Published in final edited form as:

AIDS Behav. 2015 August ; 19(8): 1379–1387. doi:10.1007/s10461-014-0855-3.

Resilience Moderates the Association between Childhood Sexual Abuse and Depressive Symptoms Among Women with and At-Risk for HIV

Sannisha K. Dale^{a,b}, Kathleen M. Weber^{c,d}, Mardge H. Cohen^{c,d}, Gwendolyn A. Kelso^a, Ruth C. Cruise^a, and Leslie R. Brody^a

^aDepartment of Psychology, Boston University, 648 Beacon Street, Boston, MA 02215, USA

^bMassachusetts General Hospital, Behavioral Medicine Service, One Bowdoin Square, Suite 701, Boston, MA 02114, USA

^cDepartments of Medicine, Cook County Health & Hospital System, 2225 W. Harrison, Suite B, Chicago, IL and Rush University Chicago, IL 60612, USA

^dCORE Center at John H. Stroger Jr Hospital of Cook County, Chicago, Illinois 60612, USA

Abstract

Childhood sexual abuse (CSA) places women at risk for HIV infection and once infected, for poor mental health outcomes, including lower quality of life and depressive symptoms. Among HIV-positive and demographically matched HIV-negative women, we investigated whether resilience and HIV status moderated the relationships between CSA and health indices as well as the relationships among CSA, depressive symptoms, and health-related quality of life (HRQOL). Participants included 202 women (138 HIV+, 64 HIV–, 87% African American) from the Women's Interagency HIV Study (WIHS) Chicago CORE Center site. Results indicated that in both HIV-positive and HIV-negative women, higher resilience significantly related to lower depressive symptoms and higher HRQOL. CSA related to higher depressive symptoms only for women scoring low in resilience. Interventions to promote resilience, especially in women with a CSA history, might minimize depressive symptoms and poor HRQOL among HIV-positive and HIV-negative women.

Keywords

resilience; childhood sexual abuse; HIV; depressive symptoms; quality of life

Introduction

Each year women make up approximately one quarter of the 50,000 newly diagnosed individuals with HIV in the United States (1). Women with a history of childhood sexual

Correspondence concerning this article should be addressed to Sannisha K. Dale (Massachusetts General Hospital, Behavioral Medicine Service, One Bowdoin Square, Suite 701, Boston, MA 02114. skdale@mgh.harvard.edu. Telephone: 617-724-6300, 111-134-2043. Fax: 617-724-8690) or Leslie R. Brody (Boston University, 648 Beacon Street, Boston, MA 02215, USA. lrbrody@gmail.com. Telephone: 617-353-3544. Fax: 617-358-1380)..

abuse (CSA) are at greater risk for HIV infection due to engagement in HIV sexual risk behaviors (e.g. unprotected sex) (2) and CSA is highly prevalent among HIV-positive women (3). For both HIV-positive and negative women, CSA has been linked to depression and lower health-related quality of life and for HIV infected women, CSA has been related to HIV medication nonadherence and increased mortality (4, 5). Further, lifetime prevalence of depressive disorders is significantly higher in women with HIV compared to women in the general population (6, 7).

Resilience is the ability to function and cope adaptively in the face of or following adversity such as CSA (8-10). Some scholars view resilience as a set of personality characteristics (e.g. positive self-concept and humor) and/or adaptive coping strategies (e.g. optimism and viewing stress as a challenge/opportunity) (9, 11), while others view it as the process of bouncing back from adversity (11, 12) or as a functional outcome, such as less substance use (13, 14). Evidence suggests that interactions among genetics, biological processes (stress hormones), and environmental resources (e.g., social support, income, education) may lay the foundation for resilience (15-21). Resilience is important in the lives of people with HIV who are faced with multiple stressors, including the effects of HIV disease, stigma associated with HIV, interpersonal violence, mental illness, unstable housing, and poverty as well as stressors that may be more commonly faced by women than by men, such as child-rearing responsibilities and gender-related stigma and discrimination (22-27).

While studies among community samples have shown that higher resilience relates to lower depression and lower psychiatric symptoms (8, 28, 29), only a small number of studies have explored these relationships among HIV-positive individuals (30-34). In addition, findings in a community sample suggest that resilience can moderate the relationship between abuse and depression (30) and it is plausible that resilience may moderate the relationship between CSA and health-related quality of life in women with HIV, although no literature addresses these relationships.

The current study focused on HIV-positive women and HIV-negative women at risk for HIV. The study investigated the relationships among CSA, depressive symptoms, and health-related quality of life (HRQOL) and resilience as a moderator of these relationships. Hypotheses were that: (1) HIV-positive women would have higher depressive symptoms and lower HRQOL than HIV-negative women, (2) CSA would relate to higher depressive symptoms and lower HRQOL among all women, (3) Higher resilience would relate to lower depressive symptoms and higher HRQOL among all women and (4) Resilience would moderate the relationships between CSA and depressive symptoms and CSA and HRQOL among all women, such that for women scoring low in resilience, CSA would predict higher depressive symptoms and lower HRQOL, but for women scoring high on resilience CSA would be unrelated to depressive symptoms and HRQOL. The study also explored the HIV status differences in patterns of relationships of resilience with CSA, depressive symptoms and HRQOL.

