AIDS Behav (2014) 18:2080–2088
DOI 10.1007/s10461-014-0708-0

ORIGINAL PAPER

Optimism and Education Buffer the Effects of Syndemic Conditions on HIV Status Among African American Men Who Have Sex with Men

Ann O'Leary · John B. Jemmott III · Robin Stevens · Scott Edward Rutledge · Larry D. Icard

Published online: 6 April 2014

Abstract The present study sought to replicate effects of the number of syndemic psychosocial health conditions on sexual risk behavior and HIV infection among a sample of high-risk African American men who have sex with men (MSM) and to identify resilience factors that may buffer these effects. We used baseline data from an HIV risk-reduction trial to examine whether a higher number of syndemic conditions was associated with higher rates of self-reported sexual risk behavior and HIV infection. Using logistic regression models, we tested for interactions between number of syndemic conditions and several potential resilience factors to identify buffering effects. Replicating previous studies, we found significant associations between numbers of syndemic conditions and higher rates of sexual risk behavior and HIV infection. Surprisingly, we also replicated a previous finding (Stall et al., Am J Public Health, 93(6):939–942, 2003) that the effects of syndemic burden on HIV status fell off at the highest levels of syndemic conditions. Among a variety of potential resilience factors, two—optimism and education—buffered the syndemic effect on HIV prevalence. This is, to our knowledge, the first paper to identify resilience factors buffering against syndemic effects among MSM. It also constitutes a significant contribution to the literature regarding prevention among black MSM. These results point to the need to identify HIV-positive black MSM and provide effective treatment for them and to develop interventions addressing both syndemic and resilience factors.

Keywords Syndemics · African American men who have sex with men · HIV · Resilience · Buffering

Introduction

The term "syndemics" refers to multiple, overlapping adverse health conditions that affect each other synergistically within a population. The term was introduced by Singer [1, 2] following its description by Wallace in the late 1980s [3]. Singer's original model, which grew from his work with drug users, included as syndemic factors substance abuse, violence, and AIDS, shortened to SAVA; subsequent investigators have added other conditions, such as childhood sexual abuse and sexual compulsivity, to their syndemic models [4, 5] (e.g., Parsons et al. [4], Stall et al. [5]).

Interest in syndemic associations in public health has grown in recent years, particularly among men who have sex with men (MSM). Stall et al. [5], examined syndemic effects on sexual risk behavior and HIV status in a sample of gay and bisexual men living in gay neighborhoods across the country [5]. This approach enabled probability-

A. O'Leary (✉)
Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, 1600 Clifton Road, MS E-37, Atlanta, GA 30333, USA
e-mail: aoleary@cdc.gov

J. B. Jemmott III
Department of Psychiatry, Perelman School of Medicine and Annenberg School for Communication, University of Pennsylvania, Philadelphia, PA, USA

R. Stevens
Department of Childhood Studies, Rutgers University, Camden, NJ, USA

S. E. Rutledge · L. D. Icard
School of Social Work, Temple University, Philadelphia, PA, USA

based sampling in these neighborhoods. In this analysis, the number of syndemic conditions reported by the men had additive effects on sexual risk behavior and HIV prevalence. Interestingly, the percentage of HIV-infected men in the category of the most syndemic conditions was reduced compared to the lower syndemic categories, a phenomenon attributed by the authors to higher levels of mortality among HIV-positive men at greatest syndemic burden. In a subsequent study, Dyer et al. [6] reported a study of HIV-positive African American MSM in the Multicenter AIDS Cohort Study (MACS), examining associations between number of syndemic conditions and sexual risk behavior but not HIV status since all participants were HIV infected. Men reporting three or more conditions were engaging in more unprotected anal intercourse than were men reporting fewer conditions [6]. However, men in the study were older and the sample was small. With the exception of the small study using the MACS cohort [6], no studies have concentrated specifically on black MSM, the population at highest risk for HIV in the United States.

Diversity of Syndemic Factors and Population Characteristics

It is interesting to note that, while these studies tended to use similar syndemic conditions, the conditions were by no means uniform across the studies, suggesting that many adverse psychosocial health conditions can contribute to HIV risk and infection. Most of the studies described above used psychological distress, childhood sexual abuse, substance use (alcohol and/or other drugs), and intimate partner violence [5, 8, 10]; sexual assault replaced childhood sexual abuse in one [7], and others added sexual compulsivity [4, 6]. It appears that cumulative adverse psychosocial health conditions of any sort seem to exert their negative effects on HIV risk and infection.

