Beyond Viral Suppression—The Impact of Cumulative Violence on Health-Related Quality of Life Among a Cohort of Virally Suppressed Patients

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Objective: To elucidate how and in what ways cumulative violence affects health-related quality of life (HRQoL) among a clinical cohort of virally stable people living with HIV.

Design: We used data from the University of North Carolina Center for AIDS Research HIV clinical cohort. Our analysis was limited to participants with an undetectable viral load (<200) and those who completed the Clinical, Sociodemographic, and Behavioral Survey between 2008 and 2017 (n = 284).

Methods: A path analysis was used to test our primary hypothesis that the effect of cumulative violence on HRQoL would be mediated through symptoms of post-traumatic stress disorder (PTSD), depressive symptoms, and HIV symptom distress.

Results: The impact of cumulative violence on HRQoL was fully mediated by symptoms of PTSD, depressive symptoms, and HIV symptom distress. Greater exposure to violence was associated with higher odds of PTSD symptoms ($P < 0.001$), increased depressive symptoms ($P < 0.001$), and increased HIV symptom distress ($P < 0.01$). HIV symptom distress displayed the largest association with HRQoL ($P < 0.001$), followed by depressive symptoms ($P = 0.001$) and PTSD symptoms ($P < 0.001$). These factors explained approximately 51% of the variance in HRQoL ($R^2 = 0.51$, $P < 0.001$).

Conclusions: Our findings indicate that addressing physical and mental health symptoms rooted in violent victimization should be a point of focus in efforts to improve HRQoL among people living with HIV who are virally stable.

INTRODUCTION

As antiretroviral therapy (ART) has become more accessible and potent, viral suppression among people living with HIV (PLWH) has grown exponentially.[1] Viral suppression significantly improves health outcomes for PLWH.[2,3] Furthermore, widespread achievement of viral suppression is essential to mitigating the spread of HIV[4–8] because maintenance of an undetectable viral load can effectively eliminate the transmission of HIV through sex[6,7] and minimize risk of perinatal transmission,[8] 2 major pathways to HIV acquisition. As such, viral suppression has long been noted as the end point of the HIV care continuum.[9] However, as more individuals move through this stage of care, the health and well-being of PLWH beyond initial achievement of viro-immunological stability has become increasingly important to researchers and clinicians.[10–14]

Many virally suppressed PLWH continue experiencing complex health challenges and low health-related quality of life (HRQoL).[3,10–18] HRQoL is a multidimensional construct representative of perceived overall well-being across physiological, psychological, and social domains, in the context of one's health status.[19–21] HRQoL is a measure of disease and treatment burden and often serves as an indicator of unmet needs that inhibit optimal health.[15–17,19–29] Low HRQoL is associated with adverse outcomes for PLWH[15–17,22–30] and could indicate risk of viral rebound.[25,30] Thus, evidence of low HRQoL among virologically stable PLWH has led to calls for including optimal HRQoL as a standard treatment target after viral suppression is achieved.[10–14] However, more research examining determinants of HRQoL among virally suppressed PLWH is needed to identify potential intervention targets.[10–14] To contribute to the emerging literature on HRQoL among this subgroup of PLWH, we sought to explore the influence of violent victimization on HRQoL in a clinical cohort of virally stable PLWH.

Violence and HRQoL

PLWH with a history of violent victimization have worse health outcomes and lower HRQoL compared with

those without such a history.[31–36] Psychosocial factors, such as violence, are a primary determinant of HRQoL for PLWH.[10,16,23] In a handful of studies examining HRQoL among virally suppressed PLWH, psychosocial risk, as well as mental health difficulties, and HIV symptom burden have been shown to predict lower HRQoL.[10–14,21–24,26–29] However, despite high rates of violent victimization within the PLWH population[31–34,36–42] and the known health effects of trauma on PLWH,[31–36] the influence of violence on HRQoL for virally suppressed PLWH has not been fully elucidated. Owing to the intersection of violence, HIV risk, and inequitable sociostructural conditions, a disproportionate number of PLWH are affected by violence.[31–34,36–42] Violence is associated with engagement in HIV risk behaviors and a higher likelihood of infection,[37–41] and health-related outcomes among persons already diagnosed with HIV, including poor mental health and HIV symptoms,[31–36,43] suboptimal ART adherence,[36,44,45] lower CD4 counts,[35,44–46] and higher viral loads.[35,44–46]

