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Prevalence and Predictors of Posttraumatic Stress Disorder and Depression in HIV-Infected and At-Risk Rwandan Women

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Abstract

Objective: During the 1994 Rwandan genocide, rape was used as a weapon of war to transmit HIV. This study measures trauma experiences of Rwandan women and identifies predictors associated with posttraumatic stress disorder (PTSD) and depressive symptoms.
Methods: The Rwandan Women's Interassociation Study and Assessment (RWISA) is a prospective observational cohort study designed to assess effectiveness and toxicity of antiretroviral therapy in HIV-infected Rwandan women. In 2005, a Rwandan-adapted Harvard Trauma Questionnaire (HTQ) and the Center for Epidemiologic Studies Depression Scale (CES-D) were used to assess genocide trauma events and prevalence of PTSD (HTQ mean >2) and depressive symptoms (CES-D ≥ 16) for 850 women (658 HIV-positive and 192 HIV-negative).
Results: PTSD was common in HIV-positive (58%) and HIV-negative women (66%) ($p = 0.05$). Women with HIV had a higher prevalence of depressive symptoms than HIV-negative women (81% vs. 65%, $p < 0.0001$). Independent predictors for increased PTSD were experiencing more genocide-related trauma events and having more depressive symptoms. Independent predictors for increased depressive symptoms were making <$18 a month, HIV infection (and, among HIV-positive women, having lower CD4 cell counts), a history of genocidal rape, and having more PTSD symptoms.
Conclusions: The prevalence of PTSD and depressive symptoms is high in women in the RWISA cohort. Four of five HIV-infected women had depressive symptoms, with highest rates among women with CD4 cell counts <200. In addition to treatment with antiretroviral therapy, economic empowerment and identification and treatment of depression and PTSD may reduce morbidity and mortality among women in postconflict countries.

Introduction

The convergence of the public health epidemics of human immunodeficiency virus (HIV) infection, gender-based violence, and mental disorders has caused increased morbidity and mortality for women globally. Women currently make up 50% of those infected with HIV worldwide and 61% of those infected in subSaharan Africa.[1] Sexual and physical abuse against women is widespread in both industrialized and low resource countries, with reported lifetime prevalence of physical or sexual partner violence of 15%–71%.[2,3] Mental health disorders contribute to 14% of the total

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global disease burden and are prominent in women who have experienced violence or are infected with HIV.[4,5]

These three intersecting epidemics impact negatively on women's heath. Partner violence, rape, and sexual abuse place women at increased risk for HIV and may cause delay or noninitiation of antiretroviral therapy (ART) and, thus, a worse HIV-related prognosis.[6–10] Depressive symptoms are common, may prevent timely diagnosis of HIV infecton as well as reduce adherence to ART, and may be associated with more rapid HIV disease progression and mortality.[11–13]

During war and postconflict, girls and women are even more vulnerable to sexual violence and exposure to HIV infection.[14,15] Although one meta-analysis did not report higher HIV prevalence in refugee camps or conflict-affected areas, it is well known that rape and HIV infection have been and are used as weapons of war.[16–18] Depression, posttraumatic stress disorder (PTSD), and anxiety are common persistent psychological sequelae secondary to traumatic events, especially among women and children.[19,20] Measuring and treating psychological symptoms in a culturally appropriate and holistic manner has been shown to improve the mental and physical health of those traumatized.[21]

During the Rwandan genocide of 1994, an estimated 800,000 persons were murdered and 250,000 women were raped, with tens of thousands purposely infected with HIV.[22–24] With improved access to HIV care and ART, many HIV-infected Rwandan women who experienced or witnessed physical and sexual abuse now receive treatment. Assessing the impact of history of trauma and mental health disorders in these women will help providers to better tailor the healthcare system to meet their needs. Therefore, the objectives of this study are to (1) use a reliable cross-cultural instrument to measure trauma experiences, depression, and posttraumatic stress symptoms of Rwandan women with and without HIV and 2) identify the predictors associated with depressive symptoms and PTSD.

