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Review Article

Preventing HIV/AIDS Transmission in Involuntary Detainees

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General Message

Human Immunodeficiency virus (HIV) infection is a major health issue in prison and among involuntary detainees alike. In the united states alone, it has been estimated that each year between 20 - 25% of those living with HIV are held in a correctional facilities [1]. Risk behaviors during incarceration period have been associated with higher incidence of HIV compared to time prior to detention [2]. Behavioral, social and medical intervention programs can be of immense importance in order to reduce the risk of unhealthy behavior or to minimize the stimulating factors in prison which draws the individual to more risky behavior even after release. Learning proper skills to maintain risk-free behavior and continuation of these behaviors should be tested via proper randomized controlled trial. This review found two major randomized controlled trials looking into the pre-determined variables. The first study [3] showed that specific behavioral interventions -- in this case, based on social cognitive theory -- can help detainees improve their HIV prevention skills while the Dolan., *et al*. study [2] showed that medical intervention (methadone treatment) could decrease risky behaviors such as syringe sharing. Apart from these two trials, there is little evidence on the effectiveness of current HIV-prevention interventions among involuntary detainees, and more research is needed.

Abstract

Background: Incarcerated population have traditionally been considered at high risk for health problems associated with contraction of HIV infection. Moreover, detainees who contract HIV while in prison may transmit the infection to partners in the community upon release, with obvious public health consequences.

Objectives: This review aims to examine the effectiveness of interventions designed to prevent transmission of HIV among involuntary detainees.

Search Methods: Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, 2017), MEDLINE (1966 to Jan Week 4 2017), EMBASE (1980 to Jan Week 4 2017), CINAHL (1982 to Jan Week 4 2017), PsycINFO (1872 to Jan Week 4 2017). For studies up to 1996, the Behavioral Prevention Register of the Cochrane Collaborative Review Group on HIV infection and AIDS were searched.

Selection Criteria: Randomized controlled trials, quasi-randomized controlled trials, cluster-randomized controlled trials, and studies utilizing a comparison group that evaluates the effects of interventions designed to influence behavior change on at least one outcome measure related to HIV transmission were selected.

Data Collection and Analysis: Two authors independently assessed trial quality and extracted data. When in dispute, further discussion was carried out.

Main Results: Two trials met the inclusion criteria. St. Lawrence and colleagues [3] found that incarcerated women showed greater improvement in condom application skills when they participated in a social cognitive theory-based intervention relative to women who participated in an intervention based on the theory of gender and power. Dolan and colleagues [2] found that prisoners who

participated in a methadone maintenance treatment used significantly less heroin and shared drug equipment less often than did prisoners who did not receive methadone.

Authors' Conclusions: There is insufficient evidence to confirm or refute the effectiveness of designed interventions to prevent transmission of HIV among involuntary detainees. There is an urgent need to conduct high-quality, double-blinded randomized clinical trials to determine which type of intervention (behavioral, social or medical) is most suitable to prevent the spread of HIV among detainees is specific and in community in general.

Keywords: *HIV/AIDS, Involuntary Detainees*

Background

People who are involuntarily detained in prisons and other correctional environments are at increased risk for infection with HIV. In the United States, the AIDS prevalence in 2006 was more than five times higher in incarcerated populations than in the general population [4]. In fact, the Joint United Nation Program on AIDS (UNAIDS) listed prisoners as a "major at-risk and neglected population" in the HIV/AIDS pandemic [5]. Other countries have also shown more HIV prevalence among prisoners as compared with general populations, such as: Canada (1 - 12% as vs. 0.5%), Brazil (1.9% vs. 1%), Honduras (6.8% vs. 2.4%), Cuba (26% vs. 0.2%), Spain (14% vs. 0.4%), South Africa (41.4% vs. 20.7%), and Vietnam (28.4% vs. 0.9%) [6]. The high prevalence of HIV among detainees is partly due to over-representation of high-risk groups in prisons (such as sex workers or drug users), although there is some evidence that HIV infection also occurs inside [7].

Much has been written about closed environments, like prisons or mandatory rehabilitation centers, being a potential threat to public health, both in relation to increased HIV transmission inside and because they serve as a vector for those at greater risk of transmission in general society [8]. For example, the United States imprisons its population at the highest known rate in the world, 724 per 100,000 persons in 2006 [4]. In 2012, 1.57 million people were incarcerated in state and federal prisons and at midyear 2013 there were 731,208 people detained in local jails. When prisoners are released, there is a question of the public health impact on the communities to which they return. Prison populations have grown all over the world in recent decades, primarily because incarceration has been the main policy of the "war on drugs" in many countries [9]. Sexual activity among male inmates, as well as sexual activity between inmates and prison staff [10], unavailability of condoms in many settings, homosexual rape, and other incidents of interpersonal violence (including fights involving lacerations, bites, and bleeding in two or more participants), sharing needles for IV drug users, sharing toothbrushes and shaving equipment (due to unavailability or financial disadvantage of inmates) and tattooing all present some risks for HIV transmission for inmates [1]. Moreover, many countries have failed to implement HIV prevention measures that are available in the community and have proven to reduce the risk of HIV infection.

Although imprisonment is considered a window of opportunity to reach inmates [11], still many incarcerated people are hard to reach with critical health information, management, and treatment. No precise count of HIV cases in prisoners is available, as brief incarceration, particularly in jails, limits access to healthcare, and the lack of universal screening hinders the identification and diagnosis of inmates with HIV infection. Furthermore, because of stigma or differential treatment (for example, missing opportunities to obtain work furloughs or participate in activities) detainees may choose not to declare their HIV status, even if they know they are infected. In addition, common features seen in HIV-infected individuals, such as sero-positivity for hepatitis B, C [12] or diagnosis of TB, which is very common in crowded prisons, will often not be detected in prison settings [13]. Moreover, detainees in juvenile centers, half way homes, and asylum enters all share the same characteristic of being vulnerable to HIV transmission or exposing other victims.

Intervention programs adopted for prevention of HIV within the prisons and in community settings are mainly divided into two categories: medical (e.g. methadone maintenance treatment) and behavioral (e.g. arranging counselling to reduce risky sex, dispensing condoms, and encouraging HIV testing). Education and training strategies will seek to ensure that inmates are fully informed about HIV transmission and risk behaviors and are provided with the information and skills necessary prerequisites, but not always sufficient, to

avoid infection. Transfer of knowledge, however, will not be sufficient without making condoms, bleach and sterile injecting equipment accessible to hose in need in order to reduce the risk of infection. HIV prevention programs inside prisons and rehabilitation centers primarily focus on harm reduction; because of the focus on security, health-related supplies such as condoms and information are not always available [2]. Moreover, there is a general reluctance to acknowledge the very existence of sexual activity and drug use in many prisons. The consequence of the high turnover of inmates in rehabilitation centers or prisons, combined with the prevalence of a range of HIV risk behaviors inside prisons and detention centers, make HIV prevention programs within them more important than ever [14].

Objectives

1. To obtain the effectiveness of interventions designed to prevent transmission of HIV among involuntary detainees.
2. To summarize the effectiveness of these interventions, including whether outcomes are different depending on the type of institution, prisoner gender, and prisoner age.
3. To identify gaps and indicate future research, policy, and program needs.

The objectives of this review are to compare the effectiveness of interventions (medical and behavioral) designed to prevent transmission of HIV among involuntary detainees, inclusive of prisoners, those involuntarily detained in half-way homes, etc. Subjects should be mentally healthy. Medical intervention could constitute methadone maintenance programs or other medications. Behavioral interventions could include various types of educational programs and behavioral models.

