Published in final edited form as:

Health Educ Behav. 2011 June ; 38(3): 241–250. doi:10.1177/1090198110372332.

Comparison of Health Education and STD Risk Reduction Interventions for Incarcerated Adolescent Females

Angela A. Robertson, Ph.D., Janet S. St. Lawrence, Ph.D., David T. Morse, Ph.D., Connie Baird-Thomas, Ph.D., Hui Liew, Ph.D., and Kathleen Gresham, M.S.

Mississippi State University

Abstract

Adolescent girls incarcerated in a state reformatory (N=246) were recruited and assigned to an 18-session health education program or a time-equivalent HIV prevention program. Cohorts were assigned to conditions using a randomized block design separated by a “wash out” period to reduce contamination. Post intervention, girls in the HIV risk reduction program demonstrated the acquisition of risk-reduction behavioral skills and improved condom application skill. At a follow-up assessment approximately nine months after release from the correctional facility, girls in both conditions reported fewer unprotected sexual intercourse occasions and less sex while under the influence of alcohol or other drugs.

Female adolescents, especially those of minority races or ethnicities, are at higher risk for heterosexual transmission of HIV than their male counterparts (Valleroy, MacKellar, Karon, Janssen, & Hayman, 1998). Substance abuse, mental health problems, childhood sexual abuse, higher rates of sexually transmitted infections and biologic susceptibility all are factors that increase the risk of HIV acquisition among sexually active female adolescents (Centers for Disease Control and Prevention, 2008; Malow, Rosenberg, Donenberg, & Devieux, 2006). These risks are compounded for female adolescents in the juvenile justice system who evidence substantially higher rates of sexual risk behaviors, substance abuse, mental health disorders, and sexual abuse than their community-based peers (Robertson & Levin, 1999; Romero, et al., 2007; St. Lawrence, Crosby, & O'Bannon, 1999; Teplin, et al., 2005). Delinquent girls engage in multiple high-risk sexual behaviors (Romero, et al., 2007), have high rates of STDs (Robertson, Thomas, St Lawrence, & Pack, 2005) and are at high risk for HIV infection, yet they are under-represented in the research literature.

Historically, research with juvenile correctional populations has concentrated on male adolescents (Hoyt & Scherer, 1998) even though female juvenile detainees represent 18% of all incarcerated youth (Sickmund, Sladky, Kang, & Puzzanchera, 2008). Moreover, few of these studies utilized rigorous methodologies such as random assignment to conditions, comparison of intervention and control conditions, or an adequate post-release follow-up to determine intervention effects on behavioral change outside the institutional setting (Bryan, Schmiede, & Broaddus, in press; Goldberg, et al., 2009; Slonin-Nevo, Auslander, Ozawa, & Jung, 1996). We were able to locate only one published study that collected behavioral outcomes at least six months after release from juvenile detention facilities and reported the results by gender (Goldberg, et al., 2009).

The existing studies of juvenile offenders have demonstrated positive changes in HIV prevention knowledge, condom attitudes, and intentions to use condoms, but provide little

evidence of behavioral changes (Tolou-Shams, Stewart, Fasciano, & Brown, 2009). In the only HIV risk-reduction intervention study with youth in correctional settings that included girls and examined outcomes separately by gender, incarcerated girls who received a six-hour intervention plus a single booster session reported more consistent condom use 6-months post-intervention than did girls who participated in the intervention but did not receive the booster session or girls in a no treatment control group (Goldberg, et al., 2009). The only other study with incarcerated girls, a pilot-test of a gender-specific health promotion intervention for girls in a short-term juvenile detention facility (Kelly, Martinez, & Medrano, 2004) found that a peer-led intervention produced changes in self-efficacy immediately after the intervention. However, conclusions from that study are limited because no behavioral outcomes were collected. Clearly more controlled research with adequate follow-up durations is needed to develop and evaluate effective HIV prevention interventions for female juvenile offenders who, despite evidence attesting to their high risk, have been largely neglected in the HIV prevention literature.

The present study describes the evaluation of an evidence-based sexual risk reduction intervention for incarcerated girls and addresses earlier criticisms of this literature by utilizing random assignment of cohorts to experimental conditions, longitudinal follow up after release from the correctional facility, and attitudinal, behavioral, and biological outcome variables (Malow, Kershaw, Sipsma, Rosenberg, & Devieux, 2007; Morrison-Beedy & Nelson, 2004). Finally, in the discussion section we describe some of the challenges that arose in conducting the intervention and research with incarcerated youth that have implications for practice.

Methods

From September 2004 through June 2007, all newly admitted adolescent female detainees at a state correctional facility who were age 12–17 and not assigned to the maximum security unit were approached for research participation and 333 of 334 girls agreed to participate. During the intervention, attrition was minimal with 23 girls administratively withdrawn because of medical conditions, placement in maximum security, or early release, and five girls who voluntarily withdrew. Written participant assent was obtained and *in loco parentis* consent was provided by the custodial agency. Parental consent was obtained for the follow-up assessment approximately nine months after release from the correctional facility.

Cohorts were randomly assigned to the experimental conditions in blocks separated by a wash-out period between blocks to reduce potential contamination (Staines, McKendrick, Perlis, Sacks, & De Leon, 1999). Girls enrolled in the study attended one of the two experimental conditions: STD risk reduction intervention (SRR) or health education (HE) during school hours, for which they received academic credit in health. Assignment of the first cohort to condition was random; thereafter the intervention order alternated.

