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HIV-Risk Reduction Intervention for Juvenile Offenders on Probation: The PHAT Life Group Randomized Controlled Trial

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Abstract

Objective—Juvenile offenders report high rates of sexual risk taking, increasing the possibility of HIV. This 2-arm group randomized controlled trial tested the efficacy of PHAT Life, a sexual risk reduction program, compared to a time-matched health promotion program for youth on probation.

Methods—Male and female 13–17 year olds ($M=16.08$; $SD=1.09$) recently arrested and placed on probation at an Evening Reporting Center were eligible for the study. Youth were 66% male, and 90% African American. Teens self-reported their sexual behavior (condom use, number of sexual partners) at baseline and six months. Retention was 85%.

Results—Youth were randomized to PHAT Life ($n=163$) or a health promotion program ($n=147$). Among youth reporting the highest risk at baseline (a composite measure of multiple partners and inconsistent condom use), those who received PHAT Life were over four times more likely than the control group to report a lower level of risk (i.e., no sex or one partner plus consistent condom use) by 6-months, $OR = 4.28$ with 95% $CI = 1.37–13.38$, $SE = 0.58$, $p = .01$. Among sexually active teens who reported sexual debut before 12 years-old, those who received PHAT Life reported significantly fewer sexual partners at 6-months than controls, partial eta squared = .32, $p = .002$.

Conclusions—Findings support PHAT Life's efficacy to reduce sexual risk for juvenile offenders on probation. Future research should examine how best to disseminate PHAT Life to ensure that it is self-sustaining within the juvenile justice system.

Keywords

Juvenile offenders; HIV prevention; sexual behavior

INTRODUCTION

Over 1.4 million youth were arrested in the United States in 2011 (Office of Juvenile Justice and Delinquency Prevention, 2013), and African Americans were disproportionately represented (U.S. Department of Justice - Federal Bureau of Investigation, 2010).

Involvement in the juvenile justice system is associated with serious negative health consequences, including higher rates of mental illness (Abram et al., 2003; Aalsma et al., 2015; Teplin et al., 2002), drug/alcohol use (Belenko et al., 2008; Teplin et al., 2005), unintended pregnancies (Committee on Adolescence, 2011), and sexually transmitted infections (STI) (Wiehe et al., 2013). While incarcerated teens typically receive medical care during detention, 80% of arrested youth are released on probation (Snyder & Sickmund, 2006) without the same health services despite a similar high-risk profile (Donenberg et al., 2015) and STI prevalence (Belenko et al., 2008). As a result, probation teens continue to engage in sexual behavior and drug/alcohol use that amplifies the risk of STI/HIV for themselves and their communities. Evidence-based interventions are imperative to alter young offenders' poor long-term trajectories (Aalsma et al., 2015; Abram et al., 2009).

Few STI/HIV prevention programs exist for youth involved in the justice system (Tolou-Shams et al., 2010). Tested interventions report low retention rates, small to no effects on behavior (Bryan, Schmiede, and Broaddus, 2009; Goldberg et al., 2009; Robertson et al., 2011; Tolou-Shams et al., 2011; Hong, Voisin, and Crosby, 2015), and intervention decay (Hong, Voisin, and Crosby, 2015; Robertson et al., 2011; Tolou-Shams et al., 2010). Methodological limitations further impede general conclusions (DiClemente et al., 2014). Hurd et al. (Hurd et al., 2010) compared the effectiveness of a 4- versus 8-session intervention in young offenders, and found change in HIV-related knowledge, self-efficacy, and behavioral intentions immediately post-intervention, but there were no risk behavior outcomes or follow-up data. In a pilot HIV prevention program (Mouttapa et al., 2010), incarcerated males reported increased condom use in the intervention condition. Unfortunately, teens with mental illness and drug dependency were excluded from the study, limiting generalizability as the majority of young offenders report co-occurring mental health and substance use problems (Abram et al., 2003).

A more recent pilot study tested the effects of a brief family-based HIV prevention intervention for substance using juvenile offenders (Tolou-Shams et al., 2017). Follow-up data suggested the intervention might lead to decreased risky sexual behavior. However, both the sample and the effect sizes were small, and effects were only measured out to three months. Similarly, Rowe et al. (2016) tested a family-based HIV-risk reduction program for drug-involved young offenders recruited in two detention centers with assessments out to 42 months. At one site, teens who reported sexual activity at baseline showed significantly greater decreases in overall frequency of sexual acts and number of unprotected sexual acts in the intervention than control group. Significant group differences did not emerge at the second site. Beyond this failure to generalize intervention effects across sites, the study suffered small sample and effect sizes.

To date, the most comprehensive trial (Bryan, Schmiede, and Broaddus, 2009) evaluated a sexual and alcohol risk reduction program for detained youth. At 6-month follow-up, youth in the two experimental arms reported less risky sex than youth in the control group, but effects were small. More importantly, 65% retention diminished the study's external validity. Promising multi-behavior intervention trials addressing risky sex in justice-involved youth have been described (Callahan et al., 2013; Magnan et al., 2013), but to our knowledge

positive longitudinal outcomes have thus far not been reported. Well-designed efficacy trials with strong retention and sexual behavior outcomes are sorely needed.

