352 YPLH (mean age = 20.36), 60% screened positive for problem level substance use (alcohol or other drugs) in the last three months (Tanney, Naar-King, Murphy, Parsons, Janisse, 2010). Rates of substance use disorders are also elevated in this population. In a sample of 174 YPLH (ages 14–24) who presented to HIV clinics, 15% met criteria for alcohol abuse and 31% for drug abuse (primarily marijuana) (Martinez, Hosek, & Carleton, 2009). These rates of substance use disorders among YPLH exceed those reported by adolescents and young adults in the National Survey on Drug Use and Health (Substance Abuse and Mental Health Services Administration; SAMHSA, 2011).

Though problems associated with substance abuse are well documented, YPLH face many unique substance related risks that place their lives, as well as those of others, in danger. For example, though results vary across studies based on methods employed (Leigh, 1999), greater use or abuse of alcohol and/or other drugs has been positively associated with unprotected penetrative sex (Elkington et al., 2012; Oshri, Tubman, & Burnette, 2012), and non-adherence to antiretroviral medication (Mellins et al., 2002; Powers et al., 2003). Early onset alcohol and polysubstance use has also been associated with injection drug use (Trenz et al., 2012). These behaviors, in turn, increase risk of exposure to new strains of HIV, reduce the likelihood of efficacious treatment (Bangsberg et al., 2001; Liu, Wyatt, Amara, Moss & Robinson, 2006), and increase risk of HIV transmission, particularly when viral loads are high (Mellins et al., 2002; Tanney et al., 2010). This latter finding is alarming given that 13% to 40% of individuals continue to engage in unprotected sex after learning about their status (Marks, Crepaz, Senterfitt, & Janssen, 2005). As such, many have advocated for interventions that effectively address substance use among YPLH (Tanney et al., 2010; Murphy et al., 2012).

Individualized substance abuse interventions for YPLH may be particularly important given a host of issues that complicate treatment with this population, such as stigma associated with HIV (and for many homosexual status), self-medication to address HIV symptoms and side effects of antiretroviral medications, high risk peer groups, low social support, and low self-efficacy, as well as high rates of depression, hopelessness, sexual abuse, and parental substance use disorders (Brown, Lourie, & Pao, 2000; Kadivar, Garvie, Sinnock, Heston, & Flynn, 2006; Murphy et al., 2000). Yet, to our knowledge, only two studies have been conducted to test interventions that specifically target substance use among YPLH. Rotherham-Borus and colleagues (2001a, 2001b) assigned 310 adolescents (ages 13–24) with HIV by cohort to a skills based group intervention or an assessment-only control condition. At baseline, 75% of the sample reported alcohol or marijuana use and 33% illicit drug use. The intervention included 31 sessions, delivered in three modules of 8–15 sessions, designed to increase positive health behavior, reduce transmission behavior (including substance use), and improve quality of life. While this intervention was associated with fewer unprotected sex acts, more positive lifestyle changes (for females), and less emotional distress relative to the control condition, no differences were found in alcohol, marijuana, or other hard drug use (Rotherham-Borus et al., 2001a).

In a study conducted by Murphy, Chen, Naar-King, and Parsons (2012), 143 YPLH (ages 16–24) were randomized to a 4-session motivational enhancement intervention targeting multiple risk behaviors (including substance use) or an assessment-only control condition. At baseline, approximately 50% of participants reported alcohol use and 32% reported

marijuana use in the past week. At 15 month follow-up, the intervention relative to the control condition was associated with lower rates of alcohol but not marijuana use in the prior week.

The present study builds uniquely upon this small body of literature by presenting results from a Stage Ia open pilot trial of an integrated cognitive-behavioral therapy (CBT) and contingency management (CM) intervention designed for YPLH with alcohol and/or cannabis use disorders. This CBT/CM intervention was created by adapting a CBT protocol for adolescent suicidality and substance abuse (Esposito-Smythers, Spirito, Kahler, Hunt, & Monti, 2011), and integrating it with a CM program, which, in studies with non-infected participants, additively or synergistically enhances treatment attendance and reductions in substance use (Carroll et al., 2006; Higgins et al., 2003; Carroll et al., 2012; Petry et al., 2004, Stitzer & Petry, 2006).

