HIV-Related Sexual Risk Behavior Among African American Adolescent Girls

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Abstract

Background: Latent class analysis (LCA) is a useful statistical tool that can be used to enhance understanding of how various patterns of combined sexual behavior risk factors may confer differential levels of HIV infection risk and to identify subtypes among African American adolescent girls.

Methods: Data for this analysis is derived from baseline assessments completed prior to randomization in an HIV prevention trial. Participants were African American girls ($n=701$) aged 14–20 years presenting to sexual health clinics. Girls completed an audio computer-assisted self-interview, which assessed a range of variables regarding sexual history and current and past sexual behavior.

Results: Two latent classes were identified with the probability statistics for the two groups in this model being 0.89 and 0.88, respectively. In the final multivariate model, class 1 (the “higher risk” group; $n=331$) was distinguished by a higher likelihood of >5 lifetime sexual partners, having sex while high on alcohol/drugs, less frequent condom use, and history of sexually transmitted diseases (STDs), when compared with class 2 (the “lower risk” group; $n=370$). The derived model correctly classified 85.3% of participants into the two groups and accounted for 71% of the variance in the latent HIV-related sexual behavior risk variable. The higher risk class also had worse scores on all hypothesized correlates (e.g., self-esteem, history of sexual assault or physical abuse) relative to the lower risk class.

Conclusions: Sexual health clinics represent a unique point of access for HIV-related sexual risk behavior intervention delivery by capitalizing on contact with adolescent girls when they present for services. Four empirically supported risk factors differentiated higher versus lower HIV risk. Replication of these findings is warranted and may offer an empirical basis for parsimonious screening recommendations for girls presenting for sexual healthcare services.

Introduction

THE REDUCTION of human immunodeficiency virus (HIV)-related health disparities has been identified as one of the three primary goals in the National HIV/AIDS Strategy and is of particular emphasis among African American young women, as rates of HIV diagnoses exceed that of men of all races except African American men.¹ Despite representing only 13.6% of the United States popu-

lation, African Americans account for half of HIV diagnoses in adolescents and adults in 37 states.² This disparity is greatest among young people between the ages of 13–24 years, with African Americans representing a disproportionate 61.5% of new HIV infections among this age group.² The great majority of these new HIV cases among young people are a result of behavioral infection, typically through sexual risk behavior (HIV-related sexual risk behavior).¹

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Hence, targeting and implementing prevention interventions for adolescents at highest risk for HIV infection that target this HIV-related sexual risk behavior and related correlates (e.g., healthy romantic relationships) is a highly promising approach to reducing HIV-related health disparities. Although multiple evidence-based HIV-prevention interventions have been developed and rigorously evaluated for adolescent populations,³ limited resources (cost, personnel, space, time) support the utility of identifying youth at highest risk for infection. Numerous research efforts over the past several decades have uncovered a range of individual risk factors contributing to HIV infection among African American girls, including infrequent condom use,⁴ multiple sexual partners,⁵ substance use,⁶ low self-esteem,⁷ interpersonal trauma (e.g., child sexual abuse),⁸ and ineffective coping styles.⁹ However, epidemiologic data have highlighted that these behaviors do not occur in isolation and that HIV risk is heightened by the co-occurrence of such risk factors.¹⁰ A gap remains in the literature as to whether there are well established patterns of co-occurrence among these risk factors in adolescent girls, which would point to potential subtypes of risk. Establishing risk profiles could improve identification of girls who may benefit most from such preventative services. Similarly, elucidating subtypes of HIV risk may help more efficiently utilize assessment data and hone screening efforts among healthcare providers who may already collect information regarding individual risk factors for HIV infection among their sexually active African American teen patients.

Latent class analysis (LCA) is a useful statistical tool to address this critical gap in the literature by enhancing our understanding of how various patterns of combined risk factors may confer differential levels of HIV infection risk and by identifying potential subtypes within a seemingly homogenous population. HIV risk behavior profiles among youth in the school setting has been explored with similar statistical procedures (latent profile analysis, cluster analysis), yielding a three-profile (condom users, few partners, and risk takers) solution for 8th to 10th graders,⁵ a four-profile (condom users, one partner, two partners, and risk takers) solution for 11th and 12th graders,⁵ and four cluster (low risk, monogamy, condom, and high risk) solutions for high school students 15–18 years.^{5,11} Although these studies help account for more complex behavioral patterns of school-based adolescent sexual risk behavior, these mixed gender samples focused on narrower age range of youth recruited from a school-based setting and included abstinent youth in one of the studies.⁵ Combined with the lack of assessment and consideration of other individual HIV risk factors (e.g., sexual abuse history⁸) within these studies, the generalizability of such findings to at-risk adolescent girls presenting to sexual healthcare clinics is limited. Thus, further research is warranted in this area.

