

## **Predictors of sexual behavior and risk practices of HIV positive and HIV negative Rwandan women**

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## **Introduction**

Studies in several sub-Saharan countries suggest that unsafe sex practices persist among large proportions of people living with HIV (1-3). Access to highly active antiretroviral therapy (HAART) for those living with HIV/AIDS has led to dramatic increases in life expectancy and better quality of life that allow HIV infected persons to remain sexually active over increasingly long periods (4,5). Thus if HAART is taken as recommended and other safe sex precautions are used to prevent HIV transmission, HIV positive women and men can safely continue to be sexually active (6, 7). However, in spite of these improvements in health and documented decreases in HIV transmission in treated persons, HIV infection can still greatly impact women's sex lives for physical and psychological reasons. The levels and determinants of sexual behavior among HIV infected women are thus an important quality of life consideration.

Prior experience of repeated sexual violence can promote unsafe sexual behavior with implications for HIV transmission. For instance, considerable evidence links previous experience of sexual coercion to sexual risk-taking, which increases susceptibility to HIV infection for women (8, 9). Additionally, lack of self-esteem is directly related to risk behaviors that promote HIV transmission (9, 10, 11). Existing literature suggests that women who experienced sexual and physical violence are subsequently more likely to have unprotected intercourse, have multiple partners and a diminished ability to effectively negotiate sexual decisions. Thus they are at increased risk for HIV transmission, consume large quantities of alcohol and other drugs and also infrequently use contraception (10, 12-19). Situations in which sex is based on material exchange and perceptions of gender inequity involve considerable power differentials that limit women's ability to effectively negotiate condom use or other safe sex practices (20, 21). These studies suggest the need for additional research to better understand how prior experiences of sexual trauma may influence sexual decision-making and the risk of HIV infection for women.

We examined factors that may influence current sexual practices of HIV positive Rwandan women, many of whom experienced rape during the genocide. We hypothesized that HIV positive women who were sexually traumatized would be less likely to participate in sexual activities that increase risk of self exposure to a second, potentially drug-resistant strain of HIV or transmit HIV to a partner.

## **Methods**

The Rwanda Women's Inter-association Study and Assessment (RWISA) is a prospective observational cohort study of HIV-infected and uninfected Rwandan women. In 2005, 710 HIV-infected and 226 HIV-uninfected women recruited through grassroots women's associations and HIV clinics in Kigali enrolled in RWISA. RWISA eligibility criteria included living in Rwanda and being >15 years old during the 1994 genocide, agreeing to be tested for HIV and willingness to travel to the study site to participate in follow-up visits. The informed consent process included video and individual discussion and has been previously described (22). The Rwandan National Ethics Committee and the Montefiore Medical Center Institutional Review Board approved the study protocol and procedures. By design approximately 75% of recruited participants were HIV+ and ~50% reported having experienced rape during the genocide. These women were all HAART naïve as usage in Rwanda was just being initiated.

During the enrollment visit, participants provided historical information, underwent physical and gynecological examination, and provided blood, urine and gynecological specimens. Interviews were conducted in the local language Kinyarwanda by trained staff with nursing or trauma counseling backgrounds. This analysis is based on interviews conducted at study enrollment.

## **Measures**

Participants provided demographic, medical, psychosocial and behavioral information regarding clinical status, disease stage, HIV-1 exposure risks, quality of life, symptoms of depression and post traumatic stress syndrome (PTSD), sexual behavior in the 6 months prior to data collection and sexual trauma experienced during the Rwandan 1994 genocide against Tutsi.

### *Demographic characteristics*

Demographic information obtained included marital status, age, whom the respondent lived with, number of dependents and income.

### *Sexual behavior and HIV status*

We used the following variables for this analysis: HIV/CD4 status (HIV negative, HIV+ and CD4 >350, HIV+ and CD4 200-350, HIV+ and CD4 <200 cells/ $\mu$ l), experience of rape during the genocide, experience of rape outside the genocide, whether or not the respondent had sex in the last 6 months, number of sex partners in the last 6 months, reported condom use at least half of the time ( $\approx$ 50%) for sex in the last 6 months, and history of transactional sex.

