

AIDS PATIENT CARE and STDs
Volume 29, Supplement 1, 2015
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DOI: 10.1089/apc.2014.0278

Substance Abuse, Violence, and HIV/AIDS (SAVA) Syndemic Effects on Viral Suppression Among HIV Positive Women of Color

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Abstract

The combined epidemics of substance abuse, violence, and HIV/AIDS, known as the SAVA syndemic, contribute to the disproportionate burden of disease among people of color in the US. To examine the association between HIV viral load suppression and SAVA syndemic variables, we used baseline data from 563 HIV+ women of color treated at nine HIV medical and ancillary care sites participating in HRSA's Special Project of National Significance Women of Color (WOC) Initiative. Just under half the women ($n=260$) were virally suppressed. Five psychosocial factors contributing to the SAVA syndemic were examined in this study: substance abuse, binge drinking, intimate partner violence, poor mental health, and sexual risk taking. Associations among the psychosocial factors were assessed and clustering confirmed. A SAVA score was created by summing the dichotomous (present/absent) psychosocial measures. Using generalized estimating equation (GEE) models to account for site-level clustering and individual-covariates, a higher SAVA score (0 to 5) was associated with reduced viral suppression; OR (adjusted)=0.81, 95% CI: 0.66, 0.99. The syndemic approach represents a viable framework for understanding viral suppression among HIV positive WOC, and suggests the need for comprehensive interventions that address the social/environmental contexts of patients' lives.

Introduction

ANTIRETROVIRAL THERAPY THAT ACHIEVES HIV virus suppression is recognized as an effective approach to preventing HIV transmission to uninfected sexual partners.¹ Therefore, in addition to being an important clinical indicator of patient health, viral suppression is also significant to public health. An estimated 26% of women in the US are virally suppressed.² African Americans are least likely to achieve viral suppression, at 21%, compared to 26% of Hispanic/Latinos, and 30% of whites.² A goal of the National HIV/AIDS Strategy is to increase the proportion of HIV-diagnosed blacks and Latinos with undetectable viral load by 20% by 2015.³ An improved understanding of the conditions contributing to these suppression-related disparities can inform intervention efforts.

Prevalent psychosocial problems can create barriers to achieving viral suppression among HIV positive women.^{4,5} These factors may negatively affect health outcomes in

myriad ways, including decreased engagement in HIV care,⁶ and reduced adherence to medications.^{7,8} An estimated 8% of HIV-positive people in the US abuse alcohol,^{9,10} while one-third of HIV patients receiving care report active drug use.¹⁰ Both alcohol and drug abuse are associated with poor ART adherence and viral suppression failure.¹⁰⁻¹² Approximately 55% of women living with HIV/AIDS have experienced intimate partner violence (IPV).¹³ A history of trauma, abuse, and violence for HIV-infected women is associated with decreased medication adherence,^{9,11,12} and increased viral load.^{13,14} Studies consistently document high prevalence of mental health disorders and symptomatology among HIV positive populations.¹⁵⁻¹⁷ In a sample of women living with HIV, Lopes et al. (2012) found 37.5% with a current DSM-V psychiatric disorder,¹⁵ of which depression is most consistently associated with decreased adherence.¹⁸ While findings have been mixed regarding the association between sexual risk taking and antiretroviral treatment, a 2004 meta-analysis of twelve studies examining the association of unprotected

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sexual intercourse or STIs with having an undetectable viral load found no association.¹⁹ These psychosocial problems frequently co-occur among HIV-positive women of color (WOC), potentially compounding their risk for poor clinical outcomes.

Research has documented the clustering of substance abuse, violence, and HIV/AIDS among marginalized groups,²⁰ referred to as the SAVA syndemic. A syndemic approach to health disparities directs us to consider the excess burden of “entwined and mutually enhancing health problems,”²¹ fueled by social and economic inequities.²² Though the SAVA-related psychosocial problems have been widely studied among HIV-positive women in the US,²³ and some research has looked at SAVA effects on mental health,⁷ few studies directly test syndemic models among this population, and none to our knowledge, have tested additive SAVA syndemic effects on viral load suppression among HIV-positive women in the US.

