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Assessment and prediction of self-reported HIV-risk behaviors by women in substance abuse treatment

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ASSESSMENT AND PREDICTION OF SELF-REPORTED HIV-RISK BEHAVIORS BY

WOMEN IN SUBSTANCE ABUSE TREATMENT

by

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Abstract

The optimal method for assessing HIV-risk behavior among vulnerable women is unknown. This study compared information obtained from self-administered questionnaires (SAQ) and face-to-face interview (FTFI) versions of the HIV Risk-taking Behavior Scale. This study also compared women intravenous drug users (IVDU's) and non-IVDU's on rates of HIV risk behaviors and the extent to which unstable housing, unemployment, single parenthood, barriers to accessing health care, and number of years of drug abuse predicted HIV risk. There were no differences in rates of risk behavior reported between SAQ and FTFI formats. IVDU's had higher sexual risk behaviors than non-IVDU's. Unstable housing significantly predicted risk behavior. Relative to those with more education, those with less than a high school education disclosed more through FTFI than SAQ. Results suggest that, among relatively educated samples, SAQ administration may yield equal rates of disclosure of HIV risk behavior in a more cost- and time-efficient manner.

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Introduction

There are currently 850,000-950,000 people living with HIV/AIDS in the United

States, and approximately 40,000 new cases of HIV infection develop every year, with a 1%

increase from 2002-2003. Of these new infections, 35% were transmitted through men who

have sex with men, 19% through heterosexual transmission, and 16% through intravenous

drug use (IVDU). Approximately 31% of new infections occur in women, of whom 45%

report getting infected through heterosexual transmission and 20% through IVDU (CDC,

2004).

Through both direct and indirect modes of transmission, IVDU has been responsible

for 24% of AIDS cases since the beginning of the epidemic. With respect to gender, IVDU-

related AIDS has impacted adult women more than men; 38% of all female AIDS cases have

been IVDU-related (i.e., directly through IVDU; or indirectly, through sex with partners who

inject drugs) while only 21% of male cases have been IVDU-related (CDC, 2004).

The rapid transmission of HIV through IVDU has been due to a combination of

factors. These include a lack of awareness of HIV's prevalence among the IVDU population,

limited availability and use of safer injecting equipment, and few restrictions on the sharing

of drug injecting equipment ("efficient mixing") within IVDU subpopulations through the

use of shooting galleries and "dealer's works" (Des Jarlais, 1999).

The association of HIV/AIDS with IVDU has long been established. Transmission of

HIV has been associated with injection frequency (Marmor et al., 1987; Schoenbaum et al.,

1989), use of shooting galleries (injecting rooms; Chaisson et al., 1987), number of people

sharing needles (Choopanya et al., 1991), injecting crack cocaine (Chaisson et al., 1987) and sharing materials such as cotton, cookers, and rinse water (Koester, Booth, & Zhang, 1996).

The sexual risk behaviors of IVDUs also cause the transmission of HIV to non-injecting drug users. These include unprotected sex (Sikkema et al., 1996) and exchanging sex for drugs and/or money (Booth, Kwiatkowski, & Chitwood, 2000). In their sample of 26,982 current drug users, Booth et al found that 28% reported sex with two or more individuals, 23% had an IVDU sex partner, and 24% had exchanged sex for drugs or money within the 30-day period prior to their interview. In comparison to injectors only, those who smoked crack only and crack-smoking IVDU's were more likely to report having multiple sex partners and exchanging sex for drugs or money. Crack-smoking IVDU's had the highest average number of days of alcohol consumption and were the most likely to have an IVDU sex partner. Number of days of alcohol use and having an IVDU sex partner was found to be independently associated with not using a condom. More than 80% of sexually active drug users reported having had sex without a condom.

In part due to the stigma attached to drug use and sexual promiscuity, a number of misperceptions and myths have evolved regarding the transmission of HIV/AIDS. These public perceptions have also contributed to the genesis of a number of unfortunate choices of terminology for AIDS, which have further perpetuated misinformation about the disease (Landau-Stanton & Clements, 1993). The next section will review some of the most common myths about AIDS.

AIDS: Myths and Public Perceptions

Myth 1: AIDS as a homosexual illness. AIDS was originally conceptualized as a gay man's illness with the use of terms such as GRID (Gay Related Immune Deficiency) and the

Gay Plague (Kaplan, 1995; Murphy & Kelly, 1994; Shilts, 1987). These terms identified AIDS solely with male homosexuality and led early researchers to ignore all other modes of transmission, such as blood transfusion and IV needle sharing. Consequently the incidence of this disease was overlooked or downplayed in other populations, including among IV drug users, blood transfusion recipients, hemophiliacs, babies, children, and women.

Furthermore, this myth served to perpetuate another in the early history of the disease: i.e., that women were biologically invulnerable to AIDS. This notion was lent credence by the high incidence of HIV among gay men and the perceived absence of cases in women (Cohen & Alfonso, 1997). The construction of AIDS as a gay male disease along with the myth of women's biological invulnerability to HIV resulted in researchers and physicians failing to address the protection and treatment needs of women (Cohan & Atwood, 1994).

Myth 2: AIDS defined as severe opportunistic infection and active illness. AIDS is not an illness; rather, it is a clinical construction that requires the presence of opportunistic infections for its diagnosis (Sontag, 1988). A list of opportunistic infections and physical manifestations that define being HIV-positive was developed by the CDC in the 1980s and used as diagnostic criteria for AIDS. These criteria were based upon CDC's observations of gay men and therefore specific to them. However, in women, AIDS-related opportunistic infections sometimes take the form of gynecological abnormalities; these cases did not meet the 1980s' criteria for AIDS and were therefore either ignored, treated as related to some other condition, or diagnosed late. In the mid 1990s, activism and media attention increased awareness of the fact that women were dying from AIDS yet were not being so diagnosed. In

light of accumulating data regarding infection patterns among women, the CDC changed its criteria for the diagnosis of AIDS (Stoller, 1998).

Myth 3: AIDS as immoral, sexual behavior. HIV infection and sex–especially homosexual and promiscuous sex–have come to be strongly associated among the general public. Since AIDS was originally regarded as being transmitted solely through homosexual anal sex (Shilts, 1987), it has come to be understood as a disease not only of sexual excess but also of immorality. Being a sexually transmitted disease, it has the added stigma of promiscuity and lack of cleanliness attached to it (Lawless, Kippax, & Crawford, 1996). In addition, only those groups of individuals who were more sexually active were perceived to be at greater risk. AIDS was thus seen by many as punishment–sometimes even as a just punishment–for this kind of activity (Sontag, 1988).

Myth 4: AIDS prevention as relevant only for "high-risk groups" and not "high-risk behaviors." AIDS has been conceptualized as an illness that happens to people who belong to a "high-risk category"; it has not typically been defined as risk associated with certain behaviors. Risk behavior has been studied by focusing on "who is risky, rather than on what is risky" (Clatts, 1995, p. 245). This is likely due, at least in part, to the early definition of AIDS as a gay male disease. The strategy of identifying high-risk groups, rather than behaviors, is prominent in public health strategies that portray high-risk behaviors (anal sex, multiple partners) as being exclusively associated with specific risk groups (gay males; Patton, 1993). The characterization of AIDS as being a relevant concern only for high-risk groups has two consequences. Group members are often stigmatized even if they do not engage in high-risk behaviors or are not infected, and individuals who engage in high-risk

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behaviors may not perceive themselves at risk if they do not belong to a "high-risk group" (Smeltzer & Whipple, 1991).

In summary, AIDS has been perceived (or misperceived) in a number of ways by the general population. These myths and perceptions, along with the terminology used for AIDS, have served to influence public perception of this disease (Landau-Stanton & Clements, 1993). It has been perceived as a homosexual illness (Kaplan, 1995; Murphy & Kelly, 1994; Shilts, 1987), as punishment for sexual excess and immorality (Sontag, 1988), as severe opportunistic infection and illness, and as relevant only to high-risk groups. These perceptions also perpetuated the myth that women were invulnerable to the disease (Cohen & Alfonso, 1997) and ignored the actual presence of the disease in women as it manifested itself in the form of gynecological abnormalities (Stoller, 1998).

The association between AIDS and sex–and the consequent public health myopia and persistence of myths–highlights the psychological, social, and cultural complexities of human sexuality (Landau-Stanton & Clements, 1993). It also provokes taboos within cultures as each culture has rules (unwritten or written) about sex, sexual behavior, who may talk to whom about sex, and what information may be communicated. These rules often interfere with AIDS education and prevention efforts. The assessment of HIV-risk behaviors is also affected as individuals at risk may be reluctant to disclose information about engaging in certain behaviors because of the taboo nature of these behaviors (e.g., anal sex).

