

Are Feelings of Responsibility to Limit the Sexual Transmission of HIV Associated With Safer Sex Among HIV-Positive Injection Drug Users?

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Summary: We developed a scale among HIV-positive injection drug users (IDUs) to measure self-perceived responsibility to limit HIV transmission during sex. We describe the characteristics of HIV-positive IDUs (n = 1114, 62% male, HIV-positive for 9 years on average) who felt responsible for protecting their sexual partners from HIV and evaluated whether such feelings were associated with safer sexual practices. Using this scale (Cronbach $\alpha = 0.83$) and audio computer-assisted self-interviewing technology, 75% of this sample felt responsible for protecting their sexual partners from HIV. In cross-sectional multivariate analysis, HIV-positive IDUs who felt responsible were those with greater HIV knowledge (adjusted odds ratio [95% confidence interval]: 1.74 [1.26 to 2.40]), perceived social support (1.77 [1.28 to 2.44]), self-efficacy for safely injecting (1.41 [1.02 to 1.94]), and self-efficacy for using condoms (1.92 [1.38 to 2.68]). Feeling responsible was associated with having relatively fewer sex partners (<10 vs. ≥ 10 , 0.57 [0.34 to 0.96]) and a lower odds of unprotected sex (0.63 [0.45 to 0.89]) but was not associated with safer injection practices. Feelings of responsibility did not vary by demographic characteristics, suggesting that prevention messages that encourage HIV-positive people to play a role in curbing HIV transmission may be acceptable to many HIV-positive IDUs. Working with HIV-positive IDUs to increase or reinforce feelings of responsibility may reduce the sexual transmission of HIV.

Key Words: HIV, injection drug user, responsibility, seropositive, sexual risk behavior

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Injection drug users (IDUs) living with HIV constitute a large group who are at risk for acquiring new infections through their injection and sexual practices and may place others at risk for HIV through these same routes of transmission.¹ The risk of transmitting HIV through unsafe sex is of special concern, because although IDUs have dramatically reduced syringe sharing,^{2,3} unsafe sex among this group continues.^{4,5} New national initiatives to curb the HIV epidemic in the United States place a priority on identifying recent HIV seroconverters and working more intensively with HIV-positive people to limit the transmission of HIV to others.^{6–8} Acceptance of these new initiatives by HIV-seropositive individuals may depend, in part, on the extent to which HIV-positive persons believe they have responsibility for protecting others from HIV.⁹

Only limited research has reported on self-perceived responsibility among HIV-positive persons. Research has been mostly qualitative, conducted among men who have sex with men (MSM), and focused on responsibility to protect sexual partners.^{10,11} In a large qualitative study among MSM, responsibility to protect sexual partners varied by personal, partner, and contextual dimensions.¹⁰ Personal characteristics associated with feelings of responsibility included one's ethical or religious standards, psychologic state, use of alcohol or drugs, and knowledge of HIV transmission.¹⁰ For example, some men reported that engaging in unprotected sex would violate their personal standards or would trigger feelings of guilt, both of which they wanted to avoid. Alternatively, depression and inebriation were at times reported as precursors to feeling less responsible for the safety of sexual partners. Some men reported that intoxication reduced their motivation to protect others and, instead, shifted their focus to immediate sexual gratification. Other men felt less responsible when they had engaged in behaviors they believed were less likely to transmit HIV (ie, oral sex, receptive anal intercourse). Partner characteristics that influenced HIV-positive MSM's sense of responsibility included perceived or actual HIV status, age, perceived promiscuity, acknowledged sexual orientation, and ability to make a decision unclouded by inebriation.¹⁰ For

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example, men reported feeling more responsible for protecting younger, closeted partners and those perceived to be too drunk, but felt less so for partners perceived as “promiscuous.” Regarding context, different situations (eg, bathhouse, circuit party, primary partnership) were imbued with varied social norms for sexual safety, which had implications for men’s own need to act responsibly.¹⁰ Other work has found that HIV-positive MSM may feel absolved from personal responsibility for protecting others once they disclose their HIV status to a partner or because of new community norms that may support unsafe sex.¹¹ In quantitative analyses with MSM, greater responsibility was associated with safer sexual behaviors.^{12–14}