Consistent with the goals of Stage Ia behavioral therapies development research (Rounsaville, Carroll, & Onken, 2001), this study examined the feasibility of the CBT/CM intervention, with close attention to participant acceptance of the assessment and intervention, feasibility of treatment delivery, and symptomatic improvement. We hypothesized that the CBT/CM intervention would be associated with high retention rates and participant satisfaction, as well as reductions in alcohol- and marijuana-related symptoms. We also explored the effect of the CBT/CM intervention on comorbid depressive symptoms and conduct problems, two common comorbidities associated with substance use disorders (Kandel et al., 1999).

## 2. Methods

### 2.1 Participants

Participants included 17 YPLH (ages 18–24) recruited from three adolescent HIV clinics located in Los Angeles, CA, Philadelphia, PA, and New York, NY (See Table 1 for socio-demographics and clinical history). All three sites provide primary care with adolescent medicine specialists and offer the following services: adherence, mental health, and risk reduction counseling; case management; HIV support groups; home visits; peer advocacy/outreach; and transportation. Participants were eligible for the study if they were: (a) 16–24 years of age; (b) met DSM-IV criteria for an alcohol or cannabis use disorder; (c) HIV infected and aware of their status; (d) received services at one of three participating Adolescent Medicine Trials Network (ATN) clinic sites; (e) English speaking; and (f) appropriate for outpatient or intensive outpatient substance abuse treatment. They were ineligible if they exhibited: 1) serious psychiatric symptoms (e.g., active hallucinations, thought disorder), 2) acute suicidal, homicidal, or violent behavior upon screening; or 3) were receiving psychosocial treatment for substance abuse.

### 2.2 Procedures

All study procedures were approved by participating clinic and university institutional review boards. A two tier screening and recruitment procedure was used. Potential participants were approached during regularly scheduled clinic visits by trained clinic staff. The clinic staff briefly explained the study and provided those interested with the contact information for study staff. Trained study staff explained the study in detail and scheduled an appointment for informed consent and eligibility screening. At this appointment, verbal consent was obtained for the administration of a 6-item screening measure for problem alcohol and marijuana use (CRAFFT; Knight et al, 2002). Those who met the cutoff for problem use were invited to complete written informed consent for the study and continue the screening process. After informed consent was obtained, participants completed a brief computerized assessment for substance use disorders (Structured Clinical Interview for

DSM Disorders (SCID) Screen Patient Questionnaire–Extended Version (SSPQ-X); First, Gibbon, Williams, & Spitzer, 2007). Those who met criteria for an alcohol or marijuana use disorder were enrolled in the study.

Twenty-three potential participants were approached for recruitment. Twenty expressed interest and completed the screening. Based on screening results, all 20 individuals were invited to participate in the study. Eighteen of these 20 individuals provided their informed consent for study participation. Thus, a total of 18 out of 23 individuals approached were enrolled (six at each of the three study sites) for a consent rate of 78%. However, one of these 18 participants was subsequently withdrawn by study staff (prior to initiating the treatment protocol) after it was discovered that he withheld information that excluded him from the study. The reasons for study refusals included: lack of study interest, study is too long, upcoming move, and/or too busy.

All study participants completed a baseline assessment as well as end of treatment and three month follow-up assessments. Data were collected using an Audio Computer-Assisted Self-Interview (ACASI). Participants only received assessment payment at these three time points. These payments averaged approximately \$28 (range of \$20-\$34.50) for each assessment across the three study sites. Monies were also provided to cover transportation costs.