HIV/AIDS and Women: Impact and Mediating Factors

AIDS has moved from being a White male homosexual disease in the 1980s to becoming a heterosexual disease that has the greatest impact on women and ethnic minorities

in the 1990s and early 2000s. As mentioned earlier, an increasing number of women infected through heterosexual contact have been diagnosed with AIDS since 1991.

While women of reproductive age are the fastest growing segment of the population to be affected, relatively little has been published regarding the disease process in women, and women's participation in drug trials and other research protocols has been limited (Cohan & Atwood, 1994; Cohen & Alfonso, 1997; Sher, 1993; Smeltzer & Whipple, 1991). This may be because gynecological symptoms were included in CDC's formal definition of AIDS only in 1993. This led to intensification of economic disadvantages for women with denial of financial assistance from the state (Cohan & Atwood, 1994).

Progression of the disease: Because estrogen and progesterone affect the immune system and may influence the natural history of infection, the progression of the disease may be different for men and women. While it is unclear whether pregnancy actually accelerates the progression of the disease, an increased vulnerability to opportunistic infections during pregnancy has been reported (Sher, 1993). In addition, research suggests that certain gynecological diseases occur more frequently and more aggressively in HIV-positive women than among their HIV-negative counterparts. Relative to HIV-positive men, shorter median survival times have been reported for HIV-positive women. This has been attributed to late diagnosis and poorer access to health care (Carpenter et al., 1991; Smeltzer & Whipple, 1991).

Additionally, women's risk is further increased by virtue of penile secretions typically having higher HIV concentrations than do vaginal secretions. The reproductive design of the vagina ensures retention and prolongs duration of exposure to semen, and the vaginal membrane is highly permeable and fragile (Anastos & Vermund, 1993). These factors may

account for the fact that male to female transmission is approximately twice as efficient as female to male transmission (Murphy & Kelly, 1994). Despite this, myths persist about the prevalence of female to male HIV transmission.

Social factors: Women have been portrayed as vectors responsible for the spread of AIDS to men and children rather than being seen as victims themselves (Cohen & Alexander, 1995; Mays & Cochran, 1989, as cited in Cochran, 1989). Most discussions of HIV and women have been limited to how women transmit the virus to their sexual partners or their children (Cohan & Atwood, 1994) rather than emphasizing the predominance of heterosexual transmission among these women, commonly in the direction of transmission from men to women (CDC, 2002).

In fact, among women, AIDS is a disease found almost exclusively among heterosexuals (Cochran, 1989). Analysis of the trends of heterosexually acquired HIV infection shows that women are disproportionately affected due to their sexual contact with a male partner who also injects drugs (Neal, Flemming, Green, & Ward, 1997) and is transmitted in the context of a relationship in which men are in control of most of the resources and responsible for most sexual decision-making (Carovano & Schietinger, 1993). This power imbalance may cause women to rely upon intimacy for protection in relationships (Weingarten, 1991), which is insufficient protection against HIV. It has been documented that women who report having high sexual relationship power, as compared to women who report low levels, are five times more likely to use condoms consistently. Also, 52% of inconsistent condom use was found to be attributable to low sexual relationship power (Pulerwitz, Amaro, De Jong, Gortmaker, & Rudd, 2002).

Women's social vulnerability is evident in the power dynamics of sexual relationships between men and women. Not only do women lack influence over their partner's sexual behavior outside the relationship, but many also have little control over the sexual activity in their own relationships (Carovano & Schietinger, 1993). The issue of condom use raises fears of mistrust, anger, and abandonment for many women (Cohan & Atwood, 1994; Williams, 1991). Minority women, in particular, report verbal, emotional, and/or physical abuse when they insist on condom use (Cochran & Mays, 1989; Kalichman, Williams, Cherry, Belcher, & Nachimson, 1998, Wingood & DiClemente, 1997).

Insisting on condom use may be futile. Women who experience intimate partner violence (IPV) also tend to report more sexually transmitted diseases, no condom use or use of condoms less than 50% of the time during sexual encounters, and engaging in relationships with partners who increase the women's risk of acquiring HIV. In addition, in comparison to women who use condoms all or none of the time, women who used condoms less than half of the time were at higher risk for IPV (Wu, El-Bassell, Witte, Gilbert, & Chang, 2003).

In another study on IPV among Hispanic women, Raj, Silverman, and Amaro (2004) found that women reporting a recent history of abuse were also more likely to report fears of verbal abuse and unfaithfulness from their partner if they insisted on condom use. They also found that abused women attempted to negotiate sexual practices assertively; however, condom use may be futile in an abusive relationship where the partner controls sex. Compared to women who did not report IPV, abused women were also more likely to perceive being at higher risk for sexually transmitted diseases and HIV due to their partner's unfaithfulness and not knowing their HIV serostatus (Raj, Silverman, & Amaro, 2004).

A prior history of sexual and physical trauma (such as sexual abuse, attempted and completed rape incidents, and childhood and adulthood physical abuse) also contributes significantly to HIV-related risk in women (Wyatt et al., 2002). In addition, women's vulnerability increases when, as often occurs, they have little or no information about their partner's at-risk behaviors (Ellen, Vittinghoff, Boyer, & Padian, 1998).

Social norms that guide sexual behavior influence women's risk of acquiring HIV. These norms are intimately linked to gender. Insisting upon condom use may lead to a woman being perceived as unattractive and promiscuous (Murphy & Kelly, 1994) or as casting aspersions on the male partner's faithfulness (Williams, 1991). Sexual double standards require women to be monogamous, while they do not require the same of men. This norm contributes to men commonly having higher numbers of sexual partners than women, and consequently heightening HIV risk for their female partners (Carovano & Schietinger, 1993).

Economic factors: Women who are at highest risk for HIV infection face an overwhelming number of other problems such as poverty, substance abuse, alcoholism, unemployment, and unplanned pregnancies (Wortley & Fleming, 1997). In their interviews with women who exchanged sex for money, Mallory and Stern (2000) found that these women were exposed to violence, drug use, sexually transmitted illnesses and HIV. Thus, ensuring economic survival becomes a practical decision in which one set of risks are exchanged for another. Pregnancy and single parenthood further intensify the economic stress experienced by single, poor women and may make them more vulnerable to involvement with and dependent on high-risk individuals as sources of support (Jackson, Hobfoll, Jackson, & Lavin, 2001). When faced with limited economic choices and the needs of their families, women may

choose activities that put them in danger such as drug dealing and prostitution (Suffet & Lifshitz, 1991).

It has also been found that women at high-risk for HIV due to their own injection drug use also face barriers to accessing health care, family planning, and reproductive health services. The high cost of medical treatment, negative experiences with medical providers and perceived stigmatization due to social class or drug history, and geographical inaccessibility to clinics are some of the barriers that prevent high-risk women from accessing health care. Additionally, these women also fear punitive action from either legal or social services, and especially fear that their children will be taken away from them (Oliva, Rienks, & McDermid, 1999). Despite an extensive search of the literature, no empirical studies linking single parenthood and HIV risk were found.

While engaging in prostitution, women may use condoms with their clients (Stoller, 1998). However, issues of trust and a need to distinguish between work sex and personal sex may preclude their using condoms with their male partners (who may be IV drug users, or engage in other at-risk behaviors; Bailey, Fox, & Oliver, 1992; Cohen et al., 1989; Day, 1988 all as cited in Cohen & Alexander, 1995). In addition, some women report a psychological need to be high while engaging in commercial sex. This can then lead to drug dependence, and a vicious cycle may ensue, in which the women's focus is narrowed to daily activities wherein HIV risk is not a prominent concern (Mallory & Stern, 2000). Female IVDUs who engage in the sex trade are more likely to use heroin more than once a day, smoke crack cocaine more than once a day, and borrow used syringes, as compared to female IVDUs who do not engage in the sex trade (Spittal et al., 2003).

The association between drug use and high-risk sexual behavior has been clearly established. Robertson and Plant (1988) found that, for young adults, male and female, age of first sexual intercourse was positively associated with age of first alcohol use and current tobacco and illicit drug use. In addition, use of alcohol before first sexual intercourse was found to be positively associated with lack of condom/other contraceptive use. In another study, Maisto, Carey, Carey, Gordon, and Schum (2004) found that higher doses of alcohol were associated with the motivation to have risky sex.