Violent Victimization and PLWH

Reported rates of violence exposure among PLWH range from 20% to 78% for intimate partner violence,[33,36,47–49] 19%–76% for childhood abuse,[33,34,47–50] and 32%–81% for lifetime abuse (abuse in childhood or adulthood).[32,33,49,50] Several reviews[33,34,36] have illustrated high rates of physical, sexual, and psychological abuse in childhood and adulthood. Pantalone et al[36] summarized rates of different forms of intimate partner violence for both men who have sex with men and women living with HIV. For men who have sex with men, the reported rates were 15%–39% for physical; 12%–33% for sexual, and 50%–73% for psychological. For women, the rates were 26%–62% for physical, 22%–44% for sexual, and 21% for psychological. Rates for sexual and physical abuse in adulthood among women with HIV were equally high in a meta-analytic study by Machtinger et al[33] (35.2% and 53.9%, respectively), as were rates of childhood sexual (39.3%) and physical abuse (42.7%). Similarly, Spies et al[34] reported documented rates of childhood abuse among PLWH ranging from 32% to 76% for sexual and 19%–64% for physical. Furthermore, evidence suggests that repeated exposure and polyvictimization are common.[32,34,36,47,48] For example, in one study,[32] 56% of women with HIV and a history of violence reported more than 5 incidents, and in 2 separate studies with PLWH,[47,48] 64.3% of men (of 154)[47] and 71.5% of women (of 137)[48] reported experiencing multiple types of abuse in their lifetime.

Violence and Illness Burden: the Accumulation of Risk Model

Violent victimization is known to affect HRQoL.[55] The mechanisms through which HRQoL is diminished may be explained by the accumulation of risk life-course model, which postulates that cumulative adversity over time is detrimental to psychological health and increases illness burden.[56,57] Violent victimization, depression, post-traumatic stress disorder (PTSD), and HIV symptom burden have each been identified as contributors to lower HRQoL

for PLWH.[43,44,47,48,51–54] Indeed, evidence suggests that for PLWH, cumulative violence may lead to increased health burden through effects on mental health and HIV symptoms.[32–36,43,44,46,51,52,58]

PTSD and depression often develop as a result of trauma.[31,45,59] PTSD is characterized by re-experiencing trauma, avoiding trauma reminders, increased arousal or reactivity, and cognitive and mood dysregulation.[60] Depression is characterized by persistent low mood.[61] Like violence, PLWH are disproportionately affected by PTSD and depression, with estimated global rates of 28% and 31%, respectively.[59,62] Among PLWH exposed to violence, risk of PTSD and depression is even greater.[33,34,43,44,51] Furthermore, violence, PTSD, and depression may function to exacerbate HIV symptom distress.[41,42,54,63] Common symptoms among persons exposed to violence, such as chronic pain, fatigue, and poor sleep,[64] overlap significantly with HIV symptom patterns found to predict lower HRQoL,[18,43] while symptoms of PTSD and depression are associated with markers of HIV symptom distress,[65] including bodily pain and other physical ailments[44] and challenges with role functioning.[44,63] Thus, it is plausible that the association between violence and HIV symptoms are partially explained by worsened mental health, all of which may contribute to lower HRQoL.

Current Study

The aim of this is to elucidate mechanisms through which cumulative violence affect HRQoL in a clinical cohort of PLWH who were in care and virally suppressed. Guided by the accumulation of risk model,[56,57] we hypothesized that the effect of cumulative violence on HRQoL would be mediated through PTSD symptoms, depressive symptoms, and HIV symptom distress. Moreover, we expected HIV symptom distress to be directly influenced by violence and symptoms of PTSD and depression and, in turn, affect HRQoL. We used structural equation modeling (SEM) to test our hypothesized model (Fig. 1), controlling for several factors known to influence HRQoL among PLWH, including socioeconomic status (SES), race/ethnicity, sex, social support, substance use, alcohol use, and comorbidity.
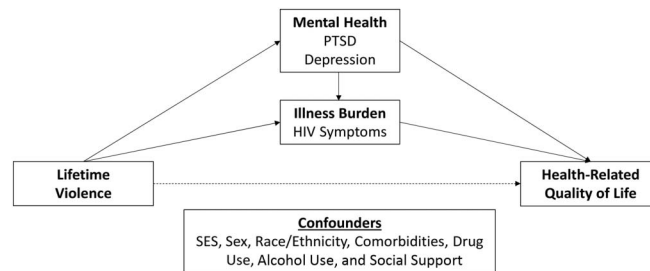

FIGURE 1. Hypothesized model.