**CBT/CM protocol**—The CBT component of the protocol is grounded in social cognitive learning theory (Bandura, 1986). According to this theory, substance abuse and mental health problems may result in part from prior learning histories, especially the learning of social behaviors and core beliefs. To effectively address substance use disorders, CBT must target the maladaptive behaviors and beliefs that underlie problems in this area, including cognitive distortions as well as poor coping and communication skills. CM is entirely compatible with social cognitive learning theory and CBT, as it is also grounded in behavioral principles and based on operant conditioning processes. When applied to treatment of substance abuse, tangible and immediate reinforcers (e.g., money, vouchers) are provided for abstinence as a means to effectively compete with the reinforcing properties of the drug of abuse.

The CBT/CM protocol was manualized and modularized. Fifteen sessions were attended weekly over the course of four months. The manual offered a menu of CBT individual (contingency contracting/goal setting, problem-solving, cognitive restricting, affect regulation, relaxation, increasing healthy pleasant events, increasing social support, assertiveness training, coping with cravings, alcohol/drug refusal skills, safe sex behavior, exploring disclosure, functional analysis of dangerous behavior) and family or significant other (communication, increasing positive interactions, problem-solving) skill-building sessions to remediate substance use behavior, as well as a motivational enhancement session to improve treatment readiness. The menu included core sessions completed by all participants and supplemental sessions administered based on clinical need. Sessions could be repeated and practiced throughout the protocol. Guidelines for the order of core sessions and use of supplemental sessions were provided in the manual. Session selection was discussed during supervision to ensure that decisions were consistent with the case conceptualization and clinical need.

The CBT component of the CBT/CM protocol was developed by modifying an evidence-based CBT protocol for adolescents with co-occurring suicidality and substance use disorders (see Esposito-Smythers et al., 2011; 2012). Numerous modifications were made based on literature reviews, clinical experience of study investigators and therapists, and feedback from focus groups conducted with 24 YPLH. For example, language was modified

to ensure development appropriateness and sensitivity to a transgender population, weekly personalized goal setting was added, a weekly alcohol/drug monitoring log was added, handouts and assignments perceived as unhelpful were removed, paperwork was condensed, relevant resources were offered (e.g., HIV support groups, coordination with HIV clinic case managers), “significant other” sessions were added, and session structure and length was adjusted. Three new sessions were also added to reduce HIV re-infection/transmission behaviors (safe sex behavior), promote healthy relationships (exploring HIV disclosure), and explain the CM protocol as well as develop personalized goals (contingency contracting/ goal setting).

The decision to integrate the CM protocol into the CBT protocol was made based on prior research that suggests relatively low rates of treatment attendance, engagement, and response among YPLH (e.g., Rotherham-Borus et al., 2001a; b). Therefore, participants were reinforced for session attendance, homework completion, and abstinence in the context of the CM protocol. The reinforcement schedule and reinforcers were determined based on prior literature and feedback from focus group participants. Specifically, participants earned draws from a prize bowl each time they performed a desired verifiable activity, including attending a session (3 draws), providing a clean urine drug screen (1 draw), completing CBT homework (1 draw), and completing two personalized goals developed with the therapist at the end of each session (1 draw each). Bonus draws (1 per week) were earned for each consecutive week that CBT homework was completed *and* the participant had a clean urine drug screen. When participants did not complete homework and did not have clean urine drug screens, the bonus draws were withdrawn but then reset to the highest bonus value earned to date after two consecutive weeks of CBT homework completion and clean urine drug screens. In line with the procedure employed by Petry et al. (2006), the cards in the prize bowl included “Good job, try again”, \$1 prize, \$20 prize, and \$100 prize. Cards were replaced after each draw so the odds of winning remained constant and participants were aware of the probabilities. Participants chose from a variety of prizes in each cost category (e.g., gift or phone card, food coupons, bus tokens, etc.) that were kept on site at each clinic. The reinforcement schedule was arranged such that the expected average maximal cost of prizes selected would be approximately \$300 per participant for a 15-week period (maximal average of \$20 per week) based on research suggesting that reinforcement values less than \$250-\$300 may not improve outcomes (Petry et al., 2005).