Methods

Sample, Recruitment and Procedures

The sample consisted of 202 women (138 HIV+ and 64 HIV-) from the Chicago CORE Center site of the Women's Interagency HIV Study (WIHS), a multisite longitudinal prospective cohort study of HIV+ women and a comparative cohort of women at-risk for HIV. Similar to the cohort of HIV+ women, women at risk for HIV also reported high levels of injection drug use and multiple sexual partners. Women were enrolled in WIHS in three waves (wave 1 [1994-5]; wave 2 [2001]; wave 3 [2011]). Cohort enrollment and characteristics at the six U.S. WIHS sites have previously been described (35, 36). Recruitment for the present substudy occurred between 2008 and 2012. Written informed consent was obtained and participants received a financial honorarium of \$25 to support their time and effort, as well as transportation and childcare as needed. The study protocol was approved by the institutional review boards of Boston University and Cook County Health and Hospital System as well as the WIHS Executive Committee.

Measures

Socio-demographic Covariates—Socio-demographic characteristics were collected including age (derived from date of birth and used as a continuous measure), education (categorized into no schooling, grades 1-6, grades 7-11, high school, some or all of college, and attended/completed graduate school), income (divided into three categories of less than \$6,000, \$6,001 to \$12,000, and \$12,001 or more), and employment (dichotomized into “yes” or “no”).

Childhood Sexual Abuse (CSA)—During their first WIHS visit or at a follow-up visit, women were asked “At any time in your life, has anyone ever pressured or forced you to have sexual contact? By sexual contact I mean them touching your sexual parts, you touching their sexual parts, or sexual intercourse.” Participants were given four response options (yes, no, don't know, or declined). Participants who responded “yes” were asked the follow up question “How old were you when this first happened?” A variable was created to categorize women who were sexually abused prior to age 18 (1 = CSA) versus women who were not (0 = no CSA).

Connor-Davidson Resilience Scale - 10 item (8)—The CD-RISC is a 10-item self-report assessing the ability to thrive despite adversity using both personality traits and coping. Total scores range from 0 to 40 with higher scores reflecting greater resilience. The CD-RISC has demonstrated good internal consistency (Cronbach's α coefficient = .85) (8). Construct validity was supported by the CD-RISC score significantly moderating the relationship between childhood maltreatment, trauma exposure, and psychiatric symptoms in the general population (8). The Cronbach's alpha coefficient for the CD-RISC in the current sample was .91 and continuous scores were utilized in analyses.

Center for Epidemiological Studies Depression Scale (CES-D Scale)(37)—This is a 20-item, self-report measure of current, affective depressive symptoms widely used in

studies of women with HIV (7, 38). The Cronbach's alpha reliability coefficient for the CES-D in the current sample was .98 and the CES-D was used as a continuous measure.

Health-Related Quality of Life (HRQOL)—To capture health-related quality of life, a modified 21-item short form of The Medical Outcome Study (MOS)-HIV was used to assess 6 domains: physical functioning, role functioning, social functioning, pain, emotional well-being, and general health perception. Previous studies have reported reliability indices between .78 and .85 (39). The total scale scores were used as continuous in analyses. In the current sample, Cronbach's alpha reliability coefficients for the four subscales with more than two items ranged from .69 to .99.

Statistical Analyses

All analyses were run using SPSS version 21.0. Chi-square and two-tailed t-tests were used to compare HIV+ and HIV– women on socio-demographics, CSA history, and resilience. Partial correlation analyses controlling for HIV status were run to explore associations between socio-demographics and outcome variables of CD-RISC, CES-D, and HRQOL. Hierarchical multiple linear regressions controlling for covariates (e.g. education) were conducted to examine relationships among predictors (e.g. resilience) and outcomes (e.g. depressive symptoms). Four participants were missing data on childhood sexual abuse; one participant was missing one item on the CD-RISC; and 35 participants were missing HRQOL data because HRQOL data were not collected at the resilience study visit for those women who were enrolled in the third enrollment wave of WIHS (2011) and for whom the resilience study visit was their first visit. T-test analyses comparing women with HRQOL data with women without HRQOL data showed that there were no significant differences on any socio-demographic or other study variable. The one missing item on the CD-RISC was replaced with the respondent's average item score computed from the mean of the nine completed items. HRQOL missing data points were excluded from analyses with HRQOL as an outcome. Similarly, the four participants missing data on CSA were not included in analyses with CSA as a predictor.

Results

Approximately 87% of the 202 women self-identified as African American, 38% did not complete high school, and 27% reported a history of CSA. Table I displays the sample demographics and clinical characteristics.

As assessed by chi-square and two-tailed t-tests, and displayed in Table I, HIV+ and HIV– women did not differ in race, age, education, enrollment wave, CSA history, and resilience, but HIV– women reported higher levels of income and were more likely to be employed than HIV+ women. Partial correlations controlling for HIV status showed that higher education, employment and/or higher income were significantly related to higher CD-RISC, lower CES-D, and higher HRQOL scores, while being older was related to a lower HRQOL (Tables II). A history of CSA was significantly related to being older, enrolling during an earlier wave, and having higher education. Age, education, employment, income, and enrollment wave were included as covariates in all subsequent analyses. Predictors and outcomes did not differ across racial/ethnic groups.