In a study comparing Canadian female street youths who engaged in prostitution to those who did not engage in prostitution, girls involved in prostitution were more likely to report bingeing on alcohol and drugs (twice and five times more likely, respectively) than those not engaged in prostitution. Also, the girls who engaged in prostitution were four times more likely to have a history of injection drug use and were 2.5 times more likely to use cocaine intravenously as their drug of choice. Also, these girls engaged in consensual sex at a younger age, were twice as likely to report anal sex, and reported more risky sexual partners. All the participants reported infrequent condom use (Weber, Boivin, Blais, Haley, & Roy, 2002).

HIV infection rates among women who smoke crack and exchange sex for drugs and/or money are comparable to rates of infection among men who have unprotected anal intercourse with other men (Edlin et al., 1994). There are also ethnic differences. African American men are 4.6 and women are 7 times more likely to have exchanged sex than Hispanic men and women respectively. Also, among those reporting sex with an IVDU, married men and women were more likely to report not using condoms than unmarried men and women. More women than men admitted to sex with an IVDU, with these differences

being more pronounced among men and women who themselves injected. Relative to their non-IVDU counterparts, female IVDU's were nearly 7 times more likely to report sex with an IVDU. Male IVDU's were nearly 3 times more likely to do so, relative to their non-IVDU counterparts (Booth, 1995).

Regarding intentions to use condoms for vaginal sex with a regular partner among male and female IVDU's, men's intentions appear to be strongly influenced by several factors: their perceptions of their sexual partner's openness to using condoms, whether or not their female partner was likely to suggest using a condom, and their own attitudes towards condom use. In contrast, women's intention to use a condom was most influenced by their perception that their regular partner thought they should use condoms (Kenski, Appleyard, von Haeften, Kasprzyk, & Fishbein, 2001).

Booth, Koester, and Pinto (1995) found that female participants had fewer legitimate employment opportunities and that gender was highly correlated with self-concept and opportunities for financial self-sufficiency. Female substance abusers were more likely to have had sex with an IVDU and more like to be involved in prostitution that included exchanging sex for drugs or money.

Long-term unemployment has also been linked to risk of contracting HIV/AIDS. Braun, Murray, Hannan, Sidney, and Le (1996) found that compared to nonusers, fewer cocaine users were employed full-time, and that cocaine use increased with duration of unemployment. Increased cocaine use was also observed to be associated with increased levels of marijuana, alcohol, and other illicit drugs. In another study on unemployment, drug use and HIV risk among American Indian and Alaskan Native drug users, Reynolds, Fisher, Estrada, and Trotter (2000) found that, compared to out-of-treatment unemployed

individuals, out-of-treatment employed individuals reported fewer risk behaviors over the past 30 days. These risk behaviors included injecting any drug, sharing used needles and syringes, days injecting cocaine, heroin, or "speedballs," and days smoking crack.

The illegal nature of prostitution and the associated penalties ensure that the contact and transaction site remain "underground." These factors likely yield fears of identification that contribute to at-risk women avoiding routine health care and HIV testing. Furthermore, to avoid detection by law enforcement, they may also live transiently (Cohen & Alexander, 1995), which is also likely to adversely impact their capacity to obtain consistent medical care. In related research, Surratt and Inciardi (2004) found that homeless sex workers, in comparison to non-homeless sex workers, were more likely to have consumed alcohol and crack daily, were more likely to engage in unprotected vaginal sex and other sexual activities when "high" on drugs, and engaged in more vaginal and oral sex acts.

Homelessness has been found to frequently co-occur with AIDS with users from homeless shelters in Philadelphia having 9 times the risk of AIDS than the general population (Culhane, Gollub, Kuhn, Shpaner, 2001). Among women, homelessness and living in low-income housing developments have been found to be associated with high levels of HIV-risk behavior. Kilbourne, Henderson, Andersen, Wenzel, and Gelberg (2002) found that in the previous year, approximately two-thirds of their sample had unprotected sex, one-fifth had exchanged sex for other commodities, and eight percent had used intravenous drugs. They also found a strong relationship between substance abuse and HIV risk behaviors among homeless women. Of their sample of homeless women, those who abused drugs were 10 times more likely to trade sex, while those who had alcohol dependence were 5 times more likely to inject drugs.

Living in low-income inner city housing projects also increases women's risk of acquiring HIV. Sikkema et al. (1996) found that these women were at high-risk because of their sexual involvement with men who had other sexual partners or who injected drugs, or because they had many sexual partners. The women in their study reported not using condoms in more than two-thirds of all intercourse occasions despite knowing that their partners had sex with others, injected drugs, or did not know their serostatus. Many of these women also reported having received treatment for a sexually transmitted disease over the past two months. Also, women who were at higher risk for HIV were younger and reported higher rates of alcohol and substance use.

Women living in shelters, as compared to women in low-income housing, are also more likely to experience physical and sexual violence, substance use and disorder, HIV-risk behavior, and co-occurrence of these problems. They were also more likely to report incidents of childhood sexual, physical, and psychological abuse (Wenzel et al., 2004).

To summarize, women's physiology and their social, personal and economic subordination to men (Carovano & Schietinger, 1993), along with engaging in high-risk behaviors such as IVD use and/or survival sex/prostitution, all contribute to their risk of HIV. Portrayal of at-risk women as vectors or reservoirs of infection ignores their vulnerability to the HIV virus. This is reflected in the marginalization of high-risk women in research protocols due to their poverty, lack of access to health care, minority status, and stigmatization as IV drug users and prostitutes. Difficulties in recruitment because of lack of transportation and childcare, and more immediate needs for food and drugs, also contribute to this marginalization. Additionally, fear of being identified as IVDUs and the consequential repercussions with police involvement also limits participation by IVDUs.

Assessment Issues

Most HIV risk research has utilized self-report techniques typically by creating a new scale for measuring the variables of interest. In a review of the self-report literature since 1990, Weinhardt, Forsyth et al. (1998) observed that very few studies have used existing measures, thereby contributing to inconsistencies and an unsystematic knowledge base. The development of multiple risk assessment measures, often times validated on different populations, has diffused efforts to develop empirically based assessment instruments, There are, however, several instruments that are more widely used, most notably the Timeline Follow-back Sexual Behavior Interview (TLFB; Sobell et al., 1980; Weinhardt, Carey et al., 1998), the Risk Assessment Battery (RAB; Metzger, Woody, & Navaline, 1993), the AIDS Risk Inventory (ARI; Chawarski, Pakes & Schottenfeld, 1998) and the HIV Risk-taking Behavior Scale (HRBS; Darke, Hall, Heather, Ward, & Wodak, 1991). These four instruments will be reviewed below. The exclusionary criteria that determined the use of the HRBS in the study currently being proposed will then be described.

The TLFB was initially developed to assess alcohol consumption and uses recall-enhancing techniques to obtain reliable information. Subjects are interviewed twice and asked to recall behavior during the previous three months. This technique was adapted by Weinhardt, Carey, et al. (1998) to assess sexual behaviors and their antecedents. Reporting of sexual behaviors was found to be reliable, with test-retest interclass correlations ranging from 0.86 to 0.97. Using the TLFB procedure yields valuable event level data, which is reliable (Crosby, Stall, Paul, Barrett, & Midanik, 1996; Weinhardt, Carey, et al., 1998; Weinhardt, Forsyth et al., 1998). However, the TLFB can be impractical due to its requirements for

trained staff and a lengthy administration time. While its reliability is well documented, its validity has not been established to date (Weinhardt, Carey, et al., 1998).

The RAB assesses recent risk behaviors through a questionnaire. Test-retest reliability for the RAB ranged from 0.75 to 0.88. While test-retest reliability is acceptable, and internal reliability is strong for the drug-risk items (Metzger, Woody, & Navaline, 1993), the RAB has some psychometric limitations. It may not be sensitive enough to detect changes in patterns of behaviors, which reflect change in the subject's risk of HIV infection. The instrument is not able to distinguish between the current or lifetime risk behaviors of individuals who are HIV-positive and HIV-negative. Since it uses aggregate measures of behaviors, those behaviors that occur irregularly or under the influence of substances may not be remembered accurately. These aggregate measures also do not take into account the context dependency of many risk behaviors (Chawarski et al., 1998).

The ARI is a relatively new inventory and currently available only as a computer-based assessment. It is a comprehensive instrument that assesses use of contaminated drug injection equipment, high-risk sexual behaviors, knowledge of the different factors associated with HIV transmission and prevention, history of other infectious diseases, motivation to reduce risk, and psychological factors that affect the likelihood of maintaining behavioral changes. This scale also has considerable flexibility as it uses a tree-like structure, which can be tailored to each individual client and does not burden him or her with unnecessary questions (Chawarski et al., 1998). No data are available on the psychometrics of the ARI.