Data were collected at baseline, post-intervention, and approximately nine months after release from the correctional facility. To accommodate low literacy and to reduce social desirability bias (Turner, et al., 1998), assessments were conducted using audio computer-assisted self interview (A-CASI) technology. The A-CASI system displayed each question on a computer monitor while a computer-generated voice read each question aloud through the participants' headphones. The participant entered her responses using the keypad. Female staff conducted the post-release assessments in the girl's home. Participants received a modest gift card to a local discount retailer for completing the post release assessment.

Follow-up data collection was originally scheduled to take place at 6- and 12-months post-release. However, high household and youth mobility both within the state and throughout

the Southern United States was accelerated by family relocations following Hurricane Katrina and temporary closure of the training school. As a result, follow-up assessments took place an average of nine months after release from the facility, and we were able to collect at least one follow-up assessment on 80.6% of the sample (n=246) using time-intensive tracking procedures through family and friendship contacts, court records, and schools.

At baseline and at the follow-up, participants were screened for Chlamydia and gonorrhea. Those testing positive at baseline received treatment from the medical staff at the reformatory; those who tested positive during the follow-up assessments received treatment at the local health department. Study procedures were approved by the Mississippi State University Institutional Review Board and by the NIH Office of Human Research Protections, and a federal certificate of confidentiality was obtained.

Measures

Knowledge of reproductive health and STD prevention and the acquisition of technical (correct condom application) and social competency skills (refusal and partner negotiation) were assessed at baseline and immediately post-intervention to determine whether either condition produced gains in two of the three theoretical components of the IMB (Information, Motivation, and Behavioral skills) model that provided the conceptual foundation for the SRR intervention (J. D. Fisher & Fisher, 1992; W. A. Fisher, Fisher, & Harman, 2003).

Health knowledge reflected the number of correct answers to 37 true/false and multiple choice questions on reproductive health, drug effects, sexually transmitted diseases, and contraceptive methods. Test items were derived from established measures developed for use with African American youth and women (Nyamathi, Bennett, Leake, Lewis, & Flaskerud, 1993; St. Lawrence, 1993).

Condom application skill (St. Lawrence, Brasfield, et al., 1995) was measured by observing participants apply and remove a condom using a penile model and a 10-item checklist with possible scores ranging from 0 to 10 for each step completed correctly.

Communication skills were assessed during three role play vignettes that placed the respondent in a high risk sexual or drug use situation and asked them to respond to a series of three escalating prompts as though the situation were actually happening (St. Lawrence, Brasfield, et al., 1995). The vignettes were adapted from the original intervention for female juvenile offenders prior to the study. Role play assessments were audio recorded and subsequently scored by two naïve raters, blind to experimental conditions and the timing of the assessment. Inter-rater reliability was periodically checked and if inter-rater reliability fell below .90, the discrepant ratings were discussed and retraining provided, if necessary.

Vignettes were rated for six skill components: acknowledgement of the other person's viewpoint; specific refusal of an unsafe invitation; provision of a reason for the refusal; use of "I statements"; specific statement of the need for safety; and proposing a lower risk alternative to the proposed action. The frequency of each skill component was summed across all vignettes. A rating of overall social skill was scored from 1 (agreed to unsafe behavior) to 10 (effectively avoided the risky behavior).

The measures for self-reported condom use and sexual behavior originally was developed by St. Lawrence (1993) for research with African American adolescents and has been used in HIV risk reduction interventions with African American youth (St. Lawrence, Jefferson, Alleyne, & Brasfield, 1995), substance abusing youth (St. Lawrence, Crosby, Brasfield, &

O'Bannon, 2002), and incarcerated male adolescents (St. Lawrence, Crosby, Belcher, Yazdani, & Brasfield, 1999).

Intervention effectiveness was evaluated on five outcome variables.

1. *Perceived Barriers to Condom Use* were assessed using the Condom Barrier Scale (St. Lawrence, Chapdelaine, et al., 1999), a measure consisting of 29 items that utilizes a five-point Likert scale ranging from “strongly disagree” to “strongly agree.” Reliability of the measure in this sample was very good (Cronbach's alpha = .93).
2. Participants reported the number of sex partners and the frequency of sexual behaviors, including condom use, in the three months prior to incarceration (baseline) or in the three months prior to the post release follow-up assessment. *Unprotected Sex Occasions* (USO) was calculated by subtracting the number of condom-protected vaginal and anal intercourse occasions from the total number of vaginal and anal intercourse occasions.
3. *Sex under the Influence* (SUI) is the number of times the participant reported sexual intercourse after drinking alcohol or using another drug.
4. *Safer Sex* was categorized as sexually abstinent or consistent condom use for all intercourse occasions. Sexual abstinence was defined as having no male sex partners and no report of oral, vaginal, or anal sex during the three month report period. Consistent condom use referred to self-reported use of condoms for 100% of vaginal and anal intercourse occasions.
5. Last, we examined the incidence of laboratory confirmed sexually transmitted Chlamydia or gonorrhea infections.

Description of Interventions

The curricula for both the experimental and control conditions consisted of 18 60-minute group sessions and one individual goal-setting session provided by interventions specifically trained to deliver the program who were not employees of the correctional facility. Both groups received the same instruction in reproductive health, effects of alcohol, tobacco, and other drugs on health, sexually transmitted diseases (including HIV/AIDS) and contraceptive methods.