Subgroup analysis

We considered to do subgroup analysis for type of institution (such as prisons, half way homes, etc.); gender (male, female, and transgender); age (adolescents vs. adults) and type of intervention (medical vs. behavioral; one-to-one intervention vs. group intervention).

Methods

Criteria for considering studies for this review

Types of studies

The following studies were included in this review: Any published or unpublished randomized controlled trials, quasi-randomized controlled trials, cluster-randomized controlled trials, and studies utilizing a comparison group that evaluates the effects of interventions designed to influence behavior change on at least one outcome measure related to HIV transmission.

Types of participants

We included participants who were involuntarily detained (inmates or prisoners) in prisons, juvenile centers, halfway homes, rehabilitation centers, asylum centers.

Participants could be of any gender, adolescents or older.

We excluded voluntarily detainees who have contact with the community as they wish (e.g. soldiers). We also excluded studies of people on probation or parole, living in the community. Moreover, newborns and children were excluded from the study.

Types of interventions

Interventions that may change individuals' behavior were considered for this review and may include, but were not limited to, the following:

Behavioral interventions: These are interventions that aim to change individual behaviors only, without direct attempts to change the norms of the target population. Components of such interventions would include counselling, HIV-testing and counselling, peer education, and skills training. These will also include interventions such as the introduction of needle exchange and condom availability, which also aim to change HIV risk behavior, but which may occur only as a result of policy or law changes. This review will consider various modes of training programs, such as workshops, lectures, talks and their effects on the individual.

Social interventions: These interventions may aim to change not only individual behaviors, but also social norms. Strategies such as segregation or mobilization of prisoners, case-by-case determination of housing placement, building networks, prison-wide education campaigns, and structural and resource support are often used to bring about changes in social norms.

Interventions that are to be included in this review are mainly focused on directly changing individual risk behavior, in order to prevent HIV infection. Although there are other types of social and policy-related interventions that may indirectly affect risk of HIV infection (e.g., universal access to healthcare; TV programs on HIV preventive measures; interventions to improve socioeconomic status of inmates, such as job-skills training, increasing staff-to-detainee ratios, classifying and housing inmates carefully, decreasing overcrowding, and providing activities for inmates) these are beyond the scope of this review.

Medical interventions: Medical interventions, such as efficacy of drug-replacement therapy (e.g., methadone or buprenorphine programs) and or biomedical interventions, such as antiretroviral therapy, will be included in the study. However, blood screening, Caesarean sections, avoidance of breastfeeding and other prenatal strategies will be excluded.

Some interventions may be a mixture of the above-mentioned interventions.

Types of outcome measures

Studies that report outcome measures directly related to HIV transmission were included.

Primary outcome of interest

Biological:

- Incidence of HIV infection after the intervention (the minimum duration of measurement of outcome after the intervention is three months)
- Incidence of STI

Secondary outcome of interest

Behavioral:

- Report of failure to abstinence
- Report of unprotected sex
- Report of sex with sero-concordant partners (sero-sorting)
- Frequency of needle sharing
- Improved skills relative to HIV preventive behaviors
- Improved level of knowledge of HIV
- Behavioral intention to reduce risk (related in the literature to outcomes)

Search methods for identification of studies

Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, 2017), MEDLINE (1966 to Jan Week 4 2017), EMBASE (1980 to Jan Week 4 2017), CINAHL (1982 to Jan Week 4 2017), PsycINFO (1872 to Jan Week 4 2017). For studies up to 1996, the Behavioral Prevention Register of the Cochrane Collaborative Review Group on HIV infection and AIDS were searched.

1. Systematic, comprehensive searches for relevant studies on electronic databases, through hand searching key journals and conference proceedings were done.
2. We hand searched the reference lists of retrieved articles.
3. Where possible, we contacted authors of identified trials to determine whether other published or unpublished trials were available.
4. Sensitive search strategies were considered, consisting of both controlled vocabulary terms and free text terms.

5. All search results were subsequently entered/downloaded into RevMan Version 5. The titles and abstracts, where available, were scanned and classified according to their relevance to the review.
6. No language restrictions were applied.

Inclusion Criteria

All the HIV-infected or uninfected involuntary detainees within the prisons, rehabilitation enters, juvenile centers, halfway homes, and asylum centers.

No age, gender, or race limit is considered necessary.

Data collection and analysis

Each review author independently selected trials for possible inclusion in the study. First, the titles and abstracts of trials identified from the search were independently reviewed. Second, each review author independently examined citation of all studies that they consider to be of possible relevance. Each review author compiled a list of studies that they believe would meet the inclusion criteria. The contents of each review author's list was compared, and any discrepancies discussed. Any disagreement were resolved by discussion and consensus between the review authors. A common list of citations were chosen after discussion. Full text of these citations were analyzed and read before excluding some more upon further discussion.

Data extraction

Two review authors independently extracted data using specially developed data-extraction forms. Information were collected on participants (age, sex, recruitment method, inclusion/exclusion criteria, trial setting, allocation procedure, blinding, number of participants, whether randomized); interventions (description of interventions, method of delivery, number and explanation for any dropouts, crossovers), outcome measures (description of measures used, duration of intervention, continuous/dichotomous nature, references provided); and results (point estimates and measures of variability, frequency counts for dichotomous variables, number of patients). One review author compiled all comparisons and entered outcome data into RevMan for meta-analysis. The second review author performed double-data entry to ensure accuracy of results. Missing data were obtained from trial authors wherever possible.

Data synthesis

The Review Manager software was to be used for statistical analysis. We planned to express the results as relative risks (RR) with 95% confidence intervals (CI) for dichotomous outcomes and weighted mean differences (WMD) with 95% CI for continuous outcomes. Results of clinically and statistically homogeneous trials were to be pooled to provide estimates of the efficacy of behavioral intervention for prevention of HIV/AIDS. Clinical homogeneity were found to be satisfactory when participants, interventions, and outcome measures were considered to be similar. For trials that were clinically heterogeneous or present insufficient information for pooling, a descriptive analysis would have been performed. Statistical homogeneity were to be assessed using the I-squared statistic. Pooled results would have been analyzed using either a fixed-effects or random-effects model, depending on the level of heterogeneity.

Comparison were to be made between:

- Medical intervention vs. no intervention
- Behavioral intervention vs. no intervention
- Behavioral intervention type 1 vs. behavioral intervention type 2
- Group behavioral intervention
- Individual behavioral intervention
- Medical intervention with behavioral intervention

Each review author would independently assess the risk of bias of the included trials, using a descriptive approach as advocated by the *Cochrane Handbook for Systematic Reviews of Interventions* (Alderson 2003). Potential for selection, performance, attrition, and detection bias were to be considered using the following criteria:

Selection bias

1. Was an appropriate method of randomization used?
2. Was allocation to treatment group adequately concealed?

Performance bias

3. Were care programs, apart from the intervention being evaluated, equivalent between groups?
4. Were the intervention providers blind to assignment status?
5. Were the participants blind to assignment status after allocation?