The application of the SAVA framework to viral suppression among women of color (WOC) demonstrates how the intersecting epidemics of substance abuse, binge drinking, intimate partner violence, poor mental health, sexual risk taking, and HIV/AIDS combine to impair health. Further, it may elucidate the complex relationships between psychosocial and health problems in order to inform effective interventions. The purpose of this study is to assess the utility of the SAVA syndemic approach for understanding viral suppression among HIV-positive WOC in the US.

Methods

Participant eligibility and recruitment

Participants were women enrolled in the Women of Color Initiative.²⁴ Eligibility for participation is fully described in Eastwood et al., (2014).²⁵ Participants were recruited via outreach to newly diagnosed women through HIV counseling and testing conducted by or in affiliation with each site or through site-outreach to clients who had not participated in care in the last year or had been lost to care for more than one year.

Survey development and data collection

As described in Eastwood et al.,²⁵ baseline surveys were developed by the cross-site Evaluation and Technical Assistance Center (ETAC) in conjunction with the nine sites.

Measures

Poor mental health. A question from the Health Related Quality of Life (HRQOL) measures from the Center for Disease Control and Prevention’s (CDC) Behavioral Risk Factor Surveillance System questionnaire assessed mental health.²⁶ Participants were asked, “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?” Scores of 14 and above indicate the presence of frequent mental health distress, which is used as a proxy for poor mental health. Fourteen days is used as the cutoff because of similarity to criteria used by clinicians to diagnose clinical depression and anxiety. This question from the CDC HRQOL has reported acceptable reliability and criterion validity compared to the mental health scales of the Medical Outcomes Study Short-form 36

(SF-36),²⁷ and acceptable test-retest reliability in a representative sample of Missouri adults (mentally unhealthy days ICC=0.67; dichotomized frequent mental distress $\kappa=0.58$).²⁸

Intimate Partner Violence. Lifetime experience of Intimate Partner Violence was measured by the Woman’s Experience with Battering (WEB), a standard scale developed to capture the way women perceive violence done to them.²⁹ Women were asked to think of their current partner if they had one, or if not, to think of any partner in the past when answering the questions. The 10-item WEB is ranked on a six-point scale from strongly disagree to agree strongly. The scale has been found to have high internal consistency and reliability ($\alpha=0.99$).²⁹ Scores of 20+ on the Women’s Experience with Battering scale indicate a positive screening for intimate partner violence.²⁹

Behavioral risks. Behavioral risks were assessed using questions from the Dynamics of Care assessment.³⁰ These questions assessed substance use, binge drinking, and sexual risk taking, and participants noted the frequency with which they participated in each behavior, ranging from never, not in the last 3 months, and in the last 3 months.

Substance abuse. Participants were asked if they ever used any of the following: heroin, crack, amphetamines, ecstasy, crystal meth, and injected drugs. An affirmative response to any of the questions was coded as positive for substance use.

Binge drinking. The following question assessed binge drinking, “During the past 30 days, how often have you had 5 or more drinks of alcohol in a row, that is within a couple of hours (e.g., 2–4 hours)?” All response options excluding ‘never’ were coded as positive for binge drinking.

Sexual risk behaviors. Participants were asked if they ever engaged in any of the following sexual risk behaviors: sex for money and/or other goods, sex with an injection drug user, sex with someone who is HIV positive, as well as unprotected sex within the last 3 months. An affirmative response to any of the questions was coded as positive for sexual risk behaviors.

SAVA score. The SAVA score (0–5) was created by summing the dichotomous measures (present/absent) of poor mental health, intimate partner violence, substance use, binge drinking, and sexual risk behaviors.

Covariates

Demographics included as covariates in adjusted models are categorical age (<25 years, 25–34 years, 35–44 years, 45–54 years, 55–64 years, and ≥ 65 years); categorical race/ethnicity (Hispanic/Latina, non-Hispanic black, other including multi-racial); dichotomous education (less than high school and high school graduation or more); categorical employment status (working full- or part-time, disabled, not working at all); categorical housing status (rent/own, institution-dwelling, live in someone else’s home, live on the street/single room occupancy), and dichotomous insurance (any insurance versus no insurance/self-pay). Transgendered women were excluded from these analyses as they may

differ systematically from non-transgendered women on the psychosocial variables,³¹ and there were too few included in the analysis data set ($n = 10$) to provide stable estimates.