The remaining lesson plans for the Health Education curriculum were based on the Family and Individual Health Course, approved for grades 9 through 12 by the Mississippi Department of Education, Office of Vocational-Technical Education. Due to high pregnancy rates among girls committed to the training school, information on pregnancy and prenatal care was added in the control condition.

In addition to the core subject material described above, girls in the STD risk reduction (SRR) intervention condition received skills training and practice on correct condom application, partner negotiation and refusal skills. The SRR intervention was based on BART (Becoming A Responsible Teen) (St. Lawrence, Brasfield, et al., 1995), an evidence-based HIV risk reduction program (Centers for Disease Control and Prevention, 1997, 2009) that is grounded in social cognitive theory (Bandura, 1994) and the IMB (Information, Motivation, and Behavioral skills) model (J. D. Fisher & Fisher, 1992; W. A. Fisher, et al., 2003). The BART curriculum was modified specifically by adding: (a) three hours of problem solving skills, decision making, and risk-related choices; (b) information on other STDs and reproductive health; (c) information on the relationship between AOD use and STD/HIV risk; (d) additional time for communication skills training and practice, and (e)

one group and one individual motivational session. The individual sessions utilized motivational interviewing (W. R. Miller & Rollnick, 2002) and lasted from one to two hours.

Data Analyses

Data analyses were conducted using SPSS software, version 16 and STATA version 7. SPSS was used to generate descriptive statistics, chi-squared tests of independence, and analyses of variance. Due to skewed distributions, all sexual behaviors were transformed using $\log^{10}(x+1)$ prior to data analysis. STATA was used to compute Stuart-Maxwell tests of marginal homogeneity to assess shifts in safer sex categories over time. Outcome analyses were conducted on the 246 participants who could be located for a post-release follow-up assessment.

Results

Characteristics of the Sample

Table 1 presents socio-demographic and behavioral characteristics of the sample by condition. Participants ranged in age from 12 to 18, with a mean age of 15.1 years ($SD = 1.3$). Many had experienced academic problems reflected by grade retention (61.5%) and reading two or more grade levels below their school grade placement (47%). Racial and ethnic composition of the sample was 28% Caucasian, 68% African American, and 4% other (Latina, Native American, or mixed race). More than half lived with at least one parent (525) while 42% lived with extended family (grandparents, or other relatives) and 6% lived with others or in foster care.

Approximately 20% of the participants reported gang membership. Involvement with the juvenile justice system ranged from less than one year to nine years (mean = 1.6 years, $SD = 1.5$). Almost one-quarter (24%) of the participants reported being assaulted by a weapon, and 30% reported having experienced forced sex.

Most (86.3%) of the sample were sexually experienced with an average age at sexual debut of 13.4 years ($SD = 1.3$); median number of lifetime male sex partners was 4 and the mean number of male sexual partners in the three months prior to incarceration was 1.7 ($SD = 3.2$). Only 2.5% reported sex exclusively with other females and 9.3% reported both male and female partners. A small percentage of the sample traded sex for drugs, money, or necessities. Twenty-eight percent of the participants reported having experienced at least one pregnancy, and 19% tested positive for an STD upon admission to the training school.

The majority of participants reported marijuana (64%) and alcohol (63%) use in the six months prior to incarceration. Slightly more than one-third (37%) regularly used marijuana (at least several times per week). Use of other substances was less frequent: stimulants (24%), hallucinogens (11%), and inhalants (8.5%). Few participants reported injection drug use. Approximately 28% of the participants engaged in sex while under the influence of alcohol or another drug, while 23% had gotten into an unplanned or unwanted sexual situation as a consequence of drug use.

Preliminary Analyses

Preliminary analyses assessed group equivalency of cohort blocks to conditions and evaluated whether there was any systematic pattern of differences at baseline between girls who successfully completed the follow-up assessment in comparison with those who could not be located.

Test of Group Equivalency—A preliminary MANOVA using Wilks' lambda identified no significant multivariate differences between girls assigned to the intervention and comparison groups on demographic, attitudinal, and behavioral variables, $F(14, 302) = 0.70, p > .05$. The groups were similar at baseline in race/ethnicity, age, residential transience, family support, years in the juvenile justice system, gang membership, substance use, perceived barriers to condom use, self-efficacy, sexual abstinence, number of male sex partners, exchange of sex, frequency of unprotected sex, and frequency of sex under the influence. This confirmed that sequential assignment of cohorts to conditions, separated by the washout period, resulted in equivalent groups prior to intervention.

Test for Bias Caused by Attrition—A second MANOVA examined whether there was any significant pattern of differences at baseline between the girls who were located for follow-up assessments and those who were lost to attrition. Wilks' criterion revealed no significant differences on measures of condom attitudes and behavioral outcomes by attrition, $F(8, 277) = 0.78, p > .05$. In addition, the interaction between experimental condition and attrition was not significant, $F(8, 277) = 0.51, p > .05$. These results indicate that attrition was equivalent across the two experimental conditions.

Acquisition of Health Information and Behavioral Skills

A $2(\text{condition}) \times 2(\text{time})$ repeated-measures ANOVA revealed significant main effects for time, $F(1, 302) = 747.78, p \leq .001$ and condition $F(1, 302) = 15.33, p \leq .001$; however, the time by condition interaction was not significant, $F(1, 302) = 3.59, p = .06$. As anticipated given that both groups received the same health information, participants in both groups significantly increased their health knowledge from baseline. The significant main effect for condition can be explained by the risk reduction group's higher pretest score and posttest scores, compared to health education participants. Summary statistics are displayed in Table 2.

