

Unsafe Sex Among HIV Positive Individuals: Cross-Sectional and Prospective Predictors

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Abstract A follow-up study was conducted on a sample of 120 ethnically diverse HIV positive men and women first interviewed in 2000. Of the 86 survivors, 37 (43%) were able to be contacted 7–8 years later to conduct an exploratory examination of cross-sectional *and* prospective predictors of unsafe sexual behavior. Predictors that emerged as significant in the two cross-sectional analyses and the prospective analysis tended to be different variables, perhaps underscoring changing needs, perceptions, and behaviors among HIV positive persons over time. The cross-sectional analysis conducted at the baseline time frame showed a considerable number of significant correlates of unsafe sex, including several demographic/background variables. The cross-sectional analysis conducted on data collected 7 years later, on the other hand, showed far fewer significant correlates of unsafe sex, none of which were demographic/background variables, and which tended to be different correlates than those found in the baseline cross-sectional analysis. Significant predictors in the prospective analysis tended to be social support factors. This

different pattern of prediction may be important to those designing interventions to influence risky sexual behavior.

Keywords HIV · Predictors · Follow-up study · Unsafe sex

Introduction

Recent studies indicate that a significant number of HIV positive individuals engage in high-risk sexual practices. Though many persons living with HIV/AIDS either abstain from sex or significantly reduce risky sexual behavior, a significant percentage of HIV positive persons (ranging from 10% to as high as 64%) continue to engage in risky sexual behaviors [1–10]. Better understanding of the underlying mechanisms and correlates of such high-risk sexual behavior among persons living with HIV/AIDS remains a priority for researchers and public health professionals alike.

The Public Health Model provides a framework for conceptualizing variables that may be correlated to risky sexual behavior among HIV positive individuals [11]. The model incorporates both the psychosocial and person-in-the-environment perspective and suggests that there is a dynamic interaction between the person with HIV, the disease and the external environment. This framework indicates that understanding why some HIV positive persons engage in high-risk sexual behavior would require taking into account demographic variables, psychosocial factors, and social support activities. Previous research has identified several predictors of sexual risk-taking behavior of HIV positive individuals within these categories. Demographic predictors for high-risk sexual behavior among HIV positive individuals have included African

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American and Hispanic male-to-male sex (MSM); not having a steady partner; poverty; low education levels; and youth [1, 3, 7, 8, 12–19]. However, these findings have not always been consistent. For example, Stein and colleagues found no association between poverty and risky sexual behavior [20].

High-risk sexual behavior and the risk of acquiring HIV is particularly high among persons who use drugs [3, 7, 9, 13, 20–26]. Aside from the obvious risk for contracting HIV from sharing needles, some studies have identified high-risk sexual activity among HIV positive injection drug users (IDUs) as a significant correlate [19–27]. The prevalence of HIV/AIDS in adults 49 and older is on the rise due, in part, to risky sexual behaviors often brought on by substance abuse [28]. Poor negotiation skills, sensation seeking, exchange of sex for money or drugs, negative outcome expectancies (i.e., loss of privacy, stigmatization, rejection of sex), multiple sex partners, and safer sex fatigue (which results from long-term exposure to prevention messages and too many years of protected sex), have also been linked to unsafe sexual behavior among people with HIV [2, 3, 8, 9, 13, 16–19, 24, 25, 28–33].

Risk-reduction intervention programs focused on principles of social cognitive theory (i.e., skills training in condom use, negotiation and problem solving skills) have been linked to successful reductions in risky behavior of HIV positive individuals [34]. Social network/group association has been associated with both positive and negative directions with high-risk sexual behaviors [35]. Valente and Vlahov found increased risky behavior among friends who were injection drug users [36]. Reilly and Woo's study of 360 HIV positive individuals found that a higher portion of those engaging in unsafe sex reported receiving help for their HIV/AIDS from close friends; however the authors also found that those engaging in safer sex practices perceived the overall support they received as more helpful than did those engaging in unsafe sex [37].