Detection bias

6. Were the outcome assessors blinded to the intervention status?
7. Were comparison groups similar at baseline?

Attrition bias

8. Were losses to follow-up described?

Each criterion will be graded as done, probably done, not done, and probably not done. Allocation concealment will be scored as adequate (A), unclear (B), inadequate (C), or not used (D) in the Table of Included Studies, according to the guidelines in the Cochrane *Handbook for Systematic Reviews of Interventions* (Alderson 2003). When criteria are scored as probably not done or unclear, one review author will attempt to obtain further information from the authors of the trial. The review authors will discuss any disagreement in the assessment of risk of bias to reach a consensus.

Results

Description of studies

Two trials met the inclusion criteria. One study, by St. Lawrence and colleagues [3] compared the effects of two behavioral interventions among incarcerated women. The first intervention was based on social cognitive theory and aimed to help women improve their technical competency regarding condom use through-hands on demonstration and practice using a penile model. The second intervention was based on the theory of gender and power and aimed to increase women's condom use intentions, self-efficacy, self-esteem and comfort in communicating about HIV prevention. The total sample size was 90; participants were randomly assigned to an intervention. Participants were assessed at baseline, immediately-post intervention and again 6-months after the intervention. Some measures were self-reported, some were obtained by rating women's behavior in role-play simulations of high-risk situations and in condom application demonstrations. Women's condom use skills were not assessed at the 6-month post-intervention time point.

The study by Dolan and colleagues [2] aimed to determine whether methadone maintenance reduced heroin use, syringe sharing and HIV or hepatitis C incidence among prisoners. Of 593 eligible prisoners, 382 were randomized to methadone maintenance (n = 191) or control (n = 191). Heroin use was measured by hair analysis and self-repot, drugs used and injected and syringe sharing was measured by self-report. Hepatitis C and HIV incidence was measured by serology. Baseline measures were compared to measures obtained 5 months after beginning the intervention.

Risk of bias in included studies

See 'Characteristics of included studies' table. Participants in the St. Lawrence study were described as randomly assigned to the intervention. However, the method of allocation concealment was not described and there was no description of the generation of randomiza-

tion sequence or blinding. Methods used in the Dolan study, however, were better described and are methodologically sound (Figure 1; Figure 2).

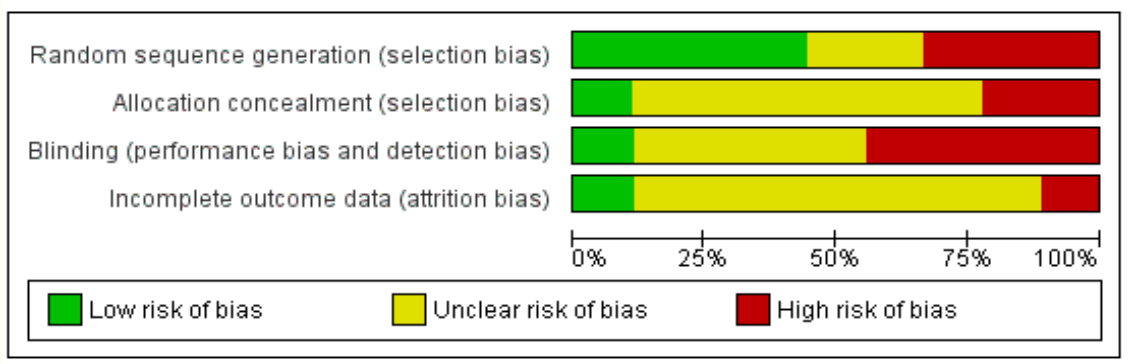

Figure 1: *Methodological quality graph: review authors' judgements about each methodological quality item presented as percentages across all included studies.*

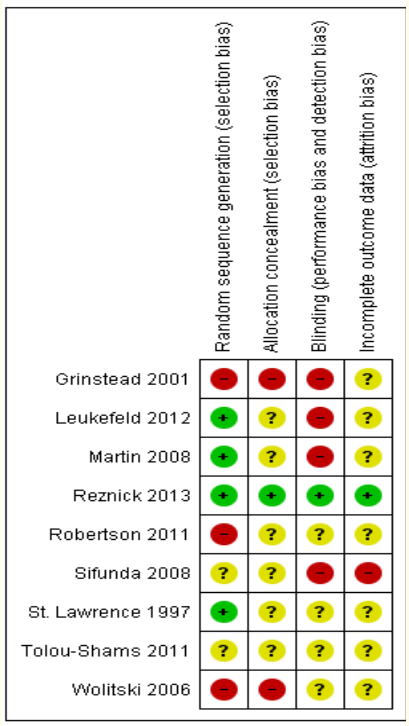

Figure 2: *Methodological quality summary: review authors' judgements about each methodological quality item for each included study.*

Effects of interventions

As one study was found to be suitable for inclusion and others were not of sufficient quality, we did not do a meta-analysis and have therefore presented data, and discussed results for the only included study [2]. In future updates of the review, as new studies emerge, it may be possible to add further comparisons and, where appropriate, combine findings in a meta-analysis.

Primary outcome

HIV and hepatitis incidence was investigated in the Dolan study [2]. HIV prevalence was zero at both baseline and follow-up from all subjects. Among the 32 subjects treated with methadone and 35 control subjects who were hepatitis C antibody negative at baseline, four subjects in each group had seroconverted by follow-up. Hepatitis C incidence was lower among treated than control group, but the difference was not significantly different.

Secondary outcome

The St. Lawrence study measured three of our targeted secondary outcomes: increase in AIDS knowledge, increase in HIV prevention skills and increase in behavioral intentions to reduce risk (See Table 2, Data and analysis section). At baseline, women assigned to either intervention type got 21 out of 27 items correct on the AIDS knowledge test. At baseline, on the condom intention scale, women assigned to the gender and power intervention scored 4.2 out of 5 and women assigned to the social cognitive theory scored 4.5 out of 5. Regardless of the intervention, no significant differences were found in AIDS knowledge or intention to use condoms at either the immediate-post or 6-month follow-up time period. At baseline, women assigned to the gender and power intervention scored 3.6 out of 6 points used to assess correct condom use. Women in the social cognitive theory intervention scored 3.7 out of 6. Compared to baseline, there was a significant increase in the scores of women who participated in the social cognitive theory intervention who scored 5.2 out of 6 immediately-post intervention ($p < 0.0005$).

The Dolan study looked into the frequency of sharing needles and syringes. According to this study, treated subjects were significantly less likely to report sharing then control subjects ($p < 0.001$) where at baseline no significant difference was found between the two groups [53 out of 129 (41%) of treated subjects versus (45 out of 124) 36%].

Discussion

The main finding of the review is that there is insufficient evidence available to confidently evaluate the effect of interventions to prevent transmission of HIV among involuntary detainees. Controlled scientific studies such as randomized controlled trials (RCT) are lacking in this field. We could find just two peer-reviewed papers almost qualified to be included in our analysis. Two of our primary outcomes (HIV and STI incidence) as well as four of our secondary outcomes (injection drug use equipment sharing, increase in AIDS knowledge, increase in HIV prevention skills and increase in behavioral intentions to reduce risk) were found to be measured in these two papers. Risk ratios were not pooled due to low number of studies and differences in study outcome. However, proper tabling was done in order to add future study results and future meta-analysis.

Authors' Conclusions

Implications for practice

Any pharmacological, psychological or educational interventions to prevent HIV spread among detainees is of immense importance. Current available studies do not have the proper design or quality to prove the effectiveness of either methods.