Resources for HIV and substance use prevention programs within juvenile justice are limited. Competing needs underscore the importance of evidence-based interventions to help administrators decide how to distribute funds most efficiently. No single intervention works for everyone, and thus, science has shifted to focus on what works for whom and when (World Health Organization, 2010). Targeting interventions to those who can benefit the most is likely to be prudent and cost effective. For example, programs that help the highest risk populations may yield the greatest public health benefit. It is therefore important to examine treatment outcomes among particularly vulnerable subgroups.

The current study builds on pilot data supporting PHAT Life (Preventing HIV/AIDS Among Teens), a uniquely tailored HIV/STI, mental health, and substance use prevention program for arrested youth placed on probation (see Donenberg et al., 2015). This report presents sexual behavior outcome data of a 2-arm group randomized controlled trial of PHAT Life with urban youth on probation in Chicago Cook County, the second largest juvenile justice system in the United States. We focused on the two most well-established behaviors associated with STI and HIV acquisition—condom use and number of sexual partners—in order to provide a robust evaluation of PHAT Life’s efficacy. In the absence of a gold standard to characterize HIV-risk from sexual risk taking, we used two approaches. First, we examined sexual risk broadly by creating a summary score that combined degree of condom use (always versus less than always) and number of sexual partners in the past 6 months. Composite scores have been used in previous research to provide a robust examination of sexual risk taking as compared with a focus on specific behaviors (Bonar, Walton, Epstein-Ngo, Zimmerman, Blow, & Cunningham, 2017; Wilson et al., 2012; Woods-Jaeger et al., 2013). Aside from abstinence, always using a condom is the most reliable strategy to prevent HIV transmission. Anything less than always using a condom introduces risk, particularly as the number of partners increases. The summary score used here therefore permitted the exploration of four risk categories from no/low risk to high risk (see below). The highest risk category captured youth who reported multiple partners plus inconsistent condom use, representing the subpopulation with greatest transmission risk. We included youth who reported no sexual activity and lower-risk behaviors in order to evaluate the full sample and to help rule out the possibility that the intervention was associated with increased sexual risk taking among low-risk youth. The second approach examined the impact of PHAT Life on specific risk behaviors separately, namely condom use (always versus less than always) and number of sexual partners.

We were especially interested in the effects of PHAT Life on youth at highest risk, namely youth who reported sex with multiple partners and inconsistent condom use and youth who reported first sex before age 12. Many studies link early sexual debut with increased STI/HIV risk due to its association with multiple sex partners, decreased condom use, and sex with older partners (particularly for females), as well as biological vulnerability (Epstein, Bailey, Manhart et al., 2014; Magnusson, Masho, and Lapane, 2012). These two groups of young offenders represent subpopulations whose behavior is arguably the most important to change and has the greatest opportunity for improvement (World Health

Organization, 2010). Consistent with most HIV-risk reduction efforts (e.g., needle exchange, condom distribution), PHAT Life emphasized harm reduction versus abstinence. Thus, data analyses examined change from a harm reduction perspective (Bennett, 2014) recognizing that from a public health standpoint elimination of risk behavior (e.g., abstinence or change from highest risk to no risk) is ideal. However, ample evidence indicates that abstinence-only programs are not effective (Santelli, Kantor, Grilo et al., 2017), and any decrease in HIV-risk behavior (e.g., going from multiple partners to one partner) can lead to meaningful reductions in HIV transmission risk (Weller and Davis-Beaty, 2002).

We hypothesized that for juvenile offenders on probation who scored in the highest sexual risk category at baseline (multiple partners and inconsistent condom use), those who received PHAT Life would be significantly more likely than teens in the control group to reduce their risk by moving into one of the two lowest categories (ranging from no sex to one partner plus consistent condom use) by 6-month follow-up. Second, regarding specific risk behaviors among sexually active teens, we expected that PHAT Life participants would report significantly more consistent condom use and, separately, a significantly greater reduction in number of sexual partners from baseline to 6-months than teens in the control group. Lastly, among the subset of youth who reported early sexual debut, we expected greater improvement on all three outcomes among PHAT Life participants than controls.

METHODS

PROCEDURE

This study reports on a 2-arm group randomized controlled trial with crossover of intervention site and time. Participants were recently arrested males and females (N=310), 13–17 years-old, placed on probation. Recruitment utilized two strategies. In the first approach, teens were recruited from five of Chicago Cook County's Evening Reporting Centers (ERC). ERC are community-based probation programs run by an outside organization as an alternative to detention following arrest. Minors can be court-ordered to participate in the ERC from 5 to 28 days in lieu of detention, but no specific criteria exist to determine who receives this judicial order. No formal data exist on youth remanded to the ERC, but many of the minors have been charged in violation of a pre-existing probation order and are awaiting a hearing, or they are on a warrant and presenting to the court for disposition of the warrant.

The ERC offer single-sex (n=4 male; n=1 female), on-site, after school supervision and programming for up to 28 days while teens await sentencing. Programming at the ERC is variable across the five facilities, but the goals are to help youth remain arrest-free, minimize risk-taking and delinquent behaviors during and beyond ERC participation, reduce recidivism and the likelihood of re-arrest, and ensure that teens attend their scheduled court appearance. Youth attending the ERC typically live at home, and transportation to and from the ERC is provided by the Department of Juvenile Probation and Court Services. Research staff presented the project to all youth present at the ERC as a group, and interested teens provided parental contact information. Staff telephoned parents of interested youth and obtained verbal consent to formally assent youth. Ninety-five percent of consenting parents also received home visits to review the consent documents in detail and provide written

consent. Youth written assent and parental verbal and/or written consent was obtained for all participants.