METHODS

Study Design and Sample

We used secondary data from the University of North Carolina Center for AIDS Research (UNC CFAR) HIV clinical cohort[66] ($\underline{N}$ = 1636). Details regarding study design and characteristics of the full cohort are reported elsewhere.[67] We limited our analysis to participants who completed the Clinical, Sociodemographic, and Behavioral Survey (CSDBS; $\underline{n}$ = 347), administered between 2008 and 2017, and had an undetectable viral load (<200) 6 months before survey completion ($\underline{n}$ = 285). We excluded one case because a lack of information regarding sex and gender. Gender categories in the obtained data included transgender, female, and male; however, only one participant was identified as transgender and without an additional qualifier. Thus, we decided to exclude this case from the analysis ($\underline{n}$ = 284). This study was approved by UNC's Institutional Review Board.

Measures

Sociodemographics

Participants reported their age, race/ethnicity, sex, educational attainment, employment status, monthly household income, and housing stability using single items on the CSDBS. Race/ethnicity included Black (African American or non-Hispanic), White (non-Hispanic), Hispanic/Latino, Asian/Pacific Islander, Native American, Mixed, and Others. Owing to the small number of participants in all categories other than non-Hispanic Black and non-Hispanic White, race/ethnicity was collapsed into 2 categories, "non-Hispanic Black" and "Others." Sex consisted of "female" and "male". We used principal components analysis to construct a composite SES variable, following methods outlined in Friesen et al,[67] using employment (unemployed/employed), income ($0-166 to $8334+), education (high school degree or lower/college degree or higher), and housing stability (rent/own). A higher score for this composite variable reflects higher SES.

Alcohol and Substance Use

Potential alcohol misuse over a 1-year period was assessed using the Alcohol Use Disorders Identification Test (Audit-C).[68] It consists of 3 items, scored on a scale from 0 (never/1–2 times per week) to 4 (4 or more times per week/10 or more). Items are summed for a total score ranging from 0 to 12. Scores $\geq$ 3 indicate possible alcohol misuse. The alpha was 0.72 in this study.

A single item from the World Health Organization's Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST)[69] was used to assess substance use over the past year: "In the past year, have you used any illegal substances on a regular basis, say, at least one time per week?"

Social Support

Social support was assessed using a modified version of the Medical Outcomes Study Social Support Survey (MOS-SS)[70] consisting of 13 items. For each item, participants rate how often they have access to a given form of support from 1 (none of the time) to 5 (all of the time). Items are summed for a total score ranging from 13 to 65. In this study, the alpha was 0.95.

Comorbidities

Clinical data were used to determine whether participants were diagnosed with high cholesterol, diabetes, cardiovascular disease, hypertension, or other major medical conditions. A dichotomous variable was constructed to represent comorbidity, where "no comorbidity" = 0 and "comorbidity" = 1.

Cumulative Violence

Cumulative violence was assessed using 24 items from a subsection of the CSDBS. Participants responded "yes" or "no" to indicate whether they had ever experienced abuse in childhood ($\leq$12; 8 items), adolescence (13–17; 8 items), and adulthood ($\geq$17; 8 items). The 8 items were identical for each life stage—1 emotional abuse item, 1 physical abuse item, and 6 sexual abuse items. The emotional and physical abuse items were nonspecific and worded similarly; for example, "Have you ever been emotionally/physically abused...as a child/teenager/adult?" The 6 sexual abuse items reflected specific acts; for example, "Has anyone ever…exposed the sex organs of their body to you when you did not want it?…forced you to have sex when you did not want this?" Given this discrepancy, the sexual abuse items were collapsed into 3 binary variables to match the other abuse items (eg, Have you ever been sexually abused…as a child/teenager/adult). A positive endorsement for any 1 sexual abuse item in a given life stage was coded as "yes" for having ever experienced sexual abuse. A total score was calculated from 9 variables (3 emotional, 3 physical, and 3 sexual), where "no" = 0 and "yes" = 1. Scores ranged from 0 to 9. Higher scores indicate increased exposure to violence. The alpha in the current sample was 0.85.