The CBT and CM components were integrated in a common fashion into each session. All sessions included: substance screens (urine drug screen, breathalyzer, field sobriety test), check-in (mood, medication adherence, attendance at appointments), agenda setting, review of CBT homework (including a weekly substance monitoring log), tally of fishbowl draws earned, skill instruction and practice, discussion of agenda items, assignment of CBT homework, and fishbowl draws. Study therapists also coordinated care with HIV clinic case managers to help facilitate treatment goals (e.g., job preparation, housing).

**Training and Fidelity**—One therapist at each HIV clinic site delivered the CBT/CM protocol, including two masters level therapists (in social work or counseling) and one doctoral level clinical psychologist. They were trained by the first and second authors through didactic instruction and role-playing in the context of three full days of face-to-face workshops. All CBT/CM intervention sessions were digitally recorded. All recordings for the first three participant cases seen by each therapist, as well as a random selection of 20% of subsequent recordings, were reviewed by the first author to rate fidelity and provide detailed feedback and supervision. Fidelity instruments used to rate therapist recordings included the Cognitive Therapy Rating Scale (CTRS; Young & Beck, 1980) and adherence checklists (see measures below), which were adapted from a prior clinical trial (Esposito-Smythers et al., 2011).

Weekly phone group supervision was provided by the first and second authors and was used to discuss skills implementation and review ratings from recording reviews. Individual supervision was also provided when emergent situations arose. If therapist drift was evident through any method of supervision, obstacles to adherence were processed, solutions generated, and role-playing conducted to enhance training. If fidelity ratings did not meet study criterion on two consecutive recordings, supervision would have been increased but this did not occur.

**Measures**—Measures were selected that were developmentally appropriate, empirically validated, and sensitive to treatment process and change in outcomes. Socio-demographic and medical information was collected with a brief questionnaire and chart review. Substance use screening measures included the CRAFFT (Knight et al., 2002) and the SSPQ-X (First et al., 2007).

Treatment acceptability was assessed using the Session Evaluation Form (SEF; Harper, Contreras, Bangi and Pedraza, 2003), Working Alliance Inventory – Short Form (WAI; Horvath & Greenberg, 1989), session attendance, and retention rates. The SEF assesses one's experience with each session (e.g., learned a lot, interesting, relevant to my life, enjoyable), with a response format ranging from 0 (strongly disagree) to 3 (strongly agree). The WAI assesses the degree of agreement on treatment goals and how to reach these goals as well as one's perceived bond with their therapist, with a response format ranging from 1 (never) to 7 (always).

Treatment feasibility/therapist fidelity was assessed using the CTRS (Young & Beck, 1980) and adherence checklists (Esposito-Smythers et al., 2011) modified slightly for the present study. The CTRS was used to assess competence in treatment delivery, with total scores 44 deemed acceptable. Adherence checklists were created for each module and included components common (e.g., assessed for substance use) and unique (e.g., taught deep breathing) to each session. Number of items ranged from 7 to 15 across sessions. Adherence to 80% of session content was deemed acceptable.

Substance use outcome measures included the Customary Drinking and Drug Use Record (CDDR; Brown, Myers, Lippke, Tapert and Vik, 1998) and urine drug screens. A breathalyzer and field sobriety test (i.e., walk in a straight line and perform a one leg stand) were also given at each therapy and assessment session to facilitate accurate reporting and prevent safety concerns. Mental health outcomes were assessed using the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) and National Youth Survey Self-Reported Delinquency Scale (SRD; Elliot, Huizinga, & Ageton, 1985). Sexual behavior and medication adherence were assessed with modules developed by ATN Working groups (Murphy et al., 2012).

### 3. Results

#### 3.1 Treatment Acceptability and Feasibility

**Retention/Session Attendance**—Fourteen out of 17 participants (82%) were retained in the study. Of these 17 participants, one failed to maintain contact with study staff and two withdrew for personal reasons (e.g., time commitment too great, overlapping commitments, family death). These three participants withdrew within the first two therapy sessions. The 17 participants attended an average of 11.4 ( $SD = 5.5$ ,  $median = 15$ ,  $range = 1-15$ ) out of 15 sessions.

