Published in final edited form as:

Sex Transm Dis. 2015 February ; 42(2): 64–67. doi:10.1097/OLQ.0000000000000230.

American Indians, Substance Use, and Sexual Behavior: Do predictors of Sexually Transmitted Infections explain the Race Gap among Young Adults?

David Eitle, PhD*, Kaylin Greene, PhD*, and Tamela M. Eitle, PhD*

*Department of Sociology and Anthropology, Montana State University, Bozeman, MT.

Abstract

Background—In this study we examined whether substance use and risky sexual behaviors predicted sexually transmitted infections (STIs) among American Indian (AI) and white young adults. Furthermore, we explored whether these factors explained the race disparity in STIs.

Methods—We conducted a cross-sectional analysis of Wave 3 of the National Longitudinal Study of Adolescent Health (Add Health) collected in 2001–2002. Young adult participants (aged 18–26 years old) provided urine specimens that were tested for chlamydia, gonorrhea, and trichomoniasis infection. Estimates of the association between AI with any STI were adjusted for sexual and other risk behavior correlates using multivariate regression techniques.

Results—Nine percent of AIs (n=367) and 3.6% of whites (n=7,813) tested positive for an STI. Race differences were found for substance use (injection drug use, 3.1% AI versus 1.3% white; alcohol use frequency, 2.01% AI versus 2.5% white; binge drinking frequency, 1.25% AI versus 1.53% white). Among sexually active respondents, AIs were more likely to have paid for sex (9%) than whites (3%). After adjustment, early sexual initiation (adjusted odds ratio, 1.69; 95% confidence interval, 1.19–2.41), no condom use at last sex (adjusted odds ratio, 1.47; 95% confidence interval, 1.08 – 2.01) and AI race (adjusted odds ratio, 2.45; 95% confidence interval 1.46 – 4.11) were significantly associated with having an STI.

Conclusions—Individual-level sexual and other risk behaviors do not fully explain disparities in STIs among AIs compared to white young adults. Further examination of network and community factors is needed to explain these disparities.

Introduction

Research has documented significant racial disparities in sexually transmitted infections (STIs) among adolescents and young adults in the United States.^{1, 2} Although black-white disparities have received substantial attention, other racial/ethnic groups are also at a heightened risk of STIs, relative to whites. American Indian (AI) adolescents and young adults have one of the highest rates of STIs of any racial/ethnic group in the US.^{2–4} For instance, in 2010, AI adolescents had chlamydia and syphilis rates roughly three times

higher than those of whites and gonorrhea rates about three and a half times higher.² However, there exists a paucity of studies that have examined why disparities in STIs exist between AIs and whites.

Prior research examining racial disparities in STIs has often focused on risky individual health behaviors and the black versus white comparison. For instance, Hallfors and colleagues⁵ tested whether risky sexual behaviors and substance use explained the black-white disparity in STIs. The results showed that a number of disparities existed between blacks and whites in risky sexual behaviors (and to a lesser extent, substance use behaviors), yet controlling for these behaviors did not account for much of the race gap in STIs.⁵ Nonetheless, a large body of research has demonstrated that substance use and risky sexual behaviors heighten STI risk^{6–8} suggesting that these behaviors may help to explain the high rates of STIs among certain racial minorities (such as AIs), relative to whites.

Cumulative evidence has demonstrated that AIs are disproportionately involved in risky sexual and substance use behaviors compared to whites. Research suggests that urban AI adolescents are more likely to be sexually active, have first intercourse at younger ages, and are less likely to use condoms than their white counterparts.^{9–10} And while some evidence^{11–12} suggests that adult AIs are less likely to have used alcohol in their lifetimes, past year, or past month, some studies suggest that adult AIs suffer from much higher rates of binge drinking, substance abuse, and substance dependence than whites.^{13–14} Finally, studies have found that AI's illicit drug use exceeds that of other racial/ethnic groups in the US.^{10,13}

Yet despite these disparities, we are aware of no studies that have examined whether sexual and drug behavior patterns can explain the AI-white race gap in STIs. A recent study by de Ravello and colleagues¹⁰ using two years of data from the national Youth Risk Behavior Survey (YRBS), found higher levels of self-reported substance abuse and sexual risk behaviors among AI compared with white high school students. However, because the YRBS does not collect information about STI prevalence, the association between these risk behaviors and STI status for AI adolescents and young adults is not known. Our study objective is to determine the association between sexual and substance use behaviors with the likelihood of having an STI among AI compared to white young adults after adjusting for confounding characteristics.