Implications for Research

In conclusion, our review was unfruitful in finding many studies which looked at some of the pre-determined outcomes of this review. There is an urgent need for high-quality, large randomized placebo controlled trials. Future research should be designed so as to have adequate power (sample size), adequate allocation concealment, blinding of outcome assessors, and clear description of follow up, so as to allow appropriate comparisons between various intervention types or control groups, or both. Primary outcomes of this review, including HIV and STD incidence, should be further investigated. Secondary outcomes such as report or failure of abstinence, report of unprotected sex, report of sex with sero-concordant partners, frequency of needle sharing, improved level of knowledge of HIV, and finally behavioral intention to reduce risk should be considered in future studies.

Each and every one of these variables are important in terms of prevention of HIV within the target population and the community in general. We recommend a comprehensive RCT to investigate all of the above mentioned variables.

Acknowledgements

We would like to acknowledge the contributions of the ORCHID group and members of Austral-Asian Cochrane Centre for providing us with information and skill.

Contributions of Authors

Shayesteh Jahanfar conceived and wrote the protocol. Her co-authors helped to write the background and methods respectively. Data collection, paper evaluation was done by Alizadeh and Mirghafourvand separately. The review was written by Shayesteh Jahanfar.

Declarations of Interest

There are no potential conflicts of interest none regarding this review by any of the reviewers.

Supplemental Material

Characteristics of Studies

St. Lawrence 1997 [3]

Methods	Baseline, post-intervention and 6-month follow-up. Pre-, post-, parallel randomised study comparing two HIV prevention interventions.
Participants	Incarcerated women due to drug offences and drug-related offences (e.g., burglary to procure money for drugs), age ranged between 17-53 years, most of the women were African American (80.7%) and the rest were White (19.3%). n = 90
Interventions	Social cognitive theory (intervention) compared to intervention based on gender and power. Observation of behavior through role play and condom demonstration. 1-Intervention based on SCT: For this intervention, group sessions for each condition met once a week for 6 weeks. Duration of treatment was for 6 weeks and each session lasted 90 minutes. Sessions 1 and 2 were identical in both conditions and provided information about HIV/AIDS and other sexually transmitted disease, disease transmission and local epidemiology. The last four sessions were parallel in their content emphasis but differed in format and methods consistent with the theoretical models. Four sessions in this intervention provided specific skills training using instruction, modelling, and skill rehearsal. In each session, brief videotapes provided information and modelled skills, group leaders than modelled the same skills, and group members practiced these skills in dyads. In session 3, participants were trained in correct condom use. In session 4 and 5, participants were trained in refusal, partner negotiation, and information provision skills. Session 6 addressed the connection between drug use and HIV risk and participants were trained in correct needle-cleaning and drug refusal skills. Sessions were co-led by same gender facilitators who were experienced in providing interventions with low-income minority women.Resources required to replicate intervention were inclusive of videotapes and penile model. 2- Comparison condition based on the theory of gender and power: The intervention was compared with condition based on the theory of gener and power which describes social influences that compromise disadvantaged women's health and autonomy and provided the conceptual framework for the time-controlled comparison condition. The model differentiates three primary structures: division of labor, division of power and cathexis. Description: Group sessions for each condition met once a week for 6 weeks. Sessions 1 and 2 were identical in both conditions and provided information about HIV/AIDS and other sexually transmitted disease, disease transmission and local epidemiology. The last four sessions were parallel in their content emphasis but differed in format and methods consistent with the theoretical models. In this condition, sessions 3 through 6 promoted unstructured discussion between the participants. Open-ended questions from group leaders opened each session and initiated discussion within the group about gender and power issues related to HIV risk reduction. Session 3 focused on women and condoms; session 4 and 5 prompted discussion about sexual communication; and the sixth session prompted discussion about the connection between drug use and high-risk sexual behavior. This intervention was unstructured and included no skills training or rehearsal of risk reduction skills. Th duration of this treatment was 6 weeks and each session lasted 90 minutes. These sessions were co-led by same gender facilitators who were experienced in providing interventions with low-income minority women. Videotapes only were used as resources to replicate the intervention.

Outcomes	1- AIDS Knowledge Test 2- The Attitude Toward Prevention Scale 3- Perceived vulnerability to HIV 4- Self-Esteem Scale 5- Self-efficacy 6- Stage of Changes 7- Condom use intentions 8- Condom communication frequency and comfort 9- Condom application skill 10- Role-play assessment of interpersonal skills relevant to risk reduction.
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Participants randomly assigned to an intervention.
Allocation concealment (selection bias)	Unclear risk	Not described beyond "participants were randomly assigned to an intervention."
Blinding (performance bias and detection bias)	Unclear risk	Not described beyond "participants were randomly assigned to an intervention."
Incomplete outcome data (attrition bias)	Unclear risk	Not described

Grinstead 2001 [15]

Methods	Controlled Clinical Trial. "A randomized design was not used because it would have denied services to motivated inmates."
Participants	Participants included Incarcerated men and thier median age was 38 years. Most participants identified as African Amer ican (55%) or White (31%).
Interventions	1- Intervention group: The intervention was developed in collaboration with prison administrators as well as with inmate peer educators. Each session included a presentation and was followed by a question and answer period and discussion. Most presenters also distributed written materials that had been preapproved by the prison's community resources department. In each intervention series, eight intervention sessions were offered on Monday through Thursday evenings for 2 consecutive weeks. Each of the eight intervention sessions was 2–2.5 hours in length for a total of 16 to 20 hours of intervention. Overall, nine intervention series were conducted. The topics of the eight sessions within each series included: (a) HIV information, (b) HIV treatment update, (c) substance use and HIV, (d) Sexuality and HIV; (e) "Pain to power" (inspirational speaker), (f) Nutrition and HIV, and (g & h) community service referrals. During the seventh and eighth sessions, service providers from participants' counties of release met with them to provide information and to make appointments for postrelease services. Providers represented services for HIV seropositive people (e.g., case management, support groups, financial assistance) as well as alcohol/drug treatment, educational and vocational training programs. Duration of treatment period was from Monday through Thursday evenings for 2 consecutive weeks. Each of the eight intervention sessions was 2–2.5 hours in length for a total of 16 to 20 hours of intervention. 2- Comparison group: No intervention

Outcomes	1- HIV knowledge 2- sexual behavior 3- drug-related risk behavior 4- risk-reduction behavior (condom use, needle cleaning, use of needle exchange) Time points measured were preintervention and postintervention. For the intervention group, postintervention surveys were conducted in the week following the last intervention session. For the comparison group, postintervention surveys were conducted at least 1 week after the preintervention survey.
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	A randomized design was not used because it would have denied services to motivated inmates.
Allocation concealment (selection bias)	High risk	A randomized design was not used.
Blinding (performance bias and detection bias)	High risk	No blinding was done.
Incomplete outcome data (attrition bias)	Unclear risk	Of the 123 participants who agreed to community follow-up, 81 (66%) completed a post-release survey (61 men in the intervention group and 20 men in the comparison group). The reasons of missing haven't been reported.