To assess changes in the social competency skills, a $2(\text{condition}) \times 2(\text{time})$ repeated-measures ANOVA was conducted on each variable with Bonferroni corrections applied to control for the inflated alpha that results from multiple tests, followed by *post hoc* Duncan's tests for significant variables to identify the differences between means in the four cells. The results are displayed in Table 2. Significant interactions were found for condom application, five of the six communication skill components, and for the overall effectiveness rating. The risk reduction group increased correct condom application and communication skills, while the health education group performance was either unchanged or showed much smaller changes.

Differences between Baseline and Follow-up in Attitudes and Behavioral Outcomes

Changes in perceived barriers to condom use—A condition by time repeated-measures ANOVA assessed changes in perceived barriers to condom use from baseline to follow-up. Neither the interaction between conditions and time $F(1, 244) = 1.02, p = .31$ or the main effect for time was significant, $F(1, 244) = 3.06, p = .08$. (see Table 3).

Changes in sexual behavior—Repeated-measures ANOVAs assessed changes in the frequency of unprotected vaginal and anal sex occasions (USO) and the frequency of sexual intercourse while under the influence of alcohol or another drug (SUI) and found no significant interaction between conditions and time for USO, $F(1, 215) = 0.91, p = .34$. However, there was a main effect for time, $F(1, 215) = 14.35, p < .001$, indicating that both groups significantly decreased the number of unprotected sex occasions, to a level approximately 60% of baseline for the SRR group and 34% of baseline for the HE group.

There was no significant interaction between conditions and time for SUI, $F(1, 238) = 0.04$, $p = .83$. A main effect for time, $F(1, 238) = 9.77$, $p = .002$, indicated that both groups significantly decreased the frequency of sex under the influence of alcohol or another drug. Summary statistics are reported in Table 3.

To examine whether girls changed their level of risk across the three safer sex categories (abstinence, consistent condom use, inconsistent or no condom use), we conducted Stuart-Maxwell test of marginal homogeneity. For girls in both the HE and in the SRR groups the change from baseline to follow-up was not significant, HE $\chi^2(2, N=133) = 0.88$, $p = .64$; RRI $\chi^2(2, N=113) = 4.63$, $p = .10$.

Changes in incidence of sexually transmitted infections (STI)—Logistic regression analysis assessed sexually transmitted infections at follow-up by condition. Neither condition (AOR = 0.51, $p = .07$) nor having an STI at baseline (AOR = 1.90, $p = .12$) was associated with incident infection at follow-up. Almost 20% of the sample was infected both at baseline and at follow-up.

Discussion

Despite the critical need for effective HIV risk reduction interventions for incarcerated adolescent girls, only one gender-specific program has been described in the literature (Kelly, et al., 2004). The Healthy Teen Girls Project enhanced BART (St. Lawrence, Brasfield, et al., 1995), an evidence-based HIV risk reduction intervention (Centers for Disease Control and Prevention, 1997, 2009), for female juvenile offenders. The adapted intervention was intensive (18 hours of group sessions) and included all of the components considered necessary for effective adolescent HIV prevention programs (Johnson, Carey, Marsh, Levin, & Scott-Sheldon, 2003; Morrison-Beedy & Nelson, 2004; Robin, et al., 2004).

While girls in the SRR intervention demonstrated post-intervention superiority in condom application and social competency skills, the risk reduction intervention was no more effective than health education in changing perceived barriers to condom use or in reducing post-release risk behaviors once girls returned to their communities. Girls in both conditions significantly decreased the frequency of unprotected sex and sex while under the influence of alcohol and other drugs. However, neither intervention led to a shift in safer sexual practices from inconsistent condom use to sexual abstinence or 100% condom protected sex. Most troublesome of all, there were no significant differences between the health education and risk reduction interventions in incidence of sexually transmitted infections post-intervention.

Several limitations in the research may offer explanations for why these interventions were not differentially effective are plausible. First, there may have been cross-contamination in spite of the sequential assignment of cohorts to conditions. Approximately one-third of all admissions to the training school were readmits. Girls lived in open dormitories and had unstructured time in the evenings and weekends. It is possible that cross contamination may have occurred when girls who previously participated in one of the interventions reentered the facility during a time when the alternate intervention was being delivered or that some girls had not yet left the facility when the alternate groups were initiated.

Second, the duration and intensity of the two interventions were the same and girls in both conditions received the same information on STD/HIV transmission and prevention. A review of HIV prevention interventions for adolescents found greater effects when interventions were compared to a no treatment control or to a comparison group that

received less HIV-related information (Johnson, et al., 2003). Girls in both health education and in the risk reduction interventions participated in risk assessment and other activities designed to increase motivation to change risk behaviors. In addition, girls in both conditions also participated in identical individual goal-setting motivational sessions prior to release. Similar motivational interventions have had success in decreasing risk behavior in the short run among incarcerated youth (Rosengard, et al., 2007) and among HIV-positive youth (Naar-King, et al., 2006). Taken together is possible that the informational sessions and individualized session may have biased the outcomes toward the null, accounting for parallel change in both groups.