Methods

This study utilizes data from Wave III of the National Longitudinal Study of Adolescent Health, or the Add Health study.¹⁵ Add Health is a nationally representative study of adolescents attending 7th–12th grade in 1994 when the study began. The Add Health sample is representative of schools in the US with respect to region, urbanicity, school size, school sector, and racial composition.¹⁶ The weighted response rate for Wave III was 75.6% (n=14,322) with analysis of the non-respondents suggesting that this wave's sample was reflective of the original Wave I sample.¹⁷ Wave III data were collected in 2001–2002 when respondents were 18 to 26 years old. All interviews were conducted by interviewers using laptop computers, although answers to questions regarding sensitive behaviors (such as drug

use and sexual behavior) were entered by the respondent in privacy (using audio-CASI methods).

At the end of the Wave III interview, urine samples were collected for tests of three STIs—chlamydia, trichomoniasis, and gonorrhea—after consent for each test was given. Respondents who consented received an incentive of \$10 for providing the specimen. Laboratory testing methods used for Add Health are described elsewhere.¹⁸ Approximately 81% of the Wave III participants submitted a viable sample. Any respondent who had missing information for these tests, regardless of the reason, was excluded from the present study. Furthermore, our study included only those respondents who had complete information on all covariates of interest and who self-identified as primarily AI or white (there was no Alaskan Native option).

Add Health respondents could choose multiple racial categories. Respondents were coded AI if they identified as only “American Indian or Native American” or if they responded that “American Indian or Native American” best described their racial background. A similar approach was used to code white respondents. In addition to race, we included other demographic variables including age, gender, and dichotomous indicators of marital status, not having a high school degree, and public assistance (based on whether the respondent had received TANF/welfare, food stamps, or a housing subsidy, during the past year).

Substance use behaviors measured included injection drug use since 1995 and frequency of marijuana use in the past month up to 31 times or more. Alcohol use behaviors measured included the frequency of alcohol use and binge drinking (i.e., drinking 5 or more drinks in a row) in the past year. Both were measured on a scale from 0(*none*) to 6(*everyday or almost everyday*). A number of measures of sexual behavior were included: early sexual initiation (<15 years of age); condom use at most recent vaginal intercourse (3 categories: condom use at last sex [referent category] did not use condom at most recent sexual intercourse (no condom use at last sex), and did not have sexual intercourse in past year (no sex); engaging in sex for money (paid for sex); number of sexual partners in the past year; and sexual situation that respondent later regretted because she/he had been drinking or used drugs (regretted sex due to substance use).

Statistical Analysis

The outcome variable is *sexually transmitted infection*, which is a dichotomous measure of whether the respondent tested positive for any of the three STIs (i.e., chlamydia, trichomoniasis, or gonorrhea). We examined this composite measure given the overall low percentage of positive infections, coupled with the relatively small number of AI respondents. AI and white participants were compared with respect to demographic, substance use, and sexual risk behaviors using bivariate logistic regressions for categorical variables (e.g. STI), ordinary least squares regression for continuous variables (e.g., age) and negative binomial regression for count variables (e.g., number of sexual partners). Subsequently, we computed multivariate logistic regression models to estimate the association between these variables and having a STI. All analyses were conducted in Stata

version 13 and weighted to account for the complex survey design and the unequal probability of selection.¹⁹

Results

After limiting the sample to respondents with complete information on relevant variables, our final sample size was 367 AIs and 7,813 whites. Descriptive information about AI and white participants is presented in Table 1. The results showed that the percent of AI participants who tested positive for an STI at Wave III was 2.5 times greater than the percent of white participants who tested positive, a statistically significant difference (9.0% for AIs versus 3.6% for whites). The results also demonstrated notable differences with regard to substance use behaviors. The frequency of binge drinking and the frequency of alcohol use were significantly lower ($p < .05$) for AIs than whites. However, AIs were more likely to have injected drugs in the past year, relative to whites. The observed difference in marijuana use frequency failed to reach statistical significance. With regard to sexual behaviors, AIs and whites only differed in terms of their likelihood to pay for sex. Among those who had sex in the past year, AIs were significantly more likely to have paid for sex (9.0% versus 3.0%). None of the other measures of sexual activity differed by racial group in our sample.