Wolitski 2006 [16]

Methods	A controlled clinical trial
Participants	Participants consisted of 830 men who were Aged 18 to 29 years, incarcerated at least 90 days, scheduled for release within 14 to 60 days in 8 state prisons in 4 states (California, Mississippi, Rhode Island, and Wisconsin). These were men who provided informed consent and communicated in English willing to provide post-release contact information, and released to an unrestricted environment in site-specific catchment areas. Races were inclusive of white-non-Hispanic, black-non-Hispanic, Hispanic- any race and other-non-Hispanic.
Interventions	1- A single-session intervention (n = 400). This intervention was based on a brief HIV-risk assessment and risk reduction planning intervention for incarcerated men. It consisted of a 60- to 90-minute individual session that was conducted approximately 2 weeks before release. The interventionist assessed the participant's HIV/AIDS, hepatitis, and STI knowledge and risk behavior and helped the participant develop a personal risk-reduction plan. Duation was 60-90 minutes. 2- An enhanced intervention consisted of 2 scheduled individual sessions before release and 4 scheduled sessions at 1, 3, 6, and 12 weeks after release (n = 430). This intervention consisted of 2 scheduled individual sessions before release and 4 scheduled sessions at 1, 3, 6, and 12 weeks after release. The first in-prison session was the same as the single-session intervention. The second in-prison session focused on community reentry needs. The post-release sessions involved review and updating of the plan developed during previous sessions. In prison sessions lasted 60 to 90 minutes; the post-release sessions were 30 to 60 minutes. Separate staff conducted assessment and intervention activities in all sites. Additional sessions were offered to enhanced intervention participants as needed during the intervention period.

Outcomes	Unprotected sex 1- Unprotected vaginal/anal sex at last sexual intercourse at baseline1 week, 12 weeks and 24 week follow up. 2- Unprotected vaginal/anal sex with any partner at 1 week, 12 weeks and 24 week follow up. 3- Unprotected vaginal/anal sex with a main partner at 1 week, 12 weeks and 24 week follow up. 4- Unprotected vaginal/anal sex with a non-main partner at 1 week, 12 weeks and 24 week follow up. 5- Unprotected vaginal/anal sex with at-risk partner at last sexual intercourse at 1 week, 12 weeks and 24 week follow up. 6- Injection Drug Use at 1 week, 12 weeks and 24 week follow up.
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Participants were assigned to intervention Groups on the basis of the month of recruitment (California and Rhode Island) or the month of anticipated release (Mississippi and Wisconsin).
Allocation concealment (selection bias)	High risk	No allocation concealment was done.
Blinding (performance bias and detection bias)	Unclear risk	Separate staff conducted assessment and intervention activities in all sites.
Incomplete outcome data (attrition bias)	Unclear risk	Retention for follow-up assessments ranged from 76% to 87%. Causes of attrition haven't been reported.

Sifunda 2008 [17]

Methods	A nested experimental design. There was both a control and an experimental group.
Participants	Participants included 357 African Black male inmates who were within 6 months of being released, either on parole or because of sentence completion. The mean age of intimates was 27, ranging from 17 to 55. The participants had been incarcerated for an average period of about 2 years, ranging from 6 months to 17 years. Most of the participating inmates (65%) were first-time offenders. Fifty percent were unemployed at the time of arrest, and after release from prison, only 31% were employed at the time of follow-up interviews. About 93% of the participants reported that they were living in their own home with their families or living with relatives after being released from prison.
Interventions	1- Ordinary education as control group (63 participants): Two health educators who had no prior history of incarceration conducted all the sessions. Participants were shown a series of videos covering various health issues, such as cholera, malaria, and TB. They also received copies of HIV and STI information, education and communication materials distributed to the general public as part of the governments prevention program. Duration of intervention was 6 weeks. Education have been performed at 12 sessions, with each session lasting 1.5 hr for a total of 18 hr for the full intervention. Two health educators who had no prior history of incarceration conducted all the sessions. A series of videos covering various health issues, such as cholera, malaria, and TB, copies of HIV and STI information, education and communication materials distributed to the general public as part of the governments prevention program. 2- Experimental group (educated by 1. Peer HIV^- or 2. Peer HIV^+) (193 participants). Two HIV^+ and two HIV^- former inmates were selected from the same areas in which the study was being conducted who spoke is iZuluas their first language after training as peer educators to conduct the training sessions in the prisons. HIV-positive educators had to disclose their status to the participants in their intervention group during their recruitment interview. The training process also provided another opportunity to fine tune the intervention. This enabled modifying and further adapting the grammar and terminology to reflect that of the culture created within the prisons, which is viewed as being important when dealing with inmates' populations. The peer educators also received refresher training and evaluation sessions periodically, as the intervention stretched for a period of 2 years. All peer educators were selected from the same areas in which the study was being conducted, and they all spoke is iZuluas their first language. Duration of intervention was 6 weeks. 12 sessions were provided during a period of 6 weeks, with each session lasting 1.5 hr for a total of 18 hr for the full intervention. The curriculum covered the following topics: (a) HIV and AIDS, (b) STIs, (c) nutrition and TB prevention and management, (d) alcohol and other drug abuse, (e) sexuality and gangsterism, and (f) manhood and general life skills.

Outcomes	1- Knowledge About Spread and Transmission of HIV and AIDS and Other STIs *at p*re-intervention, prior to release from prison, 3 to 6 months after release from prison .2- *Participant's attitude toward condom use in preventing HIV at p*re-intervention, prior to release from prison, 3 to 6 months after release from prison *3- Participants' attitude toward people living with HIV/AIDS at p*re-intervention, prior to release from prison, 3 to 6 months after release from prison *4- Sex Communication at p*re-intervention, prior to release from prison, 3 to 6 months after release from prison. 5- *Self-Efficacy at p*re-intervention, prior to release from prison, 3 to 6 months after release from prison 6- *Intention at p*re-intervention, prior to release from prison, 3 to 6 months after release from prison.
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	There is no mention of randomization.
Allocation concealment (selection bias)	Unclear risk	There is no mention of randomization.
Blinding (performance bias and detection bias)	High risk	No blinding was done.
Incomplete outcome data (attrition bias)	High risk	32 - 37 out of 263 withdrawals at the first follow-up (prior to release from prison) 121 - 127 out of 263 withdrawals at the second follow-up (3 to 6 months after release from prison)

Martin 2008 [18]

Methods	Randomised Controlled Trial
Participants	Subjects were recruited from those about to be released through work release (in Delaware), prison (in Kentucky) and jail (in Virginia) from March 2006 to May 2008. At the release stage, volunteers were recruited to be in a research study from all potential releases at each institution.The mean age of the participants is almost 34, with the youngest participant being 19 and the oldest being 68. The gender breakdown of those who have completed all phases of the study is 85.7% males and 14.3% females. The racial breakdown was 40.2% White and 59.8% African American.
Interventions	1- A DVD-based, peer delivered intervention: The intervention was developed to utilize peer interventionists in a culturally competent intervention designed for reentering offenders. All participants were offered HIV and HCV testing as part of the intervention, and were given post-test counseling approximately two weeks later. The DVD Targeted groups received the respective interventions in conjunction with the testing process, and also received a short booster session as part of post-test counseling. In addition, for the DVD Targeted Intervention, the interventionist worked the client through the five video components that are imbedded in the intervention and answered questions following a detailed training manual procedure (described in more detail in Inciardi et al. 2007 and available from the authors on request and at the CJDATS website: www.cjdats.org). The intervention was delivered in prison or work release in the period 10 days to two weeks prior to release. 2- NIDA Standard HIV Intervention: The NIDA Standard HIV Intervention incorporates CDC guidelines that provide specific recommendations for the pre- and post-test counseling and diagnostic testing for HIV antibodies. These include: (1) all "necessary" elements of "high-quality" pre- and post-test HIV prevention counseling (CDC2001:16–20); (2) informed consent for testing; (3) confirmation of positive screening results for HIV antibody through Western Blot, IFA or other established techniques; and (4) medical and psychosocial evaluation and monitoring services or referral to such services for persons with confirmed positive test results. Counseling guidelines in the NIDA protocol are detailed and are conducted with the understanding that personal information and test results are confidential to the extent permitted by law. Information provided includes facts about HIV disease, transmission routes, risk behaviors such as abusing drugs and/or engaging in sexual behavior without the use of a condom, and the proposal of possible modifications to such risky behaviors to at least decrease the risk of infection. Service referrals to drug abuse treatment centers and to support services are also included in the guidelines. Post-test counseling includes a discussion of the test results and again, recommendations are made accordingly. Providers were community-based interventionists. 3- A standard practice condition (HIV educational video): Standard practice usually involves an educational video and the provision of HIV testing.
Outcomes	1- unprotected sex 90 days post release.
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	The study utilized a randomized controlled trial design to each of the three conditions, and effective randomization of clients was achieved based on sample characteristics.
Allocation concealment (selection bias)	Unclear risk	There is no mention of allocation concealment.
Blinding (performance bias and detection bias)	High risk	No blinding was done.
Incomplete outcome data (attrition bias)	Unclear risk	The follow-up response rate for the study is currently 85% of those eligible for the 90-day interview.

