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Efficacy of the Young Women’s CoOp: An HIV Risk-Reduction Intervention for Substance-Using African-American Female Adolescents in the South

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Abstract

HIV/sexually transmitted infection (STI) risk-reduction interventions are needed to address the complex risk behaviors among African-American female adolescents in disadvantaged communities in North Carolina. In a two-group randomized trial, we reached 237 sexually active, substance-using African-American female adolescents, to test a risk-reduction intervention, the Young Women’s CoOp (YWC), relative to a nutrition control. In efficacy analyses adjusting for baseline condom use, at three-month follow-up participants in the YWC were significantly less likely to report sex without a condom at last sex relative to control. There were mixed findings for within-group differences over follow-up, underscoring the challenges for intervening with substance-using female youths.

Keywords

alcohol and other drug use; culturally sensitive; gender; sex risk behaviors

INTRODUCTION

African-American female adolescents in the United States continue to experience high rates of heterosexually acquired sexually transmitted infections (STIs), including HIV (Centers for Disease Control and Prevention [CDC], 2014; CDC, 2015b) and elevated pregnancy rates (Finer & Zolna, 2011). These health disparities are especially pronounced in the Southeastern United States where discrimination, poverty, poor schools, widespread incarceration, and a historical legacy of segregation shape the social context of the lives of

many African-Americans at risk for HIV (Adimora, Schoenbach, & Doherty, 2006; Lloyd et al., 2012). Many social determinants contribute to health disparities for young African-American women who use or abuse alcohol or other drugs (AOD), which include marijuana and hard drugs, including early age of coital debut, sex risk behavior, pregnancy, and involvement in crime, violence, and gangs (Browne et al., 2014; Raiford et al., 2014).

An analysis of the social networks among African-American adolescents recruited from poor and underserved neighborhoods elucidated how social norms govern substance use and risky sex behaviors (e.g., lack of condom use and having multiple partners) (Dolcini et al., 2013). To survive and attain what may be considered success in disadvantaged and underserved communities, some African-American female adolescents, particularly those who drop out of school, gravitate toward substance use, unsafe sexual relationships, and negative peer groups such as gangs (Henry, Knight, & Thornberry, 2012; Kirk, Lewis, Lee, & Stowell, 2011).

In North Carolina, female adolescents who previously dropped out of school and live in communities laden with gang-related violence are likely to form relationships with older male partners and friends who serve as powerful decision-making influences regarding sex behaviors, substance use, and educational attainment (Browne et al., 2014; Raiford et al., 2014). Because of poor employment opportunities, particularly among young women who have not completed high school, some may turn to trading sex (Browne et al., 2014). Moreover, some young women believe that by intentionally becoming pregnant they will stay connected to their boyfriends. These relationships can make young women susceptible to violence, make it difficult for them to negotiate and use condoms, and increase their risk of early pregnancy and parenthood, as well as STIs, including HIV.

As a result of multiple correlated behaviors, African-American female adolescents and young adults are at risk for several adverse health outcomes. To help address the complexity of risk among vulnerable female African-American adolescents, evidence-based behavioral interventions (EBIs) are needed to teach empowerment skills that can reduce substance abuse and HIV/STI risk behaviors. The Centers for Disease Control and Prevention (CDC) systematically reviews and evaluates the efficacy of HIV behavioral interventions conducted in the United States (Lyles, Crepaz, Herbst, Kay, & Team, 2006). One of the risk-reduction EBIs included in CDC's online Compendium of Evidence-Based Interventions and Best Practices for HIV Prevention (CDC, 2015a) is the Women's CoOp, an intervention developed for sexually active African-American women in North Carolina who use crack cocaine (Wechsberg, Lam, Zule, & Bobashev, 2004). This intervention, based on an empowerment theoretical framework and African-American feminist theory, provides education about substance use and sexual risk, condom use skills training, and personalized risk-reduction planning. Because these risk behaviors are clustered, the intervention components target several of them simultaneously. The intervention was successful in reducing sex without condoms, trading sex, frequency of crack use, and homelessness, as well as increasing full-time employment (Wechsberg et al., 2004).

The Women's CoOp has been adapted for use with vulnerable adult women in international settings and has demonstrated efficacy (Wechsberg, Browne, Ellerson, & Zule, 2010;

Wechsberg et al., 2013; Wechsberg et al., 2012; Wechsberg, Luseno, Kline, Browne, & Zule, 2010; Wechsberg et al., 2011). However, it had not been adapted specifically for substance-using African-American female adolescents. In the compendium of evidence-based interventions for HIV prevention, there are only two “best-evidence” or top-tier individual-level interventions that were developed specifically for substance-using African-American women—and one of these interventions is the Women’s CoOp (CDC, 2015a). There are no “best-evidence” individual-level interventions for substance-using African-American female adolescents. With funding from the CDC’s Adopting and Demonstrating the Adaptation of Prevention Techniques (ADAPT-2) project (CDC, 2007), the Women’s CoOp was adapted to address the HIV/STI prevention needs of sexually active, substance-using African-American female adolescents ages 16 to 19 who had either dropped out of school or were at risk for dropping out of school.

The aim of this article is to evaluate the efficacy of the adapted Young Women’s CoOp (YWC) relative to an attention-control nutrition intervention in reducing HIV/STI-related sex risk behaviors, substance use, and victimization in a randomized behavioral trial. We hypothesized that young African-American women assigned to the YWC arm would report greater reductions in sex risk behaviors, AOD use, and victimization compared to young African-American women assigned to the nutrition control arm.