Materials and Methods

The Rwandan Women's Interassociation Study and Assessment (RWISA) is a prospective observational cohort study designed to assess the effectiveness and toxicity of antiretroviral therapy in HIV-infected Rwandan women, including survivors of genocidal rape. The study was funded by the National Institute of Allergy and Infectious Diseases and was approved by the Rwandan National Ethics Committee and the Institutional Review Boards of Montefiore Medical Center (Bronx, NY) and Stroger Hospital (Chicago, IL).

Study population

HIV-infected and uninfected Rwandan women enrolled in RWISA between May 16 and November 15, 2005. The majority of HIV-infected and uninfected participants were recruited by Rwandan women's associations. These Rwandan associations mainly addressed psychosocial issues, including mental illness secondary to trauma during the genocide, economic self-reliance, and HIV prevention or support. Some HIV-infected participants were also recruited from HIV clinics in Kigali prior to their initiation of ART. Eligible women had lived in Rwanda and were >15 years of age in 1994. They were able and willing to give informed consent, agreed to be tested or retested for HIV, and were able to complete the interview in the Kinyarwanda language, travel to and from the research site, and participate in a baseline visit as an outpatient. In 2005, CD4 testing and ART were just becoming available in clinics in Rwanda. All HIV-infected women enrolled in RWISA were naïve to ART at baseline, but those with clinical indications for treatment initiated ART after the baseline visit. Study personnel used frequency matching during enrollment so that half of the HIV-infected and uninfected participants reported a history of experiencing genocidal rape. Informed consent included a video describing and demonstrating the study, followed by a group question and answer period, and then a private standard written informed consent process. Participants received transportation support, a meal while waiting, and a modest monetary incentive. Most baseline visits lasted 3 hours. The trauma questionnaire was administered at a separate interview occurring within 2 weeks of the enrollment visit.

The baseline study visit consisted of an interview, physical and gynecological examination, and collection of blood, urine, and gynecological specimens. The interviews were conducted in Kinyarwanda by trained interviewers with a background in nursing or trauma counseling or both. Research staff entered all interview and physical examination data directly into an ACCESS database through a user-friendly interface. The interviewer collected demographic, medical, psychosocial, and behavioral information necessary to assess clinical status, disease progression, risks for exposure to HIV-1, quality of life, symptoms of depression and PTSD, and experience of trauma during the 1994 genocide. If a participant had an acute medical illness, she was referred to a clinical provider in the colocated clinic or to her primary care site. Participants who experienced emotional distress as a result of sensitive questions or recalling of events were counseled onsite and provided with debriefing and referral, if needed, for counseling by study trauma counselors.

Measures

Participants answered questions about age, marital status, income, educational attainment, and reading ability. They were also questioned about nongenocidal abuse, including physical and sexual abuse, and threats to their safety. Blood was taken for CD4 cell count testing. This baseline visit was conducted in 2005, prior to the dissemination of ART in Rwanda, so the impact of ART on depressive symptoms and PTSD in HIV-infected women is not addressed by this analysis.

Depressive symptoms. Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D), with the standard cutoff of 16 indicating clinically significant symptoms of depression and the cutoff of 27 indicating major depressive disorder (MDD).[25] If 1–3 items were missing, the full CES-D score was imputed using the person-mean approach, which is simple to implement and has been shown to be accurate.[26] In this approach, the full CES-D is calculated as:

$$20/(20 - \text{number of missing items}) * [\text{person mean among non-missing items}]$$

Harvard Trauma Questionnaire. The Harvard Trauma Questionnaire (HTQ), a cross-culturally validated instrument

measuring trauma and torture events and symptoms, was administered by study trauma counselors who were trained by the study psychologist to determine events experienced during the 1994 genocide and responses to these events.[27] In accordance with World Health Organization (WHO) guidelines for cross-cultural translation and adaptation, the HTQ was translated into French, then Kinyarwanda, followed by blind back-translation into French and then English. Three focus groups comprising six to eight trauma counselors from different Rwandan women's associations reviewed the questionnaire item-by-item, adapting the HTQ items to the Rwandan experience and the Kinyarwanda linguistic equivalent. The instrument was then piloted to insure that the words and descriptions of traumatic events and symptoms were relevant to women who had lived in Rwanda during the genocide. The instrument was revised to incorporate this input and was then administered to RWISA participants.

