

Health Status, Sexual and Drug Risk, and Psychosocial Factors Relevant to Postrelease Planning for HIV+ Prisoners

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Abstract

The prevalence of HIV infection among male prison inmates is significantly higher than in the U.S. population. Adequate planning to ensure continued medication adherence and continuity of care after release is important for this population. This study describes the prerelease characteristics of 162 incarcerated HIV-positive men (40 from jails and 122 from prisons). The results include a demographic description of the sample and the participants' sexual risk behaviors, substance use, health status and HIV medication adherence, health care utilization, mental health, and family and social support. The results highlight a potentially high level of need for services and low levels of support and social connectedness. Postrelease planning should include support for improving HIV medication adherence as well as reducing both sexual and injection drug-related transmission risk for these individuals.

Keywords

incarceration, HIV, medication adherence, sexual risk, family

More than 2.3 million U.S. citizens are currently confined in jails or prisons, and 4 million more are on parole or probation (Sabol & West, 2011). Behaviors that can lead to incarceration (e.g., drug use

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and sex work) also put individuals at risk of HIV, and prison and jail populations have experienced an increasing burden of HIV infection (Pagliaro & Pagliaro, 1992). At the end of 2004, 1.9% of male state and federal prison inmates were known to be HIV positive, a rate 8 to 10 times that of the general population (Maruschak, 2007). Most prisoners serve short sentences and return to their communities. It has been well established that there is a legal and ethical responsibility for adequate discharge planning that will provide continuity of care for HIV-positive prisoners (Mellow & Greifinger, 2008), and there are clear public health benefits to ensuring that release does not disrupt treatment due to the potential for drug resistance and higher rates of HIV transmission.

Nationally, African American and Hispanic inmates reported higher rates of HIV infection (2.0% and 1.8%, respectively) than White prisoners (1.0%; Maruschak, 2007). Current demographics show that 64% of the prison inmates belong to ethnic minority groups (Sabol & West, 2011) and that the majority had low or no income prior to incarceration (Grinstead, Zack, Faigeles, Grossman, & Blea, 1999; Petersilia, 2000). Therefore, the preponderance of prisoner HIV and AIDS cases are among low-income men and men of color.

Our previous research indicates that many HIV-positive prisoners return home to sexual and needle-sharing partners who are not yet infected and that sexual and drug-related HIV transmission risk is common following release (Grinstead, Zack, & Faigeles, 2001). Given the number of people who are incarcerated in the United States and the increasing burden of HIV infection in this population, interventions targeting prisoners preparing for release could have an important public health impact in preventing new HIV infections.

Adherence to medical HIV regimens is critically important to both HIV-infected individuals and public health. Individuals who have better adherence to antiretroviral treatment (ART) achieve lower viral loads, higher CD4 cell counts, less clinical progression, and lower probability of death (Cain et al., 2006; Cole, Hernan, Anastos, Jamieson, & Robins, 2007; Palella et al., 1998). Both sub-optimal levels of treatment and inadequate adherence to medical regimens are associated with increased evidence of viral resistance (Harrigan et al., 2005) and risk of HIV transmission, leading to the emergence of “seek, test, and treat” interventions to lower viral load and reduce HIV infectivity as a major part of the national HIV/AIDS strategy (Dieffenbach & Fauci, 2009; Granich, Gilks, Dye, De Cock, & Williams, 2009; Montaner et al., 2006).

There have been investigations of both historical and postrelease HIV-associated behaviors of prisoners (see Moseley & Tewksbury, 2006; Seal, Margolis, Sosman, Kacanek, & Binson, 2003). Three recent investigations of HIV medication adherence among prisoners described by Seal (2005) showed a decline in HIV medication adherence and an increase in associated measures such as viral load after release. Baillargeon et al. (2009) showed that nearly 70% of HIV-positive prisoners had not refilled HIV prescriptions within 2 months of release, and Stephenson et al. (2005) showed that reincarcerated prisoners had worse trajectories of viral load than those who remained in prison.

Both theoretical (Draine, Wolff, Jacoby, Hartwell, & Duclos, 2005) and applied (Rhine, Matthews, Sampson, & Daley, 2003) approaches to inmate reentry have recently focused on community involvement and a “coalition of support” (Travis, Crayton, & Mukamal, 2009). As Draine et al. note, “. . . social capital accrues to people through their relationships with family and friends.” Family and friends may have a positive effect on medication adherence through encouragement, promotion of the importance of adherence, and serving as a reminder mechanism for the individual (Vervoort, Borleffs, Hoepelman, & Grypdonck, 2007), although these same individuals may also negatively affect adherence through counterproductive interactions (Remein et al., 2006). Family and social support may be particularly relevant to risk reduction and adherence in African American and Latino individuals.