The single study reporting on responsibility from HIV-positive IDUs was a qualitative investigation of sexual risk taking. The notion of responsibility to protect sexual partners emerged in reference to intimate relationships but not sex-trade partners.¹⁵ Specifically, couples in steady relationships prioritized intimacy (expressed by means of unprotected sex) over sexual risk reduction. Disclosure of HIV status was common; thus, both partners shared the responsibility and attendant risks. In contrast to MSM, among whom substance use may reduce feelings of responsibility,¹⁰ IDUs did not report that being high absolved themselves from the responsibility to protect sexual intimates. In a separate report from the same IDU sample, feelings of responsibility were linked to disclosure of HIV status;¹⁶ however, this relationship was complex. For some, feelings of responsibility to protect sex partners from HIV did not always motivate disclosure. The act of disclosing freed some IDUs from feeling responsible, whereas others reported feeling no responsibility for having safe sex nor compunction to disclose their status.

In summary, qualitative explorations suggest several factors that may influence feelings of responsibility to protect sexual partners from HIV. In MSM samples, responsibility was associated with reduced sexual risk. No corresponding quantitative work has been conducted among HIV-positive IDUs. We first report on the properties of a quantitative scale to measure feelings of personal responsibility to protect sexual partners from HIV among a sample of HIV-positive IDUs. We then report the proportion of HIV-positive IDUs with such feelings, identify correlates of responsibility, and examine whether feelings of responsibility were associated with self-reported safer sexual behavior with at-risk partners.

METHODS

Study Sample

Preintervention data were analyzed from a multisite randomized trial of a behavioral intervention to reduce unsafe sexual and injection behaviors and improve health care outcomes among HIV-positive IDUs. This study, described elsewhere,¹⁷ enrolled 1161 men and women in Baltimore, Miami, New York, and San Francisco. Individuals were eligible for the study if they were at least 18 years old, able to communicate in English, confirmed to be HIV-positive by means of an oral specimen (OraSure; OraSure Technologies, Bethlehem, PA), and reported injection drug use in the past 12 months and sex with an opposite-sex partner in the past

3 months. The present cross-sectional analysis was based on data from 96% (1114 of 1161) of those enrolled who answered all questions on the responsibility measure. All variables for this analysis were collected through audio computer-assisted self-interviewing (ACASI; Questionnaire Development System; NOVA Research Company, Bethesda, MD).

Dependent Variable

Development of the Responsibility Scale

When the assessment for this trial was developed, we were aware of only 1 scale to measure the construct of personal responsibility for curbing HIV transmission. This scale, derived from work with MSM, focused on responsibility toward sexual partners and had yet to be quantitatively evaluated in any sample.¹⁴ Because the main goal of the present study was to test a behavioral intervention rather than scale development, the scale was empirically evaluated for its suitability among the present sample only after data collection. The construct of personal responsibility to protect sexual partners was measured by means of 11 items that inquired about perceived responsibility to limit the spread of HIV generally and under sex-trading situations (Appendix). Scale items were readily adapted to IDUs with slight wording changes, because items were not highly contextualized to sexual scenarios of MSM. Participants stated the extent to which they agreed with each scale item (1, strongly disagree; 2, disagree; 3, neutral; 4, agree; or 5, strongly agree). To generate the final set of items for the present sample, factor analysis was performed on the 11 items using Varimax rotation. The scree plot of eigen values was examined to identify potential factor(s). Within a factor, an item was retained if it exhibited a significant factor loading and its exclusion did not markedly improve scale performance as measured by the alpha-if-item-deleted criterion.¹⁸ A 7-item positively-scored single factor scale was derived (Cronbach $\alpha = 0.83$; see Appendix).