Many studies examining factors associated with unsafe sex practices have been solely cross-sectional and thus, temporal relationships cannot be determined. A clearer understanding of the differences between associations obtained concurrently versus longitudinally could be important in designing interventions aimed at influencing unsafe sex practice. Further, factors that initially motivate people living with HIV to avoid high-risk sex may not be the same ones that enable them to maintain safer sex practices over the long-term. In the present study, we examine cross-sectional *and* prospective predictors of unsafe sexual behavior. Demographic/background variables, sexual behaviors, barriers to care, and social support variables were examined as cross-sectional correlates of unsafe sex at two time points—at baseline and at a follow-up period approximately 7 years later. In addition, in a

prospective analysis, we examined baseline predictors of unsafe sex reported at follow-up.

Methods

Design

This study was designed to collect exploratory data from a cohort of HIV positive individuals for the purpose of examining correlates of sexual practices.

Procedures

An original baseline interview was conducted in August through December of 2000. HIV positive participants were recruited with the cooperation of medical staff from both private and public health care sites in the Las Vegas Valley area. An estimated 75 percent of all people under care for HIV/AIDS in the Las Vegas area receive their medical care services at these sites [17]. Convenience sampling was used to recruit 120 participants. The sample was balanced by gender (60 females, 60 males) and by ethnic group (40 African-American, 40 Latino, 40 White). Face-to-face interviews were arranged at the participant's convenience in a private office within the medical site. Trained interviewers that matched the participant's gender and ethnicity conducted the interviews. Omitting names from data collection instruments and reporting only aggregate results protected respondent confidentiality. The research protocol, including data collection instrument, was reviewed and approved by the hospital and a university institutional review board.

A follow-up of the 120 HIV positive individuals was conducted from October 2007 through March 2008. Using death certificates from various search engines that were connected to a national database, the Clark County Health District determined that 34 participants were deceased at the time of the follow-up, leaving 86 survivors. Of the 86 survivors, 37 (43%) were able to be contacted 7–8 years later to conduct the follow-up interview. Employees from the Clark County Health District re-contacted the individuals from the original study to ascertain their interest in being re-interviewed. Those agreeing either gave permission for researchers to contact them directly or were given a number to contact to set up an interview. Respondents were paid \$40 for participating in both the baseline and follow-up interviews.

Interview Measures

The 48-page interview instrument, administered twice, assessed a wide range of demographic, medical,

behavioral, and psychosocial variables. A more detailed description of these measures can be found in Reilly and Woo [17, 38].

Recent Unsafe Sex

The outcome variable, unsafe sex during the past 6 months (yes versus no) was computed at baseline and again at the follow-up 7–8 years later. At both time points, participants were asked to estimate the number of sexual contacts with men and women (both regular partners and casual partners) during the last 6 months. The sexual activities of interest included insertive and receptive anal intercourse and vaginal sex; therefore, male participants were asked about male and female partners, whereas female participants were only asked about male partners. A participant that reported any of the aforementioned sexual activities but reported that a condom was not always worn was coded as *1* (unsafe sex). Those reporting none of the activities, or those reporting always wearing a condom, were coded as *0* (no unsafe sex).

Selection of Predictor Variables

Because of the small sample size and the exploratory nature of the study, initial analyses were conducted to identify candidate predictor variables of unsafe sex. Initial analysis indicated that unsafe sex was unrelated, cross-sectionally or prospectively, to years having been HIV positive; having an AIDS diagnosis; CD4/T-cell count; viral load count; types of HIV medications currently used; compliance with medications; self-rated health; alcohol or other substance use; and services needed and used. Therefore, these variables were not included in subsequent analysis, and subsequent analyses focused on demographic/background items, sexual activities including sexual risk avoidance, perceived barriers to care, and social support variables. Predictor variables are described in more detail below.