The HRBS consists of 11 items, each of which covers a specific risk associated with injecting/drug use and sexual behaviors. This scale's psychometric properties have been found to be satisfactory. Cronbach's coefficient alpha was found to be 0.70, and test retest

reliability was r = 0.86. The test retest correlation with the same interviewer was r = 0.87, and with different interviewers was r = 0.85. Study participants and their sexual partners demonstrated high levels of agreement for assessed behaviors. The scale was developed as a structured interview and is brief, can be administered quickly, and is used for both clinical and research purposes (Darke et al., 1991). However, because it was developed and validated in interview format, no psychometric information is available for the self-administration of the questionnaire, which would be a more practical procedure in many settings.

To determine the most appropriate instrument for the proposed study, the four HIV risk assessment measures described above were evaluated in terms of whether they met the following criteria: (1) possesses strong psychometric properties, (2) is cost effective in terms of time and resources needed to collect data, and (3) requires minimal training. Cost effectiveness and ease of training are important factors because many agencies that work with at-risk women face severe staffing and budgetary constraints. Therefore, they require a measure that can be administered quickly, at low cost, and without specialized training.

Since the TLFB requires more time than other measures and intensive training for those collecting data and is thus not cost-efficient, it was not selected. While the RAB does not require much training to administer, it is lengthy and has several methodological problems (discussed previously). The ARI is also very lengthy and requires considerable training to administer. There is no psychometric data available on its reliability and validity. Also, the use of the ARI, which is available only in computer-based format, was precluded by concerns about the target population's familiarity with computers.

Of the four scales described above, the HRBS is the only one that meets all three criteria. It appears to have satisfactory test-retest reliability, is short, is easy to administer,

and does not require training to administer. Furthermore, it has face validity for the target population, which engages in both injecting and sexual behaviors that confer HIV risk. It was not developed for self-administration because the developers' pilot data revealed that IVDUs had difficulty with this format. However, they report no data or information on the difficulties experienced during administration. Therefore, because the instrument would be far more useful if it could be reliably administered in self-report format, and because other measures (e.g., the RAB) are routinely administered in self-report format, the present study proposes to systematically test the psychometric properties of self-administered versus interview formats of the HRBS.

The Reliability and Validity of Self-Reports

The present study will examine whether different modes of administration of a questionnaire (self-administration and interview) will result in different information about at-risk behaviors. Of particular interest is whether participants will be more or less self-disclosing on a self-administered version of the HRBS, relative to their level of candor when interviewed.

Research on the sexual behaviors of individuals who are at-risk for HIV has been restricted to self-report data. However, the reliability and validity of self-report data can be influenced by participation and response biases (e.g., intentional misrepresentation, inaccurate recall; Weinhardt, Forsyth, et al., 1998). Respondents may conceal and underreport or refuse to answer questions about sexual behaviors because of privacy, embarrassment, and fear of reprisals. Some individuals may embellish sexual activity and over-report sexual behaviors. Non-responders to questions about sexual behaviors tend to be individuals who are less educated and have lower reading ability (for young adults), who are

less sexually experienced, and who have read fewer sexual materials (Johnson & DeLamater, 1976, as cited in Catania, Gibson, Marin, Coates, & Greenblatt, 1990; Catania, McDermott, & Pollack, 1986, as cited in Catania et al., 1990).

Non-response biases (i.e., denying a behavior at the initial assessment but acknowledging it at the second assessment) and/or memory difficulties (i.e., less accurate recall of more frequently occurring behavior) may affect test-retest reliability for reports of the frequency of the behavior in question. Other task variables such as type of assessment (self-administered questionnaires, face to face interviews), question sensitivity (whether the questions elicit feelings of threat or approval-seeking behavior), the saliency and complexity of the behavior, recall strategies utilized, and emotional factors also affect the reliability and validity of data obtained through self-report (Catania et al., 1990).

Some of the different modes of assessment that use self-report are Self-Administered Questionnaires (SAQs), Face-to-Face-Interviews (FTFIs), and telephone interviews. FTFIs may be considered more threatening and intrusive than SAQs and thus may cause embarrassment and reduce honest reporting. SAQs, while more cost effective, do not permit clarification of ambiguous responses and are influenced by respondent literacy. Similarly, telephone interviews may afford the respondent more privacy because of the anonymity. It may, however, be difficult to reach certain populations such as IVDUs (Catania et al., 1990). Telephone interviews also do not offer as much opportunity for reassurance and rapport development as FTFIs, and may heighten fears of obscene phone calls in women (Acree, Ekstrand, Coates, & Stall, 1999).

Reviewing the self-report literature since 1990, Weinhardt, Forsyth, et al. (1998) found that FTFIs, SAQs, computer-administered questionnaires, biological markers, and

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collateral interviews were commonly used methods to examine the reliability and validity of self-report sexual behavior measures. The studies reviewed covered reporting periods ranging from 3 weeks to several years and assessed behaviors such as number of sexual partners, frequency of protected and unprotected oral, anal, and vaginal sex, nonconsensual sexual experiences, and history of relationships. Test-retest reliability has often been conceptualized in terms of consistency of scores across different reporting periods, despite the fact that different reporting periods may result in the measurement of different behaviors. In addition, many studies have been limited by their use of different questionnaires/measures that were unstandardized (Weinhardt, Forsyth, et al., 1998).

A number of studies (Boekeloo et al., 1994; Durant & Carey, 2000; Goldstein et al., 1995; James, Bignell, & Gillies, 1991; Sohler, Colson, Meyer-Bahlburg, & Susser, 2000) have compared the influence of mode of administration on self-report data. Boekeloo et al. (1994) compared risk behaviors reported through written self-administered questionnaires with those reported by audio self-administered questionnaires. After administration of these questionnaires, participants were interviewed face to face. Compared to the written questionnaires, audio questionnaires were found to have fewer missing responses and identified more risk behaviors such as unprotected vaginal intercourse and having sexual partners who may be HIV-positive. That same study found that both audio and written questionnaires identified more risks than the FTFI.

James et al. (1991) assessed the reliability of self-reported sexual behavior by asking individuals attending a genitourinary medicine clinic to respond to questionnaires and interviews. Agreement between responses to questionnaires and interviews was high overall; however, specific areas such as condom use with a non-regular partner, condom use in

vaginal intercourse, and oral sex in men had lower agreement between the two modes of administration. Sexual behaviors such as body massage, active oral sex, passive oral sex, body kissing, biting or scratching for pleasure, and vaginal penetration with fingers were reported significantly more frequently during FTFI.

Durant and Carey (2000) evaluated the influences of mode of administration, person and situational variables in a sample of undergraduate females who maintained a sexual diary for eight weeks. Thereafter, these women completed either a self-administered questionnaire or a face-to-face interview about their recent sexual behavior. Responses obtained on the FTFI and the SAQ were subtracted from the diary card to check the accuracy of retrospective self-reports. While both modes of assessment were found to be reliable, SAQs elicited less discrepant responses for protected vaginal sex. Reports of unprotected sexual behaviors were found to be equivalent for SAQ and FTFI, suggesting that both modes of assessment were reliable. Unfortunately, due to low rates of risky behaviors across the different modes of assessment, Durant and Carey were unable to determine which modality would have revealed more risky behaviors.

Self-report data have also been found to be reliable among homeless men with severe mental illness (Sohler et al., 2000). Using the same interview twice, with a one- to two-week time interval, test reliability ranged from 0.49 to 0.90 with the highest reliability (.93 to .78) for sex with men, number of sexual episodes, overall sexual activity, number of new partners and number of female commercial partners. However, reliability for condom use, frequency of receptive anal sex and number of male commercial sexual partners was the lowest. Another study of high-risk groups (Goldstein et al., 1995) examined self-reports of drug-

related and sexual risk behavior among pairs of IVDUs and found that these individuals can provide reliable reports of their own risk behaviors, both sexual and drug-related.

Furthermore, reliability of self-report is affected by the time period assessed, with 2-week and 3-month reporting periods being reliable but 12-month periods yielding unreliable data (Kauth, Lawrence, & Kelly, 1991).

In summary, research suggests that self-report is a valid and reliable assessment technique in assessing sexual risk behavior, but SAQs and FTFIs may differ in some of the information they obtain about specific behaviors. Despite the fact that many factors can introduce measurement error, ethical and practical considerations limit direct observations and other techniques that researchers might otherwise use to measure at-risk behavior (Catania et al, 1990; Weinhardt, Forsyth, et al., 1998). Thus, self-report remains one of the most viable techniques to assess the topography of sexual behaviors.

It is, therefore, imperative to further investigate the factors that may influence the reliability of self-report data regarding HIV risk behaviors. Also, the literature suggests that a number of interrelated factors uniquely affect women and place them at risk for HIV/AIDS. However, the literature is equivocal as to which predictors are most important for women who use or abuse drugs. The present study thus proposes to investigate these variables simultaneously, in order to clarify which factors have the greatest impact on women in vulnerable populations, specifically, those involved in substance abuse treatment.