On average, trained trauma counselors spent 45 minutes administering the HTQ. Participants were asked specifically about trauma experiences, head injury, torture, and trauma symptoms. The total number of trauma events was calculated and presented as a mean number. The HTQ includes a measurement of PTSD, which assessed the three categories of symptoms required for a DSM-IV diagnosis: reexperiencing, avoidance, and hyperarousal. Each category had several components, all of which were scored. A final mean score was calculated. Mean HTQ scores >2 meet DSM-IV diagnostic criteria for PTSD, and women with mean HTQ scores >2 were categorized as having PTSD in this study.[28]

Statistical analysis

The Cronbach α,[29] a measure of internal consistency reliability, was estimated at 0.934 for all 40 trauma symptom items of the HTQ, indicating excellent internal consistency. Differences in reported traumatic events and baseline characteristics between HIV-infected and uninfected women were assessed using chi-square test, exact test, and *t* test as appropriate. Bivariate and multivariate forward stepwise logistic regression was performed to investigate the effect of predictor variables on depressive symptoms (CES-D $\geq$16 vs. 16) and PTSD (PTSD symptom score >2 vs. $\leq$2). In the stepwise models, all variables were given the opportunity to enter even if they were not statistically significant in bivariate models. All analyses were performed using SAS, version 9 (Cary, NC).

Results

At the first RWISA visit, 936 participants (710 HIV-positive and 226 HIV-negative women) enrolled. Included in this analysis are the 850 participants (91%) with available depressive and trauma symptoms data at this visit. Table 1 presents the demographic characteristics of these subjects at study entry by HIV serostatus. Most women reported being unmarried and unemployed and having an income of < US$2/day and low levels of education and literacy. Women with HIV differed from the uninfected women in being significantly younger, less likely to be widowed, and more likely to report nongenocide-related abuse. Among the women with HIV, one third had CD4 cell counts <200 cells/μL.

Of the 850 women, 660 (78%) met the threshold (CES-D $\geq$ 16) for clinically significant symptoms of depression, and 249 (30%) met the CES-D $\geq$ 27 criterion for MDD. Although depressive symptoms were common among all RWISA participants, women with HIV infection were significantly more likely than HIV-negative women to have clinically significant depression (81% vs. 65%, $p < 0.0001$) and MDD (31% vs. 23%, $p = 0.047$). PTSD (HTQ mean >2) was common in both women with HIV (58%) and uninfected women (66%) ($p = 0.05$).

Although depressive symptoms were more frequent than PTSD, many women experienced both depressive symptoms and PTSD. There were high levels of comorbidity: of those with PTSD, 82% also met the criteria for depressive symptoms, and of those participants with depressive symptoms, 63% also had PTSD.

Types of trauma experienced during the 1994 genocide are shown in Table 2. A majority of participants (60%–94%) reported experiencing the following traumatic events during the genocide: conditions of war; the murder of a friend or relative; witnessing a beating; losing property; lack of shelter, food, or water; forced evacuation; no medical care; and extortion or robbery. As described in Materials and Methods, our sampling quotas required that women who had experienced genocidal rape constitute approximately half of the subjects in each group.

The mean number of trauma events was high (13.6) for the whole cohort and slightly higher for the HIV-uninfected (14.5) than for the HIV-infected women (13.4) ($p < 0.05$). HIV-uninfected women were more likely to report lack of access to medical care, robbery, loss of property, and injury to relative or friend, but women with HIV were more likely to report forced evacuation.