Demographic/background items included gender (*1* = male, *2* = female); age in years; race/ethnicity (White, African-American, and Hispanic); education level (*1* = Less than high school, *2* = high school or greater); past year household income (*1* = less than \$15,000, *2* = \$15,000 or greater); whether or not one currently has medical insurance (*0* = no, *1* = yes); and sexual orientation (heterosexual bisexual, or homosexual).

Sexual Activities were measured with items assessing, (a) number of sexual partners in one's lifetime, (b) the number of different men the patient had sex with in the past 6 months, and (c) sexual Risk Avoidance scores adapted from a published scale [39]. Variance on an item assessing number of different women the patient had sex with was too low to include as a variable. Risk avoidance scores

were computed as the mean response to 8 items assessing the use of strategies to resist temptation or pressure to have unsafe sex (e.g., "I will keep condoms nearby"). Scores ranged from 1 to 5, with higher scores indicating greater use of risk avoidance strategies.

A Barriers to Care scale, developed by Heckman, Somlai, Peters, Walker, Otto-Salaj and Galdabini, was used to assess the severity of geographical, psychosocial, and resource problems that impede care and service provision (e.g., long distance to medical facilities and personnel) [40]. Overall scores were computed as a mean across 13 items, and could potentially range from 1 to 4, with higher scores indicating a greater level of severity.

Social support activities used in the last 6 months to deal with living with HIV included eight individual items assessing the use (yes, coded as *1* versus no, coded as *0*) of: (a) a professional counselor for emotional support, (b) support groups, (c) involvement with organizations, (d) socializing with other persons with HIV, (e) skills training, (f) Internet resources, (g) healthy lifestyle changes, and (h) experimental/alternative methods. Each activity was considered as a separate variable.

Helpfulness of social support from medical professionals, friends, and siblings was measured with items from an instrument developed by Peterson, Coates, Catania, Middleton, Hilliard, and Hearst [41]. We focused on these three sources because our previous research indicates that these are the most common sources of support [37]. Participants were asked if they received help for any HIV/AIDS-related issue from these sources, and if they indicated that they received help, rated the helpfulness on a scale ranging from *1* (extremely harmful) to *5* (extremely helpful). Each of the three sources of social support was considered as a separate variable.

Statistical Analysis

Nonparametric (distribution-free) Spearman rank correlations (ρ) were used to assess associations. First, we examined baseline predictor variables with unsafe sex also measured at baseline. We then assessed the association of follow-up predictor variables with unsafe sex measured at follow-up. In a prospective analysis, we then examined baseline predictors with unsafe sex at the follow-up.

Results

Follow-up Rate

The follow-up rate for the current study was 43%. Analyses were performed to determine any bias in the baseline

characteristics of those followed compared to those lost to follow-up. The two groups did not differ with regard to the majority of baseline characteristics, including age, education level, income, insurance status, years being HIV positive, having been diagnosed with AIDS, viral load, alcohol or drug use, helpfulness of social support, having received professional counseling to deal with being HIV positive, number of sexual partners in one's lifetime, sexual risk avoidance, or perceived barriers to care. There was a tendency for men ($\chi^2(1) = 3.37, P = .07$), Hispanics ($\chi^2(1) = 4.36, P = .11$), homosexuals ($\chi^2(2) = 4.41, P = .11$), those with CD4 counts less than 200 ($\chi^2(2) = 4.52, P = .10$), and those reporting a higher number different male sexual partners in the past 6 months ($t(84) = 1.91, P = .06$) to be less likely to complete the follow-up interview. However, these associations did not reach statistical significance at the .05 level.

Characteristics of the Sample

Table 1 presents *baseline* characteristics of the 37 patients. The sample was diverse in both socioeconomic status and ethnicity, although it was disproportionately female and of heterosexual orientation. About three-fourths had some type of medical insurance. Participants had been living with HIV an average of 6.8 years, and 32% had been diagnosed with AIDS.