The second recruitment strategy focused exclusively on females, who constitute only 14% of arrested youth annually in Cook County, and are less likely to be remanded to the ERC than males. Probation officers distributed study fliers to girls in their caseload, taking care not to promote the study. The officers collected responses (indicating yes/no interest to learning more) in a sealed envelope. Probation officers distributed 172 flyers; 101 girls expressed interest.

All participants completed a 2-hour baseline assessment within one week prior to intervention delivery and then again 6-months after baseline. Youth recruited at the ERC completed the baseline assessment at the ERC, and girls recruited through probation flyers completed the baseline assessment at a convenient location determined by the young women (e.g., home). Participants in both intervention conditions received \$35 and \$40 at baseline and 6-month follow up assessments respectively as compensation for their time, but youth were not paid to attend the intervention or control programs.

Both intervention arms were delivered in single sex groups over two weeks. The groups were conducted at the ERC for youth recruited at the ERC, or the University of Illinois at Chicago (UIC) for girls recruited through flyers. All sites delivered both conditions to control for potential site-related differences, but to minimize contamination across treatment groups, we alternated delivery of each arm. No youth participated in both conditions. Facilitators were research assistants with a bachelors or Masters degree. All study procedures were approved by UIC's Institutional Review Board, with special attention to vulnerable populations. The study obtained a Certificate of Confidentiality as an additional measure to protect participant confidentiality.

PARTICIPANTS

Figure 1 shows the participant flow from initial recruitment through 6-month follow up. Recruitment began in June, 2011 and was completed in August, 2015. Six-month follow-up interviews were completed in April, 2016. Youth were eligible to participate if they: a) understood the consent/assent process; b) spoke English (the assessments are normed for English speakers); c) provided assent to participate; and d) had parental/legal guardian consent. Furthermore, teens recruited at the ERC had to be in attendance at the ERC for at least 3 of the 8 intervention sessions based on days remanded by court order.

As noted in Figure 1, 692 youth participated in the research presentation at the ERC (n=520) or received a flyer (n=172; girls only). Of the 565 youth interested in the study, 81% were eligible (n=458); ineligibility was due mainly to < 3 days at the ERC. Parental consent was obtained for 85% (n=389) of eligible and interested youth, and 92% (n=356) of these youth formally assented. Ninety-eight percent of assented youth (n=349) completed the baseline assessment. Eleven percent of the youth who completed the baseline assessment (n=39) left the ERC prior to randomization (e.g., violated probation, re-arrested, did not have enough participants to form a group), and thus, the final sample included 310 teens randomized to the PHAT Life (n=163) or control (n=147) group.

Most youth were male (66%) and African American (90%), and 86% qualified for free lunch at school. Retention at 6-months was 85%. Adolescents self-reported their mental health symptoms on the Youth Self-Report (Achenbach & Rescorla, 2001). The average respective T-scores on internalizing, externalizing, and total problem scales were 54.05 ($SD = 10.53$), 60.34 ($SD = 10.66$), and 56.86 ($SD = 10.64$). Based on the T-scores, 22% ($n = 69$) and 43% ($n = 134$) of youth met clinical criteria for internalizing and externalizing symptoms, respectively. Thirty-three percent ($n = 103$) met clinical thresholds for total problems. Rates of substance use were high; 63% ($n = 194$) of youth reported ever using alcohol, and 76% ($n = 233$) endorsed lifetime marijuana use. Youth reported a variety of most recent offenses at baseline and were permitted to list more than one. Teens most often reported person-related crimes (i.e., assault and battery) (41%), followed by public order offenses (e.g., gun possession) (22%), property-related crimes (i.e., theft, trespassing) (20%), drugs (9%), and other offenses (8%). These rates are comparable to youth on probation nationally (Office of Juvenile Justice and Delinquency Prevention, 2013).

MEASURES

Mental Health—Mental health was assessed with the Youth Self-Report (YSR) (Achenbach & Rescorla, 2001), a widely used measure of adolescent behavioral and emotional problems. The reliability and validity of the YSR, normed for children 11–18 years, has been extensively documented (<http://www.aseba.org/ordering/reliabilityvalidity.html>). Each item on the YSR was scored from 0 (*not true*) to 2 (*very true or often true*). Three broadband scales—internalizing, externalizing, and total problems—were used to describe the present sample. Respective scores on these three scales range from 0–62, 0–64, and 0–210, with higher scores indicating increased symptoms. The total problems scale included all items from the internalizing and externalizing scales, along with items assessing social, thought, attention, and other problems. Each YSR scale generates a raw and T score. In the present study, T scores ≥ 63 were considered clinically significant. Coefficient alpha for internalizing, externalizing, and total problems in the baseline sample was .88, .89, and .95, respectively.