Impact of HIV Status on Depressive Symptoms, HRQOL, and Resilience

To explore whether HIV+ women had higher depressive symptoms and lower HRQOL than HIV- women, partial correlations between HIV status and depressive symptoms and between HIV status and HRQOL were run controlling for age, education, employment, income, and enrollment wave. Results indicated that HIV+ women reported significantly lower HRQOL than HIV- women ($r = -.21, p = .01$), but the two groups did not differ in reported depressive symptoms ($r = .02, p = ns$).

Regression analyses were conducted that included three-way interactions among HIV status, CSA, and resilience, and two-way interactions of HIV status with resilience, HIV status with CSA, and CSA with resilience. Covariates were income, education, employment, age, and enrollment wave entered in block 1; main effects of HIV status, CSA, and resilience entered as predictors in block 2; dummy variables representing the two-way interactions of HIV status with resilience, HIV status with CSA, and CSA with resilience entered in block 3; and dummy variables representing the three-way interaction of HIV status, CSA, and resilience entered in block 4. The outcomes were depressive symptoms and HRQOL scores and separate regressions were conducted for each outcome. The three-way interaction among HIV status, CSA, and resilience, and the two-way interactions between HIV status and resilience and HIV status and CSA did not significantly relate to depressive symptoms and HRQOL, indicating that the nature of the relationships among CSA, resilience, depressive symptoms, and HRQOL did not differ based on HIV status. HIV+ and HIV- women were combined in further analyses and HIV status was included as a covariate.

Relationships of CSA with Depressive Symptoms and HRQOL

Hierarchical multiple linear regressions were used to test whether CSA would relate to higher depressive symptoms and lower quality of life while controlling for age, education, employment, income, HIV status, and enrollment wave. In the analyses, covariates were entered in block 1, CSA was entered as a main effect in block 2, and outcomes were HRQOL or depressive symptoms. Separate hierarchical regressions were conducted for HRQOL and depressive symptoms. CSA significantly related to lower HRQOL ($\beta = -.18, t = -2.12, p = .04, R^2 = .20$), indicating that women with a history of childhood sexual abuse reported lower HRQOL. However, CSA did not significantly relate to depressive symptoms.

Relationships between Resilience, Depressive Symptoms, and HRQOL

To determine if higher levels of resilience would relate to lower depressive symptoms and higher HRQOL, multiple linear regressions were conducted while controlling for covariates of age, education, employment, income, HIV status, and enrollment wave. In block 1, covariates were entered, in block 2, resilience was entered as a main effect, and the outcomes were depressive symptoms or HRQOL. Separate regressions were conducted for the two outcomes (i.e. HRQOL and depressive symptoms). Findings indicated that resilience was significantly negatively related to depressive symptoms ($\beta = -.49, t = -7.98, p = .001, R^2 = .35$) and significantly positively related to HRQOL ($\beta = .27, t = 3.67, p = .001, R^2 = .22$) such that higher resilience related to lower depressive symptoms and higher HRQOL.

An additional regression analysis was conducted to explore the relationship between depressive symptoms and HRQOL. In this regression, covariates were entered in block 1, depressive symptoms were entered as the main effect in block 2, and HRQOL was the outcome; and results showed that higher depressive symptoms significantly related to lower HRQOL ($\beta = -.44$, $t = -6.14$, $p = .001$, $R^2 = .32$).

Resilience Moderating the Relationships between CSA, Depressive Symptoms, and HRQOL

To determine whether resilience moderated the relationships between CSA and depressive symptoms and between CSA and HRQOL, hierarchical multiple linear regressions were conducted. Regression analyses included the covariates: income, education, employment, age, enrollment wave and HIV status entered in block 1; the main effects CSA and resilience entered as predictors in block 2; and dummy variables representing the interaction of resilience with CSA entered in block 3. The outcomes, depressive symptoms and HRQOL scores, were analyzed in separate regressions. Results showed that the interaction between resilience and CSA significantly related to depressive symptoms ($\beta = -.16$, $t = -2.73$, $p = .01$, $R^2 = .39$), but did not significantly relate to HRQOL. To interpret the significant interaction between resilience and CSA predicting depressive symptoms using methods suggested by Holmbeck (40, 41), women's resilience scores were divided into low (≤ 1 SD below mean, $n = 38$) and high (≥ 1 SD above mean, $n = 43$) resilience groups. Regressions were run separately for each group with covariates entered in block 1, CSA as the main effect in block 2, and depressive symptoms as the outcome. The nature of the relationship between resilience and depressive symptoms differed based on level of resilience, in that CSA significantly related to higher depressive symptoms only for women scoring low in resilience ($\beta = .32$, $t = 2.15$, $p = .04$, $R^2 = .43$) but not for women scoring high in resilience, as displayed in Figure 1.