A third explanation for our findings is that social context influences HIV risk behaviors (Malow, et al., 2006). Many adolescent female offenders have a history of physical and sexual abuse and come from dysfunctional homes where other family members evidence substance dependence, mental illness, and/or criminal involvement (Acoca & Dedel, 1998; Dembo, Williams, Wothke, Schmeidler, & Brown, 1992). Family substance abuse and criminal involvement are associated with less parental monitoring and more child maltreatment, which in turn, are associated with greater adolescent drug use, delinquency, and sexual risk behaviors (Robertson, Baird-Thomas, & Stein, 2008). Family-based interventions have been successful in reducing substance and delinquent behavior among juvenile offenders (Liddle, et al., 2001) and may hold greater promise for reducing sexual risk behaviors in this population because the same family antecedents and parental practices are involved in adolescent risk-taking and psychopathology. Future research should consider intervening with the home environment to which these girls are likely to return.

Romantic relationships are another important social context because the behavior of male partners may be a greater determinant of sexually transmitted infections among females than their own behavior (Auerswald, Muth, Brown, Padian, & Ellen, 2006; Dolcini & Catania, 2000). For example, having an older partner is associated with early sexual initiation, less condom use, greater likelihood of STD infection, and pregnancy (Crosby, et al., 2002; K. S. Miller, Clark, & Moore, 1997). Furthermore, STD risk behavior and infection is greater among women whose partners use drugs, have a history of incarceration or who are physically abusive (Auerswald, et al., 2006; Wingood & DiClemente, 1997). Prior to incarceration, 53% of the study participants reported their boyfriend was three or more years older and 48% continued to date older men after their release. In addition, a substantial number of girls in our study reported high-risk sex partners after returning home: 44% of our participants' partners had also been incarcerated, 14% reported being physically assaulted by their partners, and 12% reported coercions into unwanted sex. Even girls who possess the requisite skills may not be successful negotiating condom use in the contexts of abusive relationships or older partners.

Fourth, juvenile offenders are a difficult group of the high-risk adolescents to influence into changed behavior (Malow, et al., 2006). Juvenile offenders have high rates of comorbid substance use and mental disorders (Teplin, et al., 2005). In spite of documented need for mental health treatment services (Robertson, Dill, Husain, & Undesser, 2004), such services were not available at the facility where these girls were incarcerated at the time of our study. In addition, it is easier to delay the onset of sexual activity and increase future safe sex practices when programs are delivered *before* youth are sexually active than it is to change habitual risk behavior (Pedlow & Carey, 2004) and the majority of our participants were already sexually active with multiple sex partners.

Fifth, the elapsed time between completion of their respective interventions and their release from the training school may have degraded the transfer of their newly acquired skills. The correctional facility required that the program be delivered as girls entered the facility.

Perhaps, if it were timed to occur just before their return to the communities from which they came, stronger effects might have been observed. A similar program provided to incarcerated adolescent males found very similar results and also hypothesized that the intervening time after the program ended and before the youth were released might have lessened intervention effectiveness (St. Lawrence, Crosby, Belcher, et al., 1999). The most effective programs to date have encouraged participants to apply their newly acquired skills in the week following their intervention session and then included discussion, reinforcement, and problem-solving of their *in vivo* experiences using the skills in the natural environment. Clearly, this *in vivo* experience was not possible for these incarcerated adolescents and may have been a critical omission that limited the transfer of skills from the facility into their natural environment post release, thereby lowering the potential impact. Future research should determine whether the outcomes might have been different if the girls had received the intervention closer to release, had post release booster sessions or other strategies that promoted generalization of their newly learned knowledge and behavior skills into the natural environment.

Finally, although girls with positive STD test results were treated at baseline, rates of incident infection were comparable in both groups at the follow-up and equivalent to the prevalence at baseline. Almost 20% of the sample was infected with Chlamydia or gonorrhea at admission to the training school and at the later follow-up assessment. Chlamydia and gonorrhea are endemic among adolescents in Mississippi communities and local health departments do not have the resources to track all sex partners, focusing their attention on those who are infected with syphilis and HIV. Thus girls infected and treated for Chlamydia and gonorrhea at baseline were at high risk for re-infection following release if they resumed a sexual relationship with an untreated partner.

Implications for Practice

Research and service delivery in juvenile correctional settings can be a challenging process, as illustrated by some of the disruptions that arose during the course of this effort. For example, the training school's average daily attendance before this study began indicated we readily could expect to recruit and enroll 400 participants. Instead, during the course of the study multiple unanticipated events arose and significantly affected both recruitment and program delivery. A new state law prohibiting placement of status offenders (those whose actions are offenses only because of their age, e.g., runaways) at the training school, negative publicity regarding alleged maltreatment of detained youth, and the development of new community-based alternatives to incarceration all led to a declining census at the correctional facility. Fourth, the projected path of Hurricane Katrina in August 2005 prompted the early release of many girls before their scheduled discharge dates. The storm's extensive damage to buildings resulted in a temporary halt in admissions to the facility. Finally, recruitment and intervention ended abruptly in 2007 when new allegations of staff maltreatment resulted in a federal investigation and closure of the facility.

Another unexpected challenge was that approximately one-third of all new admissions actually were readmissions of girls who had already completed one of the interventions, lowering the potential pool for recruitment and necessitating alternative arrangements for that class period.

Finally, although the ideal would be to deliver the interventions shortly before release from the facility, timing was dictated by the administrators of the training school and had to occur immediately after entry to fit in with participants' academic schedules during their approximately 14-week stay in the facility. Taken together, these challenges illustrate the challenges that can arise unexpectedly and the flexibility that is needed to successfully work within youth correctional settings.

Summary

In conclusion, girls in the intensive HIV risk reduction program that emphasized skill acquisition clearly learned and could demonstrate the skills in simulations at post intervention, while health education (control) participants were largely unchanged. Both groups evidenced comparable improvement in health knowledge and lower self-reported risk behavior at follow-up, although these self-reported changes were not accompanied by reductions in incident STI infections.