Another point of interest is that, even among the MSM samples tested in the above studies, similar results were obtained across a variety of racial, ethnic, cultural, and socioeconomic sample characteristics. The MSM sample in the study by Stall et al. [5] contained relatively few men of color—only 18 % were African American—and most participants were middle class and highly educated (38.5 % had a college or graduate degree). In another study the participants were Chinese men living in China [8]. The fact that the syndemic associations with HIV-risk-related outcomes generalize across these different populations—as well as transwomen [9] and STD clinic patients [10]—attests to the robustness of this effect.

Are There Resilience Factors that Buffer the Effects of Syndemic Conditions on HIV Risk and Infection?

The important question of whether there are resilience factors that buffer the adverse effects of syndemic conditions has thus far received little empirical attention. Some syndemic theorists have discussed the possibility that resilience factors exist and have posited some possibilities. In one qualitative study, men identified acceptance by others, community resources, and alternative family structures as sources of resilience [11]. Herrick et al. [12] list the qualities of shamelessness, sexual creativity, social creativity, volunteerism/social activism, self-monitoring, and social support as possible sources of resiliency that might buffer syndemic effects. More recently, Stall et al. [13] convened a symposium to discuss possible resiliency factors among gay and bisexual men and other men who have sex with men. In addition to the factors identified above [12], this group identified altruism/empathy, adaptability, optimism, connection to a sexual minority community, external monitoring (dyadic), neighborhood, policy, community, homophobia management, and demographic characteristics as potential sources of resilience.

Finally, one empirical study identified resilience factors associated with sexual serosorting, a method to prevent transmission between serodiscordant partners by limiting sex to seroconcordant partners [14]. In this study, serosorting among HIV-positive men was associated with higher coping self-efficacy; among HIV-negative men, higher levels of social engagement predicted this behavior (admittedly a riskier one among men believing themselves to be uninfected).

The Present Analyses

The present analyses used baseline data from a study that tested an HIV risk-reduction intervention among African American MSM (Jemmott et al., in prep) to 1) attempt to replicate effects of syndemic burden on HIV risk behavior and seroprevalence, and 2) test whether potential resilience factors buffered these effects. We hypothesized that the number of syndemic conditions experienced by participants would be associated with higher levels of risk behavior and higher HIV prevalence. In exploratory analyses, we hypothesized that significant interactions between number of syndemic conditions and the resilience factors would reflect buffering; that is, the effect of syndemic numbers on the two outcomes would be attenuated when levels of resilience factors were higher. The potential resilience factors tested in the present paper were social support (as social network size), connection to the gay community, religiosity, Black pride, optimism, education, and income.

Methods

Participants

The participants were 593 African American MSM recruited from the Philadelphia area for a HIV risk-reduction intervention trial. The study included men irrespective of their HIV serostatus and sexual orientation self-identification. Men were eligible to participate if they were at least 18 years of age, self-identified as Black or African American, were born a male, and reported having anal intercourse with a man in the previous 3 months. Participants were recruited between April 2008 and March 2011 by advertising in a local newspaper read by African American MSM, through community-based organizations that serve African American MSM, by posting recruitment flyers at colleges, universities, parks, bars, adult bookstores, employing face-to-face recruitment at social events and activities and parties expecting a high African American MSM turnout, and through the referrals of participants (i.e., snowballing).

Procedure

Institutional review boards at the University of Pennsylvania and Temple University reviewed and approved this study. The Centers for Disease Control and Prevention deferred approval to the IRB at the University of Pennsylvania.

The present analyses used data from the baseline assessment of an intervention study [15]. The data collection sessions were implemented in a conference room at the University of Pennsylvania. Participants completed confidential questionnaires via audio computer-assisted self-interviewing (ACASI). Participants were compensated with $25 for the preintervention assessment.

Measures

Prior to the present study, we pilot tested the paper version of the questionnaire with 217 men to ensure that the questions were clear and appropriate for the target population and then programmed it for ACASI and pilot tested it with 16 men.

Outcomes

Sexual Risk The primary outcomes for the present analyses were HIV risk behavior and HIV serostatus. Because our study included men who were both HIV-negative and HIV-positive, we constructed a sexual risk variable that took into account respondent serostatus, partner serostatus, and sexual position ("role") for unprotected anal sex. This was possible because we had asked about participant serostatus, partner serostatus, and sexual position (insertive or receptive). For negative men, risk was defined as unprotected receptive intercourse with a seropositive or serostatus-unknown partner. For HIV-positive men, risk (in this case, transmission risk) was defined as unprotected insertive sex with a seronegative or HIV status-unknown partner. Each participant received either a "1" (engaged in risk) or a "0" (did not engage in risk).