Table 2 presents associations between demographic, substance use, and sexual behavior variables. Importantly, even when controlling for substance use and sexual behaviors, race was a significant predictor of having an STI. The odds of having an STI were 2.4 times greater for AIs than for whites. Surprisingly, none of the substance use behaviors were significant predictors of having a STI. In contrast, a number of sexual behaviors emerged as important predictors of having a STI. Early sexual initiation was associated with a heightened risk of STI, controlling for all other variables. Not using a condom at last sex also was associated with a greater risk of STI, with the odds of having a STI 1.5 times greater for this group than the referent group (i.e., condom use at last sex).

We also computed a logistic regression model in which we dropped those respondents who did not have sex in the past year and reanalyzed the data. The results (available from the authors on request) were quite similar to the findings presented in Table 2.

Discussion

The key finding from our study was that the significant racial disparity in STIs persisted even when controlling for substance use and sexual behaviors. That is, the higher STI prevalence among AIs compared to whites was *not* explained by differential substance use or risky sexual behaviors between the two groups. Our finding is consistent with prior research, examining whites and other racial groups, that such behaviors could not account for racial disparities in STIs.^{5,20}

Consistent with past studies, we found that a number of risky sexual practices were predictive of increased STI risk. Not using a condom at last sex and early sexual initiation were both associated with a higher likelihood of having an STI. However, even when adjusting for these individual substance use and sexual behaviors, the racial disparity in STIs persisted. These results extend prior work by highlighting that the differences in STIs among

AI and white adolescents and young adults are not due to differences in substance use and risky sexual activity. Although we do not know the reasons for the enduring AI-white gap in STIs, our results clearly suggest the need to look beyond sexual and substance use behaviors. It may be that the documented STI disparity results from racial differences in social environments (e.g., discrimination, place of residence, neighborhood disadvantage)^{21,22} or differential access to treatment services between the groups.²³ Furthermore, the gap may result from different sexual networks between the two groups. Morris and colleagues have argued that individual behaviors do not define one's STI risk. Instead "sexual networks determine levels of individual exposure, the population dynamics of infection spread, and the interactional contexts that constrain behavioral changes" (pg. 1029).²⁴ Indeed, findings from a number of studies have linked sexual network characteristics with STI prevalence.^{25,26} These studies suggest that there is a compelling need to conduct more research that examines sexual networks, especially for exploring the AI-white race gap in STIs.

Importantly, our results should be interpreted in light of the limitations of the current study. First, we only explored the associations with cross-sectional data. Hence, we have not examined the possibility that early substance use or risky sexual behaviors led to STIs prior to the wave in which our data were collected. Further, we did not consider reciprocal relationships in these analyses; it is possible, for instance, that people who discovered that they had a STI prior to Wave III might have reduced their engagement in risky sexual behaviors (e.g., unprotected sex), potentially serving to weaken the strength of the association between risky sexual behaviors and STIs (measured at Wave III). Ideally, a longitudinal model that would include testing for STIs at each wave would allow one to more precisely examine these relationships, but our data did not include such testing. Additionally, the sexual and substance use measures were self-reported and thus some response bias may be a concern. Furthermore, our measure of condom use only captured the last sexual intercourse; hence, the consistency in condom use during sexual activity is not being considered in our study. Also, the Add Health study did not ask information about the tribal affiliation of the AI respondents, so we cannot speak to any tribal variation in norms and customs relating to sexual activity. Nor does our analysis consider evidence that suggests that AI STI rates may vary greatly by region.²⁷ Finally, the Add Health study, like any study based on students in schools, misses students who are truant or dropped out when the Wave I study was conducted, missing respondents who may be at a heightened risk of engaging in substance use and risky sexual behaviors.

Despite these limitations, the results from the current study make an important contribution to the literature. The findings demonstrate that AI young adults were much more likely to have an STI (i.e., chlamydia, gonorrhea, and trichomoniasis infection) than white young adults. Because each of the tested STIs can be treated, access to healthcare may be an important factor that may serve to explain much of the race gap. Thus, focusing on structural factors that may explain the AI-white gap in STIs will be an important direction for future research. Factors such as persistent poverty, limited access to healthcare, and high incarceration rates may all contribute to the AI-white gap in STIs. Indeed, it may be time to reconsider the individual behavioral approach to explaining race differences in STIs and implement models that focus on networks and communities instead.