**Participant Satisfaction**—The mean ratings for participant and study interventionist rated SEFs, respectively, were 2.7 ( $SD = 0.3$ ) and 2.5 ( $SD = 0.5$ ). On average, participants

and therapists had “strong to very strong” positive experiences with sessions. The mean for the WAI was 6.3 ( $SD=0.8$ ) at post-treatment, suggesting that, on average, participants “very often” agreed with their therapist on treatment goals, how to these reach goals, and bonded with their therapist.

**Treatment Feasibility/Therapist Fidelity**—On the CTRS, 93.5% of sessions reviewed were rated as competent (score  $>44$ ;  $M=51.10$ ,  $SD=5.24$ , range = 36 – 63). Further, 96.6% of sessions reviewed were rated as adherent ( $>80\%$ ;  $M=96.75$ ,  $SD=6.99$ , range = 56 –100). Thus, the intervention was delivered with high rates of competence and adherence.

### 3.2 Reinforcement Earned

The mean overall cost of the actual prizes selected in the CM lottery was \$190.40 per participant ( $SD= \$169.18$ , *Median* = \$151.00, *Range* = \$1.00 to \$676.00).

### 3.3 Symptomatic Improvement

A series of dependent sample t-tests were conducted to examine changes from baseline to end of treatment, and baseline to 3 month follow-up, on alcohol and marijuana. As can be seen in Table 2, across follow-up periods, participants reported statistically significant reductions in total number of days per month of alcohol use (sum of days per month used beer, wine, and liquor, respectively) as well as alcohol withdrawal symptoms, dependence symptoms, and related problems, with effect sizes in the medium to large range by three month follow-up. With regard to type of alcohol consumed, greater reductions were evident for beer and hard liquor relative to wine, likely because wine was consumed at low rates in the sample. With regard to marijuana use, there was a trend toward statistically significant reductions in days used per month at post-intervention (small effect) and marijuana related problems across follow-ups (medium to large effect). Mean changes were in the anticipated direction for marijuana dependence and withdrawal symptoms but did not reach statistical significance. No change in rate of positive urine drug screens was found (range of 65% to 71% across three assessment sessions; 69% to 83% across therapy sessions). All breathalyzer and field sobriety tests were negative suggesting that participants were not intoxicated at the time of study assessments or therapy sessions.

**Exploratory Analyses**—Dependent sample t-tests were conducted to examine changes from baseline to each follow-up on mental health symptoms, risky sexual behavior, and adherence to antiretroviral medication. Across follow-ups, participants reported significant reductions in depressive symptoms (medium effect) and delinquent behavior (large effect) (see Table 2). With regard to sexual risk behavior, the one female enrolled did not report any sexual behavior during the study period and all male participants reported sex with males. As can be seen in Table 2, statistically significant reductions were not found for the number of times participants had insertive or receptive anal sex *without* a condom with partners who were HIV negative or of unknown status. However, results were generally in the anticipated direction (small to medium effect sizes). We could not examine this question with regard to HIV positive partners because only one participant reported sexual intercourse with an HIV positive partner across follow-ups. Though the sample sizes were too low for meaningful statistics, 18.8% (3 out of 16) participants reported having unprotected vaginal or anal sex after drinking alcohol at baseline and only 7.1% (1 out of 14) at each follow-up. Only 6.7% (1 out of 15) of participants reported having unprotected vaginal or anal sex after using marijuana at baseline, compared to 9.1% (1 out of 11) and 8.3% (1 out of 12) at each follow-up. Adherence to antiretroviral medications in the last seven days remained high across assessments, 95.4% ( $n=10$ ), 95.7% ( $n=11$ ), and 93.2% ( $n=11$ ) at baseline, post-intervention, and three month follow-up, respectively.