HIV Serostatus Participants self-reported their HIV status by answering the question, "Has a nurse or doctor ever told you that you were HIV-positive?"

Syndemic factors

Each of the syndemic factors we used had been found to contribute to a syndemic effect on sexual risk and/or HIV serostatus in previous studies.

Depression Depression was assessed with the five-item version of the Center for Epidemiologic Studies Depression (CESD) inventory [16]. For each item, respondents reported on a scale from 0 (not at all) to 4 (extremely) their feelings during the previous week. Example items are "Have you been bothered by feeling lonely even when you are with people?" and "Have you been bothered by feelings of worthlessness?". Ratings on the five items were averaged, and a binary variable was created where the respondent was given a score of "1" if the average rating was greater than or equal to 1.00 and a score of "0" if the average rating was less than 1.00.

Childhood sexual abuse Childhood sexual abuse was assessed with six items concerning events before the respondent was age 18; an affirmative response to any was counted as sexual abuse. The measure was adapted from a subset of the Wyatt Sex History Questionnaire [17]. Example items were "Before you were 18, did anyone have sex with you against your will?" and "Before you were 18, did anyone ever put their penis in your mouth or your mouth on their penis?"

Alcohol Problems Alcohol problems were assessed with the 4-item CAGE [18]. The respondent answered yes/no to 4 questions and was coded as having a problem if he endorsed two or more items.

Problems with Drug Use. We used the Texas Christian University Drug Screen (TCUDS) to identify a history of heavy drug use and dependence, denoted by a score of 3 or greater [19, 20].

Intimate partner violence (*IPV*). Intimate partner violence was assessed with three items from the Revised Conflict Tactics scale [21]: "Since the age of 18, has any intimate partner ever punched or kicked you, beat you up, slammed you against a wall, hit you with something that could hurt, or scalded or burned you on purpose?", "Since

the age of 18, has any intimate partner choked you or used a knife, gun or other weapon on you, or threatened to do so?," and "Since the age of 18, has any intimate partner used any force to make you have sex?" Endorsement of any of these items led the respondent to be classified as having experienced IPV.

The syndemic variable was constructed, as in other studies, by adding the number of syndemic conditions experienced by each man. The categories that we used were 0, 1, 2, and 3 or more.

Resilience Factors

Social Network Size Social network size was assessed with a ten-item scale asking which of a number of different types of people to whom the respondent had spoken on the phone or in person in the previous 2 weeks [22]. These included, for example, "spouse or steady partner," "any of your children," and "members of your church, mosque, etc." The sum of endorsed items became the scale score. Social support was one of the factors speculated to be protective in the study by Herrick et al. [13].

Connection to the Gay Community Respondents were asked to respond "yes" or "no" to the question, "Do you consider yourself to be a member of the gay community?" This factor was also identified in the Herrick et al. [13] study.

Religiosity Respondents indicated the frequency with which they engage in specific religious activities, on a scale from 1 (never) to 5 (twice a week or more). Items include "(How often do you) go to church or worship services," "read the Bible or other religious works," and "listen to religious radio stations?" The sum of endorsed items became the religiosity score. This variable was selected based on the recognition of the importance of religion in the lives of African Americans [23].

Black Pride Black pride was assessed with a seven-item scale [24]. Responses ranged from 1 (disagree strongly) to 5 (agree strongly). Example items are "I believe that because I am black, I have many strengths" and "I feel good about black people." The item average became the scale score. In the study by Herrick et al. [13], "internal homophobia management" was speculated to be protective. In this African American sample, we considered black pride to be an analogous concept.

Optimism This was assessed with Cantril 's Self-Anchoring Ladder scale [25, 26], which was comprised of two items with values ranging from 1 (worst possible life) to 10 (best possible life). Respondents indicated the level at which they placed themselves "at the present time" and "one year from now." Optimism scores were computed by subtracting the "present" value from the "one year from now" value. Optimism was given as a potential resilience factor by Herrick et al. [13], who also listed "demographics", leading us to include two final potential resilience factors:

Education Four levels of education were entered into resilience analyses: No formal education, less than a high school diploma, a high school diploma, and some college or more.

