



Published in final edited form as:

AIDS Behav. 2017 September ; 21(9): 2650–2658. doi:10.1007/s10461-016-1645-x.

Vengeance, Condomless Sex and HIV Disclosure Among Men Who Have Sex with Men Living with HIV

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Abstract

Vengeance has been shown to be a risk factor for HIV nondisclosure. Research examining the associations between vengeance, condomless sex, and HIV nondisclosure is lacking. The aim of the current study was to explore the association between vengeance, condomless sex and disclosure (behavior, attitude and intention) among men who have sex with men (MSM) living with HIV. Participants included 266 MSM who were a part of a disclosure intervention study. Men were recruited from local and state AIDS service organizations (ASOs), HIV-related venues and forums, and at local eating and drinking establishments in Tampa, Florida, and Columbus and Dayton, Ohio metropolitan statistical areas (MSAs). Advertisements were also placed in local daily newspapers. Vengeance was operationalized into three groups based on percentiles (least, more, and most vengeful) and as a continuous variable. Crude and multivariable logistic regression models were used to examine the association between vengeance and condomless sex in the past 30 days. Simple and multiple linear regression models were used to determine the association between vengeance and HIV disclosure. After adjusting for demographic and geographic characteristics, participants who were “most vengeful” had, on average, an approximate six-point decrease (β : -5.46 ; 95% CI $-9.55, -1.36$) in disclosure intention compared to MSM who were “least vengeful.” Prevention and intervention programs geared towards improving disclosure among MSM should address vengeance.

Keywords

Vengeance; MSM; HIV; Disclosure; HIV risk behavior

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Compliance with Ethical Standards

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of interest Monique J. Brown, Julianne M. Serovich, Judy A. Kimberly, and Jinxiang Hu declare that they have no conflict of interest.

Informed consent Informed consent was obtained from all individual participants included in the study.

Introduction

Vengeance has been defined as a way of being [1] or a multifaceted emotive state as a result of hurt and anger due to loss [2]. Vengeance is also described as an alternative to forgiveness [3], in going beyond pain and anger and perceiving a personal attack, injury or insult [4] in the process [5]. Gabriel and Monaco [1] described vengeance as a continuum, from relatively harmless thoughts or actions to destruction, or in extreme cases, death. Feelings of vengefulness may be produced from specific experiences— a vengeful act may be done after a time of reflecting on the harm or “wrong” that has been done to oneself, which goes beyond just being hostile [6]. As such, vengeance may be a risk factor for HIV through its association with nondisclosure [7]; that is, those that are HIV infected may feel vengeful and not disclose their status to sexual partners. Nevertheless, Stuckless and Goranson [6] suggested that even though vengefulness may be a separate concept from general hostility, a person who may be highly vengeful has a higher likelihood of displaying anger. However, it may also be considered as a psychological state [1] as some individuals may be more likely to consider or do vengeful acts compared to others.

Vengeance has been shown to be a risk factor for HIV nondisclosure [7]. One study found that men who have sex with men (MSM) who scored higher on the vengeance scale tended to hide their HIV serostatus more compared to men who reported less vengeance [7]. However, findings have been mixed examining the relationship between vengeance and condom use with studies showing a positive association between attributing blame of HIV infection to others and condom use [8] and no relationship between vengeance and condom use [7]. Researchers have also shown that age [4, 7], being male [4, 9], and knowing one’s source of infection [7] are factors positively associated with vengeance. Researchers have suggested that time may also influence maladaptive vengeance, which is defined as the affect in which the desire to “get even” is overwhelming and results in the expression of dangerous behaviors to oneself or others [1]. Fromm proposes that scarcity versus abundance may influence degrees of vengefulness [10]. As a result, income, employment, and educational level may also be associated with vengefulness. Gabriel and Monaco suggest that those with paranoid and narcissistic traits may sometimes seek vengeful vindication from those who they know and those who they don’t know [1]. With regards to HIV infection, Moskowitz and Roloff have proposed that knowing the person who was responsible for HIV transmission may provide opportunities for reconciliation, which may lead to less vengefulness [7]. It is also possible that thinking one was infected intentionally and/or knowledge of a partner’s (or partners’) HIV serostatus may influence vengeful feelings, if present. Location may also play a role in acting on vengeful feelings as failure to disclose one’s HIV serostatus may have legal consequences in some states.