The AIDS-Risk Behavior Assessment (ARBA) (Donenberg et al., 2001) assesses teens' self-reported sexual behavior using audio-computer assisted self-interview to increase anonymity and privacy. Self-reported sexual behavior closely approximates actual behavior, especially when questions are administered using computer technology (Beck, Guignard, & Legleye, 2014; Kelly, Hewett, Mensch et al., 2014). The ARBA has been used extensively with ethnically diverse low-income youth in psychiatric care (Starr, Donenberg, and Emerson, 2012) and juvenile justice (Udell, Donenberg, and Emerson, 2011). Youth reported on their vaginal/anal sexual behavior over the past six months at baseline and 6-month follow-up. Data analyses evaluated change in three primary outcomes: sexual behavior summary score, number of partners, and inconsistent condom use.

Sexual Summary Score—The sexual behavior summary score combines two behaviors associated with HIV transmission, number of sexual partners and inconsistent condom use, as reported by youth. The summary score was intended to capture a broad range of sexual behavior and included the full sample. Scores ranged from 0 to 4 and represented level of

sexual risk, with 0=no sexual behavior, 1=one partner and consistent condom use, 2=one partner and inconsistent condom use, 3=multiple partners and consistent condom use, and 4=multiple partners and inconsistent condom use.

Number of Sexual Partners—Participants reported number of sexual partners over the last six months at baseline and at six months. For analyses testing change in number of partners over this time, only youth who reported engaging in vaginal/anal sex at both time points were examined.

Inconsistent Condom Use—Participants indicated whether they used condoms consistently (always/less than always) over the past six months at baseline and at six months. When testing group differences in inconsistent condom use at six-month follow-up, only participants who reported engaging in vaginal/anal sex over the previous six months were considered.

INTERVENTION AND CONTROL PROGRAMS

PHAT Life—PHAT Life was systematically adapted from three CDC-documented evidence-based interventions for high-risk youth: Rikers Health Advocacy Program (Magura, Kang, and Shapiro, 1994), Street Smart (Rotheram-Borus et al., 2003), and Project STYLE (Brown et al., 2014). Program development and modifications were informed by focus groups, a series of pilot tests, input from youth and adult advisory boards, and careful attention to cultural context (see Donenberg et al., 2015). PHAT Life is an 8-session comprehensive sex education program guided by a combination of social learning theory (Bandura, 1986) and a Social-Personal Framework (Donenberg and Pao, 2005). Content targets broad psychosocial factors implicated in HIV-risk behavior, including knowledge, attitudes, and beliefs about HIV/AIDS and substance use, emotion regulation, peer influence, and partner relationships. PHAT Life promotes positive attitudes toward HIV prevention, self-efficacy to reduce risk, affect management, optimism about the future, and less substance use and sexual risk taking.

The curriculum is delivered in single sex groups and each session lasts 90–120 minutes. Intervention activities are interactive and employ role-plays, videos, games, and skill development activities (e.g., assertive communication) to facilitate learning. Groups are an effective strategy to challenge negative peer norms and provide social support when discussing sensitive topics (Burleson, Kaminer, and Dennis, 2006). Youth identify personal risk-related triggers, including people (e.g., parents, friends, sexual partner), places (e.g., school, home), situations (e.g., parties, being alone), and moods (e.g., depression, anxiety, anger), and develop plans to anticipate and manage them. Mental health is addressed in several ways. For example, participants use a thermometer to label their feelings along a continuum of “hot” and “cold” and then note how the degree of feeling impacts their decisions and risk behavior. Youth learn strategies to manage their feelings more effectively in order to bring those in the “hot” zone into the “cool” zone. Similarly, the impact of specific moods (e.g., depression) on sexual risk and substance use is discussed and strategies to cope more effectively are considered. Youth practice skills such as condom use and assertive communication to reinforce and encourage applications in real life settings. The

impact of drugs and alcohol on accurate condom use is illustrated using goggles and rubber gloves. Videos with ethnically matched and representative youth were carefully selected for cultural relevance, and healthy versus unhealthy relationships are discussed. Youth practice effective communication with peers and partners to avoid risk and increase prevention behavior (e.g., drug refusal).

Recognizing the transience of youth in the juvenile justice system and the possibility that teens may not attend the full program (e.g., differing probation lengths, sentencing from probation to detention), each PHAT Life session was designed to stand alone, whereby attendance at prior sessions was not required to understand or benefit from the current session. Each session began with the same two tasks (i.e., “inside/outside check-in” to describe feelings and outward appearance, learning goal), a review of group expectations, and an invitation to post questions for later discussion. Next, each session targeted theoretical issues related to HIV-risk, such as HIV knowledge or healthy relationships.

Facilitator Training: Individuals with a background in psychology and previous experience working with youth co-facilitated each group. Group facilitators received over 20 hours of training in group dynamics, delivering manualized interventions, basic HIV/STI knowledge, and intervention content. Facilitators participated in multiple practice sessions, alternating between leading the session and being a participant. Each facilitator conducted all of the sessions following a detailed manual, received extensive feedback from trainers, and was deemed fully trained by the project director. Sessions were observed by a third trained facilitator and rated for fidelity to the manual. Facilitators could be male or female for the boys’ groups. However, due to high rates of previous sexual trauma exposure among probation girls (Wilson et al., 2013), only female facilitators led the girls’ groups. An independent observer rated facilitators on fidelity to the curriculum. Mean ratings across all sessions indicated 95% fidelity.