PTSD

PTSD was assessed using the Primary Care PTSD,[71] which consists of 4 items describing PTSD symptoms. Participants indicate whether they have experienced each symptom (yes or no). A dichotomous variable was constructed to reflect the presence of symptoms, where "no symptoms" = 0 and "$\geq$ 1 symptom" = 1. The Primary Care PTSD has demonstrated adequate reliability (test–retest, r = 0.83).[72] The alpha in the current sample was 0.82.

Depressive Symptoms

The Patient Health Questionnaire-9[72] was used to assess depressive symptoms. Participants rate 9 items, from 0 (not at all) to 3 (nearly every day), to indicate the degree to which a given symptom was experienced over the past 2 weeks. Items are summed for a total score ranging from 0 to

27. Higher scores indicate greater severity of symptoms. The Patient Health Questionnaire-9 has demonstrated adequate reliability (α = 0.86–0.89) and construct validity.[73] In this study, the alpha was 0.84.

HIV Symptom Distress

The HIV Symptom Distress Scale (HIV-SDS)[73] was used to measure HIV symptom severity and consists of 20 items reflecting common HIV symptoms. Participants rate the degree to which each symptom has been bothersome over the past 4 weeks, from 0 ("I do not have this symptom") to 4 ("It bothers me a lot"). Items are summed for a total score. Higher scores indicate greater symptom distress. The HIV-SDS has demonstrated adequate reliability (α = 0.85–0.93) and construct validity.[74] In this study, the alpha was 0.90.

Health-Related Quality of Life

HRQoL was assessed using the EuroQol 5-dimensions, 3-levels (EQ-5D-3L) Health-Related Quality of Life Scale.[74] The EQ-5D-3L assesses 5 dimensions of health: mobility, self-care, daily activities, pain/discomfort, and anxiety/depression. Each dimension is represented by 1 item and rated from 0 (no problems) to 2 (extreme problems). Items are summed for a total score and converted using the EQ-5D US preference-weighted index score algorithm.[75] Converted scores range from 0 to 1. Higher scores reflect greater HRQoL. In this study, the alpha was 0.70.[70]

Data Analysis

Univariate and bivariate statistics were used to examine all variables. Before testing the hypothesized model, statistical assumptions were assessed using SPSS (v27). Although skewness and kurtosis statistics were within appropriate ranges, data for several variables displayed ceiling and floor effects; therefore, bivariate correlations were obtained using the Spearman rank order correlation (rho; Table 1).[76] We conducted a path analysis using Mplus (v.8)[77] to evaluate our hypothesized model. Path analysis is a SEM technique used to assess empirically or theoretically determined relations between observed variables.[78] Adequacy of the model was evaluated based on fit with the observed data.[79] Owing to non-normal distribution of the data, we used maximum likelihood estimation to obtain standard errors and test statistics considered robust to non-normality.[80] We evaluated model fit using the following criteria: χ^2 test (X^2) > 0.05 (global fit); X^2 < 0.05 (local fit); Steiger–Lind root mean square error of approximation < 0.08; Bentler comparative fit index (CFI) > 0.90; and Tucker–Lewis Index (TLI) > 0.90; standardized root mean square residual (SRMR) < 0.10; and Hu and Bentler's[81] fit index combination criteria of CFI $\geq$ 0.96 and SRMR $\leq$ 0.09. We reviewed modification indices to consider whether respecification of the hypothesized model was appropriate.

RESULTS

Sample Characteristics

Sample characteristics are summarized in Table 2. The mean age for the sample was 46.73, 57.75% identified as male, 64.79% identified as non-Hispanic Black, and 38.73% were married or in a committed relationship. Overall, the sample was fairly low-SES. Only 22.52% reported owning their home, 48.07% had a high school degree/GED or less, 44.72% reported a monthly income of $\leq$ \$834%, and 34.85% were employed. The mean social support was 50.36 (SD = 13.06). Over half of the participants (61.40%) had at least 1 other medical condition, with the most common being hypertension (47.72%), followed by high cholesterol (36.14%). A quarter (23.94%) endorsed regular use of illicit substances in the past year. For alcohol consumption, the mean score was 1.75 (SD = 2.42), indicating an average score below the cut-off for misuse.