Sexual health clinics often serve as a medical home for young women, and provide a unique window of opportunity to assess and intervene with a population at elevated risk for HIV infection. Given limited resources, there would be clinical utility and cost effectiveness in determining if there is a “high risk” subtype among a group of sexually active African American adolescent girls. Despite that sexual health clinics serve as the most common target population for HIV prevention intervention,⁴ no studies to date have investigated specific patterns of risk behavior and classification among African American adolescent girls within this setting. The

current study will apply LCA to identify empirically derived behavior patterns that are ecologically valid for sexual healthcare seeking African American adolescent girls. Identification of latent classes (e.g., higher risk versus lower risk) and estimation of their respective probability of HIV risk can then inform targeted assessment and implementation in healthcare settings and tailor primary, secondary, and tertiary prevention interventions. The latent classes will be composed of behaviors that differentiate among levels of risk to equip pediatricians and other healthcare providers, who are often charged with serving a high volume of clientele, with the ability to screen efficiently for HIV risk.

The objective of the study was to identify latent classes of risk factors for HIV sexual risk behaviors among sexual healthcare-seeking African American adolescent girls and determine the degree to which these classes predict an HIV sexual risk index. A two-group solution (lower risk and higher risk subtypes) was hypothesized. Although prior studies had found evidence of factor solutions greater than two under certain circumstances, less heterogeneity was expected in this all-female, sexual health service-seeking sample.

Methods

Study design

Participants were part of a larger study evaluating a sexual risk-reduction intervention for African American adolescent girls. Analyses reported in this article are based on data from the baseline assessment. From June 2005 to June 2007, African American female adolescents 14–20 years of age were recruited from three clinics in Atlanta, Georgia, providing sexual health services to predominantly inner-city adolescents. A young African American woman recruiter approached adolescents in the clinic waiting area, described the study, solicited participation, and assessed eligibility. Eligibility criteria included self-identifying as African American, being 14–20 years of age, and reporting vaginal intercourse at least once without a condom in the past 6 months. Adolescents who were married, currently pregnant, or attempting to become pregnant were excluded from the study. Adolescents returned to the clinic to complete informed consent procedures, baseline assessments, and be randomized to trial conditions. Written informed consent was obtained from all adolescents with parental consent waived for those younger than 18 due to the confidential nature of clinic services. Of the eligible adolescents, 98% agreed to participate and 94% ($n=701$) enrolled in the study, completed baseline assessments and were randomized to study conditions. The Emory University Institutional Review Board approved all study protocols.

Patient and procedural characteristics

The baseline sample consists of 701 African American participants, recruited from three sites: a county health department STD clinic ($n=373$), a hospital-based adolescent clinic ($n=81$), and a Planned Parenthood clinic ($n=247$). The mean (SD) age of the participants was 17.6 (1.7) years. Most (65.3%) were full-time students; the remaining 34.8% had already graduated or were not in school, which represents appropriate levels of education for their age. Most reported currently living in a mother-only headed household (42.5%).

The majority of participants (79.5%) reported being in a current relationship (mean [SD] length of relationship, 14.4 [14.9] months). Data collection consisted of a 60-minute survey administered via audio computer-assisted, self-interviewing technology assessing for demographics and a range of other study variables as described below. This baseline survey was developed from psychometrically sound standardized measures utilized in evaluations of HIV prevention curriculum.¹² Participants were compensated \$75 for their baseline participation.