Discussion

This is the first study to report that among HIV-positive and at-risk women, resilience significantly moderated the relationship between CSA and depressive symptoms. These findings are important given the high prevalence of abuse among HIV-positive and demographically similar women and the negative consequences of trauma, particularly during childhood in this population (3, 5, 42). These findings are consistent with results by Wingo and colleagues (30), who found that resilience moderated the relationships between trauma and depression scores in a community sample such that the high resilience group reported lower depression scores than the medium and low resilience groups. Results also showed that higher resilience significantly related to lower depressive symptoms and higher health-related quality of life in the current sample, which is consistent with three previous studies of resilience and hardiness (a construct similar to resilience) among HIV-positive individuals (32-34).

In developing the CD-RISC, Connor and Davidson (9) viewed resilience as consisting of both personal qualities that help an individual to succeed in the face of adversity and as a measure of successful coping/adaption in response to stress. The CD-RISC captures both

personality traits and successful coping via items such as “I am able to adapt when changes occur” and “I think of myself as a strong person when dealing with life’s challenges and difficulties”. Women with CSA who score highly on this scale are endorsing items that indicate that they have a positive view of themselves as strong and as capable of dealing with adversity, a view which is in contrast to the negative view of the self often endorsed by individuals with depressive symptoms (43). Women high in resilience may not be as susceptible to depressive symptoms or may respond more adaptively to the onset of depressive symptoms (e.g., by seeking support) and therefore prevent further exacerbation of depressive symptoms. It is also possible that resilience and low depressive symptoms are linked by a commonality in self-presentation or response bias: women who are likely to report they are strong and confident may also be less likely to report any vulnerabilities such as depressive symptoms (44, 45).

Resilience did not moderate the relationship between CSA and health-related quality of life and similarly, no previous literature has reported a significant moderation. The health-related quality of life measure asks about the participants’ views of their health and how their health interferes with functioning in other areas of their lives (e.g., social). CSA has negative physical health outcomes for survivors (46, 47) and high levels of resilient coping strategies may not buffer the underlying physical consequences of CSA (and the consequent impact on their health-quality of life). Conversely, low resilience may not worsen the physical sequelae of CSA. However, irrespective of CSA history, higher resilience scores significantly related to higher health-related quality of life among the entire sample of women with and at-risk for HIV. Future studies are needed to expand an understanding of why resilience did not moderate the relationship between CSA and health-related quality of life, but did moderate the relationship between CSA and depressive symptoms. Perhaps for women with a history of CSA high scores on resilient coping strategies are especially beneficial in buffering against negative mood states, but do not affect physical health-related functioning.

Women with HIV reported significantly lower health-related quality of life than HIV-negative women. This is consistent with previous literature and with the additional health burden faced by HIV-positive women (48-51). This study did not find a significant difference in depressive symptoms scores by HIV serostatus, which is in accordance with previous findings among the WIHS cohort (52, 53). The HIV+ and HIV- women in the sample are socio-demographically similar and experience many of the same vulnerabilities and stressors associated with low socioeconomic status (36), which may partly explain this lack of difference in depressive symptoms. Women with HIV may also gain access to resources through HIV programs that are not otherwise available and that may alleviate some stressors. This may also in part account for the lack of difference in depressive symptoms between HIV-positive and HIV-negative women.

Results indicated that women with a history of childhood sexual abuse reported lower health-related quality of life. Childhood sexual abuse did not significantly relate to higher depressive symptoms in the sample, which is inconsistent with the literature noting that CSA relates to higher depressive symptoms in adulthood (54). Perhaps the study was limited by sample size in detecting significant relationships between CSA and depressive symptoms. In

addition, women in the sample who did not report CSA may have been exposed to other forms of childhood/adult trauma and environmental stressors, such as racial and gender discrimination (25) that may account for the lack of difference in depressive symptoms between women with a history of CSA and those without.

Findings that resilience mitigates the relationship between childhood sexual abuse and depressive symptoms, and relates to lower depressive symptoms and higher health-related quality of life among HIV+ and HIV- women, makes a new contribution to the literature and highlights the importance of promoting resilience in prevention and intervention strategies. Increasing resilience among HIV-positive and HIV-negative women could lower depressive symptoms and could increase health-related quality of life. Focusing on resilience could also mitigate the impact of CSA on depressive symptoms, thus potentially promoting better physical health outcomes, since depressive symptoms are associated with HIV medication nonadherence and disease progression (55, 56).

Previous literature supports the feasibility and possible effectiveness of a resilience intervention for HIV-positive and HIV-negative women with histories of CSA. Among women and men with HIV and reporting histories of CSA, Sikkema and colleagues (57, 58) found that interventions for enhancing adaptive coping with HIV and CSA (thereby promoting resilience) reduced traumatic stress symptoms and the frequency of unprotected sexual intercourse. A resilience intervention for women with or at-risk for HIV might potentially consist of sessions on (1) psychoeducation about abuse and its impact on the health of women with HIV or at-risk (2) resilient coping strategies that are relevant for women with HIV or women at-risk (e.g. believing that you can adapt to changes in medications for illness management) and (3) having women reflect or write about (a) evidence of their resilience based on their past and present experiences and (b) new strategies women will try to enhance their resilience and attain future goals. Additional research needs to be conducted to better understand factors that contribute to higher resilience among women with and at-risk for HIV as well as to develop and test a resilience intervention for this population.