Health Promotion—The health promotion control group was matched in time and attention to PHAT Life (i.e., eight sessions each lasting approximately 90–120 minutes). Delivered in a group format, the health promotion intervention focused on adolescent cigarette smoking, marijuana use, nutrition and eating, exercise, and violence, and utilized the same interactive approach with videos and games. The only overlap with the PHAT Life curriculum was a brief presentation in session one about the facts of HIV/AIDS and condom use. Youth did not receive hands-on practice, role plays, or personalized plans. We elected to provide HIV/AIDS information given the high-risk profile of the population, although we recognize that this may have attenuated group comparisons. Still, information alone is typically insufficient to produce behavior change, and we decided our obligation to provide the information outweighed the statistical benefit of not providing it.

DATA ANALYSES

Data analyses were performed in SPSS version 24 (IBM, 2016). Power analyses determined the sample size needed to compare PHAT Life and the health promotion program based on a dichotomous outcome. Using a two-sided test with $\alpha = .05$, we had 80% power to detect medium effects at 80% retention ($r=1.80$) assuming 20% with a positive outcome in the

control group. Given the small numbers of early sexual debut youth (specific *ns* provided below by model), analyses on this subgroup should be considered preliminary.

To test change in the sexual risk summary score, two dichotomous sexual risk variables were created. The first identified participants who moved from the highest sexual risk group at baseline (i.e., a score of 4 on the sexual risk summary) to one of the lowest two risk groups by six-month follow-up (i.e., a score of 0–1). The second indicated participants who moved from a lower sexual risk group at baseline (i.e., 0–3) to the highest risk group (i.e., 4). Logistic regression examined if treatment predicted change in sexual risk behavior in the full sample ($n = 260$), and then among youth who reported early sexual debut ($n = 42$).

Repeated measures ANOVA tested the effect of the intervention on number of sexual partners. Time was entered as the within-subject factor and arm as the between-subject factor. This method was selected over simple tests of differences in group means because it compared differences in slopes between groups, providing dynamic insight into behavior change over time. The repeated measures ANOVA was run first for youth who reported vaginal/anal sex in the past six months at both time points ($n = 103$), then in the subset who also reported early sexual debut ($n = 26$). To provide an estimate of effect size, we calculated the partial eta squared value of each predictor from the repeated measures ANOVA. Partial eta squared indicates the ratio of variance accounted for by an effect plus its associated error variance. Values $< .06$ and $.14$ may be considered small and medium effects, respectively, and values $> .14$ large effects (Gray & Kinnear, 2012).

Logistic regression tested if treatment predicted condom use at six-month follow-up, first for youth who reported vaginal/anal sex at follow-up ($n = 120$), then in the subset who also reported early sexual debut ($n = 26$).

We tested if cohort (i.e., the group in which participants received the intervention or control program) was associated with any of the outcomes described above. For each binary outcome, this was accomplished via chi-square test of independence. For each continuous outcome, a one-way ANOVA was created with cohort as the between-subject factor. Cohort was not significantly associated with any outcome in either the full sample (p -values ranged from .37 to .87) or the subsample that reported early sexual debut (p -values ranged from .34 to .94). We thus did not account for cohort in the models reported below.

RESULTS

At baseline, most males (73%, $n = 147$) and females (57%, $n = 60$) endorsed lifetime vaginal/anal sexual activity. Of those, the majority (75% males, 73% females) reported vaginal/anal sex in the past six months. Among sexually active youth in the past six months ($n = 153$), 41% ($n = 63$) reported not using a condom at last sex. Figure 2 presents the total number of sessions attended by youth from each arm. Seventy-five percent ($n = 231$) completed at least four sessions, and 22% ($n = 67$) attended all eight; the average number of sessions completed was five. There was no significant difference between the intervention and control groups in mean number of sessions completed. Number of sessions completed did not significantly predict any of the sexual health outcomes, and was not significantly

associated with baseline mental health (i.e., symptoms of internalizing, externalizing, or total problems) or substance use (i.e., ever having using alcohol or marijuana) (all p -values $> .05$).

Descriptive statistics are presented in Table 1. For the full sample, independent sample t -tests and chi-squared tests showed that randomization was successful on all variables (p -values $> .05$), with the exception of age at baseline and age of sexual debut. The intervention group was significantly older at baseline (mean = 16.20 years, $SD = 1.09$) than the control group (mean = 15.95 years, $SD = 1.07$), $t(308) = 2.02$, $p = .04$. Intervention youth also reported a significantly later age of first vaginal/anal sex (mean = 13.15 years, $SD = 2.26$) than did controls (mean = 12.36 years, $SD = 3.16$), $t(202) = 2.06$, $p = .04$. Baseline age ($n = 310$) and age of first sex ($n = 204$) were thus included as covariates in the prospective models run in the full sample.

In terms of early sexual debut, a chi-squared test confirmed there was no significant difference between arms in the full sample, $p > .05$. All youth who reported early sexual debut were male. This item was worded to exclude experience of child abuse. Tests of randomization revealed no differences on any baseline variable across arms (including age at baseline; p -values $> .05$) eliminating need for consideration of covariates in these prospective tests.