### *Depressive Symptoms*

Depressive symptoms were measured by the 20-item Center for Epidemiological Studies-Depression scale (CES-D). Item scores ranged from CES-D >16, CES-D 16-26 and CES-D >26 were summed to provide an overall depression score. A threshold score of >16 represented clinically significant symptoms of depression. Internal consistency reliability for the entire scale was Cronbach's alpha = 0.82.

### *Post Traumatic Stress Disorder*

The 40-item Harvard Trauma Questionnaire (HTQ) was used to measure trauma symptoms in the context of traumatic sexual experiences related to or outside of the genocide. For this study, 16 HTQ items that corresponded to the three categories of symptoms associated with post-traumatic stress disorder were used. The scale for each item ranged from 1 to 4, and a mean score >2 indicated that the individual had symptoms consistent with PTSD. The internal consistency reliability for the subscale was Cronbach's alpha = 0.88.

### *Statistical analysis*

We compared HIV-positive and HIV-negative women by categorical or categorized characteristics using exact tests for statistical significance. Univariate and multivariate logistic regression models were fit to determine unadjusted and independent associations between experience of rape and other factors of interest with the following study outcomes; sex in the past 6 months, condom use  $\geq$ 50% of the time for those who had sex in the past 6 months, history of transactional sex and ever had non-HIV sexually transmitted infection (STI). Multivariate models were fit to these outcomes using stepwise selection with P-values of  $\leq$ 0.05 for entry and  $\geq$  0.10 for removal. Statistical analyses were performed using SAS version 9.2.

## **Results**

Table 1 shows that 76% of women included in the sample were HIV positive and 51% had experienced genocidal rape, in keeping with study design. HIV infected women (compared with HIV uninfected women) were more likely to be <30 years old, have CES-D scores >16, have experienced non-genocidal rape, have had more sexual partners in the last six months, and to report transactional sex, a history of non-HIV STI, living with fewer people and greater use of condoms; and were less likely to live in their own homes. Women who experienced genocidal rape were less likely to live in their own house, reported more sexual partners, history of STI, transactional sex, and at study entry were more likely to have CES-D scores >16 and PTSD scores >2.

Table 2 shows the distribution of four outcome variables among participants. Condom use is restricted to women who reported sexual activity in the prior 6 months. Fifty-four percent of respondents were sexually active in the past 6 months, half of whom reported using condoms  $\geq$  50% of the time. Slightly more than 1 in 5 women reported a lifetime history of transactional sex as was also the case for a non-HIV STI. Women more likely to report sex in the previous 6 months were younger and more likely to live with a husband or partner, earn >35,000 RWF monthly, have experienced genocidal rape and have CES-D score <16 (all at  $p$ <0.05). Among those that were sexually active, condom use  $\geq$  50% of the time was significantly lower among women who reported only one partner in the last 6 months, had CES-D score of <16 and PTSD score of  $\leq$ 2 (all at  $p$ <0.05). Women who had previously engaged in transactional sex were less likely to live in their own house or with a partner and more likely to have <3 people who lived with them, have experienced

genocidal or non-genocidal rape, and to have CES-D score of >16 or PTSD score of >2 (all at  $p \leq 0.05$ ). History of a non-HIV STI was significantly lower among women who had no sex partner in the last 6 months, had not experienced genocidal rape, or had CES-D score <16 (all at  $p = 0.05$ ). Univariate and multivariate logistic regression models were built to determine the association between respondents' demographic and clinical characteristics and study outcomes. Again, models for condom use included only women reporting sexual activity in the last 6 months.

Table 3 shows univariate and multivariate logistic regression models that were fit to determine the association between respondents' demographic and clinical characteristics and study outcomes. Again, models for condom use included only women reporting sexual activity in the last 6 months. As the univariate models mostly reflect associations already seen in Table 2, we focus on the multivariate associations.