Measures

Sexual History was assessed using behaviorally specific items that asked about number of lifetime sexual partners, sex while high on drugs and/or alcohol, frequency of condom use (e.g., "Of the X times you had vaginal sex in the 6 months, how many times did you use a condom?"), and sex with recently incarcerated men. Past history of positive STD was assessed with self-report ["Have you ever had a positive STD test result?" (yes/no)] and with self-collected vaginal swab specimens.¹³ Specimens were delivered to the Emory University Pathology Laboratory and assayed for two bacterial pathogens, *Chlamydia trachomatis* and *Neisseria gonorrhoeae* using the BDProbeTec ET *C. trachomatis* and *N. gonorrhoeae* Amplified DNA assay (Becton Dickinson and Company).¹⁴ Among those who reported a previous positive STD result, participants were asked about type of STD. Of the 56.6% ($n=397$) that reported they had a positive STD report, 37.8% ($n=150$) reported they had trichomoniasis, 72.5% ($n=288$) reported they had chlamydia, 38% ($n=151$) reported they had gonorrhea, 8 (6.8%) reported they had syphilis, 27 (6.8%) reported they had genital warts, and 20 (5%) reported they had genital herpes.

A six-item index was used to assess partner communication self-efficacy ($\alpha=0.82$), and fear of consequences of condom negotiation with a sexual partner was assessed using a seven-item scale ($\alpha=0.87$); both scales were utilized in prior HIV prevention trials.¹⁵ Self-esteem was assessed using the 10-item Rosenberg self-esteem scale¹⁶ ($\alpha=0.86$). Fourteen items modified from the African American Women's Stress Scale¹⁷ reflected perceived stress in various interpersonal relationships. Respondents indicated their level of stress from 1=no stress to 5=extreme stress; a sample item was, "relationships with family members"¹⁷ ($\alpha=0.87$). Impulsivity was assessed using Zimmerman's 15-item impulsivity scale¹⁸ ($\alpha=0.76$). Recent alcohol and marijuana use was assessed by asking participants to report the number of days in the past 90 days that they used alcohol and the number of days in the past 90 days that they used marijuana. Physical abuse was assessed with the question, "Have you ever been physically abused (hit, punched, kicked, slapped, etc.)?" (yes/no). Sexual assault was assessed with, "Has anyone ever forced you to have vaginal sex when you didn't want to?" (yes/no).

Statistical analyses

LCA, using Mplus 5.1,¹⁹ an approach that employs maximum likelihood procedures to determine distinct subgroups based on the variables of interest, was applied.^{20,21} In discerning these subgroups, LCA identifies an underlying latent variable comprising multiple dichotomous indicators. Our

dichotomous indicators were created from variables that were either assessed as yes/no constructs (ever having a positive STD test result, ever having sex when high on drugs/alcohol) or from continuous variables that were transformed to dichotomous indicators using either median split (e.g., ≥ 5 sex partners vs. < 5 sex partners) or clear high-risk behavior (e.g., condom use during 100% of encounters vs. condom use less than 100% of the time over the past 6 months). It is assumed that the latent variable probabilistically represents distinct subgroups²⁰, which are then assessed on their substantive, theoretical, and empirical merits. These procedures have demonstrable accuracy, particularly with large ($n \geq 300$) samples.²²

Multiple solutions specifying various numbers of groups were run, and the optimal number of groups was identified using the substantive meaningfulness of the models and three model fit statistics (Table 1): the adjusted Bayesian information criterion (aBIC), the Lo-Mendell-Rubin (L-M-R) test statistic, and class probability statistics.^{20,21,23} The aBIC is a relative fit statistic wherein lower values indicate a better fitting model. The L-M-R test statistic is a comparative fit statistic; significant values indicate how many groups should be extracted by testing the parsimony of the current model against the model with one less group.^{20,21} The class probability statistics summarize how well participants can be classified into one group or another based on a given model as well as the ability of the latent variable to distinguish groups based on the model.^{20,21}

After examining fit statistics for various solutions and choosing the best fitting solution, we examined chi-square differences in the indicator variables between groups to characterize the subgroups identified in the LCA (Table 2). We then conducted a logistic regression analysis predicting latent class membership from the indicator variables to examine the independent and relative contributions of each indicator to overall risk classification (Table 3). Finally, to better characterize the groups, we used analysis of variance and chi-square, respectively, to examine differences between the classes on five continuous and four dichotomous correlates that are theoretically linked to and empirically predictive of high-risk behavior (e.g., sex refusal self-efficacy, substance use in the previous 90 days, or a history of physical or sexual abuse).