METHOD

Recruitment and eligibility

Participants were recruited through street outreach, local service organizations, churches and schools, local radio advertisements, Facebook marketing, and respondent referral with the use of recruitment coupons. The eligibility requirements included the following: female; self-identify as African-American or Black; between the ages of 16 and 19 years old; report previous experience dropping out of school or having problems such that they have considered dropping out of school; report not obtaining a high school diploma or GED; report vaginal intercourse in the past three months with a male partner; report AOD use in the past three months; and report intention to remain in the area for the duration of the follow-up period.

This study was approved by the Office of Research Protection at RTI International. Verbal and written consent was obtained from the 18- and 19-year-olds, and written assent was obtained from the 16- and 17-year-olds. A waiver of parental permission for participation was granted for the 16- and 17-year-olds because of the sensitive nature of the eligibility criteria and because parents would learn that the adolescent had been sexually active and using substances. Furthermore, the study procedures involved no more than minimal risk to participants, and a waiver would not adversely affect the rights and welfare of participants. To further protect participant confidentiality, we obtained a Certificate of Confidentiality from the CDC.

Interventions

Each intervention included three individual content-driven sessions and one “dinner club” group session that supplemented the content in the individual sessions and included several activities (Figure 1).

Young Women’s CoOp (YWC)—The development of the YWC followed CDC guidelines for adaptation of EBIs (Galbraith et al., 2011; McKleroy et al., 2006) to ensure that the required components of the original Women’s CoOp (Wechsberg, Browne et al., 2010; Wechsberg et al., 2004) were maintained while tailoring the intervention to the new target population of female African-Americans ages 16 to 19 through formative methods. These methods included a Teen Advisory Board (TAB), focus group discussions, in-depth interviews (Browne et al., 2014), and pretesting and pilot testing of the intervention for feasibility and satisfaction. An existing Community Advisory Board provided feedback on intervention content and study implementation, in addition to an expert panel, which included parents, researchers, teachers, pastors, health educators, nurses, and community center directors.

On the basis of these formative activities, modifications were made to the content, format, and delivery of the intervention. New content addressed circumstances and situations unique to young adulthood, including expectations of sex, information about teen pregnancy prevention and consequences of becoming a young parent, the influence of gangs on risk behavior, developmental issues that occur during adolescence, the importance of education, and promoting positive values to help young women move from dependence to independence. A key adaptation for the YWC was the inclusion of brief stories from young African-American women sharing personal experiences via video to coincide with topics covered in the adapted intervention. In addition, the TAB suggested that to make the YWC materials appeal to adolescents the amount of text was reduced and replaced with informative, colorful graphics.

At the end of each individual session, participants worked with an interventionist to develop a personal risk-reduction and action plan to achieve immediate and long-term goals. The group session involved activities such as assessing the risk level of different sex acts and practicing the speaker and listener technique to improve interpersonal communication. All participants received referrals to local organizations or resources as needed.

Nutrition control intervention—The nutrition intervention was an equal attention control modeled on the Colorado State University Extension Nutrition Program’s (2001) “Eat Well for Less” curriculum, which was designed to improve health and reduce chronic disease risk through healthy eating and physical activity. The individual sessions addressed topics such as eating healthy food within a budget, and how to read and understand food labels. The group session had activities, such as making meals without a stove, identifying ingredients for quick meals, and the importance of physical activity in maintaining health. We adapted the attention control to more local foods, grocery labels, menus, and graphics.

Common elements of the interventions—For both study arms, the interventionist summarized the primary points of each session, debriefed participants, and provided relevant

brochures. The interventionist also provided participants with a list of local education, social, and health service providers. To mitigate social desirability, interventionists did not administer follow-up assessments for participants who participated in their intervention sessions.

Data collection and measures

At baseline and follow-up visits, participants completed a survey through a combination of computer-assisted personal interviewing (CAPI) and audio computer-assisted self-interviewing (ACASI). The more sensitive sections about sexual risk behaviors, drug use, illegal activities, gang involvement, and victimization were administered using ACASI to reduce social desirability bias in reporting proscribed behaviors (Turner et al., 1998).

Sex and drug risk assessment—The Young Women’s Risk Behavior Assessment (YWRBA), an adaptation of the Revised Risk Behavior Assessment (Wechsberg, 1998), included questions on socioeconomic status; sexual activity and condom use, and other contraceptive use; past diagnoses of STIs; AOD use; delinquency and problem behaviors (e.g., gang affiliation and involvement, conflict and victimization, criminal and civil justice activities); condom communication competency; sensation seeking; depressive symptoms; power, assertiveness, and empowerment; gender roles; and emotional, physical, or sexual abuse. The recall periods for these variables included the past 30 days, past 90 days, or ever. Variables assessed only at the baseline visit included age at first sex, past diagnosis of an STI, history of physical or sexual abuse, ever being homeless, ever or current gang membership, ever or current gang affiliation (i.e., spending time with gang members, but not a gang member), and neighborhood violence.

Biological assessment—At baseline and both follow-ups, participants provided a urine sample for rapid drug testing using Reditest® to detect recent use of cocaine, methamphetamine, marijuana, methadone, ecstasy, opiates, oxycodone, phencyclidine, barbiturates, and benzodiazepines. These drug-screen tests were intended to validate self-reported recent drug use. However, for some substances, the recall periods in the questionnaire (30 and 90 days) exceeded the time that their metabolites remain detectable. Consequently, more participants self-reported drug use than was identified biologically. At baseline, for example, among all participants who reported marijuana use, 47% screened negative. Also, rarely did a participant report abstinence from drug use and test positive (e.g., only one participant for marijuana use).