Definition of Dependent Variable

Participants were categorized into those who agreed or strongly agreed with statements about responsibility for limiting HIV transmission (high) or those who felt little or no such responsibility (neutral/low), based on their average scale score. Participants were grouped to provide more meaningful information for practitioners, because continuous scale scores identify subtle changes along a continuum. Because it is somewhat arbitrary to determine the cut point on a continuous scale, preliminary bivariate analysis was conducted, with the outcome trichotomized into groups of high, neutral, and low. There were no meaningful differences between the neutral and low groups; thus, these 2 groups were combined (data not shown). Because the risk of transmitting HIV varies by men versus women^{19,20} and such knowledge may affect the extent to which one feels responsible for limiting the sexual spread of HIV,¹⁰ we also conducted preliminary analysis stratified by gender (data not shown). Perceived responsibility did not differ by gender.

Independent Variables

The baseline assessment assessed domains related to health care seeking, HIV transmission behaviors by means of injection and sexual practices, and correlates of risk behavior.

All behavioral questions referred to 3 months before interview. To minimize the possibility of a type 1 error, we considered the following domains a priori for their associations with the construct of responsibility: demographics, HIV knowledge, psychologic state, substance use, and HIV sexual and injection risk transmission behaviors and potential correlates. Selection of these domains was guided by the literature,^{10-13,15,16} availability of measures in the data set, and the goals of describing those who felt responsibility toward sex partners and whether those feelings were associated with sexual risk behavior. Although the scale focused on sexual risk, because data were available about injection risk behaviors, they were also evaluated to inform on the criterion-related validity of the scale. Decisions on how to categorize variables were guided by frequency distributions, correspondence with scale scores, and the literature.

HIV knowledge was measured through 18 questions about transmission risk, reinfection, and self-care. Responses were summed and dichotomized into $\geq 80\%$ correct or $< 80\%$ correct to reflect high or low knowledge. Psychologic distress experienced in the week before interview was measured using the sum of the anxiety (6 items), depression (7 items), and hostility (5 items) subcomponents of the Brief Symptoms Inventory (Cronbach $\alpha = 0.91$).²¹ These 3 subscales were highly correlated; combining them made it possible to include all 3 affective states in the model. Because there is no established cut point for this scale, scores were dichotomized at the median to represent categories of high or low, which also provides more meaningful results to practitioners than subtle changes along a continuum. Empowerment was assessed using a 28-item scale to measure perceived ability to influence one's environment (Cronbach $\alpha = 0.76$).²² Participants were categorized as high or low, which corresponded to agreeing or disagreeing with statements about feeling empowered. Social support was measured with 5 items adapted from Barrera²³ that assessed domains of intimate interaction, directive guidance, positive social interaction, and instrumental support (Cronbach $\alpha = 0.87$). The scale was dichotomized at the value corresponding to probable through definitely perceived social support (high) or else (low). Measurement of recent substances used included the frequency of alcohol use (at least weekly, at least monthly, or no use) and types of illicit drugs used by means of any mode of administration (heroin with any other drug, heroin without other drugs, crack/cocaine and/or other drugs, other drugs only [eg, lysergic acid diethylamide (LSD)], or none).

HIV Risk Transmission Behaviors and Potential Correlates

Injection risk transmission behaviors were defined as lending a used syringe and sharing any injection paraphernalia (cookers, cotton, or rinse water, which are used to prepare drugs for injection) with a person who was HIV-negative or of unknown serostatus. These 2 variables were categorized into "yes," "no," or did not inject in past 3 months. Self-efficacy for practicing safer drug use was measured with a 6-item scale developed for this study. This scale assessed perceived ability to limit HIV transmission under common situations that may lead IDUs to share drug use equipment (Cronbach $\alpha = 0.85$). Scale

scores were dichotomized at the point that corresponded to agreement (high) or ambivalence/not sure (low).