#### *Predictors of sex in the last 6 months*

In the multivariate model, living with a husband or partner, but also younger age, living in someone else's house, and experience of genocidal rape were significantly associated with greater sexual activity in the last 6 months. Women who were >40 years (aOR=0.10, 95% CI =0.06-0.19) were less likely to report sexual activity in the last 6 months, while women living with a husband or partner (aOR=113.80, 95% CI = 49.70-260.7) and those living in someone else's house (except their parent's house) (aOR= 1.89 vs. living in their own house 95% CI = 1.11-3.21) and those who experienced genocidal rape (aOR=1.70, 95% CI = 1.15-2.51) were significantly more likely to engage in sexual activity in the last 6 months. While the huge aOR of 113.80 for living with partner or husband calls into question model stability, it is noteworthy that the model did mathematically converge and that the adjusted odds ratios for other variables in the model were similar to their unadjusted odds ratios in univariate models. Therefore we believe the multivariate model accurately reflects adjusted associations.

#### *Predictors of Condom use $\geq 50\%$ of the time in last 6 months*

In multivariate modeling restricted to women who reported sexual activity, only HIV status was significantly independently associated with greater odds of condom use  $\geq 50\%$ . Women who were HIV positive with CD4 counts 200-350 cells/ $\mu$ l were nearly 10-fold more likely to use condoms than HIV negative women (aOR= 9.56, 95% CI = 4.88-18.70).

#### *Predictors of transactional sex*

In the multivariate model, age, living with husband/partner and experience of genocidal rape were significantly associated with experience of transactional sex. The odds were significantly lower among women >40 years (aOR=0.54, 95% CI = 0.32-0.90) and those living with a husband or partner (aOR= 0.22, 95% CI = 0.14-0.35) whereas it increased significantly among women who lived with someone else (aOR=1.62, 95% CI = 1.04-2.54) and those who had experienced genocidal rape (aOR=1.86, CI=1.30-2.66).

#### *Predictors of ever having a non-HIV STI*

Age, number of people in household, higher CES-D scores and being HIV positive were significantly associated with reporting any history of a non-HIV STI. In the multivariate models, the odds of ever having had a non-HIV STI was significantly lower among women aged 30-40 (aOR= 0.63, 95% CI = 0.42-0.96) and significantly higher among women who experienced genocidal rape (aOR= 1.77, 95% CI = 1.25-2.52), had a CES-D score of 16-27 (aOR= 1.64, 95% CI = 1.01-2.52) or were HIV positive regardless of CD4 count.

### **Discussion and Conclusion**

This paper describes the association between and the factors that influence current sexual practices of HIV positive Rwandan women. We focus on unsafe sexual behaviors that could affect HIV transmission or acquisition of drug resistant strains of HIV as well as socio-demographic and clinical characteristics associated with such behaviors among 936 Rwandan women.

Previous experience of genocidal sexual violence was associated with high-risk behavior. We found that having experienced sexual genocidal trauma was associated with greater sexual activity, more transactional sex, and a greater likelihood of having had an STI. The finding that sexual abuse during a period of war or conflict was associated with involvement in transactional sex is consistent with studies that show women with a history of (non-genocidal) sexual trauma are more likely to engage subsequently in transactional sex and other high-risk sexual practices (23, 24). Although prior experience of repeated sexual abuse particularly during childhood is associated with greater sexual risk behaviors and transactional sex, the influence of sexual trauma during war and conflict on subsequent sexual activity and transactional sex has not been previously investigated.

We also found that by far the strongest predictor of any sexual activity in the last 6 months was living with a husband/partner, although younger age and experience of genocidal rape were also associated with more recent sexual activity. Women living with a husband/partner may experience increased sexual activities in fulfillment of conjugal expectations as well as accessibility to procure sex. As other studies suggest HIV positive women <30 years of age may also be more sexually active in part because of fertility intentions and/or living with a husband or partner (25, 26). Having HIV infection was the only independent predictor of condom use among sexually active women in this study.

Some limitations warrant attention in interpreting these findings. First, we used self-reports of sexual behaviors and consequences as the study outcomes. Self reported variables are known to be subject to recall bias or the responses could be subject to socially desirable answers depending on the cultural beliefs and norms regarding sexual behavior. Because the participants are women, the gender specific stigma associated with risky sexual behavior in many cultures in Africa and elsewhere may have resulted in under-reporting these behaviors (27). In addition, there may have been recall bias in women's self-reports of diagnosed sexually transmitted infections. Furthermore, while participants were recruited from grassroots organizations serving genocide survivors, the research incentives may have influenced women to say they experienced sexual trauma during the genocide so they can be included in the study. Finally, because the cohort was recruited through grassroots women's associations and HIV clinics in Kigali, it may not be representative of all Rwandan women.