All study participants were also tested for pregnancy using New Choice™ at the baseline study visit. After the second intervention session, study staff encouraged participants to receive gonorrhea, chlamydia, and HIV testing; however, testing for HIV and STIs was not mandatory for study participation. HIV/STI testing was conducted through partnership with a local AIDS service organization offering testing at the study sites twice a week. Staff from the AIDS service organization collected urine for chlamydia and gonorrhea testing. Participants who were tested also signed a release of results to the study. The study referred participants with a positive pregnancy ($N = 18$) or STI ($N = 23$) test result to local health organizations; no participants tested positive for HIV.

Outcome variables—Unlike traditional medical or clinical randomized controlled trials (RCTs), this behavioral intervention addressed intersecting risks. As such, it is difficult to select a single primary outcome to evaluate when all of the behavioral outcomes are interrelated. All outcome variables were derived from self-reported data measured at each follow-up visit that included several sex risk behaviors, substance use behaviors, and measures of victimization. We could not assess incident STIs because the testing was optional and conducted at one time point. Furthermore, the small number of participants who were tested and who tested positive precluded us from analyzing these data. Dichotomous outcomes included sex without a condom at last episode of vaginal intercourse, multiple sex partners (defined as having at least two male sex partners during the past 90 days), any marijuana use in the past 90 days, and heavy alcohol consumption in the past 90 days (i.e., three or more drinks at a time when drinking). Analyses also included a continuous measure of the number of days of marijuana use in the past 90 days, number of times victimized (i.e., physical and sexual abuse) during the past 90 days, and experience of partner emotional abuse based on the Partner Emotional Abuse scale ($\alpha = 0.81$; Jewkes, Levin, & Penn-Kekana, 2002).

Statistical analysis—Analyses were conducted in Stata (Release 14; College Station, TX: StataCorp LP). All statistical tests were two-sided with an alpha level of 0.05. The final sample size of 237 ($N = 118$ YWC and $N = 119$ nutrition control) provided sufficient statistical power to detect moderate (Cohen's $d = 0.3$ – 0.5) intervention effects. This study was not powered to test for mediation. All analyses followed an intention-to-treat approach by including all participants as assigned and regardless of amount of intervention exposure. Randomization failure and lost to follow-up were assessed using methods established by the Consolidated Standards of Reporting Trials (Altman et al., 2001; Moher, Schulz, Altman, & Group, 2001; Figure 2).

The primary analytic strategy involved estimating the impact of the interventions on each of the study outcomes, and used generalized linear mixed models with repeated measures observed at baseline, and at three- and six-month follow-up visits. Planned comparisons involved identifying differences at three and six months between the nutrition and YWC arms.

These analyses contain all available cases consistent with an intent-to-treat approach, estimated for statistically significant findings. The specified models included effects for treatment (two levels for intervention arms), time (baseline, three months, and six months), and an interaction term for treatment by time. Contrast statements also reflected tests between arms within the two follow-up assessments.

For dichotomous outcomes, the logit link was used to obtain effect estimates (i.e., odds ratios) of the magnitude of differences between arms within each of the follow-up visits. Interactions were tested using a Wald F -test and a likelihood ratio test. For continuously distributed outcomes, an identity link function was specified. The same general class of linear models described previously was used to investigate changes in the association between treatment (nutrition control versus YWC) and the continuously distributed outcomes, controlling for baseline values. To assess the magnitude of the intervention effect

in each of the key constructs, we examined changes between baseline and the three-month follow-up visit, which is the time when we expect to see the greatest intervention impact. We also examined the changes between the three- and six-month follow-up visits. The statistical models took group membership interclass correlation into account.

To supplement the primary outcomes in which the goal was the elimination of the risky behavior, we used a harm-reduction approach to understand whether the intervention had an effect reducing the quantitative magnitude of the outcomes. Instead of examining the prevalence of any marijuana use, for example, we compared the change in the mean number of days of marijuana use at each visit by study arm. Using this approach is consistent with the conception of substance use, particularly addiction, as a relapsing and chronic condition, rather than a stringent binary “all-or-none” threshold (Wechsberg, Novak et al., 2010).

Post hoc analysis—Current membership in a street gang was analyzed post hoc. For the post hoc analysis, we examined changes between each visit as well as from baseline to the six-month follow-up using the analytic approach described earlier and simple logistic regression.

RESULTS

Among the 921 young women screened, 526 (57%) did not meet the study eligibility criteria. Reasons for ineligibility include not dropping out of school (49%), no AOD use (49%), and no vaginal sex (39%; Figure 2). An additional 158 young women met the eligibility criteria but did not enroll for reasons listed in Figure 2. The remaining 237 eligible young women (26% of 921 screened) enrolled and were randomized into either the nutrition control arm ($N = 119$) or the YWC arm ($N = 118$). Retention rates for intervention sessions were comparable in both arms. Participants completed 81% of follow-up visits overall; however, retention was lower at the three-month follow-up (75%) than the six-month follow-up (87%). Only 9% of participants did not return for any follow-up visit.

Randomization and study population

The distribution of key demographics, AOD use, sex behaviors and contraception use, STI and pregnancy test results, and other psychosocial factors are reported in Table 1. There were no significant differences between study arms in the distribution of baseline participant characteristics; however, differences were found in the proposed dependent variables, suggesting that randomization procedures were not completely successful balancing risk behavior. Most young women were 17 or 18 years of age (60.4%), reported ever dropping out of school (60.3%), and were below grade level for their age (65.0%). Nearly 30% had children, and 27% reported ever being homeless. Although 64.6% of participants lived in the same place for the preceding six months, 23.7% had moved one or two times and 11.8% had moved three or more times. Only 18.2% were employed; however, 90.2% reported currently looking for work. About one-third had ever been arrested, 51.9% reported gang affiliation, and 6.3% were a current or past member of a gang (Table 1). Significant differences at baseline between the two groups showed the nutrition group significantly more likely to use a condom at last sex episode ($p = .007$).