The risk of transmitting HIV through sex was measured by number of sex partners, type of sex, and condom use. In preliminary analysis, the total number of partners was highly correlated with whether one had traded sex for money or drugs; only the former was included in modeling, because these 2 were collinear. In preliminary analysis, cross-tabulations with the outcome were generated with the number of sex partners dichotomized at different cut points. The categorization used (0, 1 to 9, ≥ 10) is the point at which this variable became significantly associated with responsibility. Because this was preliminary research, we thought it appropriate to use such exploratory methods to categorize this variable. Type of sex was grouped by transmission risk (anal only, anal and vaginal, vaginal only, oral, or not current sexually active).^{24,25} Condom use was defined by categorizing the sample into those who had any condom-unprotected vaginal and/or anal sex with at-risk partners (HIV-negative or unknown serostatus) versus none (ie, fully protected sex). We examined sexual acts with at-risk partners because we were interested in responsibility and the potential for HIV transmission.

Three potential correlates of sexual transmission behavior were considered: self-efficacy for condom use, disclosure of HIV status, and use of alcohol or drugs during sex (always/usually, sometimes, or rarely/never). Self-efficacy for condom use was assessed by means of a 9-item scale that inquired about confidence to use condoms during different socially-challenging situations. Participants were asked the self-efficacy scale questions with respect to each sexual partner (up to 3 partners). Scale scores across partners were highly correlated, and for each participant, we calculated an average scale score to measure condom use self efficacy. Scale scores were dichotomized at the point corresponding to categories of "pretty sure or absolutely sure" (high) versus "not sure or absolutely sure I cannot" (low). Disclosure was examined by type of sex partner (main, casual, or exchange partner[s]), because disclosure and responsibility may vary by this dimension.¹⁵ Within partner type, we examined disclosure to all, some, or none of one's sexual partners among those who reported having each type of partner. In bivariate analysis, we observed homogeneity in the association between responsibility and disclosure for main and casual partners; therefore, in multivariate modeling, this variable was combined into a single 3-level variable: (1) disclosed (yes/no) to any main or casual partners among those with main or casual partners, (2) did not disclose to all main or casual partners among those with these partner types (referent), or (3) did not have these partner types (category included to retain full analytic sample in model).

Statistical Analysis

Associations between the outcome and independent variables were assessed using the χ^2 test. Because this was a multisite study, we examined in bivariate analysis whether there were any significant or observable differences in the outcome by recruitment city; seeing none, this variable was not considered during modeling. The logistic regression model was built by including all variables significant at $P \leq 0.10$. Variables were removed from the model based on their

association with the outcome until the most parsimonious model was obtained.

RESULTS

The sample was 42 years old on average, 62% male, and predominantly minority (65% African American and 17% Hispanic) and had low levels of education and income (Table 1). Approximately three quarters (72%) of the sample self-identified as heterosexual, and participants had been aware of their HIV-positive status for an average of 9 years. Three quarters (75%) of the sample reported a high level of responsibility for limiting the spread of HIV to sexual partners. Responsibility did not significantly differ by any of the demographic factors evaluated, but there was a trend ($P < 0.07$) for older people to feel more responsible.

In bivariate analysis (Table 2), feelings of responsibility were associated ($P \leq 0.10$) with all the knowledge and psychosocial correlates investigated. Responsibility was higher among those with greater HIV knowledge and personal empowerment and among those who felt they had social support but was inversely associated with psychological distress. Responsibility did not differ by recent use of alcohol, types of illicit drugs used, or likelihood of lending or sharing injection equipment but was positively associated with self-confidence to engage in safer injection practices.

Responsibility differed by sexual behavior. Those with greater perceived responsibility to protect sexual partners had fewer sexual partners, were less likely to report unprotected sex with at-risk partners, and reported greater self efficacy for using condoms. Feelings of responsibility also varied by disclosure of one's HIV status, but this association depended on partner type. Those who felt greater responsibility were more

likely to have disclosed their HIV status to their main and casual partners, but responsibility was not associated with disclosure to sex-trading partners. Responsibility was not associated with type of sex or with the use of alcohol/drugs during sex.