Findings from this study should be interpreted within the context of the limitations of a cross-sectional study design that prevents drawing causal conclusions, potential recall bias regarding CSA, missing HRQOL data for some women newly enrolled in WIHS, and the use of self-report measures of resilience, depressive symptoms, and HRQOL that are subject to social desirability and impression management factors. In addition, some have argued that resilience is better understood as a trajectory of healthy functioning following a traumatic event (13), and therefore longitudinal designs examining the resilience trajectory of HIV-positive and HIV-negative women are needed. Nonetheless, the finding that a cross-sectional measure of resilience was significantly related to lower depressive symptoms and higher quality of life, and buffered the impact of CSA on depressive symptoms, provides a foundation for future studies of resilience among women with and at-risk for HIV and the development of prevention and intervention efforts.

Acknowledgments

Data in this manuscript were collected by the Chicago CORE Center site of the Women's Interagency HIV study (WIHS), which is funded by the National Institute of Allergy and Infectious Diseases Grant U01-AI-34994 (PI, Dr. Mardge Cohen) and co-funded by the National Cancer Institute and National Institute of Drug Abuse. Sannisha K. Dale was funded by a National Research Service Award (#F31MH095510) from the National Institute of Mental Health. Kathleen M. Weber was also funded in part by P30-AI082151. The contents of this publication are solely the responsibility of the authors and do not necessarily represent the views of the National Institutes of Health. We are grateful to the WIHS participants in this study and to WIHS staff Cheryl Watson, Crystal Winston, Darlene Joiner, Sally Urwin, Maria Pyra MPH, and Jane K. Burke-Miller PhD who assisted with data collection and management.

References

- Centers for Disease Control and Prevention. HIV Surveillance - Epidemiology of HIV Infection (through 2011). 2013. Available from: <http://www.cdc.gov/hiv/topics/surveillance/resources/slides/general/index.htm>
- Parillo KM, Freeman RC, Collier K, Young P. Association between early sexual abuse and adult HIV-risky sexual behaviors among community-recruited women. *Child Abuse Negl.* 2001; 25(3): 335–46. [PubMed: 11414393]
- Cohen M, Deamant C, Barkan S, Richardson J, Young M, Holman S, et al. Domestic violence and childhood sexual abuse in HIV-infected women and women at risk for HIV. *Am J Public Health.* 2000; 90:560–5. [PubMed: 10754970]
- Gielen AC, McDonnell KA, Wu AW, O'Campo P, Faden R. Quality of life among women living with HIV: the importance violence, social support, and self care behaviors. *Soc Sci Med.* 2001; 52(2):315–22. [PubMed: 11144787]
- Cohen MH, Cook JA, Grey D, Hanau LH, Levine AM, Wilson TE, et al. Medically eligible women who do not use HAART: The importance of abuse, drug use, and race. *Am J Public Health.* 2004; 94(7):1147–51. [PubMed: 15226135]
- Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Arch Gen Psychiatry.* 2005; 62(6):593–602. [PubMed: 15939837]
- Ickovics JR, Hamburger ME, Vlahov D, Schoenbaum EE, Schuman P, Boland RJ, et al. Mortality, CD4 cell count decline, and depressive symptoms among HIV-seropositive women: longitudinal analysis from the HIV Epidemiology Research Study. *JAMA.* 2001; 285(11):1466–74. [PubMed: 11255423]
- Campbell-Sills L, Stein MB. Psychometric analysis and refinement of the connor–davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. *J Trauma Stress.* 2007; 20(6):1019–28. [PubMed: 18157881]
- Connor KM, Davidson JRT. Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depress Anxiety.* 2003; 18(2):76–82. [PubMed: 12964174]
- Masten AS, Best KM, Garmezy N. Resilience and development: Contributions from the study of children who overcome adversity. *Dev Psychopathol.* 1990; 2(04):425–44.
- Jacelon CS. The trait and process of resilience. *J Adv Nurs.* 1997; 25(1):123–9. [PubMed: 9004020]
- Olsson CA, Bond L, Burns JM, Vella-Brodrick DA, Sawyer SM. Adolescent resilience: a concept analysis. *J Adolesc.* 2003; 26(1):1–11. [PubMed: 12550818]
- Bonanno GA. Uses and abuses of the resilience construct: loss, trauma, and health-related adversities. *Soc Sci Med.* 2012; 74(5):753–6. [PubMed: 22300714]
- Bonanno GA, Galea S, Bucchiarelli A, Vlahov D. Psychological resilience after disaster: New York City in the aftermath of the September 11th terrorist attack. *Psychol Sci.* 2006; 17(3):181–6. [PubMed: 16507055]
- Charney DS. Psychobiological mechanisms of resilience and vulnerability: implications for successful adaptation to extreme stress. *Am J Psychiatry.* 2004; 161(2):195–216. [PubMed: 14754765]