A search of PsycINFO and Sociological Abstracts¹ found two investigations that examined the impact of family or friends on sexual risk behavior or HIV medication adherence in adult male

prisoners. It should be noted that one investigation (Seal et al., 2003) was a survey of what service providers felt were the important factors related to risk and nonadherence. The other investigation (Pettus-Davis, Scheyett, Hailey, Golin, & Wohl, 2009) noted that prisoners expressed concern about their ability to access prosocial support upon release. There is a need for more knowledge about how stress and support from family and friends are related to HIV risk behaviors and medication adherence in adult men being released from prison.

This article describes the prerelease characteristics of incarcerated HIV-positive men with imminent release from prison and jail, providing information for both postrelease planning and intervention development. Data presented include a demographic description of the sample and the participants' sexual risk behaviors, substance use, health status and HIV medication adherence, health care utilization, mental health, and family and social support.

Method

Data reported are from the baseline, prerelease, and prerandomization assessment that was conducted for a longitudinal intervention study of HIV-positive inmates being released from a prison or jail. Participants were recruited to participate in a randomized controlled trial of a behavioral intervention to decrease sexual risk behavior and improve medication adherence. All procedures were approved by the University of California, San Francisco Committee on Human Research. Project recruitment began in August 2005, and enrollment to the project continued until March 2007 (Reznick, McCartney, Gregorich, Zack, & Feaster, 2013).

Study Sites

Data were collected at three sites: two California state prisons, California Medical Facility and San Quentin State Prison, and one jail in San Francisco. During the study period, the policy at the two prisons was that each HIV-positive person had their viral load measured every 3 months and was provided with a 30-day supply of medication upon release. At the jail, people with HIV received medications upon release.

Recruitment

The study recruiter identified and met with potential participants who were between 21 and 90 days of their expected release back into the community. The recruiter reviewed eligibility criteria in a confidential space with those interested. Eligibility criteria were as follows: (1) over 18 years of age, (2) being released to one of the nine San Francisco Bay Area counties, (3) ability to speak English or Spanish, (4) ability to name at least one local adult family member or close friend who would be able to participate in a postrelease counseling intervention, and (5) willing to sign a release to allow the study staff to contact that person. Upon confirmation of eligibility, the recruiter read the consent form aloud with the participant, answered any questions, and had the participant sign or initial the consent form. Participants were offered a blank unsigned copy of the consent form for their reference, and the prerelease survey was scheduled.

Of the 325 individuals approached, 162 were eligible, provided signed consent, and had a prerelease assessment; of these, 40 were from a jail and 122 were from a prison. Of the 214 approached at the prisons, 122 enrolled in the study, 73 were ineligible, 18 declined to participate, and 1 failed to complete the survey. Of the 111 approached at the jail, 40 enrolled in the study, 12 were eligible but declined to participate, and 59 were not eligible. Of note, 7 of those from prison and 13 from jail were ineligible because they were unable to identify a family member or a friend to participate in the intervention with them.

Data Collection and Management

All assessment instruments were interviewer administered. Participants were paid US \$40 for the prerelease survey. The money was added to their prison account or provided upon release.

Measures

Demographics. Demographics included age, education, ethnicity, sexual orientation, gender identity (male, female, transgender, or “something else”), relationship status, lifetime incarcerations, past sexual trauma, income level, and source of income prior to their incarceration.

Sexual Risk Behavior. Sexual risk behavior was assessed only for the 4-month period prior to incarceration by asking about specific sexual behaviors with the most recent of up to five male and five female partners. Sexual risk behavior was defined as vaginal or anal sex that was not protected by a condom. Serodiscordant unprotected sex was also examined, that is, unprotected sex with a partner who was HIV negative or of unknown serostatus. Finally, condom self-efficacy ($\alpha = .92$) was assessed by having respondents rate their perceived ability to use a condom.

Substance Use. Substance use during the 4 months prior to incarceration as well as lifetime was assessed through questions about the use of alcohol, specific drugs, intravenous drug use, and needle sharing. Drug treatment involvement both prior to and during incarceration was noted.