Table 1 Sample profile—demographic and social characteristics, BRO, 2008–2011

Variable		% (No.) or mean (SD)
Demographics		
Age		41.62 (10.73)
Education	No formal education	12.14 (72)
	Less than HS diploma	39.46 (234)
	Completed high school	29.51 (175)
	Some college; 2 year degree; college degree	18.89 (112)
Employment status	Unemployed	69.31 (411)
	Employed, part-time	16.19 (96)
	Employed, full-time	12.31 (73)
	Retired	2.19 (13)
Income	Less than 400 per month	36.93 (219)
	400–850 per month	35.75 (212)
	851–1,650 per month	20.07 (119)
	1,651 and above per month	7.25 (43)
Ever incarcerated		52 (308)
Outcomes		
HIV infection		29.53 (168)
High risk behavior		0.37 (48)
Syndemic conditions		
Depression		20.57 (122)
Problem drinking		26.64 (158)
Substance abuse		16.69 (99)
Intimate partner victimization		37.10 (220)
Childhood sexual abuse		48.90 (290)
No. of syndemic conditions	0	25.30 (150)
	1	28.84 (171)
	2	24.96 (148)
	3+	20.91 (124)
Potential buffering factors		
Social support		4.36 (2.57)
Gay community member		1.34 (1.34)
Religiosity		2.89 (1.05)
Black pride		4.20 (0.65)
Optimism		0.49 (2.47)

Table 2 Correlation matrix of syndemic conditions, Pearson's product-moment

	Problem drinking	Substance abuse	IP victimization	Childhood sexual abuse
Depression	0.17**	0.24**	0.18**	0.09*
Problem drinking	1.00	0.29**	0.12**	0.04
Substance abuse		1.00	0.18**	0.06
IP victimization			1.00	0.28**
Childhood sexual abuse				1.00

The sample size was 593

* $P < 0.05$; ** $P < 0.01$

Income Participants reported their monthly income in seven categories that ranged from "less than $400" to "1651 and above".

The assessment also included measures of other socio-odemographic variables, theoretical mediator variables, and health promotion behaviors and mediators.

Data Analysis

Pearson product-moment correlations were performed to identify degree of overlap among the syndemic variables. Chi square tests of association and logistic regression were used to identify levels and significance of the HIV risk behavior and infection outcomes for different numbers of syndemic factors (0, 1, 2, and 3 or more). To examine potential buffering effects, significance of interactions between the syndemic variable and each potential resilience factor were tested for each of the two outcomes in the logistic regression models. The alpha = 0.05, two-tailed statistical significance criterion was used and all analyses were completed using SAS version 9.3.

Results

Demographic characteristics of the sample are given in Table 2. In general, the sample was poor, with more than two-thirds earning less than $850 per month. Unemployment was high, with almost 70 % being unemployed. About 12 % of the sample reported no formal schooling, and 52 % had less than a high school education. About a third of the sample reported being HIV positive (likely an underestimate of actual infection, given findings indicating high levels of undiagnosed HIV infection in this population [27]. Almost 40 % reported high-risk behavior. Table 1 also reports levels of syndemic and resilience factors. About a quarter of the sample reported problem drinking; almost half reported childhood sexual abuse. Thirty-seven percent of respondents reported having experienced intimate partner violence. The majority of men said that they did not feel themselves to be members of the local gay community.

Table 2 presents intercorrelations among the syndemic factors we examined. The substantial overlap (correlations) among them is consonant with syndemic theory, which posits synergistic relations among components of syndemics.

Table 3 provides the percentages of men reporting high-risk sexual behavior and HIV infection as a function of the number of syndemic conditions experienced. As in previous studies, higher numbers of syndemic conditions were associated with greater prevalences of high-risk behavior and HIV infection. As in the study by Stall et al. [5], the effect of syndemic number on HIV prevalence was reduced at the highest syndemic level compared to lower ones. In logistic regression models, the odds ratio was 1.88 (95 % CI, 1.59, 2.25) for high-risk sexual behavior and 1.25 (95 % CI, 1.06, 1.48) for HIV prevalence. No covariates were included in these models.

Results for the analyses testing interactions between syndemic burden and potential resilience factors were non-significant (ps > 0.1), except for two revealing buffering of the syndemic effect on HIV prevalence (see Table 4). Significant syndemic number by resilience factor interactions were obtained for both optimism and education, which means the relation of syndemic factors to HIV prevalence significantly differed depending on the level of optimism and education. As shown in Figs. 1 and 2, which depict graphically these interactions, there were buffering effects: higher levels of both optimism and education were associated with an attenuated relationship of syndemic number to HIV prevalence compared with lower levels of these resilience factors. In fact, at the highest levels of both optimism and education, the relationship between syndemic number and HIV prevalence was flat or sloped slightly downward. At the lowest levels of these resilience factors, the relationship increased sharply; at intermediate levels the relationship remained positive but was intermediate in size between the high and low levels.