With regard to AOD use during the past 90 days, 42.6% consumed heavy amounts (three or more drinks) of alcohol when drinking. The majority of participants smoked marijuana (83.0%), and 20.9% reported smoking marijuana daily. In contrast, only 11.0% reported that they used at least one “hard drug,” such as cocaine or opioids.

Experience of past abuse was common, with 28.5% reporting physical abuse, 32.2% reporting being touched sexually against their will, and 20.0% reporting vaginal or anal sexual abuse. In regards to sex trading, 35 participants (14.8%) had ever traded sex, and 32.2% reported their first sexual intercourse at age 13 or younger. Only 25.7% of participants reported use of hormonal contraception or an intrauterine device (IUD). Just over three-quarters of participants reported ever being tested for an STI; and among those young women, more than half (52.8%) reported a prior STI diagnosis. Eighteen participants (7.6%) had a positive pregnancy test. Among the 81 participants (34.2% of 237 enrolled) who received STI testing as part of the study, 28.4% tested positive for chlamydia or gonorrhea or both (Table 1).

Intervention effects on self-reported outcomes

As shown in Table 2, there was one statistically significant intervention effect on the primary outcomes. At the three-month follow-up, a statistically significant difference was found in the proportion of those in YWC who reported sex without a condom at last sex relative to the nutrition control (65% to 60% versus 46% to 61%; $X^2(1) = 4.21$, $p = 0.04$). Among YWC participants, there was a significant reduction in any marijuana use (86% to 72%; $p = 0.004$) from baseline to three-month follow-up. Among nutrition control participants, there was a significant decrease in heavy alcohol consumption from baseline to three-month follow-up (48% to 34%, $p = 0.015$), and a nonsignificant increase at the six-month follow-up (43%; $p = 0.159$). Among YWC participants, there was a nonsignificant decrease in heavy alcohol consumption from baseline to three-month follow-up (38% to 27%; $p = 0.10$), and a significant increase at six-month follow-up (42%; $p = 0.048$). There were no significant intervention effects on the number of days smoked marijuana.

For other risk behaviors, both study arms significantly decreased having multiple (two or more) sex partners from baseline to three-month follow-up (37% to 22%, $p = 0.005$ for nutrition control; 39% to 28%, $p = 0.05$ for YWC). Although there were no significant changes in the number of victimization experiences in either arm across both follow-ups, YWC participants reported significant reductions in partner emotional abuse (1.9 to 0.8, $p = 0.003$) at three-month follow-up.

Post hoc analyses

In an analysis of changes from baseline to six-month follow-up, the proportion of participants reporting gang membership in the nutrition control arm nearly tripled (odds ratio [OR] = 3.07, 95% confidence interval [CI] = 1.29 to 7.28; $p = 0.011$). In contrast, the proportion of YWC participants who reported gang membership did not change significantly during follow-up. Based on a logistic regression model treating gang membership at six months as the outcome and controlling for baseline gang membership, YWC participants

were significantly less likely to belong to a gang than control participants (OR = 0.31, 95% CI = 0.11, 0.92, $p = 0.034$).

DISCUSSION

The findings from this RCT to determine the efficacy of the adapted YWC intervention for reducing substance use and sex risk behaviors among African-American female adolescents from economically disadvantaged communities in Raleigh and Durham, North Carolina, are mixed. Sex without condoms at last sex significantly increased among nutrition control participants at the three-month follow-up relative to a small, nonsignificant reduction among YWC participants. Because of this disparity and large baseline differences, group differences (efficacy in favor of the YWC) were found at three-month follow up. YWC participants reported significant short-term reductions at three-month follow-up in marijuana use, emotional abuse from partners, and sexual risk attributed to the intervention; however, the sustainability of these effects was varied at six-month follow-up. The nutrition arm reported initial significant reductions in heavy alcohol use, although alcohol was never mentioned in the nutrition intervention, and was not sustained at six-month follow-up. Given the short follow-up period and the sample at an age of ubiquitous alcohol and marijuana use, these findings are not surprising and incremental at best.

Both groups reported significant reductions in multiple sex partners between baseline and three-month follow-up, and these effects were sustained in both groups at six-month follow-up. This is an interesting finding because the nutrition intervention did not address sex behaviors. The significant increase in the percentage of nutrition participants reporting sex without a condom at last sexual encounter at three-month follow-up is also consistent with prior studies of adolescents (Fortenberry, Tu, Harezlak, Katz, & Orr, 2002; Katz, Fortenberry, Zimet, Blythe, & Orr, 2000; Matson, Adler, Millstein, Tschann, & Ellen, 2011). The additional efficacious finding discovered in a post hoc analysis that YWC participants were substantially less likely to be members of gangs during follow-up involved a small number of participants. However, we were concerned about gang membership because in our earlier analysis of baseline data, we found that those who reported gang membership in their lifetime were more likely to report sexual abuse, physical abuse, emotional abuse from their main partner, being a runaway, being arrested, and violence in their neighborhood including murder and having fights with weapons—compared to those who reported no gang membership (Wechsberg et al., 2015). In addition, these gang members were less likely to report receiving emotional support, which raised our concern in conducting further analysis.