ART and Adherence. Respondents were asked whether they were taking or had been prescribed HIV medications. A binary variable indexed whether sample members met the then-current criteria for ART: (1) an AIDS diagnosis; (2) recurrent infections that would indicate the need for ART; (3) CD4 cell count below 200; or (4) a viral load greater than 100,000. Separate indices were calculated for the period during incarceration and the 4-month period prior to incarceration. For the 4 months prior to the incarceration, those who reported taking every dose of HIV medications in a typical week were defined as adherent. Adherence during incarceration was measured using the AIDS Clinical Trial Group Adherence Interview Questionnaire (Chesney et al., 2000). Adherence during incarceration was defined as not skipping any pill and being on schedule. Self-efficacy for HIV medication adherence ($\alpha = .93$), and negative attitudes about HIV medications ($\alpha = .82$) were also assessed.

Cognitive Status. Cognitive status was measured by three of the four questions from the HIV Dementia scale (Power, Selnes, Grim, & McArthur, 1995). The “at-risk” threshold for this abridged test was adjusted to ≤ 7.5 points (i.e., full scale cutoff is $10 \times 0.75 = 7.5$; the scoring allows fractional points).

Health Status. Health status was assessed for both the 4 months prior to incarceration and during the incarceration period. CD4 cell count and HIV viral load were assessed by self-report and medical records when available. Correlations between the two reports were 0.87 for CD4 cell count and 0.72 for viral load; therefore, self-report was used when medical records were unavailable. Use of health services was assessed for the 4-month period prior to incarceration and for the incarceration period. HIV, sexually transmitted disease (STD), and hepatitis knowledge was measured by 17 true–false questions concerning risk factors, treatment options, and medical care.

Psychological Distress. The Brief Symptom Inventory (BSI; Derogatis, 1993) was used to measure psychological distress. The BSI Global Severity Index ($\alpha = .96$) is calculated as the mean response

(i.e., 0 to 4) across the 53 items assessing psychological symptoms over the past 7 days. For men, a T score on the Global Severity Index—or two subscales—greater than or equal to 63 (a raw score of 0.58 or greater) signifies clinical levels of psychological distress.

Social Support. Social support for the 4-month period prior to incarceration included four scales. *Network size* included a list of up to six persons who were important in the participant's life and whether the participant's HIV status had been disclosed to each. *Received family support* ($\alpha = .86$) and *Dissatisfaction with family support* ($\alpha = .86$) were from the Feetham Family Functioning survey (Roberts & Feetham, 1982). The Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet, & Farley, 1988) provided *Perceived support* ($\alpha = .86$) and three subscales of perceived support from friends, family, and a close special person (α ranged from .90 to .92). Social support during incarceration was assessed by the numbers of visitors, calls, and packages the participant received from outside.

Perceived Stress. Perceived stress was measured by 20 items using four ordered response categories. Four domains of stress were assessed: family ($\alpha = .74$), friends ($\alpha = .78$), employment ($\alpha = .76$), and finances ($\alpha = .82$). These domains were measured as the average score of items in the domain (possible range, 1 to 4).

Data Analysis

Data analysis was completed with SAS Version 9.1. For descriptive analyses, means and standard deviations (*SDs*) were used when appropriate; otherwise, either medians (*Mdns*) and interquartile range (IQR) or proportions were used. We also conducted an exploratory analysis of the correlation between indicators in two broad areas: (1) family/friend support and stress and (2) HIV health/adherence and HIV transmission behaviors. Finally, statistical tests compared differences by source of recruitment (jail or prison) on all variables (only significant differences are reported). For approximately symmetrically distributed variables, *t* tests are reported; otherwise, a Wilcoxon test for continuous variables, a chi-square for categorical variables, or a Spearman correlation is reported. CD4 cell count was square root transformed, and viral load was log 10 transformed.

Results

Demographics and Descriptive Information

Table 1 contains demographic information on the men. The majority would have been considered low income in the 4-month period prior to incarceration. Most reported monthly incomes of US \$500 to US \$3,999 (42.6%) or below US \$499 (26.5%). Most (61.1%) also reported receiving some form of public assistance, including Supplemental Security Income (42.0%), food stamps (15.4%), and general assistance (14.8%). About 34.0% reported three or more residences in the 4 months prior to incarceration, an indication of housing instability. Of those with housing instability, 43.6% reported having been homeless. An additional 11 of the 42 who reported two residences reported having been homeless.

Most of the participants had been incarcerated more than once. The mean number of previous incarcerations was 27.3 (*Mdn* = 17, IQR = 29 [8 to 37], range 1 to 198). Twelve additional participants reported that they had been incarcerated "more times than they could count." The median length of the current incarceration was 4.5 months (IQR = 6.7 [9.6 to 2.9]). The maximum incarceration length at the time of assessment was 51.7 months.