16. Caspi A, Sugden K, Moffitt TE, Taylor A, Craig IW, Harrington H, et al. Influence of life stress on depression: moderation by a polymorphism in the 5-HTT gene. *Science*. 2003; 301(5631):386–9. [PubMed: 12869766]
17. Tannenbaum B, Anisman H. Impact of chronic intermittent challenges in stressor-susceptible and resilient strains of mice. *Biol Psychiatry*. 2003; 53(4):292–303. [PubMed: 12586448]
18. Waaktaar T, Torgersen S. Genetic and environmental causes of variation in trait resilience in young people. *Behav Genet*. 2012; 42(3):366–77. [PubMed: 22101958]
19. Young AH, Gallagher P, Porter RJ. Elevation of the cortisol-dehydroepiandrosterone ratio in drug-free depressed patients. *Am J Psychiatry*. 2002; 159(7):1237–9. [PubMed: 12091208]
20. Haskett ME, Nears K, Ward CS, McPherson AV. Diversity in adjustment of maltreated children: factors associated with resilient functioning. *Clin Psychol Rev*. 2006; 26(6):796–812. [PubMed: 16797807]
21. Wells M. Resilience in rural community-dwelling older adults. *J Rural Health*. 2009; 25(4):415–9. [PubMed: 19780924]
22. Centers for Disease Control and Prevention. HIV infection among heterosexuals at increased risk — United States, 2010. *Morb Mortal Wkly Rep*. 2013; 62(10):183–8.
23. Demarco R, Lynch MM, Board R. Mothers who silence themselves: a concept with clinical implications for women living with HIV/AIDS and their children. *J Pediatr Nurs*. 2002; 17(2):89–95. [PubMed: 12029602]
24. Whetten K, Reif S, Whetten R, Murphy-McMillan LK. Trauma, mental health, distrust, and stigma among HIV-positive persons: Implications for effective care. *Psychosom Med*. 2008; 70(5):531–8. [PubMed: 18541904]
25. Watson JM, Scarinci IC, Klesges RC, Slawson D, Beech BM. Race, socioeconomic status, and perceived discrimination among healthy women. *J Womens Health Gend Based Med*. 2002; 11(5):441–51. [PubMed: 12165161]
26. Semple S, Patterson T, Shaw W, Straits-Tröster K, Atkinson JH, Grant I. HIV-seropositive parents: Parental role strain and depressive symptoms. *AIDS Behav*. 1997; 1(4):213–24.
27. Kelso GA, Cohen MH, Weber KM, Dale SK, Cruise RC, Brody LR. Critical consciousness, racial and gender discrimination, and HIV disease markers in African American women with HIV. *AIDS Behav*. 2013
28. Davidson J, Stein DJ, Rothbaum BO, Pedersen R, Szumski A, Baldwin DS. Resilience as a predictor of treatment response in patients with posttraumatic stress disorder treated with venlafaxine extended release or placebo. *J Psychopharmacol*. 2012; 26(6):778–83. [PubMed: 21926426]
29. Sexton MB, Byrd MR, von Kluge S. Measuring resilience in women experiencing infertility using the CD-RISC: examining infertility-related stress, general distress, and coping styles. *J Psychiatr Res*. 2010; 44(4):236–41. [PubMed: 19665730]
30. Wingo AP, Wrenn G, Pelletier T, Gutman AR, Bradley B, Ressler KJ. Moderating effects of resilience on depression in individuals with a history of childhood abuse or trauma exposure. *J Affect Disord*. 2010; 126(3):411–4. [PubMed: 20488545]
31. Scali J, Gandubert C, Ritchie K, Soulier M, Ancelin ML, Chaudieu I. Measuring resilience in adult women using the 10-items Connor-Davidson Resilience Scale (CD-RISC). Role of trauma exposure and anxiety disorders. *PloS One*. 2012; 7(6):e39879. [PubMed: 22768152]
32. Yu XN, Lau JTF, Mak WWS, Cheng YM, Lv YH, Zhang JX. Risk and protective factors in association with mental health problems among people living with HIV who were former plasma/blood donors in rural China. *AIDS Care*. 2009; 21(5):645–54. [PubMed: 19444674]
33. Farber EW, Schwartz JA, Schaper PE, Moonen DJ, McDaniel JS. Resilience factors associated with adaptation to HIV disease. *Psychosomatics*. 2000; 41(2):140–6. [PubMed: 10749952]
34. Spies G, Seedat S. Depression and resilience in women with HIV and early life stress: does trauma play a mediating role? A cross-sectional study. *BMJ Open*. 2014; 4(2)
35. Barkan SE, Melnick SL, Preston-Martin S, Weber K, Kalish LA, Miotti P, et al. WIHS Collaborative Study Group. The Women's Interagency HIV Study. *Epidemiology*. 1998; 9(2):117–25. [PubMed: 9504278]