## 4. Discussion

Though interventions have been developed for YPLH who use alcohol and drugs (Murphy et al., 2012; Rotheram-Borus et al., 2001a; 2001b), this is the first study, to our knowledge, to test a clinical intervention for those meeting clinical criteria for alcohol and marijuana use disorders. This is also the first study to test an integrated CBT/CM intervention tailored to YPLH with substance use disorders. Interventions tailored to YPLH are particularly important given unique factors that complicate treatment with this population (e.g., stigma, self-medication of HIV symptoms/medication side effects, etc.), which often exclude them from treatment research. Consistent with prior research among adults or non-infected adolescents, results of this open pilot trial provide preliminary evidence to suggest that a tailored, integrated CBT/CM intervention, delivered on-site in HIV community clinics by clinical staff, is feasible and acceptable to participants and community clinicians. In addition, this CBT/CM intervention shows potential promise in reducing substance use, particularly alcohol, and related problems.

Retention and treatment attendance were excellent for this population of YPLH. Fourteen out of 17 (82.4%) eligible participants were retained in the study assessment protocol, which is equal to or higher than the three month follow up assessment rates found in other substance focused interventions with YPLH (65.5% to 83%; Murphy et al., 2012; Rotheram-Borus, 2001a; 2001b). In addition, 100% of subjects in this study attended at least one session, and the average session attendance was 11.4 out of 15 sessions (76%). Our therapy attendance rates exceeded those reported in other studies with YPLH (Rotheram-Borus et al., 2001a; 2001b; Murphy et al., 2012), in which 62% to 76% of participants attended at least one session and average session attendance rates were 52% to 68%. It is possible that our better attendance and retention rate was due to the addition of the CM lottery component of our intervention, the motivational enhancement session, or the use of an individual, as opposed to group, modality.

The CBT/CM intervention also appeared to be well accepted by participants and community clinic therapists alike. Participants reported a “very strong” therapeutic alliance with their therapist. Further, session ratings from participants and therapists indicated that they had “strong to very strong” positive experiences with sessions. Also of importance is that the intervention could be delivered with high fidelity by clinicians who worked in community based HIV clinics. Given that this intervention was well received by participants *and* community clinicians, it holds great promise for potential dissemination in community based HIV clinics.

Study results were most promising for alcohol related outcomes. YPLH who participated in this CBT/CM intervention reported significant reductions in alcohol use, withdrawal symptoms, dependence symptoms, and related problems (i.e., relationship break-up, problems at work/school, medical problems, etc.) between pre-treatment and follow-up assessments. On average, they reported reducing the number of days per month they drank beer, wine, and/or liquor (summed across each type) from 14.8 to 8.4 over the course of three months. Consistent with results reported by Murphy et al. (2012), marijuana outcomes were less impressive relative to alcohol. A trend was evident for reductions in days used per month (post-treatment only) as well as marijuana related problems. Statistically significant reductions were not reported for marijuana withdrawal or dependence symptoms, though changes were in the anticipated direction.

There are a number of reasons for potential discrepancies in alcohol and marijuana related results. First, participants used marijuana at much higher rates than alcohol. Second, a few participants were medically prescribed marijuana by a physician, though they used at rates



that well exceeded their prescriptions. Even those without a prescription were aware that marijuana could reduce the negative side effects of their antiretroviral medication (e.g., nausea, appetite disturbance) as well as physical pain. Thus, for many participants, their goal was not to achieve abstinence but to reduce their use to a level that did not cause significant problems and impairment. This may explain why the most change in marijuana outcomes was in the area of marijuana related problems. Overall, these results may reflect that a more intensive intervention and/or higher reinforcement values are needed for heavy marijuana users in this population. Participants in this study selected an average of approximately \$190 in prizes through the CM lottery. Petry et al. (2005) suggest that an average maximal earning of up to \$300 per participant may yield good outcomes. Notably, alcohol results were quite promising with the reinforcement earned in the present study. Results may also reflect the possibility that many participants had a harm reduction as opposed to an abstinence goal for marijuana use, which for some was supported by their physicians and was legal. Under such conditions, significant reductions in marijuana were less likely in the present study. Still, given that medical use of marijuana is legal in many states, YPLH are prescribed marijuana to manage symptoms, and that many YPLH use at rates that exceed that prescribed, inclusion of YPLH in treatment studies is important.