Table 1. Demographics.

	Jail (<i>n</i> = 40)	Prison (<i>n</i> = 122)	Full Sample (<i>n</i> = 162)
Mean age	41.1 (7.8)	42.0 (7.8)	41.5 (7.9)
Race/ethnicity ^a			
African American (%)	16 (40.0)	68 (55.7)	84 (51.9)
White, non-Hispanic (%)	12 (30.0)	26 (21.3)	38 (23.5)
Hispanic (%)	7 (17.5)	17 (13.9)	24 (14.8)
Mixed (%)	3 (7.5)	8 (6.6)	11 (6.8)
Native American (%)	2 (5.0)	0 (0.0)	2 (1.2)
Pacific Islander (%)	0 (0.0)	2 (1.6)	2 (1.2)
Marital status			
Single (%)	26 (65.0)	81 (66.4)	107 (66.0)
Divorced/widowed (%)	9 (22.5)	23 (18.9)	32 (19.8)
Married/partnered (%)	5 (12.5)	18 (14.8)	23 (14.2)
Education ^a			
Less than high school degree (%)	14 (35.0)	46 (38.0)	60 (37.0)
High school degree or equivalent (%)	14 (35.0)	44 (36.4)	58 (36)
More than high school (%)	12 (30.0)	31 (25.6)	43 (26.7)
Gender orientation			
Male (%)	35 (87.5)	111 (91.0)	146 (90.1)
Female (%)	2 (5.0)	2 (1.6)	4 (2.5)
Transgender (%)	3 (7.5)	5 (4.1)	8 (4.9)
Other (%)	0 (0.0)	4 (3.3)	4 (2.5)
Sexual orientation ^b			
Heterosexual (%)	24 (61.5)	82 (67.8)	106 (66.3)
Homosexual (%)	7 (18.0)	17 (14.1)	24 (15.0)
Bisexual (%)	6 (15.4)	17 (14.1)	23 (14.4)
Other (%)	2 (5.1)	5 (4.1)	7 (6.6)

Note. No statistically significant differences between jail and prison.

^aOne person did not answer these questions.

^bTwo persons did not answer this question.

Sexual Risk Behaviors

All but two men reported having engaged in sexual activity at some point in their lifetime. The average age of sexual initiation was 12.9 years ($SD = 3.5$). Half of the men (51.2%) reported having had sex with another man at least once. Of those who reported having had sex with another man, 56.6% reported that sex with men occurred both inside and outside of prison, 39.8% reported it occurred only outside of prison, and 1.9% reported it occurred only in prison. Of the participants, 35.2% reported having experienced a sexual trauma involving forced sex at some time in their lives. About half (49.1%) of these cases of forced sex occurred when the participant was a child, 22.8% when they were an adult, and 28.1% had occurrences both as children and as adults. Finally, 48.2% of all the men reported having traded sex for drugs or money at least once during their lifetimes.

Most participants, 82.6%, were sexually active prior to incarceration. Of those sexually active, 63.2% reported only female partners, 28.6% reported only male partners, and 8.3% reported having both male and female partners. Fourteen participants were newly diagnosed with HIV during the current incarceration. Questions about sexual activity addressed only the period prior to the current incarceration. Nearly half (61/127 = 48.0%) of the sexually active participants reported some unprotected sex, though there was a significant difference depending on knowledge of serostatus (Fisher's exact $p = .0033$). Participants who did not know their serostatus were more likely to engage in unprotected sex (10/11 = 90.9%) than were those who knew they were HIV positive (51/116 = 44.0%). Of

Table 2. Substance Use in 4 Months Prior to Incarceration.