SEXUAL RISK SUMMARY SCORE

Among youth in the full sample who scored in the highest sexual risk category at baseline (see Table 2), those from the intervention were significantly more likely than controls to have moved into one of the two lowest risk categories by follow-up, odds ratio (OR) = 4.28 with 95% confidence interval (CI) = 1.37–13.38, standard error (SE) = 0.58, $p = .01$ (see Figure 3). This held above and beyond the effects of baseline age, OR = 2.52 with 95% CI = 1.37–4.65, SE = 0.31, $p < .01$, and age of first sex, OR = 0.87 with 95% CI = 0.75–1.02, SE = 0.08, $p = .08$. For early sexual debut youth who were in the highest sexual risk category at baseline, the effect of the intervention did not reach significance in predicting movement to a lower sexual risk category by follow-up, OR = 7.86 with 95% CI = 0.83–74.48, SE = 1.15, $p = .07$.

We conducted follow-up analyses to test for any differences between arms in change from the lower sexual risk category at baseline (i.e., 0–3) to the highest risk group by follow-up (i.e., 4). In the full sample, the effects of arm, OR = 0.31 with 95% CI = 0.06–1.57, SE = 0.84, $p = .16$, baseline age, OR = 0.75 with 95% CI = 0.36–1.59, SE = 0.38, $p = 0.46$, and age of first sex, OR = 1.04 with 95% CI = 0.80–1.36, SE = 0.14, $p = .77$ were all non-significant in predicting increased sexual risk. Similarly, arm was not associated with movement from the lower to highest sexual risk category when examining only youth with early sexual debut, OR = 0.00 with 95% CI = 0.00, SE = 220.90, $p = .99$. There was thus no evidence that the intervention was associated with an increase in sexual risk taking among youth engaged in low-risk behaviors, including abstinence, at baseline.¹

¹In addition to testing if the intervention was associated with change from the range of lower sexual risk scores (i.e., 0 through 3) to the highest score (i.e., 4), we also tested if the intervention was associated with change from each individual sexual risk score (e.g., 0

SEXUAL PARTNERS

Among sexually active youth, the interaction of time by arm did not reach significance in predicting change in number of sexual partners over 6-months, $F(1, 98) = 3.71$, partial eta squared = .04 with 95% confidence interval (CI) = .00–.13, $p = .06$ (see Figure 4, left panel). The main effect of time, $F(1, 98) = 7.40$, partial eta squared = .07 with 95% CI = .01–.18, $p = .01$, but not arm, $F(1, 98) = 1.30$, partial eta squared = .01 with 95% CI = .00–.09, $p = .26$, baseline age, $F(1, 98) = 0.16$, partial eta squared = .00 with 95% CI = .00–.05, $p = .70$, or age of first sex, $F(1, 98) = .00$, partial eta squared = .00 with 95% CI = .00–.00, $p = .97$, was significant.

Among sexually active youth who reported early sexual debut, the interaction of time with arm was highly significant in predicting change in number of sexual partners, $F(1, 24) = 11.52$, partial eta squared = .32 with 95% CI = .05–.54, $p = .002$. The reduction was significantly greater in the intervention than the control group (see Figure 4, right panel). The main effects of time, $F(1, 24) = 1.71$, partial eta squared = .07 with 95% CI = .00–.29, $p = .20$, and arm, $F(1, 24) = 2.27$, partial eta squared = .09 with 95% CI = .00–.32, $p = .15$, were not significant.

CONDOM USE

Contrary to expectations, there was no significant difference between the intervention and control arms in inconsistent condom use at six-month follow-up. This was true in both the full sample of sexually active youth, OR = 0.56 with 95% CI = 0.25–1.24, SE = 0.41, $p = .15$, and in the subset who also reported early sexual debut, OR = 1.36 with 95% CI = 0.29–6.36, SE = 0.79, $p = .70$. In the first model, the effects of the covariates were also non-significant: baseline age OR = 0.96 with 95% CI = 0.61–1.53, SE = 0.24, $p = .87$; age of first sex OR = 1.01 with 95% CI = 0.85–1.20, SE = .09, $p = .88$.

In order to better understand this absence of significant findings and inform future investigation, we conducted follow-up tests examining potentially relevant baseline corollaries of inconsistent condom use in the full sample. Baseline age, OR = 1.26 with 95% CI = 0.91–1.74, SE = 0.17, $p = 0.17$ and age of first sex, OR = 1.02 with 95% CI = 0.89–1.17, SE = 0.07, $p = .75$, both showed non-significant zero-order associations with baseline condom use. Significant zero-order associations did emerge between inconsistent condom use and mental health as measured by internalizing, OR = 1.08 with 95% CI = 1.03–1.13, SE = 0.02, $p < .01$, externalizing, OR = 1.04 with 95% CI = 1.00–1.08, SE = 0.02, $p < .05$, and total problems, OR = 1.02 with 95% CI = 1.01–1.04, SE = 0.01, $p < .01$. In order to help determine which symptoms were most strongly associated with condom behavior, internalizing and externalizing symptoms were entered into a single model. Inconsistent condom use continued to show a significant link with internalizing, OR = 1.07 with 95% CI = 1.01–1.13, SE = 0.03, $p = .02$, but not externalizing, OR = 1.01 with 95% CI = 0.97–1.06, SE = 0.02, $p = .53$, symptoms.

or, separately, 1) to any of the higher scores. These analyses were run first in the full sample, then in the early sexual debut group. In each case, there was no significant effect of arm (all p -values $> .05$). The follow-up tests thus further supported the conclusion that the intervention did not appear to increase sexual risk.