Results

Solutions were identified for one, two, and three groups representing risk level. The solution remained unidentified at the three-group model, suggesting that larger models should not be examined. The lowest aBIC, which indicates the best fitting model, was found with the predicted two-group

TABLE 1. FIT STATISTICS FOR LATENT CLASS MODELS

Model	aBIC	L-M-R
1 class	3256.5	—
2 class	3138.9	135.0***
3 class	3150.5	4.68

*** $p < 0.001$.

aBIC, adjusted Bayesian information criterion; L-M-R, Lo-Mendell-Rubin (L-M-R) test statistic.

TABLE 2. CHI-SQUARE ANALYSES EXAMINING DIFFERENCES IN LATENT CLASS ANALYSIS INDICATOR VARIABLES

	Lower risk (n=370)	Higher risk (n=331)
Positive STD test result (chi-square)	112.7***	
Yes	140 (38%)	257 (78%)
No	230 (62%)	74 (22%)
Five or more sexual partners	322.8***	
Yes	93 (25.1%)	306 (92.4%)
No	277 (74.9%)	25 (7.6%)
Sex while high on drugs/alcohol	123.3***	
Yes	38 (10%)	159 (48%)
No	332 (90%)	172 (52%)
Condom use	33.8***	
100%	66 (18%)	13 (4%)
< 100%	304 (82%)	318 (96%)

*** $p < 0.001$.

STD, sexually transmitted disease.

solution (Table 1). The L-M-R statistic, which indicates how many groups should be extracted, remained significant for the two-group model. We also examined the probability statistics, which summarize how well participants are classified into one group or another based on a given model. The probability statistics for groups 1 and 2 in this model were 0.89 and 0.88, respectively. These statistics indicate that the model fits the data well and that the model will classify participants into their respective groups consistently more than 88% of the time. The low aBIC value, the statistically significant L-M-R value, and the strong probability statistics for the two-group class solution suggested that this solution is robust and should be examined for its substantive utility.

Table 2 presents the chi-square values and the proportion of individuals classified into each group based on the latent class variable indicators. Class 1 ($n = 331$), referred to as the "higher risk" group, was distinguished by a higher likelihood of a history of STDs, more than 5 lifetime sexual partners, having sex while high on alcohol/drugs, and using condoms during less than 100% of occasions when compared with class 2 ("lower risk" group; $n = 370$). We examined mean differences between the groups on the continuous versions of the indicator variables to glean more information about these groups. The higher risk group had nearly 14

lifetime sexual partners on average compared to only 3 for the lower risk group. Lower risk adolescents reported using condoms during a significantly greater percentage of sexual encounters when compared with the higher risk group (51% versus 46%, respectively), and they had a significantly lower total number of STDs at baseline ($M = 0.4$ vs. 0.3).

Logistic regression analyses were used to examine which indicator variables were the strongest relative predictors of membership in the higher risk group (Table 3). The model correctly classified 85.3% of participants and all indicator variables were significantly associated with membership in the higher risk class, however, five or more lifetime sexual partners was the strongest relative predictor of classification in the higher risk group. Sex while high on alcohol or drugs was the next strongest predictor, followed by ever having a positive STD result. As expected, those who used condoms 100% of the time were less likely to be classified in the higher risk group.

Risk group difference analyses

We also explored differences between the two groups on five continuous correlates and four dichotomous variables that have been linked with HIV risk in the empirical literature (Table 4). The higher risk group had significantly lower sex refusal self-efficacy scores, higher fear of condom negotiation scores, lower self-esteem scores, higher perceived stress scores, and higher impulsivity scores when compared with the lower risk group. The higher risk group members also were more likely to report alcohol and marijuana use in the last 90 days and they were more likely to report a history of sexual assault or physical abuse when compared to the lower risk group. As an additional question regarding high risk sexual partners, we examined whether the participants had recently had sex with an incarcerated male. Girls in the higher risk group (19.9%; $n = 66$) were significantly more likely to report having had sex with a male just released from jail or prison in comparison with girls in the lower risk group (11.4%; $n = 44$), $p = 0.002$.