Robertson 2011 [19]

Methods	Randomized pre-post comparison design with a 9-month follow-up after release from correctional facility.
Participants	Participants were adolescent female detainees who were aged between12–178 (n=264) adolescent girls incarcerated in state reformatory. Racial and ethnic composition of the sample was 28% Caucasian, 68% African American, and 4% other (Latina, Native American, or mixed race).
Interventions	1- STD risk reduction intervention (SRR) 2- Health education (HE) 18-session health education program or a time-equivalent HIV prevention program (adapted version of BART).The curricula for both the experimental and control conditions consisted of 18 60-18-60 minute group sessions and one individual goal-setting session. 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. 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 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. Due to high pregnancy rates among girls committed to the training school, information on pregnancy and prenatal care was added in the control condition.

Outcomes	1- Health knowledge 2- Condom application skill 3- Communication skills include 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* *- proposing a lower risk alternative to the proposed action* 4- Perceived Barriers to Condom 5- Unprotected Sex Occasions (USO) 6- Sex under the Influence (SUI) 7- Safer Sex 8- Incidence of laboratory confirmed sexually transmitted Chlamydia or gonorrhea infections.
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Pg. 2: "Cohorts were randomly assigned to the experimental conditions in blocks separated by a wash-out period between blocks to reduce potential contamination" Assignment of the first cohort to condition was random; thereafter the intervention order alternated.
Allocation concealment (selection bias)	Unclear risk	Assignment of the first cohort to condition was random; thereafter the intervention order alternated. it is unclear
Blinding (performance bias and detection bias)	Unclear risk	No information is provided
Incomplete outcome data (attrition bias)	Unclear risk	No information has been provided

Tolou-Shams 2011 [20]

Methods	Randomised Controlled Trial
Participants	94 Juvenile drug court offenders aged 12-18 years old in two sexes of Female and male that 90% were male. sample was predominantly Caucasian (76%), but included 14% African American youth, 8% multi or biracial youth and 2% Native Hawaiian/Pacific Islander. Eighteen percent of youth ethnically identified as Latino.
Interventions	1- Group-based Affect Management Intervention (AMI): This Intervention focused on addressing emotion regulation in risky situations with affect management skills (e.g., reducing anxiety in negotiating condom use with partners) and also targeted increasing motivation and HIV prevention skills similar to other successful prevention programs. Condition consisted of five weekly, 2-hour sessions with approximately five participants per group, and used games and interactive activities. A research assistant and trained clinician, not affiliated with the JDC, facilitated each group at the JDC. 2- Health Promotion Intervention (HPI) as comparison condition included psychoeducational content on substance use, HIV prevention, tobacco use, sleep hygiene, exercise, and diet. Duration of intervention was 5 weeks and each session lasted 2 hours. A research assistant and trained clinician, not affiliated with the JDC, facilitated each group at the JDC.

Outcomes	1- Lifetime and recent (past 90 days) sexual risk behavior (e.g., condom use at last sex, number of partners, substance use during sex), 2- Attitudes and communication with partners regarding condom use (e.g., self-efficacy for condom use, condom beliefs) 3- Lifetime history of HIV testing 4- Recent (past 30 days) substance use (cigarette use, frequency of alcohol and marijuana use)
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	The method of random sequence generation haven't been reported bou only mentioned that adolescents were randomized either to the AMI or to the comparison condition.
Allocation concealment (selection bias)	Unclear risk	No information has been provided.
Blinding (performance bias and detection bias)	Unclear risk	No information has been provided.
Incomplete outcome data (attrition bias)	Unclear risk	No information has been provided.

Leukefeld 2012 [21]

Methods	This was a randomized clinical trial
Participants	Participants were inclusive of 344 incarcerated women with median age of 34.6 (range of 27.7 to 41.7) from four state prisons in Connecticut, Delaware, Kentucky, and Rhode Island. Eligibility criteria were: female, age 18 and older, consenting to participate, reporting at least weekly substance use before incarceration, and not prescribed antipsychotics. Women's race were inclusive of White, African American, Hispanic.
Interventions	1- Prevention intervention group:The intervention was developed in two phases: six focus groups that identified relationships, beliefs, and assumptions which could decrease women's abilities to refuse and/or avoid HIV risk as well as a pilot; these are described in more detail by Staton-Tindall and colleagues (2007a). For the focus groups, facilitators used a script to guide the groups. After consenting, 56 women participated. Transcripts were analyzed and themes coded. This phase was followed by a meeting of women substance abuse treatment clinicians and researchers who identified key themes. After a pilot, these themes were formalized into seven risky relationship thinking myths that were used to tailor an intervention to increase a woman's ability to protect herself against HIV. A manual (available from the corresponding author) was developed. The intervention consists of five 90-minute prison-based group sessions and one face-to-face or telephone session after community re-entry. The manual incorporates relationship thinking to promote safety. Each of the prison-based group intervention sessions includes didactic and skill-building exercises focused on each thinking myth. In addition, session one incorporates HIV prevention information from the NIDA HIV intervention. Duration of intervention was five prison-based sessions that began about six weeks before community re-entry and one telephone or face-to-face community booster session. Each session lasted 90 minutes. To ensure fidelity, women who delivered the intervention were trained to use the manual and received weekly supervision from one person. Bi-weekly cross-site conference calls updated implementation, reviewed data, and resolved issues. The prevention intervention group also received the video titled "Drug Abuse and HIV: Reaching Those at Risk," a 17-minute video that features HIV/AIDS risk-reduction information. 2- The comparison group received an AIDS awareness video titled "Drug Abuse and HIV: Reaching Those at Risk," a 17-minute video that features HIV/AIDS risk-reduction information.

Outcomes	1- HIV/HCV 2- HIV knowledge 3- AIDS risks 4- Relationship power 5- Self-esteem 6- Thinking myths 7- Condom use HIV knowledge, Unprotected sex
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	444 women were randomized using the Research Randomizer (2010).
Allocation concealment (selection bias)	Unclear risk	No information is provided
Blinding (performance bias and detection bias)	High risk	Blinding is not done.
Incomplete outcome data (attrition bias)	Unclear risk	No information is provided

Reznick 2013 [22]

Methods	This was a randomized clinical trial
Participants	Participants consisted of HIV+ inmates who were within 21 to 90 days of their release back into the community. Eligibility criteria were (a) over 18 years of age, (b) being released to one of the nine San Francisco BayArea counties, (c) able to speak English or Spanish, (d) able to name at least one adult in the local area who would be able to participate in the intervention with them, and (e) willingness to sign a release for the recruiter to contact that person.