DISCUSSION

This study presents 6-month follow-up data on sexual risk outcomes following a 2-arm group randomized controlled trial for youth on probation who received a HIV-prevention intervention—PHAT Life—versus an attention-matched health promotion program. Findings revealed less sexual risk taking among PHAT Life participants who reported the most high-risk sexual behavior at baseline, namely a summary score inclusive of inconsistent condom use and multiple partners, and fewer sexual partners among youth who reported sexual initiation before 12 years old. Both effects were very large. Compared to the control group youth, those from PHAT Life were 4.3 times more likely to move from the highest sexual risk category at baseline to one of the two lowest levels of risk by follow-up. Among early sexual debut youth, the intervention accounted for an impressive 32% of the variance in reduction in number of sexual partners from baseline to six months. In an environment of limited resources, juvenile justice administrators must prioritize spending and improve efficiency. Reducing sexual risk taking among the most vulnerable youth is likely to have the greatest public health impact. These data provide evidence for the efficacy of PHAT Life for young offenders on probation engaged in the highest risk behavior and those who initiated sexual activity before 12 years old.

Analyses examined outcomes in three groups of young offenders on probation to facilitate a more targeted evaluation of intervention effects on subgroups. Among PHAT Life teens who reported sexual debut before 12 years old, the reduction in number of partners was highly significant compared to controls despite the small sample size. Surprisingly, there was no evidence of group differences in inconsistent condom use among sexually active teens, including early sexual initiators. These findings are however consistent with some previous intervention studies (Tolou-Shams et al., 2011) and underscore the difficulty in changing condom use behavior. It is possible that PHAT Life's curriculum can be strengthened to address the importance of consistent condom use more effectively. Given that positive cross-sectional associations emerged between internalizing symptoms and condom use in our baseline sample, it is possible that increased focus on reductions in internalizing symptoms in particular could help improve future condom use.

Study limitations require cautious interpretation of the results. There were more males than females, and participants were mostly African American. Results may not generalize to other offenders (e.g., incarcerated) or non-offending youth, but the sample included key populations involved in juvenile justice who are highly vulnerable to STI/HIV. Self-reported vaginal and/or anal sex at baseline was high for males (73%) and females (57%), consistent with prior reports of arrested youth on probation (Belenko et al., 2008). Participants received other programming at the ERC in addition to the intervention or control conditions, and this may have attenuated the effects of PHAT Life. Relatively small sample sizes, particularly among the subgroups, may have impeded our ability to detect significant effects. Similarly, our significant finding of fewer sexual partners among early debut youth from the intervention versus control relied on a relatively small sample. However, the large effect size from this model somewhat offsets concern. We did not collect biologically confirmed STI data at 6-month follow up, and self-reported sexual behavior may suffer social desirability biases. However, evidence indicates general correspondence between biological tests and

self-reported sexual behaviors (DiClemente et al., 2011). Finally, we did not examine the interactions between mental health symptoms and/or substance use and risky sexual behavior; this remains an important direction for future research.

In the context of these limitations, this study has numerous strengths. Previously reported interventions for youth involved in juvenile justice have often demonstrated small behavioral effects (e.g., Tolou-Shams et al., 2010; 2017). Findings in this study were robust and consistent, included multiple high-risk indicators, and held for both a summary risk score as well as a specific risk behavior (multiple partners). Three aspects of PHAT Life may have distinguished it from existing interventions for young offenders, positioning it to reduce sexual risk taking compared to previous research. First, PHAT Life simultaneously addressed a range of HIV risk-related behaviors, rather than targeting a single behavior in isolation (e.g., only condom use). This approach is consistent with Problem Behavior Theory (Jessor & Jessor, 2016) underscoring that risk behaviors often co-occur among youth. PHAT Life may have been more effective because it treated sexual risk taking as part of a syndrome cluster with substance use and mental health problems rather than an isolated phenomenon. Problem behaviors exacerbate each other, so greater gains may occur in any given area when problems are addressed simultaneously rather than individually. Second, in contrast to interventions delivered in highly controlled settings, PHAT Life was implemented within the Evening Reporting Centers and only after extensive development and tailoring, feedback from youth and stakeholders, and pilot testing (Donenberg et al., 2015). These factors may have enhanced its generalizability and acceptability leading to more positive outcomes. Third, the intervention was highly personalized and applied, allowing youth to translate intervention concepts into concrete plans relevant to their daily lives. Other strengths of the study include high retention (85%) at 6-months, and findings were strongest for the most vulnerable teens within an already high-risk population, providing needed guidance for decisions about targeted programs. Finally, this study improves upon earlier research by providing evidence of sustained effects, and by employing a strong design with an equally time intensive control group to reduce confounds.