One theoretical framework that may help in understanding vengeance is equity theory [11]. The equity theory proposes that in relationships people have a desire to sustain fairness or equity in power or control, and their resources [11]. As a result, when individuals realize that they are in unbalanced relationships, they become distressed and endeavor to eliminate this distress by reestablishing equity [11]. Therefore, equity theory may be used to understand the association between vengeance, condomless sex, and HIV disclosure. When applied, it could be proposed that populations living with HIV and who score high on vengeance may

be more likely to have condomless sex in order to seek “equity” or balance. Individuals who are aware of their HIV serostatus and who may score high on vengeance may have “vengeful sex” with other partners to express the pain and hurt that they may feel due to contracting HIV from a previous partner. However, the use of this framework in understanding these relationships within this context is even more complex, as the “restoration of equity” is not with the person whom they contracted the disease from but with other partners with whom they have condomless sex. One “equity” consideration that may help in understanding this relationship is “equity with the world,” which suggests that if a person feels cheated in one relationship, then there may be a feeling of entitlement to “make things up” in supplementary relationships [12–14]. Therefore, the “imbalance” in an intimate relationship that is perceived is not with a sexual partner who may also be living with HIV but with a partner who is not living with HIV or whose serostatus is unknown. Therefore, these individuals may endeavor to seek restoration in other sexual relationships.

There is a lack of studies examining vengeance, which is an important factor, and may actually be a risk factor of HIV risk behavior. The aim of the current study was to explore the association between vengeance, condomless anal intercourse and disclosure behavior, disclosure attitudes/beliefs and disclosure intentions among MSM living with HIV. It is hypothesized that men who score higher on vengeance will be more likely to report condomless sexual intercourse and score lower on disclosure measures.

Methods

Data Source and Study Population

Data for the current study were collected from 266 MSM who participated in a longitudinal randomized controlled trial of an intervention geared towards helping men to decide on disclosing their HIV serostatus to their sexual partners. Data collected during immediate post-intervention assessment were used. The intervention took place from December 2009 to December 2014 across two metropolitan statistical areas (MSAs): Tampa, Florida, and Columbus and Dayton, Ohio. Eligibility criteria for the intervention study included: having an HIV diagnosis, being 18 years old or older, being sexually active with at least two partners in the past year, of which at least one had to be a man, and indicating an interest in learning more about HIV disclosure to sexual partners. The study had an eligibility rate of 50.7%. Of those who were eligible, 83.1% enrolled in the study. Three hundred and forty (340) men were enrolled in the study at baseline. Data were collected on 272 participants immediately post intervention. Four (4) participants were missing vengeance scores and two additional participants were missing key sociodemographics, therefore, the resultant sample size was 266.

Participants were recruited via local and state AIDS service organizations (ASOs) and at HIV-related venues and forums in the MSAs. Caseworkers at the ASOs were informed about the study. Handouts were also made available for distribution to potential participants or through newsletters and direct mailings. Advertisements for participation were also featured on the ASOs’ websites. Recruitment materials were also distributed at HIV-related venues and forums held throughout the MSAs, and at local eating and drinking establishments. Advertisements were also placed in local daily newspapers. Audio-computer assisted self-

interviewing (ACASI) was used to complete baseline questionnaires from which data were obtained. The study was approved by the University of South Florida and the Ohio State University Institutional Review Boards.

Measures

Vengeance—Vengeance was measured using a 20-item scale [6] at the session after intervention implementation. This scale was used to obtain information on participants' perspectives on response to various situations, which can elicit a vengeful response. Participants' general views on vengefulness were also obtained. Items were scored using a 7-point Likert type scale ranging from *Disagree Strongly* (1) to *Agree Strongly* (7). Items were reverse coded so that higher scores represented higher vengefulness. The scale was previously shown to be minimally impacted by social desirability [6] and has been used in prior research to examine vengefulness among MSM [7]. Vengeance scores were sum scores of the 20 items. Participants were placed into three categories based on vengeance percentiles: least vengeful (lower third percentile), vengeful (middle third percentile), and most vengeful (upper third percentile). This categorization was done so as to determine what group of men (those who had the lowest, moderate, or highest vengeance scores) would be more or less likely to take part in condomless sex or score lower or higher on disclosure behavior, attitude and intention. Vengeance was also operationalized as a continuous variable using the sum vengeance scores of each participant. Cronbach's alpha for the vengeance scale was 0.93.