Acknowledgments

This study was funded by a grant from the National Institute on Drug Abuse to Angela A. Robertson, Principal Investigator (R01DA17509).

References

- Acoca, L.; Dedel, K. No Place to Hide: Understanding and Meeting the Needs of Girls in the California Juvenile Justice System: The National Council on Crime and Delinquency. 1998.
- Auerswald CL, Muth SQ, Brown B, Padian N, Ellen J. Does Partner Selection Contribute to Sex Differences in Sexually Transmitted Infection Rates Among African American Adolescents in San Francisco? *Sexually Transmitted Diseases*. 2006; 33(8):480–484. [PubMed: 16645551]
- Bandura, A. Social cognitive theory and exercise of control over HIV infection. In: DiClemente, RJ.; Peterson, JL., editors. *Preventing AIDS: Theories and methods of behavioral interventions*. New York: Plenum Press; 1994. p. 25-29.
- Bryan AD, Schmiede SJ, Broaddus MR. HIV/STD Risk Reduction Among Detained Adolescents: A Randomized Controlled Trial. *Pediatrics*. (in press).
- Centers for Disease Control and Prevention. Research to classroom project: Programs that work. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, Division of Adolescent and School Health; 1997.
- Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance, 2007. 2008. Figure 5, Table 10. Retrieved from <http://www.cdc.gov/std/stats07/main.htm>
- Centers for Disease Control and Prevention. Compendium of HIV Prevention Interventions with Evidence of Effectiveness. Atlanta, GA: U.S. Department of Health and Human Services; 2009.
- Crosby R, DiClemente RJ, Wingood GM, Harrington K, Davies SL, Hook EW III. Predictors of infection with *Trichomonas vaginalis*: A prospective study of low income African-American adolescent females. *Sexually Transmitted Infections*. 2002; 78:360–364. [PubMed: 12407241]
- Dembo R, Williams L, Wothke W, Schmeidler J, Brown CH. The role of family factors, physical abuse, and sexual victimization experiences in high-risk youths' alcohol and other drug use and delinquency: A longitudinal model. *Violence and Victims*. 1992; 7(3):245–266. [PubMed: 1294239]
- Dolcini MM, Catania JA. Psychosocial Profiles of Women with Risky Sexual Partners: The National AIDS Behavioral Surveys (NABS). *AIDS and Behavior*. 2000; 4(3):297–308.
- Fisher JD, Fisher WA. Changing AIDS-risk behavior. *Psychological Bulletin*. 1992; 111(3):455–474. [PubMed: 1594721]
- Fisher, WA.; Fisher, JD.; Harman, J. The Information-Motivation-Behavioral Skills Model: A General Social Psychological Approach to Understanding and Promoting Health Behavior. In: Suls, JM.; Wallston, KA., editors. *Social Psychological Foundations of Health and Illness*. London: Blackwell Publishing; 2003. p. 82-106.
- Goldberg E, Millson P, Rivers S, Manning SJ, Leslie K, Read S, et al. A human immunodeficiency virus risk reduction intervention for incarcerated youth: A randomized control trial. *Journal of Adolescent Health*. 2009; 44:136–145. [PubMed: 19167662]
- Hoyt S, Scherer DG. Female juvenile delinquency: Misunderstood by the juvenile justice system, neglected by social science. *Law and Human Behavior*. 1998; 22:81–107. [PubMed: 9487792]