Nonetheless, interventions may need to address the specific needs of HIV positive sexually abused women whose health and psychosocial needs may be different from other populations of HIV positive women without a history of sexual violence. Moreover, it is important for programs and policy to recognize that HIV positive women with a history of sexual violence in the contexts of conflict and war may be susceptible to sexual risk taking. If so, policy and programs need to focus on building skills to help them avoid risky behaviors. The psychosocial and health impact of sexual violence and the added burden of HIV infection may have serious implications for the long term reproductive health of women in post-conflict settings where rape is often employed as a weapon of war. Although the context of our study may be unique and thus exhibit different patterns than others where sexual violence is extensive, programs and policies that aim to mitigate the impact must identify the peculiarities of these contexts by relying on additional research to generate pertinent information for implementing effective interventions.

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**Table I showing portions HIV+ and portions raped during genocide by respondents' demographic characteristics\*\***

| Variables   | N   | % HIV positive | % Raped during genocide |
|---|-----|----------------|-------------------------|
| <b>Overall</b>  | 936 | 75.9           | 51.2                    |
| <b>Age</b>  |     |                |                         |
| <30   | 190 | 82.6***        | 53.2                    |
| 30-40   | 449 | 86.9           | 53.2                    |
| >=40  | 289 | 54.3           | 46.7                    |
| <b>Living in</b>  |     |                |                         |
| Own house   | 281 | 62.3***        | 44.1**                  |
| Parent house  | 71  | 71.8           | 57.7                    |
| Someone else's house                                    | 558 | 84.7           | 54.7                    |
| <b>Number of people living with you</b>                 |     |                |                         |
| <3  | 215 | 89.3***        | 53.5                    |
| 3-5   | 457 | 76.6           | 51.6                    |
| >5  | 224 | 67.4           | 48.7                    |
| <b>Husband/Partner living with you</b>                  |     |                |                         |
| No  | 592 | 77.5           | 51.7                    |
| Yes   | 318 | 75.5           | 51.6                    |
| <b>Monthly income</b>                                   |     |                |                         |
| <10k RWF  | 340 | 72.9*          | 52.3                    |
| 10-35k RWF  | 422 | 81.5           | 51.4                    |
| >35k RWF  | 129 | 75.2           | 48.1                    |
| <b>Experience non-genocide rape</b>                     |     |                |                         |
| No  | 804 | 74.4**         | 48.5***                 |
| Yes   | 117 | 86.3           | 70.1                    |
| <b>CES-D</b>  |     |                |                         |
| <16   | 193 | 63.7***        | 42.0***                 |
| 16-26   | 412 | 81.1           | 51.7                    |
| >27   | 260 | 81.9           | 60.4                    |
| <b>Number of sexual partners last 6 months</b>          |     |                |                         |
| 0   | 412 | 72.6**         | 47.6*                   |
| 1   | 450 | 78.7           | 54.2                    |
| >=2   | 43  | 93.0           | 65.1                    |
| <b>Experienced genocidal rape</b>                       |     |                |                         |
| No  | 453 | 74.4           | -                       |
| Yes   | 475 | 77.3           | 100                     |
| <b>CD4 count</b>  |     |                |                         |
| >350  | 194 | 100            | 52.6                    |
| 200-350   | 267 | 100            | 50.6                    |
| <200  | 241 | 100            | 53.5                    |
| <b>PTSD</b>   |     |                |                         |
| <=2   | 362 | 79.3           | 43.4***                 |
| >2  | 550 | 73.6           | 55.6                    |
| <b>Had sex last 6 months</b>                            |     |                |                         |
| No  | 415 | 72.8*          | 47.7*                   |
| Yes   | 493 | 79.9           | 55.2                    |
| <b>Ever had (non-HIV) STI?</b>                          |     |                |                         |
| No  | 743 | 73.1***        | 48.3***                 |
| Yes   | 185 | 87.0           | 62.7                    |
| <b>Condom use at least 50% of time last 6 months</b>    |     |                |                         |
| No  | 245 | 66.1***        | 54.7                    |
| Yes   | 246 | 93.9           | 56.1                    |
| <b>Ever exchange sex for cash or help with children</b> |     |                |                         |
| No  | 704 | 74.0***        | 48.4***                 |
| Yes   | 195 | 85.6           | 63.6                    |