Substance Used	Jail (n = 40; %)	Prison (n = 122; %)	Full Sample (n = 162; %)
Any alcohol	26 (65.0)	83 (68.0)	109 (67.3)
Binge drinking	17 (42.5)	46 (37.7)	63 (38.9)
Any drug use ^a	37 (92.5)	110 (90.2)	147 (90.7)
Marijuana	31 (77.5)	83 (68.0)	114 (70.4)
Cocaine	25 (62.5)	79 (64.8)	104 (64.2)
Crack cocaine ^b	20 (51.3)	65 (53.3)	85 (52.5)
Powder cocaine	10 (25.0)	33 (27.1)	43 (26.5)
Amphetamines	25 (62.5)	56 (45.9)	81 (50.0)
Heroin	14 (35.0)	31 (25.4)	45 (27.8)
Speedball (cocaine + heroin)	4 (10)	12 (9.8)	16 (9.9)
Goofball (amphetamine + heroin)	5 (12.5)	8 (6.6)	13 (8.0)
Sedative/hypnotics ^c	12 (30.0)	26 (21.5)	38 (23.5)
Viagra ^d	8 (20.0)	13 (10.7)	21 (13.0)
Poppers	6 (15.0)	12 (9.8)	18 (11.1)
Ecstasy ^d	5 (12.8)	13 (10.7)	18 (11.1)
Hormones	2 (5.0)	8 (6.6)	10 (6.2)
Hallucinogens	1 (2.5)	6 (4.9)	7 (4.3)
PCP	1 (2.5)	4 (3.3)	5 (3.1)
Steroids	1 (2.5)	0 (0.0)	1 (0.6)

Note. PCP = phencyclidine. No statistically significant differences between jail and prison.

^aAny drug use excludes Viagra, hormones, and steroids.

^bOne participant from jail did not respond to this question.

^cOne participant from jail and one from prison did not respond.

^dOne participant from prison did not respond.

those reporting unprotected sex, 76.7% indicated that it was with a HIV-negative partner or a partner of unknown serostatus (Knew HIV-negative status, 37/51 = 72.6%; Did not know status, 9/9 = 100%; $p < .10$).

Substance Use and Needle Sharing

Six (3.7%) participants reported neither drug nor alcohol use in the 4 months prior to incarceration and nine (5.6%) reported alcohol use but no illegal drug use in that period. The most frequently used substances were marijuana, cocaine, amphetamines, and heroin (Table 2). Nearly all (98.2%) reported having used some illegal drug in their lifetime. Seventy-four (45.7%) participants reported injection drug use (IDU) in the 4 months prior to incarceration (10.5% did not answer). Of those reporting IDU, 36.5% ($n = 27$) reported having shared needles with others during that period; 12 only took needles from someone else; and 15 both gave and took needles. It should be noted that 89 (54.9%) men in the study had tested positive for hepatitis. Hepatitis C was reported by 74 (45.7%) of the men. Hepatitis A and B were each reported by 20 (12.3%) men. Percentages do not sum to 100% because 23 men had multiple types.

HIV-Related Health Status

All men in this study were HIV positive. The median time respondents had known their HIV serostatus was 117.6 months (IQR = 118). We report information about the men's HIV-related health status in both the 4-month period prior to incarceration and during incarceration. Analyses of preincarceration health exclude the 14 respondents diagnosed during the current incarceration.

HIV-Related Health Status Prior to Incarceration. In the 4 months prior to incarceration, the median CD4 cell count was 332 (IQR = 423.5) and the median viral load was 1000, (IQR = 45,950). It should be noted that there was considerable missing data in these measures, with only 54.1% and 44.6% reporting a CD4 cell count and a viral load, respectively. Of the 148 men who knew they were HIV positive prior to incarceration, 61 (41.2%) were taking ART prior to incarceration. A total of 106 men met the criteria for ART, but 58 (54.7%) of these men were not taking ART prior to incarceration. Of the 61 men taking ART prior to incarceration, 30 (49.2%) reported being adherent to the dosing schedule.

HIV-Related Health Status During Incarceration. The median of the last CD4 cell count during the incarceration was 308 (IQR = 275). The median viral load was 1,016 (IQR = 18,600). Only 7 men were missing CD4 cell count and 37 (22.8%) were missing viral load data. ART usage increased from 61 to 96 (59.3%) of the 162 men during incarceration. The number meeting the criteria for ART also increased from 106 to 132, and those not taking ART declined to only 46 (34.8%), still a sizable proportion. Finally, of those taking ART, 87.8% were adherent, an increase over the preincarceration period.

The HIV Dementia Scale showed that 62 (38.3%) of the men showed signs of cognitive-motor deficits. The study did not have access to further information to characterize or quantify the extent of these deficits or to rule out causes other than HIV for their existence.

The average correct responses on the HIV, STD, and Hepatitis Knowledge questionnaire were 89% ($SD = 9.3\%$). This is significantly different than expected by chance ($z = 9.74, p < .0001$) and reflects approximately 15 correct responses out of 17.

Change in Health Status From Preincarceration to Incarceration. The median change in CD4 cell count was -5.0 (IQR = 233, $n = 77$). The median change in viral load was $+146$ copies (IQR = 23,844, $n = 52$).