In multivariate analysis, feelings of responsibility were associated with increased HIV knowledge, perceived social support, and self efficacy for injecting safely and using condoms (Table 3). The strength of these associations ranged from an increase in odds of between 40% and 90%. Regarding risk behaviors that could transmit HIV to others, greater feelings of responsibility were associated with having relatively fewer sexual partners and with a reduced likelihood of engaging in unprotected sex with an at-risk partner.

DISCUSSION

This study is the first to quantitatively measure the extent to which HIV-positive IDUs feel personally responsible for limiting the spread of HIV through sexual behavior. We found that most (75%) felt responsible for protecting their sex partners. The widespread feelings of responsibility in the present sample were in line with qualitative reports from HIV-negative IDUs much earlier in the AIDS epidemic²⁶ and reports from more recent qualitative investigations with HIV-positive IDUs.¹⁵ This finding, coupled with the fact that responsibility did not vary demographically, suggests that a broad spectrum of HIV-positive IDUs may be receptive to hearing prevention messages that encourage them to play a role in limiting HIV transmission.

Importantly, feelings of responsibility were associated with a lower likelihood of unprotected sex with at-risk partners. Increasing correct HIV knowledge, social support, and self-confidence in using condoms and injecting safely

TABLE 1. Baseline Sample Characteristics Overall and by Perceived Responsibility for Protecting Sexual Partners from HIV: Interventions for Seropositive Injectors—Research and Evaluation (INSPIRE) Study, 2001 to 2005

	Overall (N = 1114)	Scores on Responsibility Scale		P
		High 75% (835/1114)	Neutral/Low 25% (279/1114)	
Age <42 years, % (n)	46.2 (515)	44.7 (373)	50.9 (142)	0.07
Male gender, % (n)	62.4 (695)	63.5 (530)	59.1 (165)	0.20
Race/ethnicity, % (n)				
White	10.0 (109)	9.8 (80)	10.7 (29)	
African American	65.1 (708)	64.9 (529)	65.8 (179)	0.89
Hispanic	17.3 (188)	17.4 (142)	16.9 (46)	
Other	7.5 (82)	7.9 (64)	6.6 (18)	
Education, % (n)				
<High school	44.1 (490)	43.6 (363)	45.9 (127)	
High school or equivalency degree	31.4 (348)	32.5 (271)	27.8 (77)	0.33
Some college or more	24.5 (272)	23.9 (199)	26.4 (73)	
Annual income <\$5000, % (n)	52.7 (569)	52.7 (427)	52.8 (142)	0.98
Sexual orientation, % (n)				
Heterosexual	72.4 (806)	73.7 (615)	68.5 (191)	
Homosexual	4.1 (46)	3.7 (31)	5.4 (15)	0.19
Bisexual/unsure	23.5 (262)	22.6 (189)	26.2 (73)	
Years since HIV diagnosis	9.2	9.1	9.3	0.55
Mean (minimum–maximum)	(0.1 to 19.7)	(0.1 to 19.6)	(0.1 to 19.7)	

TABLE 2. HIV Knowledge, Psychosocial Characteristics, and Sexual and Injection Risk Behavior and Correlates by Perceived Responsibility for Protecting Sexual Partners from HIV: Interventions for Seropositive Injectors—Research and Evaluation (INSPIRE) Study, 2001 to 2005