References

1. Morris M, Handcock MS, Miller WC, et al. Prevalence of HIV infection among young adults in the United States: Results from the Add Health Study. *Am J Public Health*. 2006; 96:1091–1097. [PubMed: 16670236]
2. Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance 2010. Atlanta, GA: Division of STD Prevention; 2011.
3. Dennis MK. Risk and protective factors for HIV/AIDS in Native Americans: implications for preventive intervention. *Soc Work*. 2009; 54:145–154. [PubMed: 19366163]
4. Mitchell CM, Kaufman CE. Health Ways Project Team, POCA. Structure of HIV knowledge, attitudes, and behaviors among American Indian young adults. *AIDS Educ Prev*. 2002; 14:401–418. [PubMed: 12413186]
5. Hallfors DD, Iritani BJ, Miller WC, et al. Sexual and drug behavior patterns and HIV and STD racial disparities: the need for new directions. *Am J Public Health*. 2007; 97:125–132. [PubMed: 17138921]
6. Boden JM, Fergusson DM, Horwood LJ. Alcohol and STI risk: evidence from a New Zealand longitudinal birth cohort. *Drug Alcohol Depend*. 2011; 113:200–206. [PubMed: 20846794]
7. Roche KM, Leventhal T. Beyond neighborhood poverty: Family management, neighborhood disorder, and adolescents' early sexual onset. *Journal Fam Psychol*. 2009; 23:819–827.
8. Khan MR, Berger AT, Wells BE, et al. Longitudinal associations between adolescent alcohol use and adulthood sexual risk behavior and sexually transmitted infection in the United States: assessment of differences by race. *Am J Public Health*. 2012; 102:867–876. [PubMed: 22493999]
9. Rutman S, Park A, Castor M, et al. Urban American Indian and Alaska Native youth: Youth Risk Behavior Survey 1997–2003. *Matern Child Health J*. 2008; 12:S76–S81.
10. De Ravello L, Jones SE, Tulloch S, et al. Substance use and sexual risk behaviors among American Indian and Alaska Native high school students. *Journal of School Health*. 2014; 84:25–32. [PubMed: 24320149]
11. O'Connell JM, Novins DK, Beals J, et al. Disparities in patterns of alcohol use among reservation-based and geographically dispersed American Indian populations. *Alcohol Clin Exp Res*. 2005; 29:107–116. [PubMed: 15654299]
12. Beals J, Spicer P, Mitchell CM, et al. Racial disparities in alcohol use: comparison of 2 American Indian reservation populations with national data. *Am J Public Health*. 2003; 93:1683–1685. [PubMed: 14534221]
13. Young RS, Joe JR. Some thoughts about the epidemiology of alcohol and drug use among American Indian/Alaska Native populations. *Journal of Ethnicity in Substance Abuse*. 2009; 8:223–241.
14. Spicer P, Beals J, Croy CD, et al. The prevalence of DSM-III-R alcohol dependence in two American Indian populations. *Alcohol Clin Exp Res*. 2003; 27:1785–1797. [PubMed: 14634495]
15. Harris, KM. The National Longitudinal Study of Adolescent Health (Add Health), Waves I & II, 1994–1996; Wave III, 2001–2002; Wave IV, 2007–2009 [machine-readable data file and documentation]. Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill;
16. Harris, KM.; Halpern, CT.; Whitsel, E., et al. The National Longitudinal Study of Adolescent Health: Research Design. University of North Carolina: Carolina Population Center; 2009.
17. Chantala, K.; Kalsbeek, WD.; Andraca, E. Nonresponse in wave III of the Add Health Study, 2004. 2005. Available at <http://www.cpc.unc.edu/projects/addhealth/files/W3nonres.pdf>;
18. Manhart, LE. [Retrieved on December 3, 2013] Add Health Biomarker Team. Biomarkers in Wave III of the Add Health Study. <http://www.cpc.unc.edu/projects/addhealth/files/W3nonres.pdf>
19. Chantala, K. Guidelines for analyzing add health data. Carolina Population Center. 2006. Retrieved from <http://www.cpc.unc.edu/projects/addhealth/data/guides/wt-guidelines.pdf>
20. Moran JS, Aral SO, Jenkins WC, et al. The impact of sexually transmitted diseases on minority populations. *Public Health Rep*. 1989; 104:560–565. [PubMed: 2511588]