Outcome variable

HIV RNA suppression was abstracted from women's medical charts. The variable was dichotomized into suppressed (< 200 copies/mL) and not suppressed ($\geq 200 +$ copies/mL).

Data analysis

Survey responses were matched to chart abstraction data for participants and only women with an HIV RNA test within 90 days of the baseline survey were included in the data analysis set. Initially, we examined women's socio-demographic characteristics, the prevalence of each psychosocial problem and viral suppression. Next, we assessed the associations among the psychosocial variables. Because the women were clustered within sites that were geographically and sociodemographically different from each other, and we anticipated women within sites would be more similar to each other than would occur by chance, we accounted for site-specific clustering using a robust variance estimator, in both unadjusted and adjusted models. Generalized estimating equations (GEEs), with the binomial family, logit link, and robust variance estimator, were used to predict each psychosocial variable as a function of the all other psychosocial variables. For instance, mental health was predicted as a function of substance use, binge drinking, intimate partner violence, and sexual risk taking. This was done in the unadjusted and adjusted contexts. Next, using the same GEE structure, we modeled the dichotomous viral load outcome as a function of each of the psychosocial problem variables singly, in unadjusted and adjusted models. Finally, in an effort to assess the summative effects of the psychosocial problems, we added the psychosocial problems to create a SAVA score and looked for evidence of a dose-response relationship between higher values of the SAVA score and viral load suppression. Our final GEE models assessed viral load suppression as a function of the SAVA score in unadjusted and adjusted models.

Results

Participants included 564 HIV + WOC with an HIV RNA test within 90 days of baseline interview (Table 1). Approximately 10% of women were less than 25, 20% were 25–34, 31% were 35–44, 31% 45–54, 8% were 55–64, and 1% were ≥ 65 . Just over 67% of women were black non-Hispanic, while nearly 26% were Hispanic/Latina. Forty percent of participants had not graduated from high school or earned a GED. Most women were not working (56%), while 23% and 20% were either disabled or working full- or part-time. The majority of women (approximately 65%) either rented or owned their home, nearly one-fourth (23%) lived in someone else's home, 6% lived in an institution, and 6% were living on the street or in a single room occupancy. About 31% of the sample had no insurance. More than half the women (54%) reported ever using substances, and 73% reported engaging in sexual risk behaviors. Almost 40% of women reported poor mental health (14 or more mentally unhealthy days), and 27% had scores consistent with experiencing intimate partner violence. Only 9% reported binge drinking in the past 30 days.

TABLE 1. BASELINE SAMPLE CHARACTERISTICS OF 564 HIV-POSITIVE WOMEN OF COLOR FROM NINE STUDY SITES PARTICIPATING IN THE HRSA-SPNS WOMEN OF COLOR INITIATIVE

Continuous HIV-positive years Characteristic	Mean = 8.4, SD = 7.6 n (%)
Age	
< 25	57 (10.1)
25–34	111 (19.7)
35–44	174 (30.9)
45–54	173 (30.7)
55–64	44 (7.8)
≥ 65	5 (0.9)
Race/ethnicity	
Hispanic/Latina	144 (25.5)
Non-Hispanic black	379 (67.2)
Other	38 (6.7)
Education	
Less than high school	226 (40.1)
High school graduation +	338 (59.9)
Employment	
Working PT/FT	115 (20.4)
Disabled	131 (23.2)
Not working/other	318 (56.4)
Housing	
Rent/own	366 (64.9)
Someone else's home	127 (22.5)
Institution	36 (6.4)
Street/SRO	34 (6.0)
Health Insurance	
Any insurance	381 (67.6)
No insurance	176 (31.2)
Viral load (copies/ml)	
< 200 suppressed	260 (46.1)
> 200 not suppressed	303 (53.7)
Poor mental health	
≥ 14 mentally unhealthy days	216 (38.3)
< 14 mentally unhealthy days	340 (60.3)
Substance use	
Ever used	307 (54.4)
Never used	257 (45.6)
Binge drinking in past 30 days	
Yes	48 (8.5)
No	516 (91.5)
Intimate partner violence	
Yes	154 (27.3)
No	410 (72.7)
Sexual risk behaviors	
Yes	409 (72.5)
No	155 (27.5)