Discussion

The present study sought to replicate previous findings indicating that, among MSM, the number of syndemic conditions was significantly associated with HIV sexual risk behavior and HIV serostatus. Further, it sought to identify resilience factors that might buffer these effects. Indeed, this study of low-income African American MSM in Philadelphia did replicate the effects of previous studies. Interestingly, the finding by Stall et al. [5] that the effect on

Table 3 Percentages of HIV infection and high risk sexual risk behavior by number of syndemic conditions

	Number of syndemic factors				Chi^2 (df = 3)
	0 (n = 143)	1 (n = 161)	2 (n = 145)	3+ (n = 120)	
High risk sexual behavior (n = 219)**	20.00	30.41	38.51	64.52	62.25**
HIV Infection (n = 168)*	20.28	28.57	37.93	31.67	0.011*

The sample size was 593

* $P < 0.05$; ** $P < 0.01$

Table 4 Odds of HIV infection by syndemic conditions, education and optimism

	Model 1 Direct effect B (SE)	Model 2 Optimism as moderator B (SE)	Model 3 Education as moderator B (SE)
Syndemic conditions	0.22 (0.09)*	0.25 (0.09)**	0.58 (0.17)
Optimism		0.07 (0.07)	–
Optimism × syndemic*		−0.07 (0.03)*	–
Education			0.41 (0.17)*
Education × syndemic*			−0.23 (0.09)*
Odds ratio for syndemic conditions (95 % CI)	1.25 (1.055,1.477)**		
Constant	−1.20 (0.16)	−1.22 (0.16)	−1.83 (0.33)

The sample size was 593

* $P < 0.05$; ** $P < 0.01$

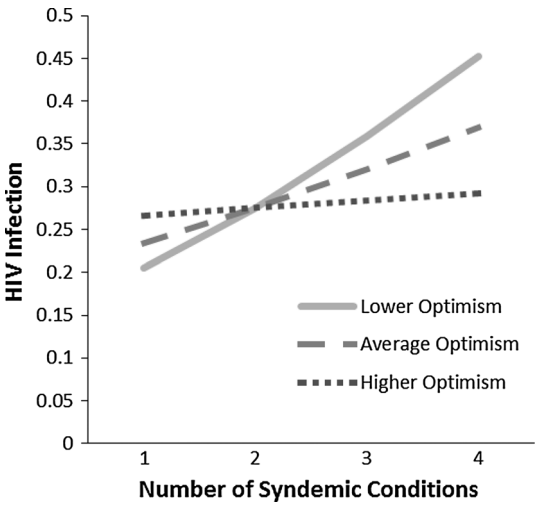

Fig. 1 Predicted probability of HIV infection by number of syndemic conditions and optimism

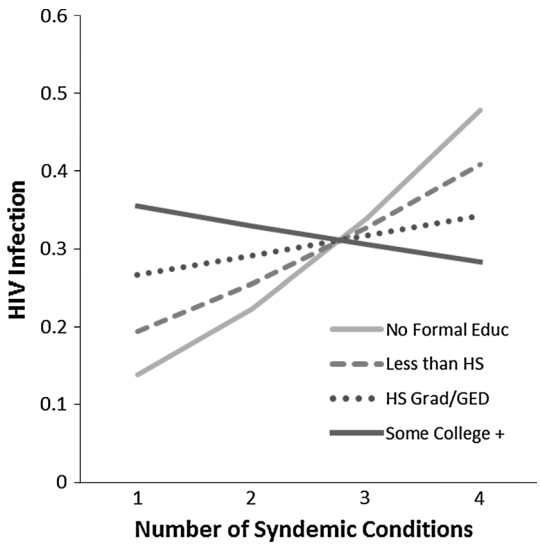

Fig. 2 Predicted probability of HIV Infection by number of syndemic conditions and optimism

HIV prevalence was attenuated at the highest syndemic level was also replicated here. Data for the Stall et al. [5] study had been collected prior to the widespread availability of combination treatment (highly active antiretroviral therapy, or HAART), which has had the effect of prolonging the lives of HIV-infected persons dramatically; thus it is not surprising that the most burdened HIV-positive participants in that study may have died. The present study, however, was conducted during the era of HAART. What could explain the diminished number of seropositives at the highest syndemic levels in the present study? Analyses of the most recent HIV surveillance report indicates that approximately 35 % of those testing HIV-positive in Philadelphia during the most recent surveillance period, [28] were simultaneously diagnosed with AIDS at the time

of their initial HIV diagnosis, indicating that some men had avoided testing—and thus, treatment and appropriate care—until it was too late for that care to make much difference. Thus, even in the present study, conducted in the late 2000s, the falloff in HIV seropositivity at high levels of syndemic burden might have been due to excess mortality among the most burdened HIV-infected men.