Participants who should have been on HIV medications in the period prior to incarceration but were not had significantly lower CD4 cell counts, $t(114) = 2.04, p < .05$, and higher viral loads, $t(81.3) = 4.11, p < .0001$, during incarceration than did the men who were on HIV medication prior to incarceration. Of the 58 men who needed medication but were not taking it prior to incarceration, 30 initiated ART during incarceration. Those men who initiated medication during incarceration had a significantly lower viral load than those who did not, $t(44) = 4.73, p < .0001$, but there was no difference in the CD4 cell count.

Health Care Utilization

Health Care Utilization 4 Months Prior to Incarceration. The median number of health care visits prior to incarceration was 0.50 (IQR = 1.0) per month, with 21.6% of the men reporting no health care use and 13.0% reporting more than two health care visits per month. Of those reporting utilization, most (73.2%) reported using community health care facilities for at least some of this care. Emergency rooms were used by 11.8% and private clinics were used by 8.7%. Of the 29.9% who reported other health care sources, a majority (76.3%) named those sources as a jail or prison (during a previous incarceration).

Lifetime hospitalization for mental illness was reported by 38.1% of the sample, with 32.3% of these in the 4 months prior to incarceration. A majority (73.5%) reported a history of substance abuse treatment, with 34.5% of these in the 4 months prior to incarceration.

Comparison of Health Care Utilization Before and During Incarceration. The median number of health care visits per month during incarceration was 0.98 (IQR = 1.07). Only two men reported not having

had a health care visit during their incarceration, and 17.2% reported having more than two health care visits per month. There was a significant increase in health care visits per month during incarceration relative to the 4-month period prior to incarceration, $t(155) = 2.03, p < .05$. Only 13.7% of the men rated health care while incarcerated as being better than in the community; 68.6% rated it worse. The remaining 17.6% rated it about the same.

Mental Health

Perceived Stress in the 4 Months Prior to Incarceration. Perceived stress was measured in four domains: friends ($M = 2.62, SD = 0.56$), family ($M = 2.53, SD = 0.67$), finances ($M = 2.66, SD = 0.71$), and employment ($M = 2.62, SD = 0.75$). These mean ratings were just above the scale midpoints, indicating general acknowledgment of these stressors. However, for “employment,” 40.1% ($n = 65$) reported that none of the items pertained to them and therefore did not respond. For “family,” 18 men (11.1%) did not respond, and for “finances” 1 man did not respond to any item. The five most frequently endorsed stressors were *Difficulty meeting and trusting new people* (80.4%), *Bad financial situation* (62.5%), *Upset with family members* (62.2%), *Friends tempting you* (61.3%), and *Trouble finding a job* (61.1%).

Psychological Distress During Incarceration. Mean psychological distress scores were greater than the clinical cutoff (BSI, Global Severity Index $M = 0.79, SD = 0.64, Mdn = 0.61, IQR = 0.86$). Clinical levels of psychological distress were evident in 79% of the sample (51.9% based on the global score and an additional 27.1% on the subdimensions). The percentages of men showing clinical levels of distress on each of the subdimensions of the BSI were as follows: depression 55.5%, psychoticism 54.9%, paranoia 48.1%, obsessive compulsive 39.5%, somatic 37.0%, anxiety 35.8%, hostility 34.6%, interpersonal sensitivity 33.3%, and phobia 27.2%.

Family and Social Support

Social Support in the 4 Months Prior to Incarceration. The mean network size was 2.92 ($SD = 2.08$) out of a maximum of six. Thirty-three (20.4%) participants named the maximum six support network members, and 23 (14.2%) indicated that no individuals were important to them. Of the men who had any network, 99 (71.2%) had disclosed their HIV serostatus to all reported network members, and 15 (10.8%) had not disclosed to any of their reported network. The mean rating of perceived support was 2.58 ($SD = .64$). The three subscale means of this measure equaled 2.42 ($SD = .94$), 2.44 ($SD = .79$), and 2.88 ($SD = .84$) for family, friends, and a special support person, respectively. *Received family support* had a mean of 4.36 ($SD = 1.08$), and *Dissatisfaction with family support* had a mean of 1.32 ($SD = 0.95$). This mean level shows that dissatisfaction with family was significantly greater than zero, $t(161) = 16.73, p < .001$.

Social Support During Incarceration. When asked about contacts with friends and family while they were incarcerated, 24.7% of the men reported having at least one visitor while incarcerated, and 67.9% reported having received a letter, package, and/or phone call.