To explore the clustering among the SAVA variables, models were developed for each single SAVA variable as the outcome, with the other four SAVA variables modeled together as predictors (Table 2). In the unadjusted models, the odds of reporting poor mental health (as the outcome) were increased when women also reported substance use (OR = 1.43, 95% CI = 1.07, 1.90), binge drinking (OR = 1.63, 95% CI = 1.10, 2.40), IPV (OR = 1.89, 95% CI = 1.26, 2.83), and sexual risk taking (OR = 1.35; 95% CI: 1.03, 1.76). When

TABLE 2. ASSOCIATION FOR EACH SAVA VARIABLE WITH ALL OTHER SAVA VARIABLES IN UNADJUSTED (ONLY SITE-ADJUSTED) AND ADJUSTED (INDIVIDUAL COVARIATE AND SITE-ADJUSTED) MODELS AMONG 564 HIV-POSITIVE WOMEN OF COLOR FROM NINE STUDY SITES PARTICIPATING IN THE HRSA-SPNS WOMEN OF COLOR INITIATIVE

	<i>Unadjusted models (only includes other SAVA variables)</i>				
	<i>OR (95% CI)</i> <i>Poor mental health</i>	<i>OR (95% CI)</i> <i>Substance abuse</i>	<i>OR (95% CI)</i> <i>Binge drinking</i>	<i>OR (95% CI)</i> <i>Intimate partner violence</i>	<i>OR (95% CI)</i> <i>Sexual risk taking</i>
Poor mental health	—	1.41 (1.04, 1.91)	1.61 (1.10, 2.37)	1.94 (1.30, 2.89)	1.34 (1.02, 1.76)
Substance use	1.43 (1.07, 1.90)	—	2.92 (1.52, 5.59)	1.50 (0.89, 2.53)	3.56 (2.24, 5.65)
Binge drinking	1.63 (1.10, 2.40)	2.82 (1.47, 5.41)	—	1.11 (0.58, 2.09)	0.87 (0.59, 1.27)
Intimate partner violence	1.89 (1.26, 2.83)	1.48 (0.88, 2.50)	1.09 (0.59, 2.02)	—	1.24 (0.99, 1.55)
Sexual risk taking	1.35 (1.03, 1.76)	3.51 (2.20, 5.61)	.87 (0.60, 1.26)	1.23 (0.98, 1.56)	—
	<i>Adjusted^a models (also includes other SAVA variables)</i>				
	<i>OR (95% CI)</i> <i>Poor mental health</i>	<i>OR (95% CI)</i> <i>Substance abuse</i>	<i>OR (95% CI)</i> <i>Binge drinking</i>	<i>OR (95% CI)</i> <i>Intimate partner violence</i>	<i>OR (95% CI)</i> <i>Sexual risk taking</i>
Poor mental health	—	1.49 (1.05, 2.12)	1.37 (0.78, 2.41)	2.04 (1.32, 3.16)	1.41 (0.98, 2.02)
Substance use	1.56 (1.09, 2.22)	—	3.46 (0.99, 12.07)	1.26 (0.68, 2.31)	4.74 (2.33, 9.64)
Binge drinking	1.47 (0.85, 2.52)	3.09 (1.00, 9.54)	—	1.13 (0.57, 2.25)	1.00 (0.62, 1.60)
Intimate partner violence	1.99 (1.29, 3.07)	1.27 (0.69, 2.32)	1.16 (0.55, 2.49)	—	1.30 (1.01, 1.68)
Sexual risk taking	1.43 (1.01, 2.03)	4.70 (2.28, 9.68)	.91 (0.59, 1.41)	1.28 (0.98, 1.67)	—

^aAdjusted for dichotomous insurance and education, categorical age, race, employment, and housing, and continuous years HIV positive.