Interventions	1- Ecosystem Intervention: This intervention proceeded in three phases: (a) initiation, during which the counselor built the therapeutic alliance and mapped the participant's ecosystem, and initial joining, in which the counselor established his or her role in the participant's ecosystem; (b) treatment, in which the restructuring interventions were conducted through both individual and group counseling sessions and newly acquired interaction patterns within ecosystems were reinforced; and (c) Termination, in which treatment sessions tapered off and ended. Throughout treatment and at the termination, counselors offered facilitated referrals as needed. The ecosystem intervention consisted of two individual intervention sessions prior to release and up to 16 intervention sessions in the 4 months following release. The intervention was family- and ecosystem-focused; postrelease intervention sessions could be with the participant alone, with the participant and his family (including intimate partners, siblings, parents, etc.), or with the participant and other ecosystem members (friends, service providers, or others whom the participant had identified). Postrelease sessions were conducted at community agencies, in participants' homes, and in other venues convenient to the study participant and family or ecosystem members participating in the session. Sessions also took place at sites associated with a family or ecosystem member to help the participant establish a connection with the system or to improve a family member's interaction with the system (e.g., a family member's home, community service provider office). Counselors sometimes conducted multiple sessions per week, although having more than three sessions in any week was reserved for crisis situations or unusual opportunities (e.g., someone who had been difficult to engage became available to attend a session). In cases with a high frequency of sessions, counselors attempted to taper off treatment in the final month so that the participant could achieve greater independence. 2- Individual Intervention: This intervention was designed as a comparison treatment to test the efficacy of the ecosystem intervention and was based on the Project START intervention, which had already been shown to facilitate risk reduction among men with imminent release from prison but not specifically HIV^+ men (Wolitski & The Project START Writing Group, 2006). The goal of the individual intervention was to provide information and support regarding (a) the reduction of sexual and drug-related HIV transmission risk and (2) the promotion of HIV-related medication adherence. Like the ecosystemintervention, the individual intervention consisted of two sessions prior to release and up to 16 individual sessions in the 4 months following release. The intervention was individually focused and the counselor and participant typically met alone. While there may have been occasional, casual contact with members of the participant's ecosystem in the process of tracing, calling, or visiting the participant, the individual intervention focused on supporting the participant's individual efforts to reduce HIV transmission risk and increase HIV-related medical adherence. Counseling sessions were client-centered and focused on each participant's individual goals and objectives. The participant, with the support of the counselor, established goals and objectives in the initial session and worked with the counselor to achieve and modify the goals as the intervention progressed. Intervention techniques included motivational interviewing, facilitated referral, and goal setting.
Outcomes	Primary outcomes: 1- Unprotected sex ; 2- Serodiscordant unprotected sex ; 3- mTaking anti-HIV medication; 4- Anti-HIV medication adherence 2- Medication adherence Secondary outcome: re-incarceration
Notes	

Risk of bias table

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomization was stratified by recruitment site. Prior to the study, stratum-specific sequential ID numbers were generated and randomly preassigned to intervention groups. Only the PI and project manager had access to the link between ID numbers and treatment assignments. Upon enrollment, each participant received the next site-specific ID number.
Allocation concealment (selection bias)	Low risk	After the IHES, the recruiter, who was blind to the randomization assignment and the participant, opened a sealed envelope that was printed with the participant's ID number and contained a card showing the ID number and intervention group assignment.
Blinding (performance bias and detection bias)	Low risk	Interviewers and counselors did not share information about the participants to prevent the interviewers from having knowledge of participants' treatment assignment and to ensure that participants were free of concern about the consistency of their responses to counselors and interviewers.
Incomplete outcome data (attrition bias)	Low risk	From 162 participants gave informed consent, 6 were dropped from the individual intervention and 5 from the ecosystem intervention due to administrative issues such as failure to be released from prison during the study period or unexpectedly being released outside the geographical area, leaving 151 participants for ITT analyses: 75 in the individual intervention and 76 in the ecosystem intervention. Overall, 151 participants completed the prerelease assessment, 92% completed the 4-month assessment, 89% completed the 8-month assessment, and 76% completed the 12-month assessment.

Data and analyses

1 Ecosystem Intervention vs. individual intervention

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate
1.1 Anti-HIV medication adherence-12 months follow-up	1	129	Odds Ratio (M-H, Fixed, 95% CI)	0.52 [0.26, 1.04]
1.2 Anti-HIV medication adherence-8 months follow-up	1	135	Odds Ratio (M-H, Fixed, 95% CI)	0.77 [0.39, 1.51]
1.3 Anti-HIV medication adherence-4 months follow-up	1	139	Odds Ratio (M-H, Fixed, 95% CI)	0.48 [0.25, 0.95]
1.4 Anti-HIV medication adherence-Prerelease	1	151	Odds Ratio (M-H, Fixed, 95% CI)	0.65 [0.34, 1.26]
1.5 Unprotected sex Pre-release	1	151	Odds Ratio (M-H, Fixed, 95% CI)	1.22 [0.64, 2.33]
1.6 Unprotected sex-4 months follow-up	1	139	Odds Ratio (M-H, Fixed, 95% CI)	0.71 [0.35, 1.43]
1.7 Unprotected sex-8 months follow-up	1	135	Odds Ratio (M-H, Fixed, 95% CI)	0.68 [0.31, 1.50]
1.8 Unprotected sex-12 months	1	129	Odds Ratio (M-H, Fixed, 95% CI)	1.11 [0.49, 2.50]

1.9 Taking anti-HIV medication-12 months follow-up	1	129	Odds Ratio (M-H, Fixed, 95% CI)	0.68 [0.34, 1.37]
1.10 Taking anti-HIV medication-8 months follow-up	1	135	Odds Ratio (M-H, Fixed, 95% CI)	0.60 [0.31, 1.19]
1.11 Taking anti-HIV medication-4 months follow-up	1	139	Odds Ratio (M-H, Fixed, 95% CI)	0.40 [0.20, 0.80]
1.12 Taking anti-HIV medication-Prerelease	1	151	Odds Ratio (M-H, Fixed, 95% CI)	0.63 [0.33, 1.20]
1.13 Sero discordant unprotected sex-12 months	1	129	Odds Ratio (M-H, Fixed, 95% CI)	1.09 [0.40, 2.96]
1.14 Sero discordant unprotected sex-8 months	1	135	Odds Ratio (M-H, Fixed, 95% CI)	0.66 [0.26, 1.66]
1.15 Sero discordant unprotected sex-4 months	1	139	Odds Ratio (M-H, Fixed, 95% CI)	0.98 [0.44, 2.20]
1.16 Sero discordant unprotected sex-Prerelease	1	151	Odds Ratio (M-H, Fixed, 95% CI)	1.42 [0.71, 2.82]