	Overall (N = 1114) % (n)	Scores on Responsibility Scale		P
		High 75% (835/1114) % (n)	Neutral/Low 25% (279/1114) % (n)	
HIV knowledge and psychosocial correlates				
HIV knowledge score \geq 80%	49.8 (552)	53.9 (448)	37.7 (104)	<0.01
Psychologic distress				
High	39.8 (443)	38.3 (319)	44.4 (124)	0.07
Personal sense of empowerment				
High	29.7 (323)	32.4 (265)	21.4 (58)	<0.01
Perceived social support				
High	58.4 (648)	62.5 (520)	46.2 (128)	<0.01
Substance use*				
Alcohol use				
At least weekly	38.5 (427)	38.5 (320)	38.5 (107)	0.81
At least monthly	34.8 (386)	35.2 (293)	33.5 (93)	
Did not use	26.8 (297)	26.3 (219)	28.1 (78)	
Drugs used, % (n)				
Heroin with any other drug	69.8 (777)	69.8 (583)	69.5 (194)	0.62
Heroin without other drugs	7.4 (82)	7.1 (59)	8.2 (23)	
Crack/cocaine and/or other drugs	11.1 (124)	11.5 (96)	10.0 (28)	
Other drugs only (stimulants, LSD)	3.8 (42)	3.4 (28)	5.0 (14)	
None	8.0 (89)	8.3 (69)	7.2 (20)	
HIV risk: injection behavior*				
Lent used injection equipment to HIV-negative or unknown status injector, % (n)				
Yes	11.6 (129)	10.9 (91)	13.6 (38)	0.44
No	73.0 (813)	73.8 (616)	70.6 (197)	
Did not inject	15.4 (172)	15.3 (128)	15.8 (44)	
Shared drug preparation equipment with HIV-negative or unknown status injector, % (n)				
Yes	26.3 (293)	24.8 (207)	30.8 (86)	0.11
No	58.3 (649)	59.9 (500)	53.4 (149)	
Did not inject	15.4 (172)	15.3 (128)	15.8 (44)	
Self-efficacy for limiting HIV transmission when injecting				
High	53.9 (594)	56.7 (467)	45.9 (127)	<0.01
HIV transmission risk: sexual behavior*				
No. sex partner(s), % (n)				
\geq 10	8.9 (98)	7.4 (61)	13.4 (37)	<0.01
1 to 9	84.0 (927)	85.6 (708)	79.4 (219)	
0	8.0 (89)	7.9 (66)	8.2 (23)	
Type of sex, % (n)				
Anal only	4.0 (45)	4.0 (33)	4.3 (12)	0.74
Anal and vaginal	31.3 (349)	30.7 (256)	33.3 (93)	
Vaginal only	52.7 (587)	53.7 (448)	49.8 (139)	
Oral or no sex	11.9 (133)	11.7 (98)	12.5 (35)	
Unprotected vaginal and/or anal sex with HIV-negative or unknown status partner, % (n)				
Yes	27.5 (298)	23.7 (192)	39.1 (106)	<0.01
No (includes sexually abstinent)	72.5 (784)	76.3 (619)	60.9 (165)	
Self-efficacy for condom use, % (n)				
High	51.1 (481)	56.6 (400)	34.6 (81)	<0.01

(continued on next page)

TABLE 2. (continued) HIV Knowledge, Psychosocial Characteristics, and Sexual and Injection Risk Behavior and Correlates by Perceived Responsibility for Protecting Sexual Partners from HIV: Interventions for Seropositive Injectors—Research and Evaluation (INSPIRE) Study, 2001 to 2005

	Overall (N = 1114) % (n)	Scores on Responsibility Scale		P
		High 75% (835/1114) % (n)	Neutral/Low 25% (279/1114) % (n)	
Disclosed HIV status, % (n)				
Among those with main partner(s)†				
Disclosed to all	93.8 (606)	94.9 (466)	90.3 (140)	0.04
Did not disclose	6.2 (40)	5.1 (25)	9.7 (15)	
Among those with casual partners				
Disclosed to all	68.3 (367)	72.3 (276)	58.7 (91)	0.03
Disclosed to some	9.5 (51)	8.1 (31)	12.9 (20)	
Did not disclose	22.2 (119)	19.6 (75)	28.4 (44)	
Among those with exchange partners‡				
Disclosed to all	44.6 (74)	43.0 (52)	48.9 (22)	0.15
Disclosed to some	8.4 (14)	6.6 (8)	13.3 (6)	
Did not disclose	47.0 (78)	50.4 (61)	37.8 (17)	
Alcohol or drug use during sex, % (n)				
Always or usually	51.8 (531)	52.0 (400)	51.2 (131)	0.97
Sometimes	28.4 (291)	28.2 (217)	28.9 (74)	
Rarely or never	19.8 (203)	19.8 (152)	19.9 (51)	

*All data derive from baseline assessment. Behaviors refer to the 3 months before interview. Self-perceptions did not have a referent time frame.