Table 3 demonstrates factors associated with PTSD in the RWISA cohort. Women who were widowed, poorer, older, had experienced genocidal rape and more traumatic events, and had depressive symptoms were significantly more likely to have PTSD in the unadjusted analyses. HIV status was not significantly associated with PTSD in this bivariate analysis. In stepwise logistic regression, the significant independent predictors of PTSD for the final model were the number of traumatic events experienced during the genocide (OR 2.47, CI 1.84–3.31) or having depressive symptoms (OR 1.66, CI 1.18–2.35). Separate predictive models for PTSD were performed for the HIV-infected women and uninfected women (data not shown) and found no differences in predictors.

Depressive symptoms (Table 4) were higher in women who were widowed or poor or had a history of genocidal rape, with those having higher numbers of traumatic events being more likely to have depressive symptoms. In addition, PTSD, a history of additional nongenocidal violence, and HIV infection were significantly more likely to predict depressive symptoms in the unadjusted analysis. Among the women with HIV, women with greater immunosuppression (CD4 cell counts <200 cells/μL) were most likely to have depressive symptoms. In the final stepwise logistic model for depressive symptoms, making <$18 a month, being HIV-infected, having CD4 cell counts <200 cells/μL, having a history of genocidal rape, and having PTSD independently predicted depressive symptoms.

Women with HIV and CD4 cell count >200/μL (OR 2.42, CI 1.608–3.66) were significantly more likely to have depressive symptoms compared with women without HIV infection. Women with more advanced disease, as indicated by CD4 cell counts <200/μL (OR 4.97, CI 2.93–8.45), were the most likely to have depressive symptoms. When we ran this model for

Table 1. Baseline Characteristic of RWISA Participants

Parameter	*HIV-negative* (n = *192*)	*HIV-positive* (n = *658*)	*All subjects* (n = *850*)
Age, mean (SD)***	41.8 (10.1)	34.8 (7.0)	36.4 (8.3)
Marriage status, %**			
Married or with partner	36.7	36.5	36.5
Other	12.8	22.3	20.2
Widowed	50.5	41.2	43.3
Monthly income, %**			
<10,000 FRW (US$18)	46.4	35.4	37.8
10,000–35,000 FRW	37.4	50.5	47.6
>35,000 FRW (US$64)	16.2	14.1	14.6
Employed, %			
Yes	26.3	24.7	25.1
No	73.7	75.3	74.9
Schooling, %			
None	29.3	22.3	23.8
Primary school	58.0	67.0	65.0
Secondary school and up	12.8	10.7	11.2
Ability to read, %			
None or a little bit	65.4	64.3	64.5
Can read most or all	34.6	35.7	35.5
Nongenocide violence, %**			
Yes	28.0	38.5	36.1
No	72.0	61.5	63.9
CES-D $\geq$ 16, %***			
Yes	64.6	81.5	77.6
No	35.4	18.5	22.4
CES-D $\geq$ 27, %*			
Yes	23.4	31.0	29.29
No	76.6	69.0	70.71
HTQ, mean (SD)	2.40 (0.67)	2.31 (0.66)	2.33 (0.69)
HTQ mean > 2, %			
Yes	65.6	57.8	59.5
No	34.4	42.2	40.5
CD4, mean (SD)	–	283.6 (168.0)	
CD4 < 200, %	–		
Yes		34.2	
No		65.8	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ between HIV-negative and HIV-positive based on exact tests for categorical variables and t tests for continuous variables.

FRW, Rwandan Francs (currency).

depressive symptoms excluding PTSD, we found that experiencing a higher number of genocidal trauma events was independently predictive of depressive symptoms, probably reflecting the high correlation between genocidal trauma events and PTSD (data not shown).

Similar predictors were found in separate stepwise logistic models for depressive symptoms for the HIV-infected and HIV-uninfected groups (data not shown). For the HIV-infected women, making <$18 a month, having a CD4 cell count <200/μL, and number of genocidal trauma events independently predicted depressive symptoms. Predictors for HIV-uninfected women were being widowed, having experienced genocidal rape, and making <$18 a month.