Relationship of Social Support and Stress on Sexual Risk and HIV Health-Related Status and Medication Adherence. The exploratory correlation analyses showed modest interrelationships between indicators of support and stress from both family and friends and indicators of sexual risk and HIV health and medication adherence. Stress from the family was associated with more serodiscordant unprotected sexual episodes ($r = .16, p < .05$). Higher levels of perceived family support were associated with a lower likelihood of unprotected sex with men ($r = -.17, p < .04$) and specifically lower

Table 3. Comparison of Jails and Prisons.

	Jail (<i>n</i> = 40)	Prison (<i>n</i> = 122)	Full Sample (<i>n</i> = 162)
Median months of incarceration***	3.0 (3.9)	5.9 (7.7)	4.5 (6.7)
Median CD4 cell counts** (preincarceration)	198 (173)	350 (755)	332 (423.5)
Change in CD4 cell count* (during incarceration)	50 (180)	-10 (269)	-5 (233)
Health care visits/month*** (during incarceration)	1.59 (2.11)	.86 (.99)	.98 (1.07)
Change in health care visits/month *** (preincarceration to incarceration)	.76 (1.34)	.18 (1.19)	.33 (1.25)
Inpatient substance abuse treatment ** (preincarceration; %)	27.5	9.0	13.6
Hospitalization for mental illness*(%)	55.0	33.1	38.1
Mental health symptoms**	.92 (.97)	.54 (.69)	.61 (.86)
Social network size*	2 (2)	3 (5)	3 (4)
Perceived support*	2.5 (.82)	2.75 (.93)	2.66 (.89)
Perceived family support*	2.00 (.50)	2.75 (1.25)	2.5 (1.25)
Dissatisfaction with family support*	1.62 (1.38)	1.10 (.79)	1.19 (1.08)
At least one visitor during incarceration***	48%	17%	24.7%

Note. IQR = inter quartile range. Medians (IQR) and percentages (labeled %).

*.01 < *p* ≤ .05. **.001 < *p* ≤ .01. *** *p* ≤ .001.

likelihood of serodiscordant insertive sex with men ($r = -.23, p < .005$). There were no relationships between measures of support and stress and being gay or bisexual. Received family support was also negatively related to sharing of any needles ($r = -.21, p < .02$) or sharing unclean needles ($r = -.23, p < .01$). Family support was positively related to HIV medication adherence self-efficacy whether measured as received support ($r = .31, p < .0001$) or perceived support from the family generally ($r = .21, p < .001$) or perceived support from a special person ($r = .19, p < .02$). Men with higher received family support had lower viral loads in the period prior to incarceration ($r = -.27, p < .03$).

Family support was also related to drug use and psychological distress. Men with more received family support ($r = -.17, p < .03$) and with more perceived friend support ($r = -.17, p < .03$) were less likely to have used stimulants or club drugs in the period before incarceration ($r = -.17, p < .03$). Men with more perceived support from family ($r = -.19, p < .02$) or from a special person ($r = -.26, p > .001$) had lower levels of psychological distress.

Comparison of Participants Recruited from Jail Versus Prison

There were significant differences across jail and prison participants (see Table 3). These differences may be important for planning interventions aimed at one but not the other population. As might be expected, participants recruited from jails had shorter incarcerations.

With respect to HIV-related health status, during the 4 months prior to incarceration, men recruited from jail had significantly lower CD4 cell counts and significantly improved CD4 cell count during incarceration from before. With respect to health care utilization, participants recruited from jail had significantly more health care visits and a larger increase in health care visits per month while incarcerated relative to the prior 4 months. Participants recruited from jail were also significantly more likely to have had inpatient substance abuse treatment in the 4 months prior to this incarceration, more likely to have been hospitalized for mental illness, and more likely to report mental health symptoms as measured by the BSI.

Social support for men recruited from jail was lower than that of men recruited from prison. Jail recruits reported significantly smaller social networks, significantly lower overall perceived support

and perceived family support, and more dissatisfaction with family support. However, participants recruited from jail were significantly more likely to have had at least one visitor, and there were no significant differences in receiving letters, packages, and phone calls.