Though not primary goals of this study, we also examined whether YPLH who participated in the intervention also reported reductions in co-occurring mental health symptoms, high risk sexual behavior, and compliance with antiretroviral medication over time. Promising preliminary results were achieved within each area. Though the focus of sessions were on substance use, many skills taught in each session could be applied equally well to mood and problematic behavior (e.g., problem-solving, cognitive-restructuring, relaxation, etc.) and at times were practiced in relation to these areas in the context of the session agenda. Attention to co-occurring mental health symptoms was also warranted in this sample. BDI-II scores indicated that nearly 60% of participants were in the moderate or significant range for depressive symptoms at baseline. Only three participants reported taking anti-depressant medication outside of the study, thus it is unlikely that it accounted for reductions in depressive symptoms reported in the sample as a whole. As depression predicts more frequent alcohol use, unprotected sex, and non-adherence to antiretroviral medication (Hosek et al., 2005; Murphy et al., 2001), and deviant behavior poses a significant threat to the community at large, attention to mood related issues and deviant behavior in the context of substance abuse interventions with YPLH is warranted. Indeed, reductions in depressive symptoms may have positively influenced study results in the areas of alcohol use, high-risk sexual behavior, and medication compliance.

Though study results are promising, the present study is subject to the limitations of Stage Ia behavior therapies development research (Rounsaville, Carroll, and Onken, 2001), including a small sample size, limited generalizability, and lack of a control condition. The small sample size limited power to detect change over time. In addition, though the sample was racially and ethnically diverse, it included primarily males, thus results may not readily generalize to females. Further, although the intervention was conducted at three sites, the results may not generalize to other HIV treatment sites or to the treatment of those unwilling to enter a clinical trial. This intervention would also be limited to HIV clinics that offer individual treatment (as opposed to only groups), accept insurance, and/or cover up to 15 therapy sessions. In addition, study interventionists were provided with a relatively high level of training and supervision, and thus results may not generalize to settings in which this level of professional service is not offered. Furthermore, given the lack of a control condition, it cannot be concluded that improvements were associated with the CBT/CM intervention. The mere passage of time as well as the concurrent provision of clinically indicated case management and medical services could account for reported changes. However, many of the participants had been in care at the ATN site for more than a year and

previous attempts to reduce substance use had been unsuccessful. Finally, only the treatment development team conducted fidelity checks, and study outcomes were primarily assessed via self-report, which further limits study conclusions.

Although it is premature to derive any major clinical implications from an open pilot trial, this study provides preliminary evidence for the acceptability and feasibility of an integrated CBT/CM intervention for YPLH with substance use disorders, delivered within community based HIV clinics by trained clinic staff. This intervention also holds promise in reducing substance use and related problems, particularly for alcohol, as well as common comorbid conditions, including depression and delinquent behavior. These results are particularly notable given that this is the first study to test a CBT/CM intervention tailored to YPLH with substance use disorders. Further, the sample included young adults, a group known to have the highest rates of most risk behaviors, including sexually transmitted infections and substance use disorders (Park, Mulye, Adams, Brindis and Irwin, 2006; SAMHSA, 2011). Additional testing of integrated CBT/CM interventions for YPLH with substance use disorders, as well as other potentially promising therapeutic approaches, is warranted. As substance use affects medication adherence and decision making around risky sexual behavior, any reductions in substance use among YPLH may prolong and save lives. Studies that compare interventions tailored for YPLH to standard non-tailored interventions would also be of scientific value and further inform future treatment development efforts in this area.