On average, participants endorsed 2.25 (SD = 2.60) exposures to sexual, physical, or emotional violence, in childhood, adolescence, or adulthood. Approximately 65% reported at least 1 exposure in their lifetime, with 40.78%

TABLE 1. Bivariate Correlations (Spearman Rank Order)

	1	2	3	4	5	6	7	8	9	10	11	12
1. HRQoL	—											
2. HIV symptom severity	−0.62***	—										
3. Lifetime violence	−0.35***	0.46***	—									
4. Depression	−0.58***	0.75***	0.43***	—								
5. PTSD	−0.48***	0.49***	0.41***	0.39***	—							
6. Social support	0.20***	−0.20***	−0.10	−0.23***	−0.18**	—						
7. Socioeconomic status	0.18**	−0.08	−0.03	−0.08	−0.15**	0.20**	—					
8. Alcohol use	0.06	0.06	0.04	−0.02	0.08	0.07	0.08	—				
9. Substance use	−0.12*	0.16**	0.10	0.16**	0.04	−0.16**	−0.20***	0.17**	—			
10. Sex	−0.15**	0.25***	0.23***	0.19***	0.24***	0.002	−0.20***	−0.21***	−0.10	—		
11. Race/Ethnicity	−0.15**	0.16***	0.11	0.21***	0.06	−0.01	0.32***	−0.03	−0.12*	−0.08	—	
12. Comorbidities	−0.03	0.01	−0.04	0.01	−0.04	−0.03	0.06	−0.062	−0.14**	0.11	0.03	—

***$P \leq$ .001. **$P \leq$ .01. *$P \leq$ .05.

Table 2. Sample Characteristics (n = 284)

Variable	Range	Mean (SD)	% of Sample
Age	20–82	46.73 (11.36)	—
Race/Ethnicity	—	—	—
Non-Hispanic Black	—	—	64.79
Sex	—	—	—
Female	—	—	42.25
Male	—	—	57.75
Socioeconomic status	−1.89–2.13	0.05 (0.99)	—
High school/GED or below	—	—	48.07
Employment (working)	—	—	34.85
Monthly income below $834	—	—	44.72
Housing stability (owns home)	—	—	22.53
Married/Committed	—	—	38.73
Substance use (yes)	—	—	23.94
Alcohol use	0–13	1.75 (2.42)	—
Comorbidities (yes)	—	—	61.40
PTSD symptoms (yes)	—	—	37.32
Violence	—	—	—
Lifetime violence (number of endorsed exposures)	0–9	2.25 (2.60)	—
Violence (any type at any life stage)	—	—	64.53
Childhood (any type)	—	—	40.78
Adolescence (any type)	—	—	36.65
Adulthood (any type)	—	—	50.18
Emotional (any life stage)	—	—	41.28
Physical (any life stage)	—	—	35.59
Sexual (any life stage)	—	—	52.48
HIV symptom distress	0–72	18.15 (15.86)	—
Depressive symptoms	0–26	4.98 (5.31)	—
Social support	13–65	50.36 (13.06)	—
HRQoL	0.18–1	0.81 (0.21)	—

reporting exposure to violence in childhood, 36.65% in adolescence, and 50.18% in adulthood. Regarding the type of violence, 52.48% endorsed exposure to sexual violence, 35.59%–physical violence, and 41.28% to emotional violence. Over a third (37.32%) endorsed the presence of ≥1 PTSD symptom. The mean score for depressive symptoms was 4.97 (SD = 5.31), reflecting an average score in the mild-to-moderate range for severity. The mean score for HIV symptom distress was 18.15 (SD = 15.86) and the mean HRQoL was 0.81 (SD = 0.21), suggesting somewhat high HRQoL overall.
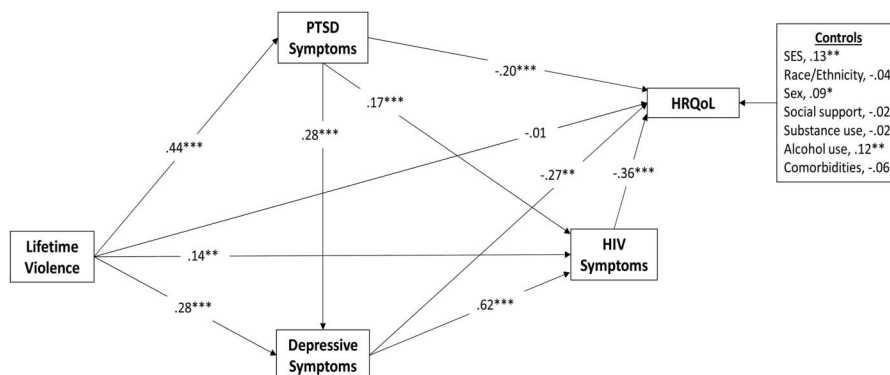
Path Analysis