21. Centers for Disease Control and Prevention. Establishing a Holistic Framework to Reduce Inequities in HIV, Viral Hepatitis, STDs, and Tuberculosis in the United States. Atlanta (GA): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2010 Oct. Retrieved from <http://www.cdc.gov/socialdeterminants/docs/SDH-White-Paper-2010.pdf>
22. Browning CR, Leventhal T, Brooks-Gunn J. Neighborhood context and racial differences in early adolescent sexual activity. *Demography*. 2004; 41:697–720. [PubMed: 15622950]
23. Santelli JS, Lowry R, Brener ND, et al. The association of sexual behaviors with socioeconomic status, family structure, and race/ethnicity among US adolescents. *Am J Public Health*. 2000; 90:1582–1588. [PubMed: 11029992]
24. Morris M, Kurth AE, Hamilton DT, et al. Concurrent partnerships and HIV prevalence disparities by race: linking science and public health practice. *Am J Public Health*. 2009; 99:1023–1031. [PubMed: 19372508]
25. Mah TL, Shelton JD. Concurrency revisited: Increasing and compelling epidemiological evidence. *Journal of the International AIDS Society*. 2011; 14:33–41. [PubMed: 21689437]
26. Goodreau SM, Cassels S, Kasprzyk D, et al. Concurrent partnerships, acute infection, and HIV Epidemic Dynamics among Young Adults in Zimbabwe. *AIDS Behav*. 2012; 16:312–322. [PubMed: 21190074]
27. Centers for Disease Control and Prevention and Indian Health Service. Indian Health Surveillance Report--Sexually Transmitted Diseases 2011. Atlanta, GA: US Department of Health and Human Services; 2014 Jun. Available at http://www.cdc.gov/std/stats/IHS/IHS-Surv-Report-2011_062314.pdf.

Comparison of demographic and risk behavior characteristics of American Indian and white adolescents and young adults, Add Health Wave III, 2001–2002.

Table 1

	American Indians (N=367)		Whites (N = 7813)		
	Mean/ Percent	(se)	Mean/ Percent	(se)	Difference
Demographic Variables					
Sex (female=1)	42.7%		49.8%		
Age	21.62	(0.3)	21.75	(0.1)	
Marital status (married=1)	20.6%		18.7%		
No high school degree	23.1%		9.2%		***
Public assistance	5.7%		5.4%		
Substance Use Behaviors					
Injection drug use	3.1%		1.3%		*
Marijuana use frequency	2.85	(0.6)	3.25	(0.2)	
Alcohol use frequency	2.01	(0.1)	2.5	(0.1)	***
Binge drinking frequency	1.25	(0.1)	1.53	(0.0)	*
Sexual Behaviors					
Early sexual initiation ^a	23.8%		16.8%		
Condom use					
Condom use at last sex ^b	44.6%		37.7%		
No condom use at last sex ^b	55.4%		62.3%		
No sex in past year	18.7%		20.0%		
Paid for sex ^b	9.0%		3.0%		***
Number of partners ^b	1.94	(0.1)	1.83	(0.0)	
Regretted sex due to substance use ^b	13.6%		20.9%		
Dependent Variable					
STI	9.0%		3.6%		***

Notes: All results weighted to account for the complex sampling design.

^a Of those who have ever had sex, N = 322 AI and 6,857 whites

^b Of those who had sex in the past year, N = 299 AI and 6,243 whites

* p < .05,
 ** p < .01,
 *** p < .001

Table 2

Logistic Regression Models Predicting Sexual Transmitted Infection among American Indian and white adolescents and young adults, Add Health Wave III, 2001–2002

	OR	[95% CI]			
<u>Demographic Variables</u>					
American Indian	2.4	1.5	4.1	***	
Sex	1.1	0.8	1.5		
Age	1.1	1.0	1.2		
Marital status	0.6	0.4	1.0	*	
No high school degree	1.3	0.8	2.1		
Public assistance	1.3	0.8	2.3		
<u>Substance Use Behaviors</u>					
Injection drug use	1.6	0.7	4.1		
Marijuana use frequency	1.0	1.0	1.0		
Alcohol use frequency	1.0	0.9	1.1		
Binge drinking frequency	1.0	0.9	1.1		
<u>Sexual Behaviors</u>					
Early sexual initiation	1.7	1.2	2.4	**	
Condom use					
Condom use at last sex (ref)	--	--	--		
No condom at last sex	1.5	1.1	2.0	**	
No sex in past year	0.7	0.4	1.1		
Paid for sex	1.7	0.9	3.2		
Number of partners	1.0	1.0	1.1		
Regretted sex due to substance use	0.9	0.6	1.4		

Notes: N=8,180. OR=Odds ratios. CI indicates confidence interval. All results weighted to account for the complex sampling design.

*
 $p < .05$,

**
 $p < .01$,

 $p < .001$