Discussion

This is amongst the first studies to examine how empirically identified factors associated with HIV sexual risk behavior may align to confer differential risk for HIV among African American adolescent girls seeking sexual healthcare services. Answering this question in a healthcare service-seeking population is critical, as a single healthcare visit may represent a unique (and perhaps only) window of opportunity

TABLE 3. RELATIVE STRENGTH OF INDICATORS IN PREDICTING HIGHER RISK CLASS MEMBERSHIP

Correlates of risk	Unadjusted estimates				Adjusted estimates			
	B	SEB	OR	95% CI	B	SEB	OR	95% CI
Positive STD result	1.7***	0.17	5.7	4.1–8.0	2.0***	0.26	7.6	4.6–12.6
Lifetime number of sex partners	1.1***	0.09	2.9	2.4–3.5	4.1***	0.33	62.5	32.8–119.1
Sex while high on alcohol/drugs	2.1***	0.20	8.1	5.4–12.0	2.6***	0.33	13.8	7.2–26.5
% condom use	−0.43*	0.22	0.65	0.43–0.96	−0.98**	0.36	0.38	0.18–0.77

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

CI, confidence interval; OR, odds ratio; SEB, standard error of B.

TABLE 4. MEANS AND STANDARD DEVIATIONS FOR HIV RISK FACTORS AND VICTIMIZATION CORRELATES BY RISK CLASS

<i>HIV risk factors</i>	<i>Lower risk (n = 370)</i>		<i>Higher risk (n = 331)</i>		F
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
Sex refusal self efficacy	25.0	3.2	24.1	3.5	11.0**
Fear of condom negotiation	7.9	3.1	8.5	3.3	5.0*
Self-esteem	39.8	4.7	37.8	5.3	29.9**
Perceived stress	29.1	13.4	33.3	13.9	15.8**
Impulsivity	37.8	7.5	39.7	7.7	10.6**
<i>Abuse history and recent substance use variables</i>	<i>Yes n (%)</i>	<i>No n (%)</i>	<i>Yes n (%)</i>	<i>No n (%)</i>	<i>Chi-square²</i>
Alcohol use in last 90 days	49 (13%)	322 (87%)	102 (31%)	229 (69%)	33.1**
Marijuana use in last 90 days	32 (14%)	204 (86%)	101 (37%)	172 (63%)	36.0**
Sexual assault	59 (16%)	311 (84%)	109 (33%)	222 (67%)	27.7**
Physical abuse	105 (28%)	265 (72%)	171 (52%)	160 (48%)	39.7**

* $p < 0.05$; ** $p < 0.001$.

to access young women at highest risk for HIV to provide targeted screening and intervention. Indeed, many teen girls engaging in risky sexual behavior do not have one particular clinician following their behavior and symptomatology over time. Alternatively, sexual health clinics often function in that role as a “medical home” and provide a unique access point for HIV prevention. Although the majority of the young women present with some level of risky behavior, it would be cost-prohibitive in these clinics, which are often understaffed and overburdened, to provide intensive screening, in-depth counseling services, and highly tailored referrals for patients. Thus, there is value in improving HIV risk screening in public health clinics or hospital settings to screen, identify, and possibly triage those in greatest need of more intensive screening and counseling. To date, an efficient and reliable HIV prevention screening approach for such purposes has been largely absent. The current LCA study offers a systematic, empirical approach—rather than an anecdotal or clinician-driven approach as used most typically—to inform screening content for this population, by identifying specific classes of risk and explicating which variables best classify patients into these risk groups.

Results yielded by LCA procedures supported the hypothesized two-class solution, suggesting that the sample fell into two categories: higher risk and lower risk for HIV. Characteristics that differentiated the higher risk and lower risk groups (with over 85% accuracy), in combination, were a greater number of sexual partners, using alcohol/drugs while having sex, less frequent condom use, and STD history. The strongest predictor of being classified as higher risk was number of sexual partners, although the associated confidence intervals were quite large. Follow-up analyses indicated that the higher risk group reported a mean of 13.7 lifetime sexual partners in comparison with a mean of 3.2 sexual partners reported by the adolescents in the lower risk group. This is not surprising, as increasing contact with new and different partners increases the odds of encountering an HIV infected partner within a social network. The contributing mechanisms and processes by which the girls that fall in the higher risk class seek a greater number of sexual partners are not well understood; however, some theories suggest that

media may influence sexual behavior.²⁴ This is supported by data highlighting the important role media plays in the socialization of adolescents²⁵ and the widely available media messages that may discourage monogamy, particularly among young people. Another theory suggests that some girls seek new sexual partners as a means of reducing negative affect by achieving intimacy.⁶ Studying these processes may be a significant avenue for future research and may aid in the development and enhancement of effective HIV interventions. For instance, if girls are engaging in sexual behavior with multiple partners in an attempt to create feelings of intimacy and connectedness with others,²⁶ teaching strategies for meeting intimacy needs without engagement in sexual behavior with multiple partners may be important.