At baseline, 40.5% ($n = 15$) of participants reported having had unsafe sex during the previous 6 months. At the follow-up, 29.7% ($n = 11$) reported having had unsafe sex during the previous 6 months. Table 2 presents the breakdown at the two time periods. Seventeen individuals were consistent in their negative reports (i.e., "no unsafe sex") of unsafe sex at both assessments, six were consistent in their positive reports of unsafe sex at both assessments, five were negative at baseline and positive as the follow-up, and nine were positive at the baseline and negative at the follow-up. A McNemar test for correlated proportions indicated that the reduction in percent of those having unsafe sex from baseline to follow-up was not statistically significant ($P = .42$).

Cross-Sectional and Prospective Prediction of Unsafe Sex

Table 3 presents Spearman correlations (ρ) between predictors and unsafe sex for the two cross-sectional analyses, and for the prospective analysis. *Safe sex* at baseline was significantly associated with older age, being bisexual, having medical insurance, higher sexual risk avoidance, *not* attending support groups to deal with HIV, and socializing with other HIV positive persons. Not being Hispanic, getting involved in organizations related to HIV,

Table 1 Baseline characteristics of 37 HIV positive patients

Characteristic	% or mean (SD)
Gender (%)	
Male	35
Female	65
Age in years (mean)	39 (7.9)
Ethnicity (%)	
White non-Hispanic	38
African American	38
Hispanic	24
Education (%)	
<High school	27
\geq High school	73
Income (%)	
<\$15,000	65
\geq \$15,000	35
Currently has medical insurance (%)	
No	24
Yes	76
Sexual orientation (%)	
Heterosexual	70
Bisexual	14
Homosexual	16
Years HIV positive (mean)	6.8 (4.1)
AIDS diagnosis (%)	
No	68
Yes	32

Table 2 Number of HIV positive patients reporting having had unsafe sex at two time periods

	Unsafe sex at follow-up		Total
	No	Yes	
Unsafe sex at baseline			
No	17	5	22
Yes	9	6	15
Total	26	11	

and trying experimental or non-traditional way to improve one's health were *marginally* (i.e., P greater than .05 but less than .10) associated with safe sex at baseline.

The only significant cross-sectional correlate of safe sex at the follow-up was having a lower number of different male sexual partners in the past 6 months, although having received professional counseling was marginally related. Perceived helpfulness of support from friends also was quite strongly related to safe sex at the follow-up ($r = -.31$), but because the sample size was reduced for this analysis ($n = 24$) due to some missing data, statistical

Table 3 Cross-sectional and prospective predictors of unsafe sex among 37 HIV positive patients

Correlate	Cross-sectional analyses		Prospective analysis
	Unsafe sex at baseline rho	Unsafe sex at follow-up rho	Unsafe sex at follow-up rho
<i>Demographic/background variables</i>			
Gender	.03	-.02	b
Age	-.41*	-.09	b
Ethnicity			
White non-Hisp vs. other	-.19	-.14	b
African Am vs. other	-.08	.10	b
Hispanic vs. other	.30 ^a	.05	b
Sexual orientation			
Heterosexual vs. other	.18	.04	b
Bisexual vs. other	-.33*	-.26	b
Homosexual vs. other	.08	.20	b
Education level	-.12	-.00	-.14
Household income level	-.15	-.02	.14
Currently has med. insurance	-.43**	-.02	-.05
<i>Sexual activity</i>			
No. of sex partners in lifetime	-.22	.04	.12
No. of different men/past 6 mo.	.24	.36*	.54***
Sexual risk avoidance	-.51***	-.27	.07
<i>Barriers to care scale</i>			
	-.04	.04	.29 ^a
<i>Social support activity</i>			
Professional counseling	.10	-.29 ^a	-.34*
Support group	.32*	-.08	-.08
Organizations/activities	-.28 ^a	-.09	-.33*
Friends with persons with HIV	-.39*	.01	-.15
Skills training	-.21	-.13	-.36*
Internet resources	.02	-.16	-.31 ^a
Healthy lifestyle changes	.03	-.04	-.09
Experimental/alt. methods	-.30 ^a	.00	-.16
Helpfulness of social support			
From medical professionals	-.18	.00	-.01
From friends ^c	-.12	-.31	-.66***
From siblings ^d	-.26	.19	-.11

* $P \leq .05$; ** $P \leq .01$;*** $P \leq .001$ ^a $.05 \leq P \leq .10$ ^b Correlations are identical to those of the cross-sectional follow-up analysis^c Sample size = 24 due to some missing data^d Sample size = 23 due to some missing data

power was lacking and this correlation did not approach statistical significance.