The hypothesized model showed reasonable fit: global fit, χ^2 = 47.01, df = 21, P <0.001; local fit, χ^2 = 619.74, df = 38, P < 0.001; Root Mean Square Error of Approximation = 0.07; CFI = 0.96; TLI = 0.92; SRMR = 0.05.[78,80] No tenable adjustments were provided through the modification indices; thus, no changes were made to the model. The results of the final model are presented in Figure 2 and Table 3. Cumulative violence did not demonstrate a direct effect on HRQoL (β = −0.01, P = 0.91); however, it was associated with increased HIV symptom distress (β = 0.14, P < 0.01), odds of PTSD symptoms (odds ratio [OR] = 1.55; β = 0.44, P <0.001), and depressive symptoms (β = 0.28, P <0.001). A positive, direct effect of PTSD symptoms on depressive symptoms (β = 0.28, P <0.001) was observed. PTSD symptoms (β = 0.17, P <0.001) and depressive symptoms (β = 0.62, P <. 001) were predictive of increased HIV symptom distress. HIV symptom distress displayed the largest association with HRQoL (β = −0.36, P < 0.001), followed by depressive symptoms (β = −27, P = 0.001) and PTSD symptoms (β = −0.19, P < 0.001).

Cumulative violence explained approximately 20% of the variance in PTSD symptoms (R^2 = 0.20, P < 0.001). PTSD symptoms and cumulative violence explained approximately 22% of the variance in depressive symptoms (R^2 = 0.22, P < 0.001). In combination, cumulative violence, PTSD symptoms, and depressive symptoms explained an estimated 61% of the variance in HIV symptom distress (R^2 = 0.61, P < 0.001). Total direct effects accounted for approximately 51% of the variance in HRQoL (R^2 = 0.51, P < 0.001). All indirect paths from violence to HRQoL were statistically significant (see Table 3). The estimated total for indirect effects was −0.33 (P <0.001).

DISCUSSION

To the best of our knowledge, this study is the first to investigate links between cumulative violence and HRQoL explicitly among a sample of PLWH with a suppressed viral load. Our hypothesized model, informed by the accumulation of risk life-course model,[56,57] was supported by the results.

FIGURE 2. Path analysis standardized direct effect

TABLE 3. Path Analysis Direct and Indirect Effects

Direct Effects	*B*	SE	*β*	SE
Lifetime violence→HIV symptoms	0.82**	0.32	0.13**	0.05
PTSD→HIV symptoms	5.62***	1.58	0.17***	0.04
Depressive symptoms→HIV symptoms	1.85***	0.14	0.62***	0.04
Lifetime violence→depressive symptoms	0.56***	0.13	0.28***	0.06
PTSD→depressive symptoms	3.09***	0.63	0.28***	0.05
Lifetime violence→PTSD	0.08***	0.01	0.44***	0.05
Lifetime violence→HRQoL	−0.001	0.005	−0.01	0.06
Depressive symptoms→HRQoL	−0.01***	0.003	−0.27***	0.08
PTSD→HRQoL	−0.08***	0.02	−0.19***	0.05
HIV symptoms→HRQoL	−0.005***	0.001	−0.36***	0.07
Social support→HRQoL	0.00	0.001	−0.02	0.04
Substance use→HRQoL	−0.01	0.02	−0.02	0.05
Alcohol use→HRQoL	0.001**	0.004	0.12**	0.04
Comorbidities→HRQoL	−0.03	0.02	−0.06	0.04
SES→HRQoL	0.03**	0.01	0.13**	0.05
Race/Ethnicity→HRQoL	−0.01	0.02	−0.03	0.04
Sex→HRQoL	0.04*	0.02	0.09*	0.04