The following section delineates the hypotheses that were investigated in the present study.

Research hypotheses

The present study was designed to investigate which mode of administration–FTFI or SAQ–yields greater rates of self-disclosure about risky sexual behaviors and drug use practices. Women who use drugs are at unique risk for contracting HIV by virtue of their lifestyle. However, to date, no studies have assessed the optimal method of data collection with this population. In particular, differences as a function of type of drug use were of interest. Additionally, this study sought to replicate and extend findings from previous studies that have used predominantly male (Darke et al., 1991) or mixed (Petry, 2001) samples; it is important to assess whether similar patterns of self-reports are observed from vulnerable women. The following hypotheses were tested:

Hypothesis 1: Different modes of questionnaire administration will yield differential reporting of HIV-risk behavior. Specifically, participants will report a higher frequency and more types of risk behavior on the SAQ version of the HRBS.

Hypothesis 2: On both FTFI and SAQ modes of the HRBS, women intravenous drug users will report higher sexual risk behaviors than women who use non-injecting drugs.

Hypothesis 3: Stability of housing, limited employment or unemployment, single parenthood, barriers to accessing health care and/or non-utilization of health-care, and number of years of drug ab/use will predict female drug-users' risk for HIV infection. It is hypothesized that unemployment and duration of drug ab/use would be most predictive of risk behavior as indicated by the HRBS total and subscale (drug and sexual risk) scores.

Methodology

*Design***:** Informed consent was obtained from all individuals who volunteered to participate. The consent process emphasized that there would be no negative consequences of

refusing to participate; that services provided at the agency where they may have learned of the study were not contingent upon participation in the study; and that no information would be released to participant's treatment providers without separate written consent. Participants were also assured that all information would be kept confidential and that the researchers were not formally affiliated with any of the referring agencies. Participants were compensated for their time with an alcohol- and tobacco-restricted $5.00 gift certificate to a local retail store. The investigator and her research associate were available to answer participants' questions.

After informed consent was obtained, participants were randomly assigned to one of two groups, SAQ or FTFI. Randomization was achieved by creating 70 packets consisting of the demographics questionnaire and the HRBS questionnaire. Out of the 70 packets, 35 were marked as FTFI using yellow Post-it notes, while 35 were left unmarked. These packets were then shuffled so that it was not known which were FTFI or SAQ questionnaires. Once participants were given the packets, they were told that if they received a questionnaire with a yellow Post-It note, they were not to fill out the questionnaire themselves; rather, that they should approach one of the interviewers for the questionnaire version.

All participants completed a brief background questionnaire that queried demographics, drug use, living situation, and relationship patterns. The HRBS was then administered in the assigned format (SAQ or FTFI). Participants were interviewed by Ph.D. students from the Clinical Psychology Department of Eastern Michigan University who were trained in administering the HRBS. The interviewers oriented the participants to the study, obtained informed consent, distributed questionnaires, administered the FTFI's, and distributed gift cards after completion of the questionnaires.

Participants assigned to the SAQ format were given the questionnaires on a clipboard and seated in a private area. The FTFIs were conducted in a private setting similar to that afforded to those assigned to the SAQ format.

Participants: 66 women were recruited from local substance abuse treatment programs by speaking to the treatment/program coordinators. The demographics of the participants are described in Table 1. The initial plan to recruit 70 participants was modified in light of recruitment difficulties, described in more detail below.

Data from eight women were invalid because they had been in a treatment program for longer than a month, and, initially, the HRBS asked for their drug use and sexual activities in the past month. Because it would have presumably been impossible for participants to engage in HIV risk behaviors while in a controlled environment, HRBS instructions were clarified thereafter to explicitly ask participants about their drug use and sexual activities *in the month before they entered treatment*. Two participants were under the age of 18 so their data were also excluded from analyses. Fifty-six women remained for the analyses presented in this report. Of these, 29 were recruited from Home of New Vision, 22 from Dawn Farms, and five from Help Source. These programs are described below.

*Setting***:** Data were collected at HelpSource, Home of New Vision, and two treatment centers run by Dawn Farms, all of which are located in the Ypsilanti/Ann Arbor area.

HelpSource provides services to pregnant and parenting teens under the age of 21. These services include health care, school, crisis intervention, getting ready for baby, FIA, and housing. While they provide services to women under the age of 21, only those participants who were between the ages of 18-21 were recruited for participation.

Home of New Vision provides transitional housing and outpatient services for homeless women suffering from chemical dependency who do not have insurance or enough income to pay for services and medication.

Dawn Farms offers inpatient detoxification along with a co-ed self-help residential treatment program for 18 to 35-year-old recovering substance abusers. The program includes occupational, recreational, group, and individual therapy plus working on the farm, with treatment lasting 6-9 months.

Table 1: Participant Demographics

Variable	SAQ		FTFI		
	Non-IVDU n= 20	IVDU n= 7	Non-IVDU n= 23	IVDU n= 6	Total Sample N= 56
Age					
(Mean ± St. Dev.)	31± 7.7	37.1± 9.3	36.6 ± 10.9	34 ±11.6	34.4 ± 9.8
Race					
% (N) Caucasian	90% (18)	100% (7)	65% (15)	67% (4)	79% (44)
% (N) African-American	5% (1)	0% (0)	30% (7)	33% (2)	18% (10)
Employment					
% (N) Employed at least part time	40% (8)	71% (5)	61% (14)	33% (2)	52% (29)
Education level					
% (N) Grade 12 or less	25% (5)	14% (1)	13% (3)	50% (3)	21% (12)
Annual household income					
% (N) less than $30,000	65% (13)	71% (5)	57% (13)	50% (3)	61% (34)
% (N) Don't know/ prefer not to say	30% (6)	14% (1)	22% (5)	50% (3)	27% (15)
# Biological children					
% (N) with more than 1 child	55% (11)	57 % (4)	68% (15)	50% (13)	60% (33)
Single parenthood					
% (N) Single parent	55% (11)	57% (4)	74% (17)	26% (6)	32% (18)
Marital Status					
% (N) married or living w/ partner	0	0	13% (3)	17% (1)	7% (4)
Health Insurance					
% (N) without insurance	25% (5)	29% (2)	35% (8)	33% (2)	30% (17)
Duration of substance abuse					
(Years, Mean ± St. Dev.)	13.4 ± 7.6	19.6 ± 12.8	16.5 ± 10.4	17.7 ± 11.4	16 ± 10
# Health Care Encounters					
% (N) with no health care encounters in past year	10% (2)	14% (1)	13% (3)	17% (1)	13% (7)

Measures: A background questionnaire developed for this study assessed demographics (e.g., age, marital/partnered status, race/ethnicity, and socioeconomic status), number of years of drug ab/use, housing, employment status, parenthood status, access to health care, and utilization of health care (see Appendix 1).

The HRBS is an 11-item scale that assesses both drug-injecting behavior and sexual risk behavior in the past 30 days. It is designed for FTFI format, and data are not available on its use as an SAQ. HRBS responses are scored on a five-point scale for frequency of behaviors ranging from 0 (not at all) to 5 (more than 10 occurrences of a specific behavior). A higher score indicates higher risk-taking, with 55 being the highest score possible. The scale also permits derivation of separate subscale scores for injecting and sexual risk behaviors. Because this study was designed to better understand the role of administration format in using the HRBS, the psychometric properties of this measure have been discussed in detail under Assessment Issues, above.

Data Analysis: Before the data analysis was conducted, several derived variables were calculated. Per the HRBS scoring protocol, HRBS items one through six were added to calculate the HRBS Drug subscale score, and the HRBS items seven through eleven were added to calculate the HRBS Sex subscale score. These two subscale scores were added to calculate the HRBS Total score for each participant.

Unstable housing was defined as living in a shelter or being homeless. *Unemployment* was defined as being completely unemployed or having irregular part-time employment. It was assumed that, among this population, retirement or disability status implied steady income while irregular part-time employment is likely to yield unpredictable (and low) income. *Single*

parenthood was defined as having one or more biological children and not being married, remarried, or living with a partner.

 Health care utilization was defined as the sum of all the different *types* of health care encounters (e.g., gynecologist, emergency room) reported over the past year. A maximum of eight types of encounters could be endorsed on the survey. Note that our survey did not query total number of health care encounters, only types of different encounters, over the past year. Admittedly, data on total number of health care encounters may have been preferable. *Duration of substance abuse* was defined as the difference between current age and the age at which the participant first tried her drug of choice.