Conclusion

Over a million young people are involved in the justice system annually. Juvenile offenders on probation are at elevated risk for STI and HIV and experience significant health problems long into adulthood, exacerbating neighborhood and community disparities. Effective interventions are essential to mitigate these negative trajectories. In a context of limited resources, policy makers need evidence to support decisions about who to target and which programs to implement. PHAT Life reduced sexual risk behavior among juvenile offenders on probation, with impressive effect sizes and high rates of retention. Future efforts should examine how best to disseminate PHAT Life to ensure that it is self-sustaining within the juvenile justice system.

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Figure 1.
Consolidated standards of reporting trials (CONSORT) summary of participant enrollment retention at 6-month follow-up.

Note: PO=flyer distributed by probation officer; DCFS=Department of Child and Family Services.

Figure 2. Number of juvenile offenders who completed each number of intervention or control sessions. There were no significant differences between the intervention ($n = 163$) and control ($n = 147$) arms in the total number of sessions completed.

Figure 3.

Proportions of juvenile offenders from the intervention and control arms who moved from the highest level of sexual risk (i.e., multiple partners and inconsistent condom use) at baseline to a lower level of risk (ranging from one partner and inconsistent condom use to no sex at all) by six-month follow-up.

Figure 4. Numbers of sexual partners over the past six months at baseline and at six-month follow-up among all juvenile offenders engaging in vaginal/anal sex (left), and among the subset who also reported early sexual debut (right). Numbers presented for all youth (left) accounted for baseline age and age of sexual debut.

Table 1

Descriptive Statistics for Sexual Behaviors and Demographics in the Full Sample

Variable	Full Sample			Early Sexual Debut		
	Total Sample <i>n</i> = 310	Intervention <i>n</i> = 163	Control <i>n</i> = 147	Total Sample <i>n</i> = 43	Intervention <i>n</i> = 20	Control <i>n</i> = 23
Mean (SD) or % (<i>n</i>)						
Sexual Risk Behaviors						
Highest sexual risk	16% (49)	18% (29)	14% (20)	28 % (12)	35% (7)	22% (5)
Number of sexual partners	1.42 (1.95)	1.44 (1.03)	1.41 (2.58)	2.02 (3.94)	2.10 (1.37)	1.96 (5.30)
Inconsistent condom use	59% (90)	60% (47)	58% (43)	56% (18)	56% (10)	57% (8)
Demographics						
Age at baseline (years)	16.08 (1.09)	16.20 (1.09)	15.95 (1.07)	15.59 (1.11)	15.83 (1.02)	15.39 (1.18)
Age of sex debut (years)	12.75 (2.76)	13.15 (2.26)	12.36 (3.16)	-	-	-
Heterosexual orientation	66% (203)	70% (114)	61% (89)	91% (39)	95% (19)	87% (20)
Male	66% (205)	63% (103)	69% (102)	100% (43)	100% (20)	100% (23)
Black or African American	90% (279)	90% (147)	90% (132)	84% (36)	75% (15)	91% (21)
Hispanic	9% (28)	9% (15)	9% (13)	15% (6)	3% (5)	4% (1)
Qualified for free lunch	86% (264)	85% (138)	88% (126)	91% (39)	90% (18)	91% (21)

Note. Numbers in boldface indicate a significant difference between the intervention and control groups at baseline. Sexual risk behaviors were assessed over the previous 6-months. The highest sexual risk group included participants who scored 4 (indicating multiple partners and inconsistent condom use) on the sexual risk summary. The number of sexual partners and inconsistent condom use variables were calculated for participants reporting vaginal/anal sex over the past six months at baseline. Percentages were calculated based on available data.

Table 2
Sexual Risk Summary Scores in the Full Sample and the Early Sexual Debut Group at Baseline and Six-Month Follow-Up

Score	Definition	Full Sample					
		Intervention		Control			
		Baseline (n = 162)	Follow-Up (n = 142)	Baseline (n = 144)	Follow-Up (n = 120)	Baseline (n = 144)	Follow-Up (n = 120)
		% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
0	No sex	51% (83)	51% (72)	49% (70)	58% (70)		
1	One partner, consistent condom use	11% (17)	19% (27)	16% (23)	13% (15)		
2	Multiple partners, consistent condom use	9% (15)	7% (10)	6% (8)	4% (5)		
3	One partner, inconsistent condom use	11% (18)	18% (25)	16% (23)	17% (20)		
4	Multiple partners, inconsistent condom use	18% (29)	6% (8)	14% (20)	8% (10)		
Early Sexual debut							
Score	Definition	Intervention		Control			
		Baseline (n = 20)	Follow-Up (n = 19)	Baseline (n = 23)	Follow-Up (n = 23)	Baseline (n = 23)	Follow-Up (n = 23)
		% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
0	No sex	10% (2)	32% (6)	39% (9)	44% (10)		
1	One partner, consistent condom use	10% (2)	32% (6)	22% (5)	26% (6)		
2	Multiple partners, consistent condom use	30% (6)	0% (0)	4% (1)	4% (1)		
3	One partner, inconsistent condom use	15% (3)	26% (5)	13% (3)	13% (3)		
4	Multiple partners, inconsistent condom use	35% (7)	11% (2)	22% (5)	13% (3)		

Note. Follow-up was conducted six months after baseline. At both time points, behavior over the past six months was assessed. Percentages were calculated based on available data for the given variable.