36. Bacon MC, von Wyl V, Alden C, Sharp G, Robison E, Hessel N, et al. The Women's Interagency HIV Study: an observational cohort brings clinical sciences to the bench. *Clin Diagn Lab Immunol.* 2005; 12(9):1013–9. [PubMed: 16148165]
37. Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Appl Psychol Meas.* 1977; 1(3):385–401.
38. Cook JA, Grey D, Burke-Miller J, Anastos K, Richardson J, Young M, et al. Effects of treated and untreated depressive symptoms on highly active antiretroviral therapy use in a US multi-site cohort of HIV-positive women. *AIDS Care.* 2006; 18(2):93–100. [PubMed: 16338766]
39. Bozzette SA, Hays RD, Berry SH, Kanouse DE, Wu AW. Derivation and properties of a brief health status assessment instrument for use in HIV disease. *J Acquir Immune Defic Syndr Hum Retrovirol.* 1995; 8(3):253–65. [PubMed: 7859137]
40. Holmbeck, GN. Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Examples from the child-clinical and pediatric psychology literatures. In: Kazdin, AE., editor. *Methodological issues and strategies in clinical research.* 2nd ed.. American Psychological Association; Washington, DC: 1998. p. 83–112.
41. Holmbeck GN. Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. *J Pediatr Psychol.* 2002; 27(1):87–96. [PubMed: 11726683]
42. Machtinger EL, Haberer JE, Wilson TC, Weiss DS. Recent trauma is associated with antiretroviral failure and HIV transmission risk behavior among HIV-positive women and female-identified transgenders. *AIDS Behav.* 2012; 16(8):2160–70. [PubMed: 22426597]
43. Beck, AT.; Alford, BA. *Depression: Causes and treatment.* 2nd ed.. University of Pennsylvania Press; Baltimore, MD, US: 2009.
44. Arce E, Simmons AN, Stein MB, Winkelman P, Hitchcock C, Paulus MP. Association between individual differences in self-reported emotional resilience and the affective perception of neutral faces. *J Affect Disord.* 2009; 114(1-3):286–93. [PubMed: 18957273]
45. Surguladze SA, Young AW, Senior C, Brébion G, Travis MJ, Phillips ML. Recognition accuracy and response bias to happy and sad facial expressions in patients with major depression. *Neuropsychology.* 2004; 18(2):212–8. [PubMed: 15099143]
46. Wilson DR. Health consequences of childhood sexual abuse. *Perspect Psychiatr Care.* 2010; 46(1): 56–64. [PubMed: 20051079]
47. Midei AJ, Matthews KA, Chang YF, Bromberger JT. Childhood physical abuse is associated with incident metabolic syndrome in mid-life women. *Health Psychol.* 2013; 32(2):121–7. [PubMed: 22775234]
48. Ingram D, Hutchinson SA. HIV-positive mothers and stigma. *Health Care Women Int.* 1999; 20(1):93–103. [PubMed: 10335159]
49. Brody LR, Stokes LR, Dale SK, Kelso GA, Cruise RC, Weber KM, et al. Gender roles and mental health in women with and at risk for HIV. *Psychol Women Q.* 2014
50. Liu C, Weber K, Robison E, Hu Z, Jacobson LP, Gange SJ. Assessing the effect of HAART on change in quality of life among HIV-infected women. *AIDS Res Ther.* 2006; 3:6. [PubMed: 16549012]
51. McDonnell KA, Gielen AC, O'Campo P, Burke JG. Abuse, HIV status and health-related quality of life among a sample of HIV positive and HIV negative low income women. *Quality Life Res.* 2005; 14(4):945–57.
52. Rubin LH, Cook JA, Grey DD, Weber K, Wells C, Golub ET, et al. Perinatal depressive symptoms in HIV-infected versus HIV-uninfected women: a prospective study from preconception to postpartum. *J Women's Health.* 2011; 20(9):1287–95.
53. Richardson J, Barkan S, Cohen M, Back S, FitzGerald G, Feldman J, et al. Experience and covariates of depressive symptoms among a cohort of HIV infected women. *Soc Work Health Care.* 2001; 32(4):93–111. [PubMed: 11451159]
54. Sachs-Ericsson N, Blazer D, Plant EA, Arnow B. Childhood sexual and physical abuse and the 1-year prevalence of medical problems in the National Comorbidity Survey. *Health Psychol.* 2005; 24(1):32–40. [PubMed: 15631560]

55. Cook JA, Grey D, Burke J, Cohen MH, Gurtman AC, Richardson JL, et al. Depressive symptoms and AIDS-related mortality among a multisite cohort of HIV-positive women. *Am J Public Health*. 2004; 94(7):1133–40. [PubMed: 15226133]
56. Leserman J, Pence BW, Whetten K, Mugavero MJ, Thielman NM, Swartz MS, et al. Relation of lifetime trauma and depressive symptoms to mortality in HIV. *Am J Psychiatry*. 2007; 164(11): 1707–13. [PubMed: 17974936]
57. Sikkema KJ, Hansen NB, Kochman A, Tarakeshwar N, Neufeld S, Meade CS, et al. Outcomes from a group intervention for coping with HIV/AIDS and childhood sexual abuse: reductions in traumatic stress. *AIDS Behav*. 2007; 11(1):49–60. [PubMed: 16858634]
58. Sikkema KJ, Wilson PA, Hansen NB, Kochman A, Neufeld S, Ghebremichael MS, et al. Effects of a coping intervention on transmission risk behavior among people living with HIV/AIDS and a history of childhood sexual abuse. *J Acquir Immune Defic Syndr*. 2008; 47(4):506–13. [PubMed: 18176319]

Fig. 1.
Regression lines for associations between childhood sexual abuse and depressive symptoms as moderated by resilience

Note: CSA= Childhood sexual abuse. Score of 16 = cutoff for probable clinical depression.