- Johnson BT, Carey MP, Marsh KL, Levin KD, Scott-Sheldon LAJ. Interventions to reduce sexual risk for the human immunodeficiency virus in adolescents, 1985–2000: A research synthesis. [Article]. *Archives of Pediatrics and Adolescent Medicine*. 2003; 157(4):381–388. [PubMed: 12695235]
- Kelly PJ, Martinez E, Medrano M. Gender Specific Health Education in the Juvenile Justice System. *Journal of Correctional Health Care*. 2004; 11(1):45–58.
- Liddle HA, Dakof GA, Parker K, Diamond GS, Barrett K, Tejeda M. Multidimensional family therapy for adolescent drug abuse: Results of a randomized clinical trial. [Review]. *American Journal of Drug and Alcohol Abuse*. 2001; 27(4):651–688. [PubMed: 11727882]
- Malow RM, Kershaw T, Sipsma H, Rosenberg R, Devieux J. HIV preventive interventions for adolescents: A look back and ahead. *Current HIV/AIDS Reports*. 2007; 4:173–180. [PubMed: 18366948]
- Malow RM, Rosenberg R, Donenberg G, Devieux JG. Interventions and patterns of risk in adolescent HIV/AIDS prevention. *American Journal of Infectious Diseases*. 2006; 2(2):80–89. [PubMed: 19088859]
- Miller KS, Clark LF, Moore J. Sexual initiation with older male partners and subsequent HIV risk behavior among female adolescents. *Family Planning Perspectives*. 1997; 29(5):212–214. [PubMed: 9323497]
- Miller, WR.; Rollnick, S. *Motivational Interviewing: Preparing People For Change*. 2. New York: The Guilford Press; 2002.
- Morrison-Beedy D, Nelson LE. HIV prevention interventions in adolescent girls: What is the state of the science? *Worldviews on Evidence-based Nursing*. 2004; 1(3):165–175. [PubMed: 17163894]
- Naar-King S, Wright K, Parsons JT, Frey M, Templin T, Lam P, et al. Healthy Choices: Motivational enhancement therapy for health risk behavior in HIV-positive youth. *AIDS Education and Prevention*. 2006; 18(1):1–11. [PubMed: 16539572]
- Nyamathi A, Bennett C, Leake B, Lewis C, Flaserud J. AIDS-Related Knowledge, Perceptions, and Behaviors among Impoverished Minority Women. *American Journal of Public Health*. 1993; 83(1):65–71. [PubMed: 8417610]
- Pedlow CT, Carey MP. Developmentally Appropriate Sexual Risk Reduction Interventions for Adolescents: Rationale, Review of Interventions, and Recommendations for Research and Practice. *Annals of Behavioral Medicine*. 2004; 27(3):172–184. [PubMed: 15184093]
- Robertson AA, Baird-Thomas C, Stein JA. Child victimization and parental monitoring as mediators of youth problem behaviors. *Criminal Justice and Behavior*. 2008; 35:755–771. [PubMed: 20631917]
- Robertson AA, Dill PL, Husain J, Undesser C. Prevalence of mental illness and substance abuse disorders among incarcerated juvenile offenders in Mississippi. *Child Psychiatry and Human Development*. 2004; 35:55–74. [PubMed: 15626325]
- Robertson AA, Levin ML. AIDS knowledge, condom attitudes, and risk-taking sexual behavior of substance-abusing juvenile offenders on probation or parole. *AIDS Education and Prevention*. 1999; 11(5):450–461. [PubMed: 10555628]
- Robertson AA, Thomas CB, St Lawrence JS, Pack R. Predictors of infection with Chlamydia or gonorrhea in incarcerated adolescents. *Sexually Transmitted Diseases*. 2005; 32(2):115–122. [PubMed: 15668619]
- Robin L, Dittus P, Whitaker D, Crosby R, Ethier K, Mezoﬀ-Ches J, et al. Behavioral interventions to reduce incidence of HIV, STD, pregnancy among adolescents: A decade in review. *Journal of Adolescent Health*. 2004; 34:3–26. [PubMed: 14706401]
- Romero EG, Teplin LA, McClelland GM, Abram KM, Welty LJ, Washburn JJ. A longitudinal study of the prevalence, development, and persistence of HIV/sexually transmitted infection risk behaviors in delinquent youth: Implications for health care in the community. [Review]. *Pediatrics*. 2007; 119(5):E1126–E1141. [PubMed: 17473083]
- Rosengard C, Stein LAR, Barnett NP, Monti PM, Golembeske C, Lebeau-Craven R, et al. Randomized Clinical Trial of Motivational Enhancement of Substance Use Treatment Among Incarcerated Adolescents: Post-Release Condom Non-Use. *Journal of HIV/AIDS Prevention in Children & Youth*. 2007; 8(2):45–64. [PubMed: 19809580]

- Sickmund, M.; Sladky, T.J.; Kang, W.; Puzzanchera, C. Easy Access to the Census of Juveniles in Residential Placement. 2008. Retrieved from <http://ojjdp.ncjrs.gov/ojstatbb/ezacjrp/>
- Slonin-Nevo V, Auslander WF, Ozawa MN, Jung KG. The long-term impact of AIDS-preventive interventions for delinquent and abused adolescents. *Adolescence*. 1996; 31(122):409–421. [PubMed: 8726899]
- St Lawrence JS. African-American Adolescents' Knowledge, Health-related Attitudes, Sexual Behavior, and Contraceptive Decisions: Implications for the prevention of adolescent HIV Infection. *Journal of Consulting and Clinical Psychology*. 1993; 61(1):104–112. [PubMed: 8450095]
- St Lawrence JS, Brasfield TL, Jefferson KW, Alleyne E, O'Bannon RE III, Shirley A. Cognitive-behavioral intervention to reduce African American adolescents' risk for HIV infection. *Journal of Consulting and Clinical Psychology*. 1995; 63(2):221–237. [PubMed: 7751483]
- St Lawrence JS, Chapdelaine AP, Devieux JG, O'Bannon RE III, Brasfield TL, Eldridge GD. Measuring perceived barriers to condom use: Psychometric evaluation of the Condom Barriers Scale. *Assessment*. 1999; 6(4):391–404. [PubMed: 10539985]
- St Lawrence JS, Crosby R, Belcher L, Yazdani N, Brasfield TL. Sexual risk reduction and anger management interventions for incarcerated male adolescents: A randomized controlled trial of two interventions. *Journal of Sex Education and Therapy*. 1999; 24(1&2):9–17.
- St Lawrence JS, Crosby R, O'Bannon RE 3rd. Adolescents at high risk of HIV infection: A comparison of four samples. *Journal of HIV/AIDS Prevention & Education*. 1999; 3:63–86.
- St Lawrence JS, Crosby RA, Brasfield TL, O'Bannon RE III. Reducing STD and HIV risk behavior of substance-dependent adolescents: A randomized controlled trial. *Journal of Consulting and Clinical Psychology*. 2002; 70(4):1010–1021. [PubMed: 12182264]
- St Lawrence JS, Jefferson KW, Alleyne E, Brasfield TL. Comparison of education versus behavioral skills training interventions in lowering sexual HIV-risk behavior of substance-dependent adolescents. *Journal of Consulting and Clinical Psychology*. 1995; 63(1):154–157. [PubMed: 7896983]
- Staines GL, McKendrick K, Perlis T, Sacks S, De Leon G. Sequential assignment and treatment-as-usual: Alternatives to standard experimental designs in field studies of treatment efficacy. *Evaluation Review*. 1999; 23(1):47–76. [PubMed: 10346073]
- Teplin LA, Elkington KS, McClelland GM, Abram KM, Mericle AA, Washburn JJ. Major mental disorders, substance use disorders, comorbidity, and HIV-AIDS risk behaviors in juvenile detainees. *Pediatric Services*. 2005; 56(7):823–828.
- Tolou-Shams M, Stewart A, Fasciano J, Brown LK. A Review of HIV Prevention Interventions for Juvenile Offenders. *Journal of Pediatric Psychology*. 2009:1–12.
- Turner C, Ku L, Rogers SM, Lindberg LD, Pleck JH, Sonenstein FL. Adolescent sexual behavior, drug use, and violence: Increased reporting with computer survey technology. *Science*. 1998; 280:867–873. [PubMed: 9572724]
- Wingood GM, DiClemente RJ. The effects of an abusive primary partner on the condom use and sexual negotiation practices of African-American women. 1997; 87(6):1016–1018.