Discussion

We describe the first adaptation of the HTQ into Kinyarwanda and cross-sectional data on trauma and depressive and PTSD symptoms in a cohort of Rwandan women with and without HIV infection measured 11 years after the 1994 genocide. The major findings of the study are the high frequency of PTSD and depressive symptoms among the entire cohort and the significant contribution of HIV infection to predicting depressive symptoms.

RWISA participants were underemployed, frequently widowed, and poor, with low literacy and little formal education. They experienced multiple traumatic events and had high rates of PTSD symptoms and extremely high rates of depressive symptoms. Over 80% of the HIV-infected women and almost two thirds of the HIV-uninfected women met the criteria for depressive symptoms, and 3 of 5 women in RWISA met the criteria for PTSD.

In comparison with previous studies of trauma, depression, and PTSD among persons living in Rwanda during the genocide, RWISA participants experienced similar frequency and kinds of traumatic events. However, the proportion of RWISA participants who met the symptom criteria for PTSD was twice as high as that reported by Pham et al.[30] This may be explained by the different methodologies used to assess symptoms or may represent selection of more traumatized women in RWISA, as an inclusion criterion was that 50% experienced genocidal rape.

Table 2. Frequency of Genocidal Trauma Events among RWISA Participants

Trauma parameter	*HIV-negative* (n = *192*) %	*HIV-positive* (n = *658*) %	*All* (n = *850*) %
Situation of war and bombing	94.2	94.0	94.10
Lack of food or water	83.3	81.1	81.6
Lack of access to medical care*	81.8	73.2	75.2
Murder of relative or friend	75.1	69.3	70.6
Forced evacuation*	57.6	67.2	65.0
Extortion or robbery**	75.0	64.4	66.8
Lack of shelter	59.4	62.8	62.0
Eyewitness beating	61.5	62.6	62.4
Loss of property**	71.9	58.8	61.8
Disappearance of relative or friend	60.7	53.5	55.1
Rape	50.5	48.6	49.1
Serious physical injury of relative or friend**	57.3	46.4	48.9
Forced separation from family	43.8	42.9	43.1
Forced to hide	46.4	43.5	44.2
Someone forced to betray you	45.2	43.4	43.8
Forced isolation	45.0	40.6	41.6
Beating and torture	39.1	38.4	38.6
Cutting with a machete, other sharps	8.1	10.9	10.3
Total number of trauma events, mean (SD)*	14.5 (6.6)	13.4 (6.2)	13.6 (6.3)

*$p < 0.05$; **$p < 0.01$ between HIV-negative and HIV-positive based on exact test.

Using the HTQ allowed us to compare PTSD symptoms experienced by RWISA participants with those in other postconflict countries. RWISA participants had a mean PTSD symptom score of 2.33 compared with 1.92 in a population-based study in Afghanistan in 2004[31] and 1.89 among political detainees in Vietnam in 1998.[32] When compared with studies measuring PTSD using other instruments, women in RWISA demonstrated a high prevalence of PTSD. Although the prevalence of PTSD was 60% in RWISA, rates of PTSD ranged from 62% in one study in Cambodia[34] to 37.4% in Algeria, 28.4% in Cambodia, 17.8% in Ethiopia, 17.8% in Gaza,[34] and 14.8% in South Africa.[35] In the current study, the number of trauma events experienced during the genocide was the strongest independent predictor of PTSD. This demonstrates the continued impact of the genocide on women in the cohort. Having depressive symptoms was also a significant predictor of PTSD, but HIV infection was not. HIV negative women experienced more traumatic events and had a higher but not significant prevalence of PTSD. The greater trauma burden and higher frequency of specific traumas among the HIV-negative women compared with the HIV-infected women might reflect recruitment methodology. The Rwandan women's associations might have been more aware of those members who were HIV-uninfected women but had experienced more traumatic events, and they may have recruited these women for the study.