In the prospective analysis, the following baseline measures were associated with subsequent safe sex: a lower number of different male sexual partners, having received professional counseling, getting involved in organizations related to HIV, and having received skills training to deal with HIV issues and particularly, higher perceived helpfulness of support from friends. In addition, lower barriers to care, and having used Internet HIV resources were also associated with subsequent safer sex, although significance levels did not reach the .05 level.

Discussion

The rates of unprotected anal and vaginal intercourse among people with HIV in this study (40% at baseline and 30% at follow-up) mirror other recent studies. Consistent with the public health model and with past studies, being older, having medical insurance, having a lower number of sexual partners, and possessing higher risk avoidance strategies were all correlated with safer sex practices in the cross-sectional analysis and/or the prospective prediction. Contrary to other studies, the results from these analyses did not suggest that social groups with fewer economic

resources or those using drug and alcohol were more likely to engage in unsafe sexual practices. However, several correlates dealing with both formal and informal social support/networks emerged in the cross-sectional and prospective analyses and warrant special attention.

Social support can be defined as an interpersonal transaction involving concern, aid, and information about oneself and the environment [42]. Considerable evidence suggests that positive social support helps individuals maintain their health under challenging conditions and some researchers have suggested that positive social support networks may be related to avoidance of unsafe sexual practices [35, 43–48]. However, other research suggests that some types of social support and network associations may be associated in negative directions with risky sexual behaviors [36, 49]. Rothenberg and colleagues have suggested the extent to which social support and networks either facilitate or impede high risk sexual behaviors may depend on the proximity and location of participants to the core of the network [50].

Social support assumes many forms and can encompass a variety of relationships and behaviors, including both formal and informal support networks. This study suggests that certain formal network associations may play a positive role in assisting HIV positive individuals adopt and possibly maintain safer sex practices. Involvement with organizations and activities that deal with HIV was found to be an important resource for individuals in practicing safer sex concurrently (at baseline) and in the future (prospective analysis). In addition, professional counseling and skills based training, which are often administered through these organizations, were positively correlated with safer sex in the prospective analysis. Organizations dealing with HIV have been in existence for many years since the HIV epidemic, and the utility of their services are critical to many individuals dealing with daily issues of living with HIV. The present study suggests that these organizations may also be playing a positive role in assisting HIV positive individuals to engage in safer sex practices, perhaps even years later. Given the exploratory nature of this study, many questions about the precise role of the organizations in assisting HIV positive individuals practice safer sex remain unanswered. We do not know how often the individual may have utilized the organizations, if the utilization was continuous, or what types of services were obtained.

The findings that professional counseling and skills training may have an effect on subsequent safer sex practices is significant and offers some validation that these efforts may be making a difference. While we do not know if the duration of counseling and skills training makes a difference or what the impact of timing, focus and type of counseling or content of the skills based training, it would

be important to further substantiate the effect of both of these support networks. There is an emerging body of research that supports the need for more holistic strategies that focus on a variety of interventions including interpersonal, cognitive and behavioral skills training geared toward the development of risk-reducing behavior strategies [26, 51, 52].