We tested for buffering effects of several hypothesized resilience factors on the effects of syndemic numbers on HIV risk behavior and HIV prevalence. Included among the factors tested were social network size, connection to the gay community, religiosity, Black pride, optimism, education, and income. It should be noted that social network size, a structural measure, should not be expected to show a buffering effect [29]. None of these resilience factors exhibited a buffering effect for syndemic effects on HIV risk behavior. However, two of them did prove to be significant buffers against syndemic effects on HIV infection. These were optimism and education. Interestingly, a sizable literature links optimism directly to a variety of health outcomes [30]. While further research is needed to elucidate why these specific factors were important, it does seem likely that optimism about the future might be associated with greater motivation to live to see that future. Education may exert its buffering effect through effects on self-esteem, HIV knowledge, or more adaptive coping reactions.

Limitations of the present study include the uncertain generalizability to other African American MSM, given our sampling strategies and self-selection to the study. For the sexual risk behavior variable, we relied on self-report, which can be prone to self-presentation bias, and the same is true of HIV serostatus, although this is probably a more reliable measure, depending as it does on provider reports of serostatus to participants. Reports from the Centers for Disease Control and Prevention's National HIV Behavioral Surveillance system (NHBS) indicate that more than half of African American MSM who were HIV-positive were unaware of their status [31, 32]. Thus, self-reported HIV status in this population will usually result in a significant underestimation of prevalence because so many positive persons are unaware that they are infected. Future research in this area will hopefully remedy this limitation. However, it seems unlikely that inclusion of undiagnosed HIV-positives (were we to know who they were) would eliminate the effects seen in the present study. Unawareness of infection is associated with being black, younger age, and lower educational attainment [32]. One might argue that, if anything, greater syndemic burden, which we know to be associated with higher levels of risk behavior, would militate *against* being tested and thus categorized among the HIV cases. If this assumption is correct, the results should be even more pronounced with these men included.

An important paper by Millett et al. [33] sought to identify factors responsible for the higher HIV prevalence among black MSM compared with MSM of other races, even with lower levels of risk behavior. It identified several factors that were higher among black MSM than others; these included higher rates of sexually transmitted infection and lower frequency of HIV testing; sexual risk behavior, nongay identity, sexual nondisclosure, or use of alcohol or other drugs did not differ by race and it was therefore concluded that they could not be responsible for disparities. There was insufficient evidence to evaluate a few remaining hypotheses. A question raised by the data reported here is whether black MSM experience higher rates of syndemic factors than other MSM; this would suggest the possibility that syndemic factors partly account for the greater HIV vulnerability among African American MSM. While a thorough review of the literature pertaining to this topic is outside the purview of the present paper, a quick comparison of these results with those of Stall et al.' [34] Urban Men's Health Study in which 80 % of respondents were white, shows higher percentages of men in the present study reporting child sexual abuse (20.6 vs. 48.9 %); physical intimate partner violence (22 vs. 37.1 %) [35], and problem drinking (12 vs. 26.6 %) [36]. Future research should address this issue.

The results of the present study raise important questions about the likely effectiveness of current prevention approaches. In the current era of emphasis on biomedical prevention strategies such as PrEP, the importance of syndemic factors needs to be considered, and studied, carefully. Is the presence of syndemic conditions associated with lower adherence, either to PrEP for HIV-negatives, or antiretroviral treatment among HIV-positives? Does the presence of resilience factors buffer these effects?

Conclusions

Results of the present study replicate previous findings that syndemic burden is associated with elevated levels of HIV sexual risk behavior and likelihood of HIV infection among black MSM. We also replicated the findings of Stall et al. [5] that, at higher levels of syndemic burden, likelihood of HIV infection drops off. This falloff, in the previous study, was attributed to excess mortality among HIV-infected MSM with high levels of syndemic burden in the pre-HAART era; we tentatively speculate that excess mortality might be responsible for the same results in the current study, despite advances in treating HIV.

The data presented here suggest, based on this speculation that the falloff in HIV prevalence at higher levels of syndemic burden is due to greater likelihood of mortality, that African American MSM should be targeted for

frequent HIV testing, and, if found to be infected, should be linked to appropriate care as soon as possible. That syndemic factors may affect engagement in the continuum of care is a hypothesis worthy of testing.