The high prevalence of clinical depression in the cohort, especially among HIV-infected women, is particularly striking. Other studies also report a high prevalence of depression among persons with HIV in Africa, particularly among women and the poor, although the rate found in our study was higher than that reported by others. In neighboring Uganda, 47% of 1017 HIV-infected adults reported depressive symptoms,[36] as did 33% of 645 adults randomly selected in a South African township. [35] In both of these studies, social factors related to poverty were found to contribute to the likelihood of depression. HIV stigma and discrimination were identified as having a negative impact on the mental well-being of 40% of 1063 HIV-positive adults in South Africa, with reports of feeling shame and guilt associated with higher risk of depression.[37]

In this study, HIV infection was the most significant independent predictor of depressive symptoms. Women with HIV infection and higher CD4 cell counts were 2.4 times more likely than uninfected women to have depressive symptoms. The more advanced the HIV disease, the greater the likelihood of depressive symptoms: women with CD4 <200 cells/μL were five times more likely to experience depressive symptoms. This large impact of HIV on depressive symptoms is in contrast with studies of cohorts of U.S. women with and at risk for HIV, whose prevalence of depressive symptoms was similar in both groups.[38] This higher level of depressive symptoms among women with HIV in RWISA in 2005 might reflect the lack of treatment of HIV in Rwanda prior to 2004 and high rates of morbidity and mortality due to HIV in the community. We do not think these depressive symptoms reflect somatic symptoms of HIV, as an analysis of the CES-D data showed that along with somatic symptoms, the affective symptoms of depression on the CES-D scale were also statistically and quantitatively prominent among the RWISA women with HIV (data not shown).

Other predictors of more depressive symptoms in the RWISA cohort were genocidal rape and PTSD (which probably reflects genocidal trauma events), demonstrating the expected impact of the 1994 genocide experience. Finally, even in this economically very disenfranchised group, lower income predicted more depressive symptoms. Women making <$18 a month were three times more likely than those making between $18 and $64 a month or >$64 per month to report depressive symptoms. Although these monthly salaries are all extremely low, women with the lowest incomes had the most depressive symptoms. Trauma exposure and conditions of poverty have been linked to negative impact on mental health.[39] Microfinance and income generation programs have

Table 3. Unadjusted and Adjusted Predictors of PTSD in Women in RWISA from Logistic Regression

	PTSD					
	Unadjusted			Adjusted		
		95% CI			95% CI	
	OR	LL	UL	OR	LL	UL
Age, years						
≥35	1.47	1.11	1.94	1.32	0.96	1.80
<35	1.00			1.00		
Marriage status						
Widowed	1.53	1.15	2.02	1.32	0.96	1.80
Married, with partner or other	1.00			1.00		
Monthly income						
<10,000 FRW (US$18)	1.53	1.00	2.34			
10,000–35,000 FRW	1.40	0.928	2.10			
>35,000 FRW (US$64)	1.00					
Employed						
Yes	0.87	0.63	1.20			
No	1.00					
Schooling						
None	0.81	0.489	1.34			
Primary school	0.82	0.52	1.29			
Secondary school and up	1.00					
Ability to read						
None or a little bit	1.02	0.77	1.36			
Can read most or all	1.00					
Genocide rape						
Yes	1.63	1.23	2.15			
No	1.00					
Depressive symptoms (CESD ≥ 16)						
Yes	1.89	1.37	2.62	1.66	1.18	2.35
No	1.00			1.00		
HIV status and CD4 count						
HIV-positive, CD4 < 200	0.75	0.50	1.12			
HIV-positive & CD4 ≥ 200	0.70	0.49	0.996			
HIV-negative	1.00					
Nongenocide violence						
Yes	1.05	0.79	1.40			
No	1.00					
Genocidal trauma events[a]						
Yes	2.68	2.02	3.56	2.47	1.84	3.31
No	1.00			1.00		

[a]Genocidal trauma events: subjects grouped by less than median number of trauma events vs. larger and equal to median number of trauma events.