 The study was designed to compare the data collected through two different modes of administration and across different types of drug-abusing women. Women in the FTFI and SAQ groups were compared on demographic variables (SES, race, etc.) to determine if significant differences existed despite randomization. T-tests and chi-square analyses were used for these comparisons as appropriate (i.e. t-tests for numeric variables and chi-square tests for categorical comparisons). The internal reliability of each administration format was ascertained by conducting Cronbach's alpha.

 A 2 (FTFI vs. SAQ) X 2 (IVDU vs. non-IVDU) Multivariate Analysis of Variance (MANOVA) was conducted to test the first and second hypotheses, simultaneously. Hypothesis 1 was tested by inspection of main effects for mode of administration, and Hypothesis 2 was tested by inspection of main effects for IVDU status. The interaction effect was also tested in this full factorial model. A 2 (education level below vs. equal to or beyond High School) X 2 (FTFI vs. SAQ) MANOVA was also conducted to assess for the possible influence of education level on response styles.

For the third hypothesis, a multiple regression analysis was conducted to calculate the proportion of HRBS score variance accounted for by psychosocial predictors (i.e., stability of housing, limited employment or unemployment, single parenthood, barriers to accessing health care and/or non-utilization of health care, and number of years of drug ab/use). Initially, we planned to inspect bivariate correlations, and variables with a p-value less than 0.05 were to be entered into a regression analysis using the forced entry method (i.e., the "Enter" method in SPSS) for including variables in the final model. However, contrary to our hypothesis, inspection of the bivariate correlations showed only one variable with a p-value less than 0.05. Nevertheless, an exploratory multiple regression using the abovementioned psychosocial predictors was conducted to determine which of the hypothesized independent variables significantly predict the HRBS total and subscale (drug and sexual risk) scores.

Factor analysis of the HRBS for examining its internal structure was considered but rejected as two previous studies have conducted exploratory analyses and obtained identical factor structures. Not surprisingly, given the discrete domains assessed at a face valid level (sexual and drug use behaviors), two factors were identified: one characterized by injection behaviors and the other by sexual risk behaviors (Darke et al., 1991; Petry, 2001).

Recruitment issues: A preliminary power analysis suggested that a sample size of 70 would be adequate to detect both moderate and small effect sizes. Specifically, power to detect a 0.5 standard deviation from the sample mean reported by Darke et al. (1991) would be 0.84, while the power to detect 1 standard deviation would be 1.0. It was anticipated that there would be 35 people in each administration format–self-administered questionnaires and face-to-face interviews–and at least 50% of the total sample would be women who use intravenous drugs. However, after devoting more than a year to data collection efforts at a number of potential sites,

only 56 participants could be recruited. Data collection was therefore halted for both pragmatic and statistical reasons. The statistical rationale in support of this is detailed below.

To support discontinuation of data collection, power analysis was conducted on the data obtained from the 56 participants who had been recruited. This analysis was done using SamplePower (SPSS, Inc.) software. Power for Hypothesis 1 was 0.79. A one-way ANOVA comparing the 2 administration formats did not yield a significant difference between the 2 groups (i.e., FTFI vs. SAQ) on either the HRBS total, the drug subscale, or the sex subscale scores. This analysis suggested that the true differences between the groups were so small that it would not be detected even with the originally proposed sample size of 70.

For the second hypothesis, women intravenous drug users were compared to non-intravenous drug users to determine if they have higher sexual risk behaviors. Note that only 24%, or 13 of the 56 participants, were intravenous drug users. The power for this hypothesis was found to be 0.61. Even with this small number of IVDU participants, however, preliminary results were significant, suggesting that additional data collection was not necessary to support Hypothesis 2.

Therefore, given that preliminary analyses suggested results would not likely be appreciably changed by recruiting the full complement of 70 participants, and given that the response cost for recruiting the remaining subjects would be considerable, data collection was halted and results were analyzed as proposed.

Results

The average age of the sample was 34.4 years (St. Dev. ± 9.8 years). Seventy-nine

percent (n=44) of the sample was Caucasian, while 18% (n=10) was Black. Fifty-two percent

(n=29) of the population was employed at least part-time, and twenty-one percent (n=12) had an

education level of grade 12 or less. Sixty-one percent (n=34) reported an average annual income

of $30,000 or less, while twenty-seven percent (n=15) did not know/refused to say. Sixty percent

(n=33) of the sample reported having more than 1 child, and thirty-two percent (n=18) were

single parents. Seven percent (n=4) were married, while thirty percent (n=17) reported having no

health insurance. Thirteen percent (n=7) had no health encounters in the past year, and the

average duration of substance abuse was 16 years (±10 years). As shown in Table 1, there were

no significant demographic differences between the SAQ and FTFI groups or between the IVDU

and non-IVDU groups. Cronbach's alpha for the FTFI format was 0.893 and 0.865 for the SAQ

administration format.

A 2 X2 MANOVA was conducted with mode of administration (SAQ vs. FTFI) and

route of drug administration (IVDU vs. non-IVDU) as factors and HRBS subscale scores as the

dependent variable. There was no significant main effect for administration format (Wilks Λ =

0.994, $F_{(2, 51)}$ = 0.157, p= .85, η^2 = 0.006). However, route of drug administration was

significant, with a large effect size (Wilks Λ = 0.554, $F_{(2, 51)}$ = 20.543, p= .00, η^2 = 0.446).

Univariate ANOVA post-hoc tests were conducted to further explore group differences on HRBS

subscale scores by route of drug administration. Both the HRBS Drug ($F_{(1, 52)}$ = 41.116, p=

.000, η^2 = 0.442) and Sex subscales ($F_{(1, 52)}$ = 7.316, p= .009, η^2 = 0.123) were significantly

different for IVDU versus non-IVDU participants (see Figure 1).

Although no significant main effect for HRBS administration format was found, a comparison of the means displayed in Figure 1 suggests that a much larger and heterogeneous sample (larger than the one originally proposed) might elicit clinically relevant differences, since the two groups showed different patterns. That is, non-IVDU users disclosed more on the SAQ version (5.2; SD = 5.3) than on the FTFI version (3.4; SD= 4.1) for the HRBS sex subscale. Their scores were similar for the HRBS total. In contrast, IVDU users disclosed more on the FTFI (9.8, 20.8; SDs = 2.8 and 12.8) than on the SAQ (7.1, 16.4, SDs = 7.1 and 16.0) for the HRBS sex subscale and total scores respectively.

Because it was possible that education level might have influenced response styles to written versus interview formats, a follow-up analysis was conducted to assess relationship of education and administration format on HRBS scores. Results showed a non-significant effect for education (Wilks Λ = 0.834, F (2, 49) = 1.15, p= .33, η^2 = 0.045) and format (Wilks Λ = 0.940, F (2, 49) = 1.558, p= .22, η^2 = 0.060). However, results also revealed a significant interaction effect for education and format (Wilks Λ = 0.834, F (2, 49) = 4.881, p= .01, η^2 = 0.166), with individuals with education below high school level disclosing more on the FTFI version while those with higher education (greater than or equal to high school) disclosing more on the SAQ.