†One person reported disclosing to some partners and was excluded from this analysis.

‡Defined as those partners with whom the participant exchanged sex for money or drugs.

may represent alternative ways of increasing feelings of responsibility. Implications are that counseling for HIV-positive IDUs should be multidimensional and focus on supporting condom use when it occurs, improving skills to initiate and use condoms to boost or maintain self-confidence for safer sex, addressing gaps in knowledge about how HIV is transmitted and how HIV-positive people can care for themselves, and making social service referrals to enhance support networks as needed. Others note that HIV-positive persons may be more receptive to messaging encouraging personal responsibility for others if safer sex counseling emphasized the benefits to the HIV-positive person and others.⁹ Additionally, the broader “ecology of HIV prevention” should foster social conditions that facilitate HIV-

positive people taking responsibility to curb HIV transmission. Ecologic shifts may include changing the laws regarding access to prevention measures (ie, condoms/sterile injection equipment) and changing social norms such that there is an expectation that HIV-positive individuals have some responsibility for protecting others.⁹ For example prevention paradigms such as “everyone who is sexually active should use a condom” may send unintended messages that HIV-positive people have no role to play in curbing HIV transmission and may need to be revisited.⁹

In contrast, we did not find an association between responsibility and types of sex acts performed. Lack of an association may be attributable to true null findings or to the fact

TABLE 3. Logistic Regression Results of Correlates Associated With Feeling Responsible for Protecting Sexual Partners from HIV*: Interventions for Seropositive Injectors—Research and Evaluation (INSPIRE) Study, 2001 to 2005

	OR (95% CI)	P
HIV knowledge (≥80% correct vs. <80% correct on 18 questions about HIV disease and transmission)	1.74 (1.26 to 2.40)	0.0008
Perceived social support (high vs. low; higher scale score = greater perceived social support)	1.77 (1.28 to 2.44)	0.0005
Self-efficacy for limiting HIV transmission when injecting (high vs. low; higher score = greater self confidence to inject safely)	1.41 (1.02 to 1.94)	0.04
Self-efficacy for condom use (high vs. low; higher score = greater self confidence to enact safer sex)	1.92 (1.38 to 2.68)	0.0001
No, sex partner in prior 3 months (≥10 vs. <10)	0.57 (0.34 to 0.96)	0.03
Unprotected vaginal and/or anal sex with HIV-negative or unknown status partner in prior 3 months (yes vs. no)	0.63 (0.45 to 0.89)	0.008

*Excludes 89 people who reported being sexually abstinent. All data derive from baseline assessment. CI indicates confidence interval; OR, odds ratio.

that many IDUs entered the study unaware of HIV transmission risks posed by different types of sex. Anecdotally, we witnessed confusion about relative HIV transmission risks during subsequent intervention exercises. Empirically, at baseline, only 54% and 17% of the sample correctly answered questions about the relative transmission risks of anal/vaginal sex and oral sex, respectively (data not shown). Additionally, the number of sexual partners was an insensitive predictor in that it only became significantly associated with responsibility among the small number of IDUs who reported at least 10 different recent sexual partners. Thus, this aspect of the sexual profile of HIV-positive IDUs may not be a helpful indicator of their feelings of responsibility. Simultaneously, these results reveal a small number of IDUs with an extremely risky partnering profile, who may not care to protect their partners or themselves and require urgent intervention. Responsibility was not associated with injection-related risk-transmitting behavior. This is likely attributable to the fact that the present scale measured responsibility with respect to sexual rather than injection behaviors, and this speaks well for the criterion-related validity of this scale. Given the substantial proportion of persons with HIV who are IDUs, further development of psychometric measures that more specifically assess responsibility with respect to protecting one's injection partners is warranted.