While several adaptations of interventions among African-American female adolescents and young women have been efficacious for sexual and reproductive health outcomes, most study populations were recruited from clinical settings (e.g., Planned Parenthood, county health departments, or prenatal clinics) and focused predominately on behavioral and biological sexual outcomes (DiClemente & Wingood, 1995; DiClemente et al., 2004; DiClemente et al., 2009; Wingood et al., 2013). Other interventions targeted to African-American female youths focus on substance use (Botvin, Schinke, Epstein, Diaz, & Botvin, 1995; Gil, Wagner, & Tubman, 2004; Jensen et al., 2011). Despite the extensive literature demonstrating the interrelationships between sex risk and AOD use and victimization, few

(if any) holistic interventions exist that empower adolescents to mitigate these risks while also providing guidance to improve their life circumstances through a personalized action plan.

The mixed results reported for the present study highlight the challenges of working with extremely underserved and vulnerable young people. Furthermore, adolescents between 16 and 19 years old are at a developmental stage when AOD use tends to increase each year and the nature of sexual relationships changes dramatically (McCoy et al., 2010; Tapert, Aarons, Sedlar, & Brown, 2001). Under these circumstances, we cannot rule out the possibility that simply maintaining baseline levels of AOD use may represent a meaningful improvement over what would have occurred without either intervention. The data from focus groups conducted with participants after they completed the study further elucidated how peer influences remain an important issue with regard to substance use, which was not measured in the quantitative data analysis.

This study has several limitations. First, we were unable to collect STI test results on all participants because of limited on-site testing and optional choice, which is a major limitation. Among young women who opted to be tested, the prevalence of chlamydia and gonorrhea was high (28%). This finding suggests the need to reach and test young African-American women for STIs. However, it is not known how these young women compare to the young women who did not opt to test. Second, during study recruitment, there were persistent difficulties in recruiting sufficient numbers of young women who had dropped out of school and who were willing to take part in the study. Consequently, we changed the eligibility criterion and also recruited young women who reported having problems to the point that they considered dropping out of school. Perhaps an increased sample size of school dropouts would have yielded more robust intervention effects that were sustained over time (Cook, Campbell, & Day, 1979; Shadish, Cook, & Campbell, 2002). Third, 60% of those who were eligible enrolled in the study, meaning that 40% of those who were eligible declined to enter this study. This may have implications for generalizability, as it is not known whether the eligible participants who enrolled in the study differ from those who did not enroll. However, of the enrolled study participants, two-thirds completed all three sessions. Fourth, all study participants completed the same assessments that included extensive questions on AOD use and sex risk behaviors. It is possible that these assessments may be viewed as an intervention on their own accord with the capacity to increase motivation to decrease risk behaviors in both study arms (Weinhardt, 2002; Weinhardt, Carey, & Carey, 2000). Another potential limitation involves unintended diffusion of intervention effects across the two study arms. The study was conducted in two mid-sized southern cities that border each other, and it is possible that participants were sampled from common social networks. It is also possible that participants who were friends and randomized to different study arms may have discussed what their sessions covered, thereby introducing diffusion across study arms. Finally, the nutrition control intervention promoted a healthy lifestyle that extended beyond eating well and exercising. While this intervention did not contain information about substance use and sexual risk, it is possible that provision of this information regarding a healthy lifestyle may have also encouraged young women to reduce substance use and sexual risk behaviors.

With these limitations in mind, it is difficult to disentangle the mixed findings and efficacy on only one primary outcome. However, the study did produce some valuable findings that may be indicative of a trend favoring a positive impact of the YWC on more study outcomes. Equal and constructive attention in both interventions promoted positive healthy living that indirectly extended beyond specific components of each intervention. The YWC aimed to mitigate HIV/STI-related risk behaviors and to cultivate feelings of and skills for empowerment. The nutrition intervention taught participants how to maintain a healthy lifestyle through diet, proper nutrition, and exercise. As this study intervened to improve adolescents' health behaviors, both interventions affected positive behavior change in the short term.

Conclusions

Young African-American women who have dropped out of school or are at risk for dropping out of school have complex problems that are individual and environmental. Implementing evidence-based, gender-sensitive, and culturally sensitive interventions that are age appropriate that address this constellation need to have impact. Although these findings are mixed, they are promising; reaching and retaining this hard-to-reach population in an intervention study can be daunting with behavior change challenging, but reductions were observed and one outcome was efficacious.

The YWC intervention and other interventions may require greater innovation with technology that engages youths through media that is in step with their rapidly changing society. Some studies have shown mobile devices and use of mobile health (mHealth) technology for health education can sustain reductions in risk, improve health, maintain wellness, and continue the delivery of positive messages (Head, Noar, Iannarino, & Harrington, 2013; Lustria et al., 2013).

HIV/STI risk-reduction interventions clearly need to address the complex behaviors among young substance-using African-American female adolescents living in disadvantaged communities (Akers, Muhammad, & Corbie-Smith, 2011; Raiford et al., 2014; Woods-Jaeger et al., 2013). Unfortunately, no best-evidence interventions currently exist that address the nexus of substance use, gender-based violence, and sexual risk in this population. The YWC intervention provides a solid base for interventions to address these components and improve overall health in this key population.