While we replicated the finding that syndemic burden was associated with HIV risk and infection, we also identified two resilience factors that buffer this effect. To our knowledge, this is the first study to identify such factors empirically. It is notable that one of these, optimism, was specifically hypothesized to be a buffering resilience factor during the symposium convened for this purpose [13]. Another resilience factor, level of education, also showed a significant buffering effect in the present study; while not specifically identified during the aforementioned symposium, "demographic factors" were, and education would be among these. It is interesting that education, but not income, showed a buffering effect, suggesting that education exerts its effects through routes other than income, possibly including self-perception as a competent and successful individual.

Removing the life circumstances that contribute to the syndemic effect among black MSM is an ideal goal. This will require structural changes, for example policies affecting child welfare and resources being made available to prevent violence and treat depression and substance abuse. In the meantime, awareness of the resilience factors that appear to buffer the syndemic effect may enable us to develop interventions that can reduce this effect more quickly. Of the two identified in the present study, optimism seems to be the potentially malleable one, although efforts to keep black adolescent MSM in school, and that support their higher educational attainment, are likely to have a beneficial effect. Identification of additional resilience factors that are capable of buffering syndemic effects remains an important task for the future, as we seek to increase our understanding of HIV risk among black MSM. Identifying the mechanisms by which syndemic and resilience factors exert their effects will also have real implications for intervention.

Acknowledgments The authors wish to recognize their funding source, the National Institute of Mental Health grant 1-R01-MH079736. We are grateful to many individuals who helped to bring this project to fruition, including Dr. Loretta S. Jemmott, Dr. Christopher Coleman, Janet Hsu, Brian Taylor, Mikia Croom, Pandora Woods, and Dennis Clegg. The findings and conclusions are those of the authors and do not necessarily reflect the official views of the Centers for Disease Control and Prevention.

References

1. Singer M. AIDS and the health crisis of the urban poor: the perspective of critical Medical Anthropology. Soc Sci Med. 1994;39(7):931–48.
2. Singer M. A dose of drugs, a touch of violence, a case of AIDS: conceptualizing the SAVA syndemic. Free Inq. 1996;24(2):99–110.
3. Wallace R. A synergism of plagues. Environ Res. 1988;47:1–33.
4. Parsons JT, Grov C, Golub SA. Sexual compulsivity, co-occurring psychosocial health problems, and HIV risk among gay and bisexual men: further evidence of a syndemic. Am J Public Health. 2012;102(1):156–62.
5. Stall RD, Mills TC, Williamson J, Hart T, Greenwood G, Paul J, Pollack L, Binson D, Osmond D, Catania JA. Association of co-occurring psychosocial health problems and increased vulnerability to HIV/AIDS among urban men who have sex with men. Am J Public Health. 2003;93(6):939–42.
6. Dyer TP, Shoptaw S, Guadamuz TE, Plankey M, Kao U, Ostrow D, Chmiel JS, Herrick A, Stall R. Application of syndemic theory to Black men who have sex with men in the Multicenter AIDS Cohort Study. J Urban Health. 2012;89(4):696–708.
7. Mustanski B, Garofalo R, Herrick A, Donenberg G. Psychosocial health problems increase risk for HIV among urban young men who have sex with men: preliminary evidence of a syndemic in need of attention. Ann Behav Med. 2007;34(1):37–45.
8. Jie W, Ciyong L, Xueqing D, Hui W, Lingyao H. Syndemic of psychosocial problems places the MSM (men who have sex with men) population at greater risk of HIV infection. PLoS One. 2012;7(3):e32312.
9. Brennan J, Kuhns LM, Johnson AK, Belzer M, Wilson EC, Garofalo R. Syndemic *theory and HIV-related risk among young transgender women: the role of multiple, co*-occurring health problems and social marginalization. Am J Public Health. 2012;102(9):1751–7.
10. Senn TE, Carey MP, Vanable PA. The intersection of violence, substance use, depression, and STDs: testing of a syndemic pattern among patients attending an urvan STD clinic. J Natl Med Assoc. 2010;102(7):614–20.
11. Bruce D, Harper GW. Operating without a safety net: gay male adolescents and emerging adults' experiences of marginalization and migration, and implications for theory of syndemic production of health disparities. Health Educ Behar. 2011;38(4):367–78.
12. Herrick AL, Lim SH, Wei C, Smith H, Guadamuz T, Friedman MS, Stall R. Resilience as an untapped resource in behavioral intervention design for gay men. AIDS Behav. 2011;15:S25–9.
13. Herrick AL, Stall RD, Goldhammer H, Egan JE, Mayer KH. Resilience as a research framework and as a cornerstone of prevention research for gay and bisexual men: theory and evidence. AIDS Behav. 2013; doi:10.1007/s10461-012-0384-x.
14. Kurtz SP, Buttram ME, Surratt HL, Stall RD. Resilience, syndemic factors, and serosorting behaviors among HIV-positive and HIV-negative substance-using MSM. AIDS Educ Prev. 2012;24(3):193–205.
15. Jemmott JB, et al. (in preparation). Efficacy of a one-on-one HIV/STI risk reduction intervention for African American men who have sex with men: a randomized controlled trial.
16. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Meas. 1977;1:385–401.
17. Wyatt GE, Lawrence J, Vodounon A, et al. The Wyatt Sex History Questionnaire: a structured interview for female sexual history taking. J Child Sex Abuse. 1992;1:51–68.
18. Ewing JA. Detecting alcoholism: the CAGE questionnaire. JAMA. 1984;252:1905–7.
19. Peters RH, Greenbaum PE, Steinberg ML, et al. Effectiveness of screening instruments in detecting substance use disorders among prisoners. J Subst Abuse Treat. 2000;18:349–58.
20. Lowmaster SE, Morey LC, Baker L, Hopwood CJ. Structure, reliability, and predictive validity of the Texas Christian University correctional residential self-rating form at intake in a residential substance abuse treatment facility. J Subst Abuse Treat. 2010;39(2):180–7.
21. Strauss M, Hamby S, Boney-McKoy S, et al. The revised conflict tactics scale (CTS2). J Fam Issues. 1996;17:283–316.