LL, lower limit; UL, upper limit.

been found to decrease intimate partner violence and may have a role in reducing depressive symptoms.[40]

Persistent depressive symptoms measured at a 6-month interval among HIV-infected persons in South Africa were found to cause disability in the domains of work and social and family functioning.[5] Depression in women with HIV has also been shown to be associated with increased risk of HIV disease progression in Africa and the United States.[41] Diagnosing and treating depression is essential to reduce depressive symptoms, improve the quality of life for women with HIV, increase adherence to ART, and reduce morbidity and mortality.[42,43]

Some limitations of our study should be noted. First, we cannot determine when the participants of the cohort were infected with HIV, how long they were infected, or what impact this might have had in causing or mitigating their symptoms. In addition, although the HTQ and the CES-D have been widely used in many countries, clinician validation has not always been performed. Bolton[44,45] has discussed the utility of mental health instruments and the need to meet the gold standards for criterion validity with a diagnostic assessment conducted by a qualified psychiatrist or psychologist. This standard is often difficult in postconflict, low-resource countries. In Rwanda, there are few psychologists and even fewer psychiatrists, and clinical diagnostic interviews did not accompany the mental health scales in the current study.

We included only women who had lived in Rwanda during the 1994 genocide and enrolled a cohort in which 50% had experienced genocidal rape. Although our findings are not generalizable to the entire Rwandan population or to women in other countries, our results have relevance for the many women with and at risk for HIV in postconflict situations.

Table 4. Unadjusted and Adjusted Predictors of Depressive Symptom in Women in RWISA from Logistic Regression

	Depressive symptoms					
	Unadjusted			*Adjusted*		
		95% CI			*95% CI*	
	OR	*LL*	*UL*	*OR*	*LL*	*UL*
Age, years						
≥35	0.78	0.57	1.08			
<35	1.00					
Marriage status						
Widowed	1.57	1.12	2.19	1.39	0.96	2.00
Married, with partner or other	1.00			1.00		
Monthly income						
<10,000 FRW (US$18)	3.12	1.92	5.06	3.04	1.80	5.12
10,000–35,000 FRW	1.69	1.09	2.62	1.53	0.96	2.44
>35,000 FRW (US$64)	1.00			1.00		
Employed						
Yes	0.80	0.55	1.15			
No	1.00					
Schooling						
None	1.59	0.90	2.81			
Primary school	1.32	0.81	2.17			
Secondary school and up	1.00					
Ability to read						
None or a little bit	1.10	0.79	1.55			
Can read most or all	1.00					
Genocide rape						
Yes	1.56	1.12	2.16	1.52	1.07	2.16
No	1.00			1.00		
PTSD (HTQ mean > 2)						
Yes	1.89	1.37	2.62	1.73	1.22	2.46
No	1.00			1.00		
HIV status and CD4						
HIV-positive, CD4 < 200	3.84	2.34	6.29	4.98	2.93	8.45
HIV-positive, CD4 ≥ 200	2.00	1.37	2.91	2.42	1.61	3.66
HIV-negative	1.00			1.00		
Nongenocide violence						
Yes	1.49	1.05	2.12			
No	1.00					
Genocidal trauma events[a]						
Yes	1.65	1.19	2.30			
No	1.00					

[a]Genocidal trauma events: subjects grouped by less than median number of trauma events vs. larger and equal to median number of trauma events.

Conclusions

Poverty, gender-based violence, and war conflicts are major structural determinants of both HIV disease and mental disorders. Understanding the psychological health of women with and without HIV in postconflict settings will allow more individualized care and better design of healthcare systems. Given the high levels of PTSD and depressive symptoms seen among genocide survivors in this study and the association of trauma during the genocide with this outcome, the ongoing healthcare of all Rwandan women should include psychologically oriented services sensitive to trauma, depression, and PTSD. Ensuring inclusion and integration of these services into a comprehensive HIV delivery model may reduce the profound morbidity experienced by women globally and in Rwanda.

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Disclosure Statement

The authors have no conflicts of interest to report.

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