substance use was modeled as the outcome, poor mental health (OR = 1.41, 95% CI = 1.04, 1.91), binge drinking (OR = 2.82, 95% CI = 1.47, 5.41), sexual risk taking (OR = 3.51, 95% CI = 2.20, 5.61), and IPV appeared to cluster (OR = 1.48; 95% CI: 0.88, 2.50), but the latter was not statistically significant. The binge drinking outcome was associated with poor mental health (OR = 1.61, 95% CI = 1.10, 2.37) and substance use (OR = 2.92, 95% CI = 1.52, 5.59), but not IPV or sexual risk taking. Women who reported IPV, modeled as the outcome, were also at increased odds of reporting poor mental health (OR = 1.94; 95% CI = 1.30, 2.89), sexual risk taking and substance use (neither being statistically significant), but not binge drinking. When sexual risk taking was the modeled as the outcome, clustering appeared to occur with poor mental health (OR = 1.34, 95% CI = 1.02, 1.76), substance use (OR = 3.56, 95% CI = 2.24, 5.65), and intimate partner violence (OR = 1.24; 95% CI: 0.99, 1.55), but less so for binge drinking. Following adjustment, most of the associations among the psychosocial problems remained statistically significant, indicating that clustering among the psychosocial variables comprising the SAVA score was robust beyond the presence of individual-level factors. In those cases where the effect estimates were attenuated, the direction of effect remained consistent with the unadjusted models.

The individual psychosocial problems that were used to construct the SAVA score were associated with lower odds of viral load suppression (Table 3), but only one variable was statistically significantly in the fully adjusted model. Intimate partner violence was associated with lower rates of viral load suppression (OR = 0.62, 95% CI: 0.39, 0.99). Also suggestive, however, the association between substance use and viral load suppression moved away from the null following adjustment for individual-level covariates (OR = 0.89 (95% CI: 0.52, 1.53) to OR = 0.68 (95% CI: 0.39, 1.19).

The five dichotomous psychosocial problem variables were summed to create a SAVA score for each participant.

Eleven percent of participants had a score of 0, 29% had a score of 1, 27% had a score of 2, 23% had a score of 3, 9% had a score of four, and only 1% ($n = 6$) had a score of 5. The mean number of psychosocial problems per participant was 1.9 with a standard deviation of 1.2.

In general, the percent of the study sample that was virally suppressed decreased as the number of psychosocial problems increased (Fig. 1), suggesting more psychosocial problems were associated with lower suppression success. Close to 50% of the women reporting zero, one or two psychosocial problems were virally suppressed, compared to 41%, 28%, and 33% for those reporting three, four, and five psychosocial problems, respectively.

The relationship highlighted in the figure was replicated in the statistical models. Higher values on the SAVA score were associated with lower odds of viral load suppression among these HIV + WOC (Table 4). The crude OR was 0.86, 95%

TABLE 3. DICHOTOMIZED VIRAL LOAD SUPPRESSION AND ASSOCIATIONS FOR EACH SAVA VARIABLE IN UNADJUSTED (SITE-ADJUSTED) AND ADJUSTED MODELS AMONG 564 HIV-POSITIVE WOMEN OF COLOR FROM NINE STUDY SITES PARTICIPATING IN HRSA-SPNS WOMEN OF COLOR INITIATIVE

	<i>Unadjusted models</i> <i>OR (95% CI)</i>	<i>Adjusted^a models</i> <i>OR (95% CI)</i>
Poor mental health	0.69 (0.47, 1.02)	0.70 (0.48, 1.02)
Substance use	0.89 (0.52, 1.53)	0.68 (0.39, 1.19)
Binge drinking	0.79 (0.43, 1.42)	0.92 (0.45, 1.87)
Intimate partner violence	0.72 (0.47, 1.10)	0.62 (0.39, 0.99)
Sexual risk taking	0.91 (0.65, 1.28)	0.92 (0.66, 1.28)

^aAdjusted for dichotomous insurance and education, categorical age, race, employment, and housing, and continuous years HIV positive.