22. Cohen S, Doyle WJ, Skoner DP, Rabin BS, Gwaltney JM. Social ties and susceptibility to the common cold. JAMA. 1997;277(24):1940–4. doi:10.1001/Jama.277.24.1940.
23. Pew Forum on Religion and Public Life. U.S. religious landscape survey, religious affiliation: diverse and dynamic. http://religions.pewforum.org/pdf/report-religious-landscapestudy-full.pdf (2008). Accessed Feb 2008.
24. Sellers RM, Rowley SAJ, Chavous TM, Shelton JN, Smith MA. Multidimensional inventory of black identity: a preliminary investigation of reliability and construct validity. J Pers Soc Psychol. 1997;73(4):805–15.
25. Brown JS, Rawlinson ME, Hilles NC. Life satisfaction and chronic disease: exploration of a theoretical model. Med Care. 1981;29:1136–46.
26. Cantril H. The pattern of human concerns. New Brunswick: Rutgers University Press; 1965.
27. Marks G, Millett GA, Bingham T, Bond L, Lauby J, Liau A, Murrill CS, Stueve A. Understanding differences in HIV sexual transmission among Latino and Black men who have sex with men: the Brothers y Hermanos Study. AIDS Behav. 2009;13:682–90.
28. Philadelphia Department of Public Health. Surveillance report, 2011 and construct validity. J Pers Soc Psychol. 2013;73(4):805–15. doi:10.1037/0022-3514.73.4.805.
29. Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. Psychol Bull. 1985;98(2):310–57.
30. Rasmussen HN, Scheier M, Greenhouse JB. Optimism and physical health: a meta-analytic review. Ann Behav Med. 2013;37(3):239–56.
31. Centers for Disease Control and Prevention. HIV prevalence, unrecognized infection, and HIV testing among men who have sex with men—five U.S. cities, June 2004–April 2005. MMWR. 2005;54(24):597–601.
32. Centers for Disease Control and Prevention. Prevalence and awareness of HIV infection among men who have sex with men—21 cities, United States, 2008. MMWR. 2010;59(37):1201–7.
33. Millet GA, Peterson JL, Wolitski RJ, Stall R. Greater risk for HIV infection of black men who have sex with men: a critical literature review. Am J Public Health. 2006;96:1007–19.
34. Paul JP, Catania J, Pollack L, Stall R. Understanding childhood sexual abuse as a predictor of sexual risk-taking among men who have sex with men: the Urban Men's Health Study. Child Abuse Negl. 2001;25:557–84.
35. Greenwood GL, Reif MV, Huang B, Pollack LM, Canchola JA, Catania JA. Battering victimization among a probability=based sample of men who have sex with men. Am J Public Health. 2002;92:1964–9.
36. Stall R, Paul JP, Greenwood G, Pollack LM, Bein E, Crosby GM, Mills TC, Binson D, Coates TJ, Catania JA. Alcohol use, drug use and alcohol-related problems among men who have sex with men: the Urban Men's Health Study. Addiction. 2001;96:1589–601.