2 Single session versus Enhanced multi session

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate
2.1 Injection Drug Use-1 week follow-up	1	444	Odds Ratio (M-H, Fixed, 95% CI)	1.98 [0.36, 10.93]
2.2 Injection Drug Use-12 weeks follow-up	1	401	Odds Ratio (M-H, Fixed, 95% CI)	1.51 [0.47, 4.85]
2.3 Injection Drug Use-24 weeks follow-up	1	376	Odds Ratio (M-H, Fixed, 95% CI)	0.92 [0.31, 2.66]
2.4 Unprotected vaginal/anal sex with at-risk partner at last sexual intercourse-1 week follow-up	1	437	Odds Ratio (M-H, Fixed, 95% CI)	0.90 [0.55, 1.46]
2.5 Unprotected vaginal/anal sex with at-risk partner at last sexual intercourse-12 weeks follow-up	1	385	Odds Ratio (M-H, Fixed, 95% CI)	1.50 [0.97, 2.34]
2.6 Unprotected vaginal/anal sex with at-risk partner at last sexual intercourse-24 weeks follow-up	1	368	Odds Ratio (M-H, Fixed, 95% CI)	0.92 [0.57, 1.48]
2.7 Unprotected vaginal/anal sex with a non-main partner-1 week follow-up	1	441	Odds Ratio (M-H, Fixed, 95% CI)	1.50 [0.86, 2.63]
2.8 Unprotected vaginal/anal sex with a non-main partner-12 weeks follow-up	1	395	Odds Ratio (M-H, Fixed, 95% CI)	1.33 [0.86, 2.03]
2.9 Unprotected vaginal/anal sex with a non-main partner-24 weeks follow-up	1	371	Odds Ratio (M-H, Fixed, 95% CI)	1.00 [0.64, 1.54]
2.10 Unprotected vaginal/anal sex with a main partner-1 week follow-up	1	436	Odds Ratio (M-H, Fixed, 95% CI)	1.06 [0.72, 1.57]
2.11 Unprotected vaginal/anal sex with a main partner-12 weeks follow-up	1	390	Odds Ratio (M-H, Fixed, 95% CI)	1.17 [0.78, 1.76]
2.12 Unprotected vaginal/anal sex with a main partner-24 weeks follow-up	1	364	Odds Ratio (M-H, Fixed, 95% CI)	1.63 [1.07, 2.49]

2.13 Unprotected vaginal/anal sex with any partner-1 week follow-up	1	441	Odds Ratio (M-H, Fixed, 95% CI)	1.35 [0.93, 1.97]
2.14 Unprotected vaginal/anal sex with any partner-12 weeks follow-up	1	397	Odds Ratio (M-H, Fixed, 95% CI)	1.56 [1.00, 2.45]
2.15 Unprotected vaginal/anal sex with any partner-24 weeks follow-up	1	372	Odds Ratio (M-H, Fixed, 95% CI)	1.68 [1.06, 2.67]
2.16 Unprotected vaginal/anal sex at last sexual intercourse-1 week follow-up	1	436	Odds Ratio (M-H, Fixed, 95% CI)	1.30 [0.89, 1.90]
2.17 Unprotected vaginal/anal sex at last sexual intercourse-12 weeks follow-up	1	384	Odds Ratio (M-H, Fixed, 95% CI)	1.57 [1.03, 2.41]
2.18 Unprotected vaginal/anal sex at last sexual intercourse-24 weeks follow-up	1	362	Odds Ratio (M-H, Fixed, 95% CI)	1.51 [0.98, 2.33]

3 Prevention intervention group vs. comparison group

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate
3.2 HIV Knowledge-90 day follow-up	1	344	Mean Difference (IV, Fixed, 95% CI)	0.40 [0.13, 0.67]
3.3 HCV	1	444	Odds Ratio (M-H, Fixed, 95% CI)	1.14 [0.75, 1.74]
3.4 HIV	1	444	Odds Ratio (M-H, Fixed, 95% CI)	0.72 [0.16, 3.25]
3.5 Condom use	1	344	Mean Difference (IV, Fixed, 95% CI)	2.80 [-0.21, 5.81]
3.6 Self-esteem	1	344	Mean Difference (IV, Fixed, 95% CI)	1.10 [0.39, 1.81]
3.7 Sexual Relationship Power	1	344	Mean Difference (IV, Fixed, 95% CI)	0.14 [0.03, 0.25]
3.8 Number unprotected sexual encounters in past 90 days	1	344	Mean Difference (IV, Fixed, 95% CI)	-5.80 [-14.86, 3.26]
3.9 Number sex partners in past 90 days	1	344	Mean Difference (IV, Fixed, 95% CI)	-0.34 [-1.28, 0.60]

4 STD risk reduction intervention (SRR) vs. Health education (HE)

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate
4.1 Health Knowledge at baseline	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
4.2 Health Knowledge-post intervention	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
4.3 Communication skills-baseline	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
4.4 Condom Application-Baseline	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
4.5 Condom Application-post intervention	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
4.6 Communication skills-post intervention	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
4.7 Condom Barriers-baseline	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
4.8 Condom barriers-follow-up	1	246	Mean Difference (IV, Fixed, 95% CI)	-3.94 [-8.86, 0.98]
4.9 Unprotected Sex Occasions-baseline	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
4.10 Unprotected Sex Occasions-follow-up	1	217	Mean Difference (IV, Fixed, 95% CI)	-0.72 [-2.43, 0.99]
4.11 Sex under the influence-baseline	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
4.12 Sex under the influence-follow-up	1	240	Mean Difference (IV, Fixed, 95% CI)	-0.04 [-1.42, 1.34]

5 Intervention based on SCT vs. intervention based on gender and power

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate
5.1 Attitude Toward Prevention Scale-Baseline	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
5.2 Attitude Toward Prevention Scale-Immediately post intervention	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
5.3 Attitude Toward Prevention Scale-Six months follow up	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
5.4 AIDS Knowledge-baseline	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
5.5 Improved level of knowledge of HIV_ Immediately post intervention	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable
5.6 Improved level of knowledge of HIV_ Six month follow up	1	0	Mean Difference (IV, Fixed, 95% CI)	Not estimable

6 Intervention group vs. control group

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate
6.1 Needle sharing since release among those who injected	1	81	Odds Ratio (M-H, Fixed, 95% CI)	0.11 [0.03, 0.41]
6.2 Injected drugs since release	1	81	Odds Ratio (M-H, Fixed, 95% CI)	0.46 [0.16, 1.30]
6.3 Use of condom-at first sex	1	81	Odds Ratio (M-H, Fixed, 95% CI)	1.75 [0.56, 5.50]
6.4 Used needle exchange among those who injected	1	81	Odds Ratio (M-H, Fixed, 95% CI)	0.24 [0.08, 0.72]
6.5 Any drugs or alcohol since release	1	81	Odds Ratio (M-H, Fixed, 95% CI)	0.46 [0.16, 1.30]
6.6 Used drugs at first sex	1	81	Odds Ratio (M-H, Fixed, 95% CI)	0.79 [0.28, 2.23]
6.7 Used alcohol at first sex	1	81	Odds Ratio (M-H, Fixed, 95% CI)	1.55 [0.45, 5.29]
6.8 Any sex since release	1	81	Odds Ratio (M-H, Fixed, 95% CI)	0.65 [0.19, 2.21]
6.9 HIV/AIDS knowledge –pre intervention	1	123	Mean Difference (IV, Fixed, 95% CI)	Not estimable
6.10 HIV/AIDS knowledge –post intervention	1	110	Mean Difference (IV, Fixed, 95% CI)	Not estimable

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Volume 5 Issue 1 July 2017