The use of informal networks and their correlation to safer sex practices for HIV positive persons was also affirmed in this study. Socializing with other HIV positive persons was associated with safer sex practices at baseline. In the prospective analysis, the higher perceived helpfulness of support from friends was significantly correlated ($P < .001$) with safer sex practices 7 years later (it was also fairly highly correlated at one cross-sectional time period). Informal networks can be especially important because the scope and availability of formal services is often limited. In addition, many HIV positive individuals are disconnected geographically or emotionally from traditional support systems such as family and faith-based institutions and must rely on different support networks. The finding that the perceived helpfulness of friends is noteworthy, and its relationship to fewer transmission-risk practices needs further exploration, insofar as other studies have suggested that friends may not produce the type of support necessary to maintain safer sex practices.

The baseline finding that not attending a support group was correlated with safer sex was unexpected. As with the other findings, many questions about the association between support groups and safer sex remain unanswered. Like the counseling finding, the timing, duration, focus and type of support group would need further study. It could be that individuals attending support groups at baseline were struggling more with the issue of maintaining safer sex practices or the focus of the support group dealt primarily with this issue and thus there was an over-representation of individuals who were engaging in unsafe sex. It also could suggest that support groups may not be an effective tool in helping HIV positive individuals reduce risky practices. More work is needed to further substantiate or explain the effect of support groups and safer sex practices.

This exploratory examination of cross-sectional and prospective predictors of unsafe sexual behavior among a sample of HIV positive individuals revealed some important findings for designing interventions and prevention activities aimed at reducing unsafe sexual practices. For example, the predictors that emerged as significant in the two cross-sectional analyses and the prospective analysis tended to be different variables, perhaps underscoring changing needs, perceptions, and behaviors among HIV positive persons over time. The cross-sectional analysis conducted at the baseline time frame showed a considerable number of significant correlates of unsafe sex,

including several demographic/background variables. The cross-sectional analysis conducted on data collected 7 years later, on the other hand, showed far fewer significant correlates of unsafe sex, none of which were demographic/background variables, and which tended to be different correlates than those found in the baseline cross-sectional analysis. Significant predictors in the prospective analysis tended to be social support factors. This different pattern of prediction may be important to those designing interventions to influence risky sexual behavior. For example, an intervention aimed at affecting current unsafe sexual practices relatively early in the infection stage might focus on enhancing sexual risk avoidance skills among the youngest age group. An intervention aimed at influencing future, long-term behavior might do better focusing on enhancing informal social support.

In light of this discussion, it is important to consider the limitations of this study. First, data collection methods in this study relied on self-reports of sensitive behavior, which are susceptible to response biases. In addition, the sample size was small, potentially reducing the ability to detect some associations, reducing the ability to generalize results, and ruling out potentially useful multivariate analyses. Significance levels were set more liberally for this reason and the study must be considered exploratory. A strength of the study was the inclusion of the prospective analysis, a useful approach for examining temporal relationships between variables to better identify antecedent risk factors. However, the study had only one follow-up, and the follow-up period was considerably long; therefore, it is unknown if changes in safe sex behavior and predictors were sustained over the entire follow-up period or fluctuated during that time. Finally, the follow-up rate was modest, and to the degree that participants do not represent the population of interest, results may not be characteristic of the overall HIV positive population. In spite of these limitations, this study advances our understanding of potential differences between associations obtained concurrently versus longitudinally that may be important in designing interventions aimed at influencing unsafe sex practice.

In conclusion, it is important to understand that HIV is a changing condition with ongoing service needs that fluctuate and require differing levels of services and support networks at various times in an individual's life. Factors that initially motivate people living with HIV to avoid high-risk sex may not be the same ones that motivate them later in life, or that enable them to maintain safer sex practices. This study indicates that further study into the effect of various formal and informal support networks on the safer sex practices in HIV positive individuals should be conducted. It may be possible to utilize an experimental design to document the timing, duration, focus and type of

support systems at various stages in a person's life. A further examination of the impact friends may have on people's reduced-risk practices is also warranted. The challenges and stressors of living with HIV in one stage of life may not be the same as in later life stages. A significant number of HIV positive persons continue to engage in risky sexual behaviors. Increased understanding of the types of interventions and preventions strategies at the various points in an individual's life that are needed to promote and maintain safe sex practices continues to be of paramount importance.

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