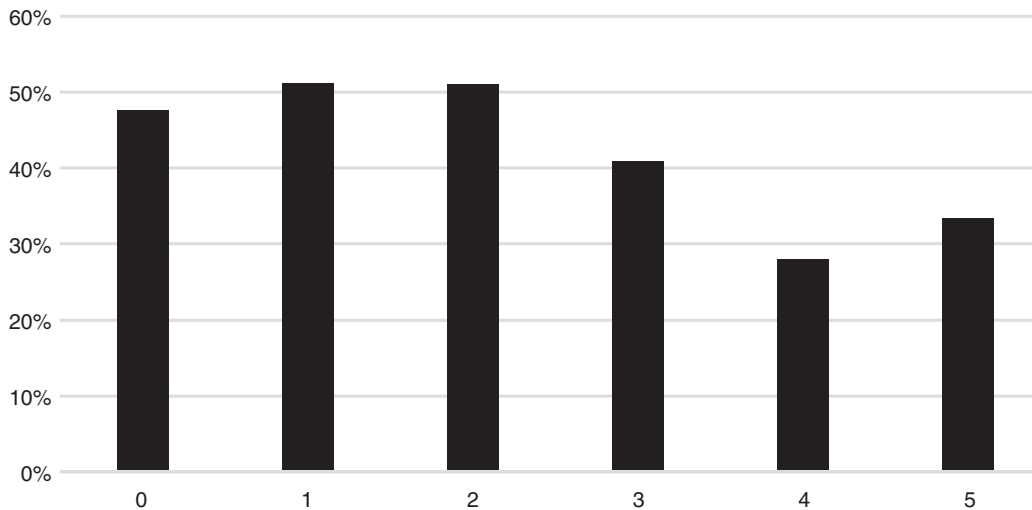


FIG. 1. Mean percentage of patients who are virally suppressed by SAVA score value among the 564 HIV-positive Women of Color from nine study sites participating in the HRSA-SPNS Women of Color Initiative.

CI: 0.70, 1.05. Following adjustment for categorical race/ethnicity, employment status, and housing status, dichotomous insurance and education, and continuous years HIV infected, the SAVA score was associated with decreased viral load suppression (OR=0.81; 95% CI: 0.67, 0.99) among these women.

Discussion

The purpose of this study was to assess the utility of the SAVA syndemic approach for understanding viral suppression among HIV-positive WOC in the US. Five psychosocial factors were examined: substance use, binge drinking, intimate partner violence, poor mental health, and sexual risk taking. Clustering among the psychosocial factors was apparent, and an additive effect of the SAVA-related psychosocial factors on HIV viral suppression was found, providing support for a syndemic effect. While prior research has examined the effects of these problems on adherence to antiretroviral medications, and less frequently, to viral suppression, these findings extend our understanding by demonstrating that the sum of these issues increases women’s likelihood of having detectable viral loads, which contributes to poor clinical outcomes and negative public health consequences.

The models employing each of the psychosocial characteristics as a predictor of viral suppression demonstrated overall low predictive value of these variables when evaluated individually, though the associations were all in the expected direction. An additive effect of the psychosocial factors on viral suppression, as demonstrated by the SAVA score in adjusted models, provides evidence of a syndemic effect; that is, psychosocial issues combine to increase the disease burden on this population. Interestingly, the proportion of women virally suppressed was around 50% for those with zero, one, or two psychosocial problems, before dropping significantly for the 30% of women with SAVA scores of three or more. Therefore, the additive effect appears to plateau when three or more of the psychosocial problems are present, suggesting a threshold beyond which an increasing proportion of women have poor clinical outcomes. Given their greater likelihood of having detectable viral loads combined with their engagement in more risk behaviors, those HIV+ women with a SAVA score of three or more are also at increased risk of transmitting the virus. Therefore, this SAVA additive effect is contributing not only to reduced health outcomes of the participants, but also potentially to the disproportionate infection rates among this population.