Table 1

Baseline socio-demographic and behavioral characteristics of participants by experimental condition

Variable	Health Education mean or % (SD)	STD Risk Reduction mean or % (SD)
Age	15.0 (1.3)	15.1 (1.3)
Race/ethnicity, %		
Black	67.6	69.1
White	29.6	26.8
Other	2.8	4.0
Family structure		
Both biological parents	13.4	12.8
Single parent	28.5	28.2
Step-parent family	7.8	14.8
Extended family	43.6	38.9
Foster home & other	6.7	5.4
Gang membership	20.1	18.1
Years involved in juvenile justice system	1.5 (1.3)	1.7 (1.7)
Ever assaulted with weapon	22.3	26.8
History of forced sex/rape	32.4	26.8
Age of sexual debut	13.4 (1.4)	13.4 (1.2)
Ever pregnant	26.3	30.9
Number lifetime male partners	5.6 (9.6)	6.0 (8.3)
Exchange of sex for money or goods	6.7	7.5
STD at admission	20.0	17.9
Any drug use in previous 6 months	73.2	80.5
Number of drugs used in previous 6 months	2.5 (2.0)	2.7 (2.0)
Ever injected drugs	1.7	2.0

No significant group differences on any variable.

Table 2

Changes from Baseline to Post-Intervention by Condition

Variable	Intervention Condition		Group × Time	
	HE Mean (SD)	SRR Mean (SD)	F	p
Health Knowledge				
Baseline	17.22 (6.77)	19.03 (6.36)	3.59	0.06*
Post Intervention	26.62 (7.00)	29.83 (5.33)		
Condom Application				
Baseline	4.35 (1.97) ^a	4.26 (1.58) ^a	239.27	<.001
Post Intervention	5.00 (1.82) ^b	8.68 (1.46) ^c		
Assertive Communication				
Acknowledge				
Baseline	0.69 (0.95) ^a	1.09 (1.39) ^b	24.57	<.001
Post Intervention	1.33 (1.39) ^b	2.74 (1.97) ^c		
Refusal				
Baseline	2.46 (1.85)	2.55 (1.65)	7.22	.008*
Post Intervention	2.28 (1.77)	3.01 (1.53)		
Reason				
Baseline	2.26 (2.13) ^a	1.75 (1.70) ^b	12.54	<.001
Post Intervention	3.26 (2.69) ^c	3.74 (2.14) ^d		
Statement				
Baseline	0.74 (1.22) ^a	0.59 (0.93) ^a	42.43	<.001
Post Intervention	0.79 (1.03) ^a	2.01 (2.24) ^b		
Safety				
Baseline	0.28 (0.64) ^a	0.23 (0.50) ^a	37.78	<.001
Post Intervention	0.44 (0.86) ^a	1.13 (1.22) ^b		
Alternative				
Baseline	0.39 (0.59) ^a	0.31 (0.55) ^a	24.63	<.001
Post Intervention	0.45 (0.62) ^a	0.82 (0.82) ^b		
Overall Effectiveness				
Baseline	4.17 (1.65) ^a	3.95 (1.51) ^a	50.63	<.001
Post Intervention	5.02 (1.57) ^b	6.29 (1.48) ^c		

Notes: HE stands for Health Education. SRR stands for STD Risk Reduction intervention.

* These variables were not significant after Bonferroni corrections were applied. Superscripts significant mean differences between the cells on Duncan's post hoc tests for the significant univariate variables.

Table 3

Changes in Condom Barriers Scores and Frequency of Sexual Risk Behaviors from Baseline to Follow-up

Variable	Intervention Condition		Time	
	HE Mean (SD)	SRR Mean (SD)	F	p
Condom Barriers	N=133	N=113		
Baseline	52.28 (16.92)	51.15 (17.22)	3.06	0.08
Follow-up	51.25 (21.44)	47.31 (17.95)		
Unprotected Sex Occasions	N=120	N=97		
Baseline	5.95 (14.69)	4.50 (11.00)	14.35	<.001
Follow-up	2.03 (6.51)	2.75 (6.20)		
Sex under the influence	N=130	N=110		
Baseline	2.79 (8.04)	2.59 (6.16)	9.77	.002
Follow-up	1.68 (5.89)	1.64 (5.02)		

Note:

1) HE stands for Health Education comparison.

2) SRR stands for STD Risk Reduction intervention