Condomless sex—Condomless sex was operationalized in three ways: condomless insertive anal sex, condomless receptive anal sex, and condomless anal sex (both insertive and receptive), all in the past 30 days. Condomless insertive sex was measured by the question "How many of these sexual encounters (encounters over the past 30 days) involved insertive anal sex (you were the top) without a condom?" Condomless receptive sex was measured by the question "How many of these sexual encounters (encounters over the past 30 days) involved receptive anal sex (you were the bottom) without a condom?" Condomless anal sex was determined by at least one sexual encounter in the past 30 days (either insertive or receptive). Condomless insertive, receptive, and anal sex were operationalized as binary variables: yes (occurring in the past 30 days) versus no (did not occur in the past 30 days).

Disclosure Measures—Disclosure behavior was operationalized by 14 items asking participants about their HIV disclosure to sexual partners. For example, "I have disclosed my HIV status to __ of my sexual partners with whom I had insertive anal sex (I was the top) without a condom." Items were scored using a 5-point Likert-type scale with values ranging from *None* (1) to *All* (5). Disclosure attitude was operationalized by 14 items asking participants about their attitudes toward HIV disclosure to sexual partners. For example, "People with HIV should disclose their status to their sexual partners with whom they have insertive anal sex (they are the top) without a condom." Items were scored using a 4-point Likert-type scale with values ranging from *Strongly disagree* (1) to *Strongly agree* (4). Disclosure intention was operationalized by 14 items asking participants about their intentions to disclose to their sexual partners. For example, "I plan to tell my future sexual partners with whom I have insertive anal sex (I am the top) without a condom about my HIV

status.” Items were scored using a 4-point Likert-type scale with values ranging from *Strongly disagree* (1) to *Strongly agree* (4). Sum scores were used for each disclosure measure. For the current study, the standardized Cronbach’s alpha values for the disclosure behavior, attitude, and intention measures were 0.98, 0.94, and 0.96, respectively.

Analytic Approach

The distribution of sociodemographic characteristics and prevalence of condomless sex in the past 30 days were obtained. Sociodemographic characteristics that were examined included age (as a continuous variable and as a categorical variable (18–34, 35–49, 50 years); race/ethnicity (Black, Other, vs. White); education (less than high school, high school, some college, college graduate vs. graduate school); income (\$0–\$500, \$501–\$1000, vs. \$1001+); employment (employed vs. unemployed). Other characteristics that were examined included: knew source of infection (yes vs. no); thought to have been infected intentionally (yes vs. no); time since diagnosis (continuous and as a categorical variable: 1 year, >1 to 5 years, >5 years to 10 years, and >10 years); location (Tampa MSA vs. Columbus and Dayton MSAs); and HIV status of partner(s) (HIV-negative or unknown serostatus vs. HIV-positive). Overall mean and standard deviation (*SD*) values for vengeance categories (least vengeful, vengeful, and most vengeful), and for disclosure behavior, attitudes/beliefs and intentions were also assessed for the study population. Mean and *SD* values for vengeance by categorical sociodemographic and other characteristics, and by condomless sex were also determined.

Crude and multivariable logistic regression models were used to examine the association between vengeance and condomless sex (insertive, receptive, and anal (both insertive and receptive) in the past 30 days. Simple and multiple linear regression models were used to determine the association between vengeance and disclosure behavior, attitudes and intention scores. Prior research has shown that age tends to have positive [15] and negative [16, 17] associations with HIV disclosure depending on how age is operationalized [16]. Age [4, 7] and knowing source of infection [7] have been shown to be associated with vengeance. A variable was considered to be a confounder based on literature review and examination of study variables. Each potential confounder was placed in each model with “more vengeful” as the independent variable and condomless anal intercourse, disclosure behavior, disclosure attitude/beliefs, and disclosure intentions as separate outcomes. The confounder that adjusted the effect of being “more vengeful” the most was then retained for the next iteration. Variables were considered confounders if the effect estimate was changed by 10% or more. All potential confounders considered were determined to confound the associations. Therefore, adjusted models controlled for age, race/ethnicity, education, income, employment, knew source of infection, thinking infection was transmitted intentionally, time since diagnosis, location and HIV status of partner(s).