These findings partially confirm qualitative observations in that IDUs, unlike MSM, are unlikely to associate substance use with feelings of responsibility.^{10,15} Additionally, present findings support prior work suggesting that IDUs may feel less responsible for protecting less intimate sex partners.¹⁰ Alternatively, we did not find that responsibility was associated with disclosure, even after stratifying on partner type. The relation between feeling responsible and disclosing HIV status is not straightforward and may have several manifestations.^{11,15,16} One manifestation is an "informed choice" framework, in which both partners make a joint decision about the level of risk they are willing to accept; within such a framework, the responsibility for safe sex is shared. Alternatively, disclosing one's HIV status may be perceived as an act of responsibility. Further still, disclosing may absolve the HIV-positive person from feeling further responsibility to protect the informed partner. Clearly, this relation is complex, because responsibility has been observed as both an antecedent of, and consequent to, disclosure. Teasing out the relationship between disclosure and responsibility may be beyond the capabilities of this quantitative cross-sectional analysis, where we did not measure these potentially important mediating variables and time order could not be established.

There are notable limitations and strengths of this analysis. Findings derive from a convenience sample of IDUs recruited from clinic and community sources in 4 US cities; thus, generalizations to other IDUs—especially those only recently learning their HIV status—cannot be made with certainty. Participants in this sample had known their HIV status for an average of 9 years, and during the intervention sessions, we heard people say they had matured dramatically since first learning their HIV status. Additionally, veracity of self-report among IDUs is a common concern,²⁷ but we used computerized data collection methods, which enhance reporting of sensitive risk behaviors among IDU samples.²⁸ We could not

rule out the possibility of socially desirable responding, however, because we did not evaluate this phenomenon. If socially desirable responding occurred, it would have likely overestimated the proportion of IDUs who felt responsible for protecting their sex partners. The analysis was cross-sectional; thus, time order could not be established. Strengths of this study were the geographic heterogeneity of the sample, the inclusion of men and women, the use of psychometric scales that performed well among this sample, and the ability to focus on behaviors with partners at risk for HIV.

Further work is needed to understand better the relationship between feelings of responsibility and disclosure, different types of sexual partners, and injection practices. Most HIV-positive IDUs in this sample felt responsible for protecting their sex partners from HIV, suggesting an acceptance for those in this group to play an important role in minimizing the sexual transmission of HIV. Working with HIV-positive IDUs to increase or reinforce feelings of responsibility may reduce the sexual transmission of HIV.

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APPENDIX

Results of Factors Analysis of 11 Items Considered for Scale to Measure Self-Perceived Responsibility to Limit the Sexual Transmission of HIV At Study Baseline

	Initial Rotation*		Final Scale† α If Item Deleted
	Factor Loading	α If Item Deleted	
1. It is the responsibility of people who trade sex for money or drugs to protect themselves from HIV (reverse coded).	−0.49	0.75	
2. HIV-positive people have a responsibility to keep others from becoming infected.‡	0.64	0.61	0.81
3. I am responsible for protecting someone from getting HIV if I get them high to have sex with me.‡	0.68	0.59	0.80
4. An HIV-positive person who pays or gives drugs for sex is not responsible for protecting that sex partner from HIV (reverse coded).	0.11	0.65	
5. I feel responsible for protecting my partner from HIV.‡	0.65	0.60	0.80
6. It is my responsibility to protect others from getting HIV.‡	0.69	0.59	0.79
7. HIV-positive people have an obligation to have safe sex with sex partners who are negative or do not know their HIV status.‡	0.54	0.61	0.82
8. I feel responsible for protecting someone I pay for sex from HIV.‡	0.69	0.59	0.79
9. It should be the responsibility of someone who is HIV-negative, not someone who is positive, to make sure that sex is safe (reverse coded).	0.04	0.67	
10. It’s very important for me to use condoms to protect my sex partners from HIV.‡	0.58	0.61	0.81
11. If my partner is HIV-negative, they should not put the responsibility on me for safer sex (reverse coded).	0.06	0.65	

*Cronbach α of 11 items initially considered: 0.60 (raw), 0.66 (standardized).
 †Cronbach α of 7 items included in final scale: 0.83 (raw and standardized).
 ‡Item included in final scale.