Figure 1: Mean (± St. Dev.) HRBS Total and Subscale scores by route of drug administration and HRBS administration format
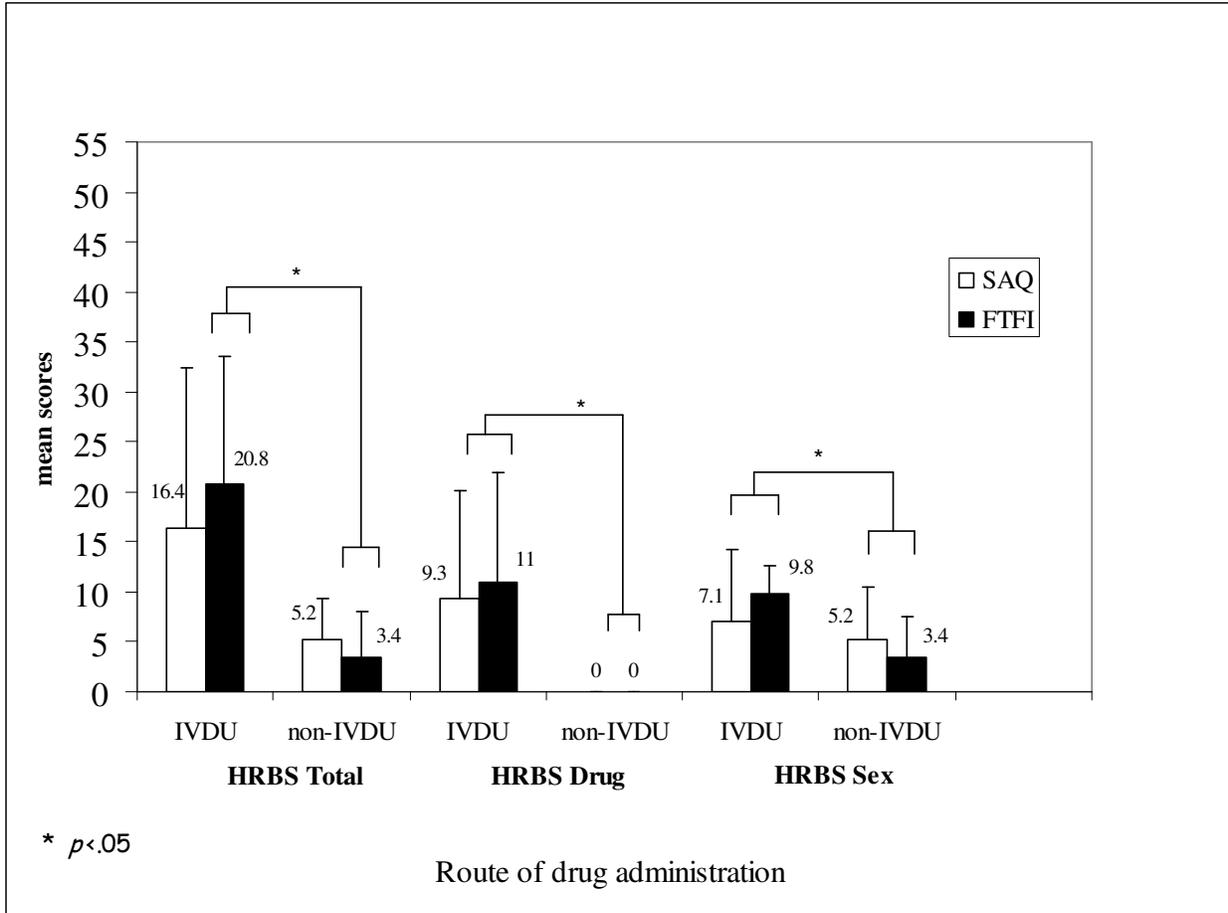
Chi-square analyses of each item by IVDU status (Table 2) revealed that all drug items and sex items related to condom use with casual and paying partners contributed to these significant differences.

Table 2: HRBS item-level responses for IVDU vs. Non-IVDU participants

Item	IVDU	Non-IVDU	p
1. Hit up (% never)	30.8%	100.0%	p<.01*
2. Needles used after someone past month (% never)	53.8%	100.0%	p<.01*
3. Number people used needles before you (% never)	61.5%	100.0%	p<.01*
4. Number times needles used by others after you (% never)	69.2%	100.0%	p<.01*
5. Cleaned needles before re-use (% never)	46.2%	100.0%	p<.01*
6. Bleached needles before re-use (% never)	46.2%	100.0%	p<.01*
7. Number people had sex with (% none)	15.4%	44.2%	p<.27
8. Number times used condoms with regular partners (% never)	30.8%	51.2%	p<.64
9. Number times used condoms with casual partners (% never)	7.7%	4.7%	p<.03*
10. Number times used condoms with paying partners (% never)	0.0%	2.3%	p<.02*
11. Number times anal sex (% never)	76.9%	90.7%	p<.06

An examination of bivariate correlations (Table 3) for all demographic variables – including, but not limited to those specified in the hypothesis–revealed that only unstable housing was significantly related to HRBS Sex, Drug, and Total scores. As mentioned before in the data analysis section, standard multiple regression was conducted to determine the ability of the hypothesized independent variables (stability of housing, limited employment or unemployment, single parenthood, barriers to accessing health care and/or non-utilization of health-care, and number of years of drug ab/use) to predict HRBS total and subscale (drug and sexual risk) scores.

Table 3: Bivariate correlations relating demographic variables to HRBS scores

	HRBS Sex	HRBS Total	Age	Income	Educ-	Ethnic	Health insurance	Tested for HIV	Intent HIV test	Poly-substance Use	Duration Abuse	Health utilization	Unemployment	Single parent	Unstable housing
HRBS Drug	.43*	.88*	-.06	.15	-.20	-.12	-.05	-.04	.40*	.31*	.11	.01	.09	-.21	.20
HRBS Sex		.81*	-.10	-.09	-.11	.08	.17	.12	.23	.04	.10	.12	.07	.04	.52*
HRBS Total			-.09	-.02	-.16	.06	.09	.12	.30*	.13	.13	.08	.12	-.02	.48*
Age				-.08	.26	.16	.07	-.09	-.26	.09	.77*	.04	-.21	-.04	-.16
Income					-.04	.02	-.03	-.14	.11	.28*	-.21	.23	-.16	-.14	-.18
Education						-.02	.26	-.07	-.08	.04	.15	.09	-.13	-.28*	-.04
Ethnic							.16	.02	.16	-.09	-.11	.07	-.17	-.07	.09
Health insurance								.07	.11	-.18	-.01	.36*	-.22	.21	-.02
Tested HIV									.13	-.17	-.07	.14	-.07	.22	.11
Intent HIV test										.11	-.24	.08	.12	.07	.04
Poly-substance use											-.04	-.13	-.01	-.25	-.00
Duration Abuse												-.11	-.20	-.01	-.08
Health utilization													-.22	.02	-.08
Unemployment														-.13	.13
Single parent															.02
Unstable housing															

* Correlation is significant at the 0.05 level (2-tailed).

Regression results indicate that the overall model did not significantly predict HRBS drug scores, R^2= .201, R^2_{adj}= 0.110, F (5, 44) = 2.210, p =0.070. A summary of regression coefficients is presented in Table 4 and indicates that only one (unstable housing) of the five variables significantly contributed to the model.

Table 4: Coefficients for model variables: HRBS Drug

	B	β	t	p
Duration of Abuse	0.122	0.178	1.282	0.207
Health care utilization	0.150	0.037	0.268	0.790
Unemployment	2.689	0.198	1.391	0.171
Single parent	-2.944	-0.200	-1.462	0.151
Unstable housing	6.213	0.299	2.168	0.036

Regression results indicate that the overall model significantly predicted HRBS sex scores, R^2= .478, R^2_{adj}= 0.418, F (5, 44) = 8.051, p <.01. A summary of regression coefficients is presented in Table 5 and indicates that only one (unstable housing) of the five variables significantly contributed to the model.

Table 5: Coefficients for model variables: HRBS sex

	B	β	t	p
Duration of Abuse	0.115	0.217	1.938	0.059
Health care utilization	0.631	0.204	1.813	0.077
Unemployment	1.464	0.140	1.222	0.228
Single parent	1.587	0.140	1.271	0.210
Unstable housing	10.132	0.636	5.702	0.000

Regression results also indicate that the overall model significantly predicted HRBS total scores, R^2= 0.355, R^2_{adj}= 0.281, F (5, 44) = 4.837, p <.01. A summary of regression coefficients is presented in Table 6 and indicates that only one (unstable housing) of the five variables significantly contributed to the model.

Table 6: Coefficients for model variables: HRBS Total

	B	β	t	p
Duration of Abuse	0.237	0.229	1.840	0.072
Health care utilization	0.781	0.129	1.032	0.308
Unemployment	4.154	0.203	1.592	0.118
Single parent	-1.357	-0.061	-0.500	0.620
Unstable housing	16.345	0.524	4.226	0.000

Discussion

It was hypothesized that different modes of questionnaire administration would yield differential reporting of HIV-risk behavior, with higher frequency and more types of risk behavior being reported on the SAQ version of the HRBS, as compared to the FTFI version. However, no differences were found for HRBS administration format, and both formats yielded comparable and high internal consistency. This suggests that substance-abusing women will disclose sensitive information about HIV risk behavior regardless of whether the questions are asked on paper or during face-to-face interviews. While there were no significant differences, Figure 1 suggests a pattern in which IVDUs may disclose more through Face-to-Face Interviews while non-IVDUs may disclose through Self-Administered Questionnaires. It may be that IVDUs are more de-sensitized to questions about their drug use and sexual behaviors. While no literature was found to support this, this was anecdotally noted during data collection, wherein, during the FTFI, IVDU women appeared to make more eye-contact and did not report being shocked by the nature of the questions on the sex subscale. In contrast, the non-IVDU women did not appear to make much eye contact and, at times, appeared to be shocked at the questions and occasionally laughed in embarrassment.

Participant responses to the FTFI v/s SAQ may have been affected by their educational level. A post-hoc analysis of the impact of education and administration format on the HRBS

scores revealed a significant education and format interaction. Individuals with education lower than high school tended to disclose more on the FTFI version than individuals who had completed high school and /or college. However, the sample size was very small.