Data on condomless sexual intercourse were missing for 82 participants for condomless insertive sexual intercourse and 82 participants for condomless receptive intercourse. These missing data were as a result of skip patterns or participants choosing not to answer the questions. Sixty-six (66) participants reported no sexual partners in the past 30 days. The question asking participants about number of sexual encounters in the past 30 days was not

asked of these 66 participants. Five (5) additional participants reported no sexual encounters in the past 30 days, and one participant did not answer the question. Of those participants who reported sexual encounters, 10 participants chose not to respond to the questions on condomless insertive sex and receptive sex. Therefore, these participants were not included in logistic regression analyses in determining the associations between vengeance and condomless anal intercourse. For disclosure measures, 44 participants were missing on disclosure behavior, while no data were missing for disclosure attitude/beliefs and three participants were missing on disclosure intentions. The participants with missing data were not included in the respective linear regression analyses. All analyses were performed in SAS version 9.4 (SAS Institute, Cary, NC).

Results

Table 1 shows the number and percent of the study population with certain sociodemographic characteristics, who knew their source of infection, who thought they had been infected intentionally, their time since diagnosis, location, HIV status of partner(s), and those who reported condomless sex in the past 30 days. The mean age (*SD*) of the study population was 43.5 years (10.5 years). Close to half of the population reported having condomless anal sex (45%), and 32% and 34% reported condomless insertive and receptive sex, respectively.

The overall mean, standard deviation, and range values for vengeance groups and disclosure measures are shown in Table 2. Participants in the least vengeful, vengeful, and most vengeful category had a mean (*SD*) vengeance score of 35.5 (7.0), 54.2 (5.0) and 80.4 (13.6), respectively. The mean (*SD*) values for disclosure behavior, attitude, and intention were 38.4 (17.8), 45.7 (8.5), and 41.8 (10.4), respectively.

Table 3 shows mean (*SD*) vengeance scores by sociodemographic characteristics, and by risky behavior. There were statistically significant differences by monthly income and thinking to have been infected intentionally. Participants in the lowest income category (\$0–\$500) had the highest mean vengeance score ($M = 62.2$, $SD = 24.3$) and men in the middle income category (\$501–\$1000) had the lowest mean vengeance score ($M = 53.5$, $SD = 17.7$). Men who thought they were infected intentionally had a higher mean vengeance score compared to men who did not believe that they were infected intentionally, 59.9 (22.9) and 54.5 (18.7), respectively.

The associations between vengeance (as an ordinal variable) and condomless sex are presented in Table 4. Logistic regression analyses, expressed as odds ratios and 95% confidence intervals, showed that after adjusting for age, race/ethnicity, education, income, employment, knowing source of infection, thinking that he was infected intentionally, time since diagnosis, location, and HIV status of partner(s), there were no statistically significant associations between vengefulness and condomless sexual intercourse.

Table 5 shows the association between vengeance (as an ordinal variable) and disclosure behavior, attitudes and intentions. Linear regression analyses, expressed as beta estimates and 95% confidence intervals, showed that after adjusting for age, race/ethnicity, education,

income, employment, knowing source of infection, thinking that he was infected intentionally, time since diagnosis, location, and HIV status of partner(s), compared to men in the least vengeful category, men in the most vengeful category scored approximately 6 points lower in disclosure intentions (β : -5.46 ; 95% CI $-9.55, -1.36$).

The associations between vengeance (as a continuous variable) and condomless sexual intercourse are displayed in Table 6. A similar pattern was seen where after adjusting for age, race/ethnicity, education, income, employment, knowing source of infection, thinking that he was infected intentionally, time since diagnosis, location, and HIV status of partner, there were no statistically significant associations between vengefulness and condomless sexual intercourse.

Table 7 shows the associations between vengeance (as a continuous variable) and disclosure behavior, attitude/beliefs, and intentions. After adjusting for age, race/ethnicity, education, income, employment, knowing source of infection, thinking that he was infected intentionally, time since diagnosis, location, and HIV status of partner, for every increase in vengeance score, there was an approximate 0.1-point decrease in disclosure intention (β : -0.09 , 95% CI $-0.16, -0.01$).