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YWC Session 1: Developmental Issues and	Nutrition Session 1: Staying Healthy and
<p data-bbox="586 226 695 260" style="text-align: center;">Drug Use</p> <ul style="list-style-type: none"> <li data-bbox="451 289 829 323">• This Intervention Is for You! <li data-bbox="451 348 829 382">• Life Stages of Development <li data-bbox="451 407 829 441">• Now is an Important Time! <li data-bbox="451 466 850 550">• Issues Young African-American Females Face <ul style="list-style-type: none"> <li data-bbox="477 583 805 617">• Substance Use and Risk <li data-bbox="496 642 786 726">• Reducing Your Risk <ul style="list-style-type: none"> <li data-bbox="539 701 740 735">• Action Plan <p data-bbox="493 760 789 793">What's Next? (1 week later)</p>	<p data-bbox="911 226 1378 319" style="text-align: center;">Eating Well: Problems People Can Have If They Do Not Eat Healthy and Nutritious Foods</p> <ul style="list-style-type: none"> <li data-bbox="927 407 1365 491">• Concern for the African-American Community <ul style="list-style-type: none"> <li data-bbox="1057 525 1227 558">• Diabetes <li data-bbox="953 583 1336 617">• Obesity and Health Problems <li data-bbox="953 642 1330 676">• Preventing Health Problems <ul style="list-style-type: none"> <li data-bbox="1008 701 1281 735">• What Is Nutrition? <li data-bbox="943 760 1346 844">• Healthy Eating: The Five Food Groups <ul style="list-style-type: none"> <li data-bbox="992 877 1297 911">• Fruits and Vegetables <li data-bbox="1005 936 1284 970">• Dairy and Calcium <ul style="list-style-type: none"> <li data-bbox="1031 995 1258 1029">• Protein Power <li data-bbox="1024 1054 1265 1087">• Reading Labels <li data-bbox="979 1113 1310 1146">• Proportions vs. Servings <p data-bbox="1047 1171 1242 1205">Session 2 Preview</p>

YWC Session 2: STDs, HIV/AIDS and Prevention, Condoms and Role-Play

- Female and Male Anatomy
 - Expectations
 - Sex and Risk
 - Pregnancy
 - STDs and HIV
 - Ways to Reduce Risk
 - Male and Female Condoms
 - Information About HIV Testing
 - Referral for HIV/STI Testing
- What's Next? (1 week later)

Nutrition Session 2: Staying Healthy and Eating Well: Fat, Salt, Sugar, Food Preparation, and Budgeting

- Fats and Sugars
 - Body Fat
 - Fats and Oils
- Facts About Fast Food
 - Salt
 - Sugar
 - Caffeine
- Food Safety
- Food Preparation
- Food Poisoning
- Shopping Smart
 - Budgeting
- Planning a Meal

Session 3 Preview

<p>YWC Session 3: Gender, Control and Violence, Problem Solving and Conflict Negotiation</p> <ul style="list-style-type: none"> • Inequality and Lack of Power <ul style="list-style-type: none"> • Abuse • Rape • Gender and Power: Being Strong, Safe, and Healthy Young African-American Women • Communication and Negotiation <ul style="list-style-type: none"> • Safety Tips • Values • Education 	<p>Nutrition Session 3: Staying Healthy and Eating Well: Physical Activity, Staying Active on a Tight Budget, Stress</p> <ul style="list-style-type: none"> • Physical Activity <ul style="list-style-type: none"> • Fitness • Stress • What You Can Do to Get Rid of Stress • Water: We Never Drink Enough <ul style="list-style-type: none"> • Sun Safety • Getting a Good Night’s Sleep <ul style="list-style-type: none"> • Sleep Environment
Within a Month	
<p>One Dinner With Group Activities</p> <ul style="list-style-type: none"> • Importance of a Balanced Life • Aggressive/Passive Assertive • Speaker-Listener Technique <ul style="list-style-type: none"> • How to Stay Safe • What Is Respectful Sex? <ul style="list-style-type: none"> • Levels of Risk • Making a Plan 	<p>One Dinner With Group Activities</p> <ul style="list-style-type: none"> • Making Healthy and Quick Meals <ul style="list-style-type: none"> • Making Healthy Snacks • Food Groups, Labels, and Reduced Fats and Sugars • Making a Casserole and Other Meals Without a Stove • How Does Physical Activity Fit In?

Figure 1. Content of the Young Women’s CoOp (YWC) and nutrition interventions.