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**Table 1**Sociodemographic and baseline characteristics of study participants ( $n = 17$ )

Age (years)	
M (SD)	21.1 (1.3)
Birth Gender, $n$ (%)	
Male	16 (94.1)
Female	1 (5.9)
Racial background, $n$ (%)	
Black/African American	7 (41.2)
White	2 (11.8)
Other/Mixed Race	8 (47.1)
Hispanic origin, $n$ (%)	
Hispanic	7 (41.2)
Non-Hispanic	10 (58.8)
Length of earliest documented HIV infection (years)	
$M$ (SD)	3.4 (4.2)
Documented HIV prior to age 13	
$n$ (%)	1 (5.9)
Most recent CD4+ T-cell count (cells/mm <sup>3</sup> ), $n$ (%)	
<350	6 (35.3)
350–500	6 (35.3)
500	5 (29.4)
Most recent viral load (copies/ml), $n$ (%)	
<400	9 (52.9)
400–9999	1 (5.9)
1,000–9,999	2 (11.8)
10,000–99,999	3 (17.6)
100,000	2 (11.8)
Taking antiretroviral medication, $n$ (%)	
Yes	12 (70.6)
No	5 (29.4)
Taking psychiatric medication, $n$ (%)	
Yes	1 (5.9)
No	16 (94.1)
Alcohol use disorder (SSPQ-X), $n$ (%)	
Yes	14 (82.4)
No	3 (17.6)
Marijuana use disorder (SSPQ-X), $n$ (%)	
Yes	15 (88.2)
No	2 (11.8)
Other substance use disorder (SSPQ-X), $n$ (%)	
Yes	1 (5.9)

No

16 (94.1)

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Table 2

## Summary of Results for Main Outcomes and Exploratory Analyses

Outcomes	Baseline	Post-Tx	3 Month Follow-up		
	n = 17	n = 14 <sup>a</sup>	n = 14 <sup>a</sup>	n = 14 <sup>a</sup>	n = 14 <sup>a</sup>
	M (SD)	M (SD)	p	Pearson r	p
<b>Alcohol Use</b>					
Beer days per month	5.2 (7.4)	3.8 (5.4)	.174	.140	.042
Wine days per month	1.7 (3.1)	1.4 (2.5)	.575	.096	.292
Liquor days per month	7.9 (7.7)	5.1 (4.1)	.088	.281	.084
Alcohol days per month	14.8 (13.1)	10.4 (9.8)	.027	.252	.023
Withdrawal symptoms	3.2 (2.2)	1.1 (1.4)	.044	.444	.027
Dependence symptoms	2.6 (2.1)	1.8 (2.0)	.064	.264	.002
Problems	2.1 (1.8)	0.6 (0.9)	.002	.555	.002
<b>Marijuana Use</b>					
Days per month	20.5 (12.8)	14.2 (12.8)	.053	.169	.155
Withdrawal symptoms	6.3 (5.3)	5.6 (4.9)	.165	.264	.410
Dependence symptoms	4.2 (3.1)	4.0 (3.9)	.642	-.054	.773
Problems	2.5 (2.4)	1.1 (1.4)	.083	.298	.089
<b>Exploratory</b>					
BDI-II	17.9 (9.4)	10.1 (8.8)	.006	.361	.011
NYSRDS	11.5 (7.0)	2.2 (1.8)	<.000	.721	<.000
HIV-/? male partner					
NC insertive anal sex	4.0 (9.8)	0.8 (1.5)	1.000	.000	.346
NC receptive anal sex	2.3 (4.8)	0.4 (0.7)	.482	.205	.332

Note. Effect size range (Pearson r): .10 = small, .30 = medium, and .50 = large effect size.

<sup>a</sup>For withdrawal symptoms, means only included those who tried to cut down on alcohol and marijuana and provided data - n sizes are 13,11,12 (alcohol) and 11, 8, 10 (marijuana), respectively for baseline, post-treatment, and 3 month follow-up.

For marijuana dependence and problem scales, there were missing data,  $n = 15, 12, 10$ , respectively for baseline, post-treatment, and 3 month follow-up. For sexual behavior items, mean only includes those who had sex with an HIV- or unknown status partner ( $n = 9, 8, 8$ ) respectively, at baseline, post-treatment, and 3 month follow-up. BDI-II Beck-Depression Scale-II. NYSRDS = New York Self-Reported Delinquency Scale. ? = Unknown HIV status. NC = No Condom.