Table I

Socio-demographic statistics, clinical characteristics, and subsample comparisons

	Entire sample (<i>N</i> = 202)	HIV + women (<i>n</i> = 138)	HIV – women (<i>n</i> = 64)	HIV+ and HIV– Comparison (χ^2)
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
Race				χ^2 (7, <i>N</i> = 202) = 3.58, <i>p</i> = .83
White / non-Hispanic	8 (4)	6 (4.3)	2 (3.1)	
White / Hispanic	10 (5)	6 (4.3)	4 (6.3)	
African-Amer / non-Hispanic	175 (87)	120 (87)	55 (85.9)	
African-Amer / Hispanic	3 (1.5)	1 (0.7)	2 (3.1)	
Other / Hispanic	3 (1.5)	2 (1.4)	1 (1.6)	
Other	3 (1.5)	3 (2.1)	0 (0.0)	
Education				χ^2 (5, <i>N</i> = 202) = 8.83, <i>p</i> = .12
Grade 11 or less	77 (38.1)	60 (43.4)	17 (26.6)	
Completed high school	58 (28.7)	38 (27.5)	20 (31.3)	
Some or completed college	65 (32.1)	38 (27.5)	27 (42.2)	
Attended/completed grad school	2 (1)	2 (1.4)	0 (0.0)	
Income				χ^2 (2, <i>N</i> = 200) = 11.30, <i>p</i> = .01
\$6,000 or less	55 (27.2)	30 (21.7)	25 (39.1)	
\$6,001-\$12,000	79 (39.1)	64 (46.4)	15 (23.4)	
\$12,001 and above	66 (32.7)	42 (30.4)	24 (37.5)	
Employed	48 (23.8)	25 (18.1)	23 (35.9)	χ^2 (1, <i>N</i> = 201) = 8.05, <i>p</i> = .01
Marital Status				χ^2 (5, <i>N</i> = 201) = 5.85, <i>p</i> = .32
Legally/common-law marriage	31 (15.3)	20 (14.5)	11 (17.2)	
Not married but living with partner	13 (6.4)	9 (6.5)	4 (6.3)	
Widowed	13 (6.4)	12 (8.7)	1 (1.6)	
Divorced/Annulled	30 (14.9)	21 (15.2)	9 (14.1)	
Separated	19 (9.4)	15 (10.9)	4 (6.3)	
Never married	95 (47)	60 (43.5)	35 (54.7)	
		<i>Mean (SD)</i>		<i>t (p)/ χ^2</i>
Age	45.23 (8.43)	45.74 (8.38)	44.14 (8.50)	–1.25 (<i>p</i> = .21)
CSA	54 (26.7)	41 (29.7)	13 (20.3)	χ^2 (1, <i>N</i> = 198)= 2.05, <i>p</i> = .15
CD-RISC	29.14 (7.55)	28.82 (7.8)	29.84 (7.01)	.93 (<i>p</i> = .35)
CES-D	12.65 (10.58)	13.28 (10.83)	11.28 (9.96)	–1.29 (<i>p</i> = .20)
HRQOL	67.24 (20.76)	64.05 (20.68)	76.71 (18.14)	3.77 (<i>p</i> = .001)

Note. CSA = Childhood Sexual Abuse. CD-RISC = Connor-Davidson Resilience Scale - 10 item. CES-D = Center for Epidemiological Studies Depression Scale. HRQOL = Health-Related Quality of Life.

Table II

Partial correlations between socio-demographic variables and outcomes controlling for HIV status

Variable	1	2	3	4	5	6 ^a	7 ^a	8 ^a	9
1. Age									
2. Education Level	.02	--							
3. Employment Status	-.18*	.31***	--						
4. Household Income	.05	.31***	.39***	--					
5. Enrollment Wave	-.25***	.00	-.01	-.11	--				
6. CSA	.24**	.16*	.02	.06	-.36***	--			
7. CD-RISC	.002	.21**	.24**	.16*	-.09	-.06	--		
8. HRQOL	-.25**	.10	.24**	.12	.06	-.20*	.29***	--	
9. CES-D	.03	-.27***	-.18*	-.26***	.13	.13 ^t	-.50***	-.45***	--

Note. CSA = Childhood Sexual Abuse. CD-RISC = Connor-Davidson Resilience Scale - 10 item. HRQOL = Health-Related Quality of Life. CES-D = Center for Epidemiological Studies Depression Scale.

^t $P < .10$,

* $P < .05$,

** $P < .01$,

*** $P < .001$.

^a Analyses controlled for age, education, income, employment status, and enrollment wave.