The reporting of HIV risk behaviors consistently between two groups contradicts previous research. Boekeloo et al. (1994) compared risk behaviors reported by participants recruited from a sexually transmitted disease clinic through written self-administered questionnaires with those reported by audio self-administered questionnaires. After administration of these questionnaires, participants were interviewed face to face. Compared to the written questionnaires, audio questionnaires were found to have fewer missing responses and identified more risk behaviors such as unprotected vaginal intercourse and having sexual partners who may be HIV-positive. Also, compared to the self-administered audio and written questionnaires, fewer risks were identified using the FTFI.

In contrast to the results found by Boekeloo et al. (1994), James et al. (1991) assessed the reliability of sexual behaviors reported by individuals attending a genitourinary medicine clinic to respond using questionnaires and interviews. After completing questionnaires, selected participants were interviewed. While agreement between responses to questionnaires and interviews was found by James et al. to be high, specific areas such as condom use with a non-regular partner and condom use in vaginal intercourse and oral sex in men had lower agreement between the two modes of administration. Sexual behaviors such as body massage, active oral sex, passive oral sex, body kissing, biting or scratching for pleasure, and vaginal penetration with fingers were reported significantly more frequently during FTFI.

Cronbach's alpha values in this study for the FTFI and SAQ administrations were 0.893 and 0.865, respectively, indicating that both versions have high inter-item correlation and

measure a single construct. In comparison, the original study found that Cronbach's alpha for FTFI administration was 0.70 (Darke et al., 1991). No values were obtained for SAQ administration, as the original researchers thought that IVDUs may have difficulty with a self-administration format. The original study also does not report data on participant's socio-economic status and education. However, the current study demonstrates that the HRBS has high reliability when used as an SAQ, thereby enhancing its utility as a cost-effective instrument that requires minimal time and training to administer and score.

It was also hypothesized that, across HRBS administration formats, women intravenous drug users would report higher sexual risk behaviors than women who use non-injecting drugs. Results of the present study substantiate this hypothesis and replicate previous reports (e.g., Kilbourne et al., 2002; Sikkema et al., 1996; Surratt & Inciardi, 2004) of IVDUs engaging in higher sexual risk behaviors than non-IVDUs. Specifically, results revealed that women who use intravenous drugs had higher sexual risk behaviors than non-IVDUs. These include inconsistent or no condom use with casual and/or paying sexual partners.

Item analysis indicated that 39.5% of non-IVDU and 61.5% of IVDU women reported using condoms inconsistently with regular partners, while 34.8% of non-IVDU and 61.5% of IVDU women reported using condoms inconsistently with casual partners. While this study does not allow us to clarify the reasons for inconsistent condom use or the health status of the participant's sexual partners, it does supplement existing literature suggesting that drug use is associated with high-risk sexual behavior (Robertson & Plant, 1988).

It was also hypothesized that stability of housing, limited employment or unemployment, single parenthood, barriers to accessing health care and/or non-utilization of health-care, and number of years of drug ab/use would predict female drug-users' risk for HIV infection. Further,

unemployment and duration of drug ab/use were hypothesized to be most predictive of risk behavior as indicated by the HRBS total and subscale (drug and sexual risk) scores.

Results indicated that the overall model consisting of the above variables significantly predicted HRBS total and HRBS sex subscale scores. However, contrary to our hypothesis, the model did not significantly predict HRBS drug subscale scores. This may be because the HRBS drug subscale specifically assesses risk behaviors related to intravenous drug use (such as sharing of needles), and this study had a very small and homogenous sample size of intravenous drug users. This model merits further investigation with a larger sample of intravenous drug users.

Also contrary to our hypothesis, of all the variables in the model, only unstable housing significantly predicted female drug-user's risk for HIV infection as assessed by the HRBS total, HRBS sex and HRBS drug scores. This is consistent with literature suggesting that homelessness among women is associated with high-risk behaviors such as unprotected sex, exchange of sex for other commodities, and use of intravenous drugs (Kilbourne et al., 2002). Also, 62% of the women in this sample reported an income lower than $30,000. Additionally, living in low-income housing developments has also been found to increase women's risk of acquiring HIV, presumably due to a confluence of factors, including their greater likelihood of having multiple sexual partners, engaging in unsafe sex (not using condoms), high alcohol and substance use, and sexual involvement with men who had other sexual partners or who injected drugs (Sikkema et al., 1996).

Closer examination of the variables of duration of abuse and health care utilization suggests a trend towards significance for sexual risk behaviors. This suggests that a larger and more heterogeneous sample might yield results that show that duration of abuse and lack of

health care leads to greater incidence of sexual risk behaviors and, consequently, HIV risk. In addition, duration of abuse is marginally related to total risk behavior score. The failure of these results to reach significance may be due to the small sample size and should be examined with a larger sample in future research. Also unanticipated were the lack of significant correlations between unstable housing, unemployment, health care, and income. This may also be due to the small sample size and its relative homogeneity in income, level of employment, and access to health care.

Similarly, unemployment did not significantly contribute to HIV risk despite evidence from the literature suggesting that it is linked to HIV/AIDS. For example, Braun et al. (1996) found that, compared to non-users, fewer cocaine users were employed full-time, and that cocaine use increased with duration of unemployment. In addition, Reynolds et al. (2000) reported that, relative to out-of-treatment *unemployed* individuals, out-of-treatment *employed* individuals had fewer past 30-day HIV risk behaviors. These risk behaviors included injecting any drug, sharing used needles and syringes, days injecting cocaine, heroin, or "speedballs," and days smoking crack. In light of these reports in the literature, it appears that a larger and more heterogeneous sample size may have permitted a more fine-grained analysis of these relationships in the present study.

Limitations of the present study: The present study has several limitations. Due to recruitment difficulties, the sample size is relatively small and homogenous. For example, 61% of all women reported an income of less than 30,000, and almost half were unemployed, thereby limiting conclusions about how results might apply to a broader sample. It is possible that the observed differences might have approached significance with a larger sample size. Moreover,

very few IVDU participants could be recruited. Despite numerous attempts to recruit more IVDU women–over a period of one and half years–efforts were relatively unsuccessful in this regard.

The study also employed a between-groups design, whereas a within-subjects comparison of HRBS administration formats may have been more sensitive to detect response style differences. Ideally, a within-groups design should have been used; however, the study was planning to recruit women from shelters. Given the transient nature of shelter living, it was thought that it would be very difficult to collect repeated measures data. Thus, a between-groups design was used.

Another limitation is that the demographics survey did not query total number of health care encounters over the past year. Instead we elected to query about the different *types* of health care encounters a person may have had. This approach did not permit us to identify those who might have had a large number of encounters with the same provider. As such, our assessment of health care utilization should be regarded as a rough approximation of actual rates of health care encounters. Future research should seek to better quantify this variable so that a more accurate understanding of these relationships can be achieved.

Three different interviewers conducted the interviews with participants. While this study did not track variation in response style across interviewers, it is possible that individual differences among interviewers may have an impact on self-disclosure rates by vulnerable women. It is recommended that future research investigate this possibility. In addition, the finding that education interacts with format of administration to affect level of disclosure by participants must be interpreted cautiously due to the small sample size.

Despite the limitations of the study, the results make a meaningful contribution to what is known about how to best obtain sensitive information from vulnerable women. To our

knowledge, this study is the first to use the HRBS as a self-administered questionnaire. Researchers appear to have mistakenly assumed that it is not possible to collect meaningful data from substance ab/using populations using SAQs. However, results of this study demonstrate that–at least with certain populations–the SAQ administration format of the HRBS may yield equal rates of self-disclosure of HIV-risk behavior in a more cost-and time-efficient manner than can be achieved by FTFI's. This has important implications for conducting future research and future public health efforts to prevent transmission of HIV. Using the HRBS as a SAQ is not only a cost-effective and time-efficient method of collecting data, but it may also facilitate obtaining more disclosure by at-risk women, particularly those who have at least a high school education. The results also have implications for public health policy. Despite major public health programs to educate women about the risks of HIV and prevent the transmission of HIV, women who ab/use drugs continue to engage in high-risk behaviors. While the economic status of women who ab/use drugs may preclude them from controlling the decision-making process to reduce unsafe sexual behaviors, prevention programs continue to require that these women take responsibility not only for their own behaviors but also their sexual partner's behaviors. Thus, this study also suggests that public health efforts need to take into account women's context so as to be more effective in preventing HIV transmission.

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Appendix

1. Demographics Questionnaire

2. HIV Risk Behavior Scale

3. Informed Consent Form