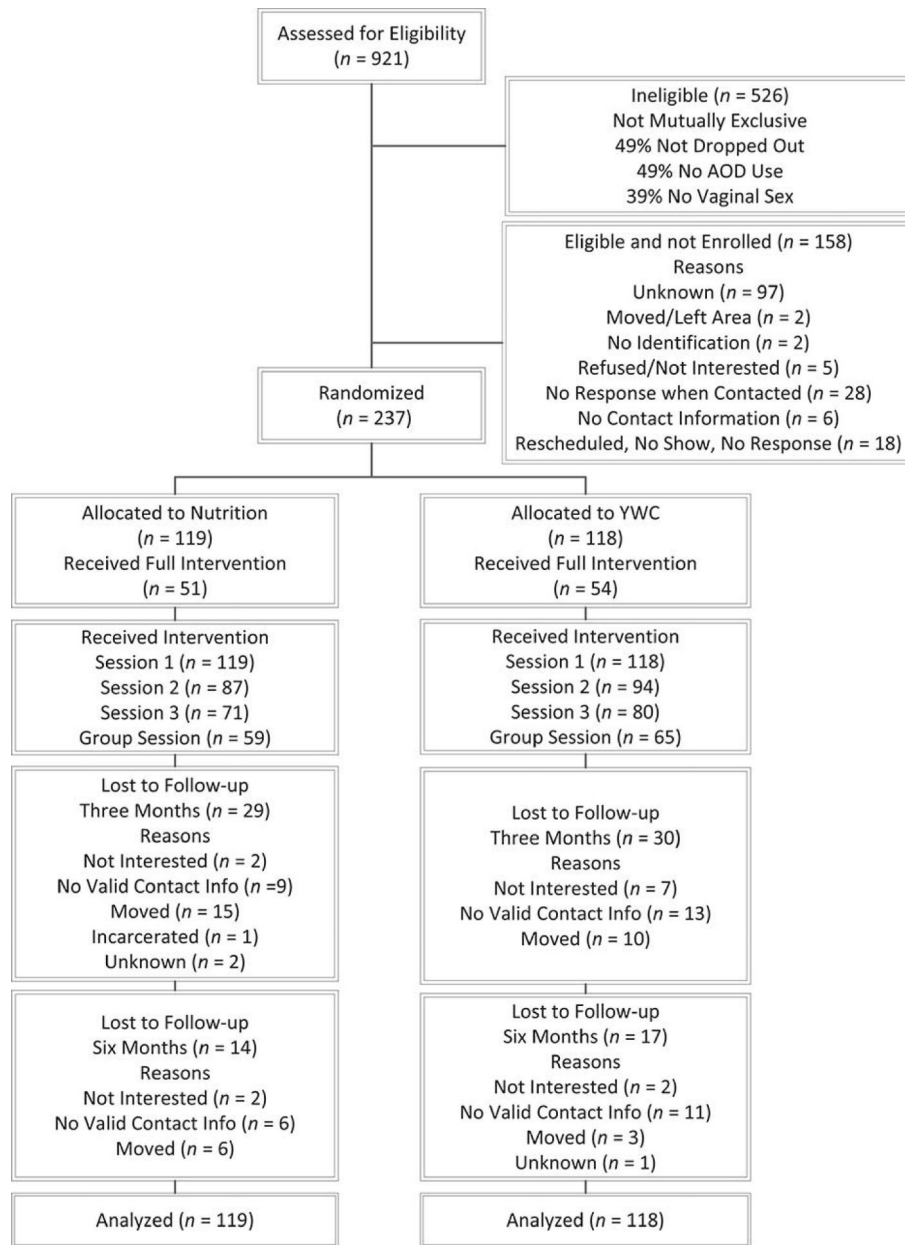


Figure 2. Participant flow chart following Consolidated Standards of Reporting Trials Guidelines.

Table 1

Participant characteristics at enrollment and stratified by study arm with dependent variables.

Characteristic	Total N = 237		Nutrition N = 119		YWC N = 118		OR	95% CI	p	
	N	(%)	N	(%)	N	(%)				
Age—mean and standard deviation	17.6	(1.02)	17.7	(1.00)	17.6	(1.03)			0.47	
Ever dropped out of school	143	(60.3)	73	(61.3)	70	(59.3)	0.92	(0.55, 1.55)	0.75	
Below grade level for age	154	(65.0)	72	(60.5)	82	(69.5)	1.49	(0.87, 2.54)	0.148	
Have child(ren)	69	(29.1)	38	(31.9)	31	(26.3)	0.76	(0.43, 1.33)	0.338	
Ever homeless	64	(27.0)	36	(30.3)	28	(23.7)	0.72	(0.4, 1.28)	0.259	
Currently employed	43	(18.2)	22	(18.6)	21	(17.8)	0.95	(0.49, 1.85)	0.89	
Currently looking for work	175	(90.2)	85	(87.6)	90	(92.8)	1.82	(0.68, 4.83)	0.232	
Ever arrested	80	(33.9)	40	(33.6)	40	(33.9)	1.01	(0.59, 1.74)	0.963	
Any “hard drug” use (past 90 days) sm Self-report of drug use, including crack, cocaine, ecstasy, methamphetamine, opioids, prescription medications, LSD, or inhalants. View all notes	26	(11.0)	12	(10.0)	14	(11.9)	1.20	(0.53, 2.72)	0.661	
Past abuse										
Past physical abuse	67	(28.5)	36	(30.5)	31	(26.3)	0.81	(0.46, 1.43)	0.471	
Sexual touching against will	75	(32.2)	38	(31.9)	37	(32.2)	1.01	(0.58, 1.75)	0.968	
Vaginal/anal sexual abuse	47	(20.0)	26	(22.2)	21	(17.8)	0.77	(0.4, 1.46)	0.416	
Ever traded sex	35	(14.8)	18	(15.1)	17	(14.4)	0.94	(0.46, 1.94)	0.876	
Age at coital debut 13 years	76	(32.1)	43	(36.1)	33	(28.0)	0.69	(0.4, 1.19)	0.179	
Uses contraception (hormonal or IUD)	61	(25.7)	36	(30.3)	25	(21.2)	0.62	(0.34, 1.12)	0.112	
Sexually transmitted diseases (STD)										
Ever obtained STD test	180	(76.0)	92	(77.3)	88	(74.6)				
Past STD diagnosis	95	(52.8)	46	(50.0)	49	(41.5)	0.86	(0.47, 1.56)	0.623	
Positive pregnancy test	18	(7.6)	10	(8.4)	8	(6.8)				
Obtained biological STD test	81	(34.2)	36	(30.3)	45	(38.1)	1.42	(0.83, 2.44)	0.202	
Tested positive for STD (chlamydia or gonorrhea)	23	(28.4)	11	(30.6)	12	(26.7)				
Total										
	N	%	N	%	N	%	OR	95% CI	p	
			Nutrition			YWC				

Characteristic	Total N = 237		Nutrition N = 119		YWC N = 118		OR	95% CI	p	
	N	(%)	N	(%)	N	(%)				
Vaginal condom use at last sexual episode										
Used condom	93	(44.7)	58	(53.7)	35	(35.0)				
No condom used	115	(55.3)	50	(46.3)	65	(65.0)	2.15	(1.23, 3.77)	0.007	
Multiple partners past 90 days	90	(38.3)	44	(37.3)	46	(39.3)	1.09	(0.64, 1.84)	0.749	
Any marijuana use past 90 days	195	(83.0)	93	(79.5)	102	(86.4)	1.65	(0.82, 3.29)	0.159	
Heavy alcohol consumption	101	(42.6)	57	(47.9)	44	(37.3)	0.65	(0.39, 1.09)	0.099	
Gang member now	15	(6.33)	6	(5.0)	9	(7.6)	1.55	(0.54, 4.51)	0.417	
Total times abused past 90 days										
Visit	Nutrition		Emotional IPV Scale, past 90 days		YWC		Nutrition		Total days marijuana	
		p		p		p		p		
BL	0.26	0.67	0.152	1.25	1.85	0.844	34.3	30.4	0.426	
3m	0.37	0.51		0.97	0.86		30.5	30.0		
6m	0.60	0.40		1.10	1.38		35.0	36.2		

Table 2

Trends over time for outcomes (over the past 90 days), by treatment arm and efficacy.