Table 8 shows the proportion of participants reporting condomless anal receptive and insertive intercourse among the three different vengeance groups. There were no statistically significant differences in the proportion of participants reporting receptive versus anal sexual intercourse among the three groups.

Discussion

The main finding of this study was that men who were in the most vengeful category scored statistically significantly lower on disclosure intention compared to men in the least vengeful category. These findings partially supported our hypothesis as the associations between higher levels of vengeance and condomless sexual intercourse, and disclosure behavior and attitudes/beliefs were not statistically significant, which were unexpected.

The lack of statistically significant associations between vengeance and condomless sexual intercourse suggest that levels of vengefulness did not influence condomless sexual intercourse or disclosure behavior and attitudes. The findings in the current study of the lack of statistically significant associations between vengeance and condomless sexual intercourse are supported by Moskowitz and Roloff who found that vengeance was not significantly related to condom use [7]. The lack of statistically significant associations between vengefulness and disclosure behavior and attitudes/beliefs suggest that comparing the men with the highest levels of vengeance to those with the lowest levels of vengeance, their behaviors and beliefs around disclosure did not differ statistically, which contradict the findings by Moskowitz and Roloff [7]. Nevertheless, the current study showed that men with the highest levels of vengeance scored lower on intentions to disclose their HIV serostatus to their causal sex partner(s) compared to men with lower levels of vengeance. These findings suggest that among men with the highest levels of vengeance in the current study, their reactions were not seen in lower scores on disclosure behaviors or attitudes/beliefs but more

so in lower scores on disclosure intentions (thoughts/feelings), which infer being on the lower to mid-range of the vengeance spectrum, and suggests less maladaptive vengeance.

The results from using vengeance as an ordinal variable show that there may be a non-linear relationship between vengeance and disclosure measures, especially for disclosure behavior and attitudes. The results show that those in the more vengeful group may be the least likely to exhibit disclosure behavior and attitudes. Though these results may not be statistically significant, they may be clinically significant as they infer that moderate levels of vengefulness may be more likely to be expressed in actual behaviors and attitudes while high levels of vengeance may be more likely to be expressed as intentions or thoughts. Therefore, interventions that endeavor to reduce vengeful feelings with the goal of accentuating HIV disclosure should target not only participants with high levels of vengeance but also those with moderate levels of vengeance.

The operationalization of vengeance as an ordinal variable also revealed that the association between being in the “more vengeful” category and disclosure intention was not statistically significant while using vengeance as a continuous variable showed a statistically significant association between vengeance and disclosure intention. This difference in findings could be due to loss of power with categorization of a continuous variable [18] and highlights the importance of analyzing variables also in their continuous form to compare results.

It is also possible that there may be other unmeasured variables that may play a role in the association between vengeance and condomless anal intercourse and disclosure that are not accounted for in the current study. For example, the tendency to forgive may be an important factor to consider in the role of vengeance. Another important moderator in the association between vengeance and forgiveness is narcissism [19]. Brown found that the strength in the relationship between vengeance and forgiveness differed by levels of narcissism, in that, the association was stronger among individuals with high narcissism compared to those with low narcissism [19]. Gabriel and Monaco suggest that those with paranoid and narcissistic traits may sometimes seek vengeful vindication from those who they know and those who they don't know [1]. However, forgiveness and narcissism were not measured in the current study, and should be considered in future research.

One theory that may help us to understand the association between vengeance and disclosure intentions is equity theory, which states that people have the desire to maintain control in relationships and their resources [20]. In the current study, higher levels of vengeance were negatively associated with disclosure intention. These results suggest that men who had higher levels of vengeance may endeavor to sustain control in relationships or try to seek balance by a lower likelihood of intending to disclose their HIV serostatus to their sexual partner(s). This theory may extend to other STIs, such as syphilis, but perhaps not to the same extent as it does with HIV due to the stigma differences that exist between HIV and other STIs. One study found that three in four respondents reported that having an HIV infection would be the most detrimental to one's reputation when compared to other STIs [21]. Therefore, vengeance (in response to a perceived wrong by another impacting oneself) may have more of an impact on disclosure intention in considering HIV infection compared to being infected with other STIs.