Although the higher risk group reported less frequent condom use relative to the lower risk group, both groups reported using condoms during only approximately 50% of sexual encounters (46% and 51% respectively). This may be a unique and noteworthy descriptor of this particular population, in comparison to other samples such as school-based samples of African American adolescent girls and boys, where both Beadnell et al.⁵ and Newman and Zimmerman¹¹ found evidence of a subgroup who used condoms consistently with a moderate number of sexual partners. The current findings suggest that assessing and addressing barriers to *consistent* condom use is important when providing healthcare services to African American female adolescents. Perhaps incorporating specific barrier-focused psychoeducational and skills-building interventions from evidence-based HIV prevention programs targeting female African Americans, such as Sisters Informing, Healing, Living, and Empowering (SIHLE)¹² and Sisters Informing Sisters about Topics on AIDS (SISTA),²⁷ into services provided in the healthcare setting may be useful.

The higher risk group reported problems across a number of associated domains that also have assessment and psychosocial clinical intervention implications. Specifically, findings identified a higher prevalence of sexual and physical abuse, as well as alcohol and marijuana use, stress, impulsivity, and lower self-esteem among the higher risk group. These latter problems have well-established empirical and clinical links with sexual assault and physical abuse,^{28,29,30,31}

thus suggesting the possibility of a “trauma-exposed subtype” in this population. The relation between history of abuse and engagement in HIV risk behavior supported in the current study is consistent with prior research demonstrating a strong association between child abuse and engagement in sexual risk behaviors.³² According to the traumagenic dynamics model,³³ certain negative feelings and behaviors learned in the context of child sexual abuse experiences are reenacted as these stigmas become integrated into the victim’s self-concept. For example, young women who have been sexually abused in childhood may engage in risky sexual behavior (such as having intercourse with a partner who refuses to wear a condom) due to learned behaviors of communication in sexual situations (e.g., “assertiveness is unsafe”). Evidence-based, trauma-focused interventions that seek to break the link between unhelpful and inaccurate beliefs a victim may develop in the aftermath of child abuse and later problematic behaviors have been shown to be useful among adolescent populations.³⁴ Specifically, trauma-focused cognitive behavioral therapy³⁵ is commonly used to address issues related to childhood sexual and physical abuse and also targets enhancing self-esteem, which may indirectly reduce high-risk behaviors, such as substance misuse and risky sexual behaviors. Additionally, associations between active substance misuse, stress, and impulsivity with high-risk sexual behavior have been documented in the literature,³⁶ particularly among child abuse victims, suggesting additional possible targets for treatment among the higher risk group. Risk Reduction through Family Therapy^{37,38} is another promising trauma-focused intervention that directly targets risky behaviors such as substance abuse and sexual risk taking, in addition to distress tolerance, and may be useful for patients who present at sexual health clinics with child abuse histories, and who, per the current study, are at increased risk for HIV infection.

Limitations of the current study should be noted. First, the cross-sectional design prohibits information about new HIV infection in this sample overtime. Second, the sample was limited to a specific geographic region (i.e., the Southeast) and may not replicate in other areas of the county. Third, the assessment of some variables (e.g., frequency of condom use; STDs other than chlamydia and gonorrhea) was limited to self-report methods; however, of note, self-report has been demonstrated to be valid in reporting on such behaviors in this population.³⁹

In sum, this study represents one of the first attempts to better understand patterns of HIV sexual risk behaviors among healthcare seeking African American female adolescents. While findings are informative, they are in need of replication and extension to longitudinal risk associations. Replication of the current findings would provide future directions for parsimonious and empirically informed screening and assessment of HIV risk behavior among this population. For example, as four primary variables in the current study were able to accurately classify over 85% of cases into the higher versus lower risk classes, these may be key areas for assessment for healthcare providers to more efficiently identify individuals at highest risk and refer them to appropriate and effective prevention programs as a critical next step in reducing risk for HIV infection. Future research also should consider and examine the cost-effectiveness of early intervention among youth falling in the lower risk

group, as recent treatment outcome research suggests specific interventions (cognitive behavioral therapy) can be efficacious in reducing HIV risk behaviors among adolescent populations presenting for services in other settings.⁴⁰

Author Disclosure

No competing financial interests exist.

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