	Baseline to 3 months				3 to 6 months			
	Percentage (BL to 3m)	OR	95% CI	p	Percentage (3m to 6m)	OR	95% CI	p
Alcohol and drug use outcomes								
Any marijuana use								
Nutrition	79 to 70	0.62	(0.4, 1.2)	0.064	70 to 75	1.25	(0.6, 2.6)	0.287
YWC	86 to 72	0.42	(0.2, 0.9)	0.004	72 to 79	1.47	(0.8, 3.0)	0.194
Efficacy	$\chi^2 = 0.89$	$df = 1$		0.346	$\chi^2 = 1.04$	$df = 1$		0.858
Heavy alcohol consumption (3 drinks when drinking)								
Nutrition	48 to 34	0.6	(0.3, 0.9)	0.015	34 to 43	1.4	(0.9, 2.2)	0.159
YWC	38 to 27	0.7	(0.4, 1.1)	0.101	27 to 42	1.7	(1.1, 2.9)	0.048
Efficacy	$\chi^2 = 0.30$	$df = 1$		0.586	$\chi^2 = 0.41$	$df = 1$		0.519
	Mean	t -Test (df)		p	Mean	t -Test (df)		p
Days smoked marijuana in past 90 days								
Nutrition	34 to 30	1.08 (375)	0.282		30 to 35	0.2 (375)		0.837
YWC	30 to 30	1.36 (375)	0.174		30 to 36	1.3 (375)		0.194
Efficacy	$\chi^2 = 0.87$	$df = 1$	0.350		$\chi^2 = 0.01$	$df = 1$		0.931
	Percentage				Percentage			
	(BL to 3m)	OR	95% CI	p	(3m to 6m)	OR	95% CI	p
Sexual risks								
Multiple (2 or more) partners								
Nutrition	37 to 22	0.5	(0.3, 0.8)	0.009	22 to 18	0.8	(0.5, 1.4)	0.500
YWC	39 to 28	0.6	(0.4, 0.9)	0.021	28 to 28	1.0	(0.6, 1.7)	0.890
Efficacy	$\chi^2 = 0.26$	$df = 1$		0.607	$\chi^2 = 0.13$	$df = 1$		0.713
Sex without condom at last sex								
Nutrition	46 to 61	1.7	(1.1, 2.8)	0.029	61 to 67	1.3	(0.8, 2.1)	0.292
YWC	65 to 60	0.8	(0.5, 1.4)	0.439	60 to 68	1.4	(0.8, 2.5)	0.193
Efficacy	$\chi^2 = 4.21$	$df = 1$		0.042	$\chi^2 = 0.06$	$df = 1$		0.812

	Baseline to 3 months			3 to 6 months		
	Percentage (BL to 3m)	OR	95% CI	Percentage (3m to 6m)	OR	95% CI
			<i>p</i>			<i>p</i>
	Baseline to 3 months			3 to 6 months		
	Mean	<i>t</i> -Test (<i>df</i>)	<i>p</i>	Mean	<i>t</i> -Test (<i>df</i>)	<i>p</i>
Violence						
Times experienced any victimization						
Nutrition	0.3 to 0.4	0.11 (375)	0.162	0.4 to 2.3	0.2 (375)	0.395
YWC	0.3 to 0.2	0.16 (375)	0.673	0.2 to 1	0.1 (375)	0.657
Efficacy	$\chi^2 = 0.56$	<i>df</i> = 1	0.453	$\chi^2 = 1.05$	<i>df</i> = 1	0.304
Emotional Partner Abuse						
Nutrition	1.3 to 0.9	0.25 (375)	0.397	0.9 to 1.1	0.11 (379)	0.776
YWC	1.9 to 0.8	0.31 (389)	0.003	0.8 to 1.3	0.42 (379)	0.176
Efficacy	$\chi^2 = 2.63$	<i>df</i> = 1	0.104	$\chi^2 = 0.77$	<i>df</i> = 1	0.381
	Percentage			Percentage		
	(BL to 3m)	OR	95% CI	(3m to 6m)	OR	95% CI
			<i>p</i>			<i>p</i>
Gang membership						
Within group						
Nutrition	5.0 to 9.0	1.78	(0.77, 4.14)	9.0 to 7.0	1.58	(0.71, 3.49)
YWC	7.6 to 6.8	0.93	(0.41, 2.11)	6.8 to 5.9	0.93	(0.39, 2.20)
Between group		0.70	(0.22, 2.18)		0.38	(0.16, 0.94)
Within group	(BL to 6m)	OR	95% CI			
Nutrition	5.0 to 14.3	3.07	(1.29, 7.28)			
YWC	7.6 to 6.0	0.80	(0.35, 1.83)			
Between group		0.39	(0.15, 1.01)			
Logistic model controlling for BL gang membership at 6 months						
		0.31	(0.11, 0.92)			0.034