There are some limitations that must be considered in interpreting the study's findings. Data were not collected on variables such as narcissism and forgiveness, and various dimensions of equity, which may play important roles in the association between vengeance, condomless sex, and disclosure among MSM living with HIV. Data on the HIV serostatus of partners or partners' use of preexposure prophylaxis (PrEP) status of partners, or objective measures of participants' viral suppression status were not collected but could have important implications for HIV risk transmission from current sexual partners. Knowing the HIV serostatus of one's partner(s), or if partners were on PrEP, or if a participant was able to achieve viral suppression may influence one's decision to have condomless sexual intercourse or sexual intercourse with a condom. There could have been social desirability bias due to underreporting levels of vengeance, which may result in underestimates and/or overestimates in the effect estimates obtained in the current study. Finally, in this study, vengeance was treated as a trait and assessed with a global measure. Future researchers may consider assessing vengeance as it directly relates to becoming infected and desiring to seek equity with the person from whom they contracted HIV, whether known or not.

Nevertheless, the current study also had some strengths. Confounders considered were selected based on review of the literature and on the results of the descriptive statistics for the current study population. Varying facets of condomless anal intercourse and disclosure were examined as outcome variables (i.e., insertive, receptive and disclosure behavior, attitude and intention) to determine the similarities and differences in the relationships between vengeance and condomless anal intercourse and disclosure.

Conclusions

High levels of vengeance were associated with disclosure intentions. Interventions that are geared towards improving disclosure intentions among MSM living with HIV should address feelings of vengefulness. Future research is needed to determine if other variables may play a role in the association between vengefulness, condomless sex, and disclosure such as forgiveness, narcissistic traits, the use of PrEP of partner(s), and viral suppression.

Acknowledgments

We would like to thank the men who participated in the study.

Funding This study was funded by the National Institute of Mental Health (R01MH082639).

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Table 1

Sociodemographic characteristics, risky sexual behavior, vengeance and disclosure among overall study population

| | N | % |
|---|------|------|
| Age (mean, SD) | 43.5 | 10.5 |
| 18–34 | 57 | 21.4 |
| 35–49 | 124 | 46.6 |
| 50 | 85 | 32.0 |
| Race/ethnicity | | |
| Black | 104 | 39.1 |
| White | 144 | 54.1 |
| Other | 18 | 6.8 |
| Education | | |
| Less than high school | 22 | 8.3 |
| High school | 58 | 21.8 |
| Some college | 117 | 44.0 |
| College graduate/graduate school | 69 | 25.9 |
| Income | | |
| \$0-\$500 | 77 | 29.0 |
| \$501-\$1000 | 112 | 29.0 |
| \$1001+ | 77 | 42.1 |
| Employment | | |
| Employed | 84 | 31.6 |
| Unemployed | 182 | 68.4 |
| Knew source of infection | | |
| Yes | 206 | 77.4 |
| No | 60 | 22.6 |
| Thought to have been infected intentionally | | |
| Yes | 115 | 43.2 |
| No | 151 | 56.8 |
| Time since diagnosis (years) (mean, SD) | | |
| 1 year | 11.3 | 8.2 |
| >1 to 5 years | 31 | 11.7 |
| >5 to 10 years | 50 | 18.9 |
| >10 years | 42 | 15.9 |
| Time since diagnosis (years) (mean, SD) | 142 | 53.6 |
| Location | | |
| Tampa MSA | 141 | 53.0 |
| Columbus and Dayton MSAs | 125 | 47.0 |
| HIV status of partner | | |
| HIV-positive | 17 | 11.6 |
| Negative or unknown | 130 | 88.4 |

| | N | % |
|--------------------------------|-----|------|
| Risky sexual behavior | | |
| Unprotected anal sex: yes | 82 | 45.1 |
| Unprotected anal sex: no | 100 | 55.0 |
| Unprotected insertive sex: yes | 59 | 32.1 |
| Unprotected insertive sex: no | 125 | 67.9 |
| Unprotected receptive sex: yes | 62 | 33.7 |
| Unprotected receptive sex: no | 122 | 66.3 |