Indirect effects	*b*	SE	*β*	SE
Total indirect effects, lifetime violence→HRQoL	−0.03***	0.004	−0.33***	0.04
Lifetime violence→PTSD→HRQoL	−0.01***	0.002	−0.08***	0.03
Lifetime violence→depressive symptoms→HRQoL	−0.006**	0.002	−0.07**	0.03
Lifetime violence→HIV symptoms→HRQoL	−0.004*	0.002	−0.05*	0.02
Lifetime violence→depressive symptoms→HIV symptoms→HRQoL	−0.005**	0.002	−0.06***	0.02
Lifetime violence→PTSD→HIV symptoms→HRQoL	−0.002**	0.001	−0.03**	0.01
Lifetime violence→PTSD→depressive symptoms→HRQoL	−0.003**	0.001	−0.03**	0.01

b, unstandardized parameter estimate; *β*, standardized parameter estimates; SE, standard error
***$P ≤ .001$. **$P ≤ .01$. *$P ≤ .05$

The link between cumulative violence and HRQoL was fully mediated through symptoms of PTSD and depression and HIV symptom distress. Cumulative violence was directly associated with greater illness burden, as demonstrated through increased odds of PTSD symptoms, depressive symptomatology, and HIV symptom distress. In addition, symptoms of PTSD and depression directly contributed to greater HIV symptom distress. Altogether, these factors explained a significant portion of the variance in HRQoL.

Our results align with those from previous studies examining the effects of violence on HRQoL for PLWH.[43–48,51–54,81] For example, Pantalone et al[52] found adult and partner abuse exerted negative effects on HRQoL through increased mental health challenges among a sample of sexual minority men living with HIV. Similarly, among a sample of men and women living with HIV, Nightingale et al[81] found that exposure to severe traumatic stressors was correlated with physical and mental quality of life and predictive of increased chronic pain. Our findings indicate that the diminishing effect of violent victimization on HRQoL is also present among virally suppressed PLWH, and left unaddressed, could reduce the long-term durability of viral suppression. Although we did not address durability and thus cannot make definitive conclusions, evidence strongly suggests that trauma, mental health difficulties, and HIV symptom burden can influence factors relevant to durability, such as ART adherence.[18,35,36,45,59,65,82] Additional research is needed to investigate the potential influence of violence, poor mental health, and HIV symptom burden on indicators of disease progression after initial achievement of viral suppression.

Several other studies have indicated that mental health and HIV symptom burden are strong predictors of HRQoL among virally suppressed PLWH.[12,13,22–24,26–29] We add to this emerging literature by highlighting the role of violent victimization in connection to mental and physical health burden in a sample of virally suppressed PLWH, which may have meaningful implications for addressing HRQoL among this group. Treating physical and mental health symptoms rooted in traumatic experiences often requires specialized care,[31,35,55] thus ensuring adequate HRQoL for virally stable PLWH who have experienced violence may be contingent on access to effective evidence-based trauma treatment in addition to ongoing HIV care.[31–35,83–88] Our findings reiterate the need for trauma-informed treatment specific to PLWH and universal adoption of trauma-informed care in clinical HIV settings.[31,45,65,83–89]

Our study has several limitations to note. As we used cross-sectional data and our sample consisted of virally suppressed PLWH engaged in care, the results are not generalizable beyond the study participants. We were also unable to establish temporal precedence regarding depressive symptoms, HIV symptom distress, and HRQoL, which may be important to explore as the pathways modeled could be oriented differently or bidirectional associations among these variables may exist. In addition, inclusion of our control variables in the path model may have provided a more nuanced understanding of how violence influences HRQoL; however, we were limited in the number of model parameters we could reasonably estimate. Finally, our violence measure was not a validated instrument, and the items were not evenly distributed across the multiple forms of violence. It will be important to replicate these findings with a psychometrically sound measure of violence exposure.

In conclusion, violent victimization, such as HIV, can result in long-term physical and mental health complications.[55] Given the complex sequelae associated with both HIV and violence, research focused on the ways in which violence and HIV, together, affect long-term health for PLWH is essential.

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