Discussion

This descriptive study involved a diverse sample of HIV-positive men nearing release from prison or jail. Although most (66%) reported heterosexual orientation, many participants identified as gay, bisexual, or transgender. Of note, the sample had a history of numerous prior incarcerations, which signals potential problems in community reentry. Many of the other characteristics of this sample—financial strain, housing difficulties, elevated psychological symptoms, and substantial substance use—point to potential general problems with community reentry that have been highlighted by many others. Lack of resources and access to jobs is a common focus and concern in reentry (Visher, Debus-Sherrill, & Yahner, 2011), as are housing (Draine et al., 2005) and access to mental health and substance use services (Hoge, Buchanan, Kovasznay, & Roskes, 2009). These same factors have been cited as factors associated with HIV medication adherence. The remainder of this discussion summarizes aspects of the sample that might guide reentry interventions to reduce HIV risk behaviors and improve HIV medication adherence upon release.

Most men in the study reported being both sexually active and having some involvement with substance use. The 44% of men who knew they were HIV positive and yet reported unprotected sex were predominantly partnering with individuals of unknown or HIV-negative status. In addition, a little less than 10% of the sample reported sharing needles after use. Both of these are high-risk behaviors for the spread of HIV. Clearly, HIV risk reduction interventions are needed for this group and, if effective, should result in public health benefits. However, even those with the skills and motivation to reduce their risk of infecting others can “slip.” Reducing viral load for these men by improving their HIV medication adherence would significantly reduce the chances of HIV transmission (Cambiano, Rodger, & Phillips, 2011).

Interventions to improve HIV medication adherence have been shown to be effective, but most have a relatively small effect size (Simoni, Pearson, Pantalone, Marks, & Crepaz, 2006). The men in this study have multiple comorbid conditions that may complicate attempts to improve medication adherence. Interventions should address these comorbid conditions to bolster the impact of interventions on HIV medication adherence. Areas to consider include financial security and housing, substance use involvement, psychological distress and mental health, stress management techniques, and, finally, social support and family.

Substance use has been found to be a serious threat to adequate levels of medication adherence (Hendershot, Stoner, Pantalone, & Simoni, 2009; Lehavot et al., 2011). There was a high level of substance use, with most participants reporting use of multiple substances and nearly 45% reporting IDU in the 4 months prior to their current incarceration. In addition, substance use is known to decrease vigilance for HIV sexual risk behaviors. Therefore, substance abuse treatment and/or harm reduction interventions would be indicated.

The high proportion of men (79%) who reported clinical levels of psychological distress is striking. Depression in particular has been shown to be associated with problems in HIV medication adherence (Simoni et al., 2011). In addition, there was endorsement of stressors by the men in the study, particularly stressors related to finances, jobs, and relationships. The high reported levels of psychological distress may also indicate high levels of stressors and/or difficulty in dealing with stressors due to the known relationship between stressors, coping, and psychological distress (Burns, Feaster, Mitrani, Ow, & Szapocznik, 2008). Cognitive behavioral interventions for depression have shown promise as an ancillary to HIV medication adherence interventions (Safren et al., 2009).

Social support is a potential promoter of HIV medical adherence. It appears, however, that social support, particularly from family, may be problematic for many in this population. A significant fraction of the participants listed no important individuals in their lives, and the most frequently endorsed stressor was difficulty meeting and trusting new people. This difficulty appears to be particularly salient for the men recruited from jails. As pointed out by Wolff and Draine (2004), social skills-building interventions may be necessary to help individuals build social connections after reentry. This is particularly important for the individual to effectively access support from and integrate into the community (Draine et al., 2005).

Limitations

The study participants were volunteers for an intervention and cannot be considered a representative sample of the HIV-positive prison or jail population. To help contextualize the sample, we included information about eligibility, screening, and nonenrollment. Another limitation was the relatively small sample of participants recruited from the jail; differences between jail and prison recruits needed to be relatively large to achieve statistical significance. Additional differences between HIV-positive men in prison and jails may not have been detected in this study. Finally, these men are from one geographic area, the San Francisco Bay area; prison and jail populations in other areas of the country may differ.

Conclusion

There is a moral and ethical responsibility to address the health needs of this population upon release from incarceration; however, there are also important public health benefits to ensuring continued medication adherence and reduced HIV transmission risk behaviors. Nearly half of the respondents reported having unprotected sex, and most of this was with serodiscordant partners. Also, nearly half of the men had injected drugs in the period prior to incarceration, and many had shared needles. Postrelease planning should include support and skills building for linking to support for reducing both sexual and IDU-related transmission risk. In addition, good medical adherence to HIV medication regimens is needed to keep viral loads low, which considerably lessens the risk of sexual transmission (Dieffenbach & Fauci, 2009; Montaner et al., 2006).

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Note

1. Search completed October 17, 2010, and included (incarceration OR incarcerated OR prison OR prisoner) AND (family OR friends) AND (HIV medication adherence OR risk behavior).

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