Note Risky sexual behavior refers to condomless sexual intercourse in the past 30 days

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Table 2

Overall mean, standard deviation and range values for vengeance groups and disclosure measures

| | Mean (SD) | Range |
|---------------------|------------------|--------------|
| Vengeance | | |
| Most vengeful | 80.4 (13.6) | 64–130 |
| Vengeful | 54.2 (5.0) | 47–63 |
| Least vengeful | 35.5 (7.0) | 20–46 |
| Disclosure measures | | |
| Behavior | 38.4 (17.8) | 2–70 |
| Attitude | 45.7 (8.5) | 13–56 |
| Intention | 41.8 (10.4) | 3–56 |

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Table 3

Mean vengeance scores and standard deviation values by demographic and geographic characteristics

| | Mean | Standard deviation | p-value ^a |
|---|------|--------------------|----------------------|
| Age | | | 0.063 |
| 18–34 | 63.2 | 23.9 | |
| 35–49 | 54.7 | 18.5 | |
| 50 | 55.6 | 21.0 | |
| Race/ethnicity | | | 0.304 |
| Black | 59.3 | 19.9 | |
| White | 55.2 | 20.6 | |
| Other | 55.5 | 25.9 | |
| Education | | | 0.631 |
| Less than high school | 56.2 | 14.3 | |
| High school | 59.9 | 20.3 | |
| Some college | 56.1 | 22.6 | |
| College graduate/graduate school | 55.5 | 19.7 | |
| Monthly income | | | 0.037 |
| \$0-\$500 | 62.2 | 24.3 | |
| \$501-\$1000 | 53.5 | 17.7 | |
| \$1001+ | 55.3 | 19.6 | |
| Employment | | | 0.322 |
| Employed | 55.0 | 19.7 | |
| Unemployed | 57.6 | 21.2 | |
| Knowing source of infection | | | 0.900 |
| Yes | 56.9 | 21.2 | |
| No | 56.5 | 19.5 | |
| Thought to have been infected intentionally | | | 0.041 |
| Yes | 59.9 | 22.9 | |
| No | 54.5 | 18.7 | |
| Time since diagnosis | | | 0.982 |
| <1 year | 58.1 | 24.5 | |
| 1 to < 5 years | 57.1 | 19.4 | |
| 5 to 10 years | 57.1 | 23.0 | |
| > 10 years | 56.3 | 19.9 | |
| Location | | | 0.512 |
| Tampa MSA | 56.0 | 20.8 | |
| Columbus and Dayton MSAs | 57.7 | 20.7 | |
| HIV status of partner | | | 0.354 |
| HIV-negative or unknown | 56.4 | 20.5 | |
| HIV-positive | 63.4 | 29.5 | |
| Risky sexual behavior | | | |
| Unprotected anal sex: yes | 56.0 | 19.3 | 0.944 |

| | Mean | Standard deviation | p-value ^a |
|--------------------------------|------|--------------------|----------------------|
| Unprotected anal sex: no | 57.8 | 21.5 | |
| Unprotected insertive sex: yes | 53.8 | 19.7 | 0.223 |
| Unprotected insertive sex: no | 57.7 | 21.2 | |
| Unprotected receptive sex: yes | 56.8 | 17.7 | 0.550 |
| Unprotected receptive sex: no | 56.6 | 21.7 | |

Note Risky sexual behavior refers to unprotected sexual intercourse in the past 30 days

Bolded p-values indicate statistically significant differences in the mean values of vengeance at $p < 0.05$

^ap-value based on F statistic from Welch's test

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Table 4
Association between vengeance and condomless anal sexual intercourse using logistic regression

| Vengefulness | Condomless anal sex | | Condomless insertive sex | | Condomless receptive sex | |
|----------------------------|---------------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|
| | OR (95% CI) | Adjusted OR ^b (95% CI) | OR (95% CI) | Adjusted OR ^b (95% CI) | OR (95% CI) | Adjusted OR ^b (95% CI) |
| More vengeful ^a | 1.16 | 1.48 | 0.95 | 1.10 | 1.42 | 1.76 |
| Middle 33.3 percentile | (0.57–2.35) | (0.59–3.70) | (0.46–1.96) | (0.41–2.93) | (0.68–2.99) | (0.67–4.62) |
| Most vengeful ^a | 0.87 | 0.82 | 0.58 | 0.45 | 1.14 | 0.90 |
| Upper 33.3 percentile | (0.42–1.81) | (0.31–2.16) | (0.26–1.28) | (0.14–1.44) | (0.52–2.48) | (0.31–2.60) |