Women of color are a hugely diverse group, including multiple racial and ethnic identities. The findings here are most applicable to African American/black women and Latinas, as other women of color were not sufficiently represented, but even within these racial/ethnic groups important heterogeneity exists. The SAVA-related factors may interact in unique ways to affect viral suppression across racial and ethnic groups, due to differing historical, cultural, and socioenvironmental contexts. While no comparisons exploring if and/or how the epidemics comprising the syndemic may uniquely interact by racial and ethnic groups to affect health outcomes among HIV positive women have been conducted, work to explore the presence of a SAVA-related syndemic among specific racial and ethnic groups, as well as to explicate the culturally specific conditions creating the SAVA syndemic have begun. González-Guarda and colleagues found substance abuse, violence, HIV risk, and

TABLE 4. ASSOCIATION BETWEEN SAVA5 AND VIRAL LOAD SUPPRESSION IN UNADJUSTED (SITE-ADJUSTED) AND ADJUSTED^a MODELS AMONG 564 HIV-POSITIVE WOMEN OF COLOR FROM NINE STUDY SITES PARTICIPATING IN HRSA-SPNS WOMEN OF COLOR INITIATIVE

	<i>HIV RNA <200 c/mL</i>
SAVA 5	
Model 1 (adjusted for site only)	0.86 (0.70, 1.05)
Model 2 (adjusted for site and covariates)	0.81 (0.67, 0.99)

^aAdjusted for dichotomous insurance and education, categorical age, race, employment, and housing, and continuous years HIV positive.

depressive symptoms among Latinas in South Florida comprised a single underlying syndemic factor, though they found limited support for their hypothesis that the factor would be associated with socioeconomic disadvantage³². Additionally, González-Guarda et al. (2011) conceptualized a Syndemic Model for Hispanics that proposes common risk and protective factors linking the syndemic conditions of substance abuse, IPV, mental health conditions, and HIV infection among Hispanics, which incorporates individual, cultural, relationship, and socioenvironmental factors identified from the literature.³³ While models specific to black and African American women would certainly have many similarities, important differences would undoubtedly exist. Future research should incorporate cross cultural comparisons of the causes and consequences of the SAVA syndemic to inform culturally specific models, deepen our conceptual understanding, and inform interventions.

This research reported here is limited in several ways. This analysis utilized cross-sectional data, precluding assessment of directionality of the association between the psychosocial variables and viral load. The sample consisting of women who had not been regularly engaged in care prior to the baseline survey, but had a viral load test within 90 days of the baseline survey is not representative of women at all levels of the HIV continuum of care. We did not control for care seeking status or the prescription of antiretroviral medications (ARVs), to which adherence is necessary for viral suppression. This is because, according to our conceptual model, engagement in HIV care—including ARV prescription and adherence—are on the causal pathway from psychosocial status to viral suppression. Adjusting for causal intermediates is inappropriate,³⁴ and their inclusion would result in an overadjustment bias.³⁵ However, we did include the length of time participants had been diagnosed with HIV as a covariate in the adjusted models. Only one type of violence, IPV, was assessed; other types of violence including childhood sexual use, were not assessed. Further, the measurements of substance abuse, and sexual risk behaviors (with the exception of having unprotected sex) utilized assess lifetime prevalence, while the measure of intimate partner violence asked respondents to think of their current partner if they had one, and if not, any partner in the past, so that some respondents referenced current relationships, while other relationships considered may have been years ago. The relationships among these issues and how they associate with viral suppression may be affected by their temporal proximity to each other and the date of the HIV RNA laboratory value utilized; further research will explore these longitudinal relationships utilizing a syndemic approach.

The findings of this study demonstrate an additive effect of the psychosocial problems on viral suppression among HIV positive women of color. It is the first study to our knowledge to demonstrate a syndemic effect on viral suppression among HIV positive women in the US. Given the importance of HIV viral suppression to achieve a generation without AIDS, comprehensive interventions that more effectively address the intersecting issues of substance use, violence, HIV, sexual risk behaviors, and mental health problems are needed which must include systemic work to target the underlying conditions perpetuating health inequities in the US along racial, ethnic, and socioeconomic lines.

Acknowledgments

This publication was made possible by Grant Number H97HA15152 from the US Department of Health and Human Services, Health Resources, and Services Administration (HRSA), HIV/AIDS Bureau's Special Projects of National Significance Program. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the government. This study was conducted with the approval of the Institutional Review Boards of the participating institutions. The authors also acknowledge the clinic staff, providers, and patients for their invaluable contributions to this research. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Health Resources and Services Administration. Special thanks are owed to Mugdha Golwalkar, Megan Ramaiya, and Kathleen Perry for their assistance with reviewing the literature.

Author Disclosure Statement

No competing financial interests exist.

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