Note: Row n does not always add up to overall N due to missing values/responses. \*\*\* p< 0.001; \*\*p< 0.01; \*p<0.05

\*\* By design, 50% of HIV+ and HIV- women experience genocidal rape and 75% of those who did not and did not experience genocidal rape were HIV+



**Table II showing rates of occurrence of the four outcomes by respondents' demographic characteristics**

|                               | N   | % Sex past 6M | % Condom use++ | % Ever Sex for cash | % Ever STI |
|-------------------------------|-----|---------------|----------------|---------------------|------------|
| Overall                       | 928 | 54.3          | 50.1           | 21.7                | 20.9       |
| Experience genocidal rape     |     |               |                |                     |            |
| No                            | 453 | 50.5*         | 49.3           | 16.4***             | 15.2**     |
| Yes                           | 475 | 57.9          | 50.7           | 26.7                | 24.4       |
| Experience non-genocidal rape |     |               |                |                     |            |
| No                            | 804 | 54.5          | 48.9           | 20.3**              | 19.2       |
| Yes                           | 117 | 53.8          | 58.8           | 32.2                | 26.5       |
| Age                           |     |               |                |                     |            |
| <30                           | 190 | 74.1***       | 48.9           | 27.7                | 26.3       |
| 30-40                         | 449 | 63.1          | 53.6           | 21.5                | 18.7       |
| >=40                          | 289 | 26.7          | 39.2           | 17.9                | 17.7       |
| Where live                    |     |               |                |                     |            |
| Own house                     | 281 | 51.4***       | 50.4           | 13.3***             | 16.0       |
| Parent house                  | 71  | 30.3          | 33.3           | 19.1                | 16.9       |
| Someone else's house          | 558 | 58.9          | 51.2           | 26.2                | 22.6       |
| People live with              |     |               |                |                     |            |
| <3                            | 215 | 52.5          | 58.0           | 30.5***             | 26.1       |
| 3-5                           | 457 | 54.9          | 47.2           | 21.2                | 18.6       |
| >5                            | 224 | 58.3          | 49.6           | 15.5                | 17.9       |
| Husband/Partner live with     |     |               |                |                     |            |
| No                            | 541 | 31.4***       | 52.1           | 28.9***             | 20.6       |
| Yes                           | 318 | 97.5          | 48.0           | 9.5                 | 19.2       |
| Income                        |     |               |                |                     |            |
| <10k RWF                      | 340 | 42.0***       | 46.1           | 23.0                | 18.2       |
| 10-35k RWF                    | 422 | 61.8          | 52.5           | 23.3                | 20.4       |
| >35k RWF                      | 129 | 69.5          | 51.1           | 15.1                | 25.6       |
| Sex partners last 6M          |     |               |                |                     |            |
| 0                             | 412 | NA            | NA             | 15.3***             | 17.2**     |
| 1                             | 450 | NA            | 47.8**         | 21.4                | 20.9       |
| >=2                           | 43  | NA            | 74.4           | 83.7                | 39.5       |
| CES-D                         |     |               |                |                     |            |
| <16                           | 193 | 61.8**        | 41.9*          | 14.6*               | 15.5*      |
| 16-26                         | 412 | 56.6          | 56.3           | 24.4                | 24.3       |
| >27                           | 260 | 45.8          | 48.7           | 23.6                | 19.2       |
| PTSD                          |     |               |                |                     |            |
| <=2                           | 362 | 48.4          | 57.5**         | 16.5**              | 19.1       |
| >2                            | 550 | 52.4          | 44.6           | 24.9                | 20.2       |
| CD4 count                     |     |               |                |                     |            |
| >350                          | 194 | 64.6          | 58.1           | 23.2                | 22.2       |
| 200-350                       | 267 | 55.5          | 64.4           | 25.8                | 21.4       |
| <200                          | 241 | 51.0          | 52.1           | 23.7                | 25.3       |

Note: Row n does not always add up to overall N due to missing values/responses. \*\*\* p< 0.001; \*\*p< 0.01; \*p<0.05

++ Analysis of condom use included only women who were sexually active in last 6 months