^aIn comparison to the lower 33rd percentile

^bAdjusted for age, race/ethnicity, education, income, employment, knew source of infection, thinking that he was infected intentionally, time since diagnosis, location, and HIV status of partner(s); education was run as a continuous variable due to small cell sizes

Table 5
Association between vengeance and disclosure behavior, attitude and intentions using linear regression

| Vengefulness | Disclosure behavior | | Disclosure attitude | | Disclosure intention | |
|----------------------------|---------------------|--------------------------------|---------------------|--------------------------------|----------------------|--------------------------------|
| | β (95% CI) | Adjusted β^b (95% CI) | β (95% CI) | Adjusted β^b (95% CI) | β (95% CI) | Adjusted β^b (95% CI) |
| More vengeful ^a | -1.60 | -3.98 | -1.35 | -2.10 | -2.16 | -2.37 |
| Middle 33.3 percentile | (-7.12, 3.92) | (-11.1, 3.14) | (-4.00, 1.29) | (-5.66, 1.45) | (-5.30, 0.97) | (-6.67, 1.93) |
| Most vengeful ^a | 2.07 | -0.14 | -1.25 | -1.32 | -4.06 | -5.46 |
| Upper 33.3 percentile | (-3.97, 8.11) | (-7.67, 7.39) | (-3.75, 1.25) | (-4.50, 1.85) | (-7.19, -0.92) | (-9.55, -1.36) |

Bolded estimates and 95% confidence intervals are statistically significant at $p < 0.05$

^aIn comparison to the lower 33rd percentile

^bAdjusted for age, race/ethnicity, education, income, employment, knew source of infection, thinking that he was infected intentionally, time since diagnosis, location, and HIV status of partner(s)

Table 6

Association between vengeance (as a continuous variable) and condomless anal sexual intercourse

| Condomless intercourse | OR | 95% CI | Adjusted OR^a | Adjusted 95% CI^a |
|-------------------------------|-----------|---------------|--------------------------------|------------------------------------|
| Anal intercourse | 1.00 | 0.98–1.01 | 1.00 | 0.98–1.01 |
| Insertive intercourse | 0.99 | 0.98–1.01 | 0.99 | 0.97–1.01 |
| Receptive intercourse | 1.00 | 0.99–1.02 | 1.00 | 0.98–1.02 |

^aAdjusted for age, race/ethnicity, education, income, employment, knew source of infection, thinking that he was infected intentionally, time since diagnosis, location, and HIV status of partner(s); education was run as a continuous variable due to small cell sizes

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Table 7

Association between vengeance (as a continuous variable) and disclosure behavior, attitude/beliefs and intention using linear regression

| Disclosure measure | β | 95% CI | Adjusted β^a | Adjusted 95% CI ^a |
|----------------------|--------------|---------------------|--------------------|------------------------------|
| Disclosure behavior | 0.10 | -0.02, 0.21 | 0.06 | -0.09, 0.20 |
| Disclosure attitude | -0.03 | -0.08, 0.02 | -0.02 | -0.08, 0.05 |
| Disclosure intention | -0.08 | -0.14, -0.02 | -0.09 | -0.16, -0.01 |

Bolded estimates and 95% confidence intervals are statistically significant at $p < 0.05$

^a Adjusted for age, race/ethnicity, education, income, employment, knew source of infection, thinking that he was infected intentionally, time since diagnosis, location, and HIV status of partner(s)

Table 8
Proportion of participants reporting condomless anal receptive and insertive sexual intercourse

| Least vengeful | | Vengeful | | Most vengeful | |
|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Receptive, % (N) | Insertive, % (N) | Receptive, % (N) | Insertive, % (N) | Receptive, % (N) | Insertive, % (N) |
| 30.0 (18) | 36.1 (22) | 37.9 (25) | 34.9 (23) | 32.8 (19) | 24.6 (14) |
| | 0.388 | | 0.804 | | 0.146 |