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HIV testing among youth in a high-risk city: prevalence, predictors and gender differences

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Abstract

While HIV is prevalent among adolescents and young adults, testing levels remain low and little is known about gender differences in HIV testing. The objectives of the study were to describe the prevalence of past-year HIV testing, and evaluate associations between HIV testing and individual- and partner-level factors by gender among heterosexually experienced youth (15-24 years) in Baltimore, Maryland (N=352). Past-year HIV testing was prevalent (60.1%) and differed by gender (69.4% among women vs. 49.6% among men, $p=0.005$). For women, African American race (AOR 3.09), and recent older partner by ≤ 2 years (AOR 4.04) were significantly associated with increased testing. Among men, only African American race was associated with increased testing (OR 4.23), with no patterns identified based on risk behavior or perceived partner risk. HIV testing among adolescent and young adults was prevalent in this highly affected urban area and provide direction for optimizing engagement in HIV testing.

Keywords

Adolescent; HIV testing; gender differences

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Introduction

Adolescents and young adults are disproportionately burdened by HIV (MMWR., 2012). Those ages 13-24 account for over one in four new infections (MMWR., 2012), yet only 12.9% of high school students have ever been tested (MMWR., 2012), with 15.7% of 18-24 year olds tested in the past year (CDC., 2013). More than half of the estimated 1.1 million HIV-infected adolescents in the United States are unaware of their status, the highest for any age group. (MMWR., 2012) In this era of effective treatment, it has never been more important to understand patterns and predictors of HIV testing, as it represents the entry point to the system of care.

Youth engagement in HIV testing, or lack thereof, often reflects low risk perception (Murphy, Mitchell, Vermund, Futterman, & Adolescent Medicine, 2002; Peralta, Deeds, Hipszer, & Ghalib, 2007), and has been associated with both individual (e.g., condom use, multiple sexual partners, injection drug use) and partner level risk behavior (e.g., injection drug use, concurrency) (Arrington-Sanders, Ellen, & Trent, 2008; Balaji et al., 2012; Goodman & Berecochea, 1994; Samet, Winter, Grant, & Hingson, 1997; Straub et al., 2011; Tolou-Shams et al., 2007). Gender differences exist in HIV testing, with more young women tested than men (CDC., 2009). This disparity is counter-intuitive given young men's higher infection rates (32.7 per 100,000 vs. 6.5 per 100,000 women) (CDC., 2011). Gender differences in risk perception and healthcare utilization may play a role. For example, risk perception is associated with testing among both men and women; though men engage in greater sexual risk behavior, their perception of their risk is often lower than that of women (Stein & Nyamathi, 2000). Women appear to test based on perceived partner risk, whereas men are more often symptomatic when tested or diagnosed, suggesting gender differences in testing motivation (Siegel, Lekas, Olson, & VanDevanter, 2010).

In 2010, Baltimore-Towson, MD ranked fourth in the US for adult/adolescent HIV diagnoses (CDC, 2010), and third for the proportion of adults living with HIV (CDC, 2010). The majority of cases are concentrated in urban Baltimore City (Center for HIV Surveillance & Epidemiology., 2011). We describe the prevalence of past-year HIV testing, and evaluate individual- and partner-level factors associated with testing by gender, among a sample of heterosexually experienced youth in Baltimore, MD.

Methods

Sample

This cross-sectional study draws on baseline data from a household survey conducted between February 2011 and May 2013 among heterosexually experienced youth ages 15-24 in Baltimore City, MD (Sherman, Under development). Further details have been described. (Sherman, Under development). A representative sample of low and middle class African American and white participants was recruited from census block groups (CBGs), with oversampling of some racial and SES groupings (n= 352). Following eligibility determination and informed consent (participants under age 18 provided parental consent), participants completed data collection via audio computer-assisted self-interview (ACASI).

Procedures were approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Measures

All data were self-reported. Past-year HIV testing, was assessed via a single item, “Have you ever been tested for HIV, the virus that causes AIDS?” with a follow-up item to assess testing within the past year. Single items assessed demographics, including age and race; highest level of parental education approximated socio-economic status (SES). Participants described all, if any, of their sex partners in the past 6 months, age at first sex, and engagement in same-sex sexual behavior. Specifically, they described both individual risk behaviors and partner-level characteristics as follows for each sex partner: condom use consistency for vaginal and anal sex, respectively, enabling dichotomous variables for unprotected vaginal, and anal, sex. Index concurrency was defined as having had anal or vaginal sex with anyone else while in a relationship with a given partner. Casual partners were defined as “someone you’ve had sex with only once or a few times or you have sex with on an ongoing casual basis”. Participants self-reported their partners’ ages, enabling calculation of participant-partner age differences of >2 years, and their partners lifetime history of having been STD or HIV infected, ever having sold drugs, injection drug use during the time of their relationship, and ever having been gang-involved, arrested, or incarcerated, respectively.

Analysis

Prevalence of past-year HIV testing was calculated for the entire sample and by gender. Gender differences in HIV testing, demographics, participant sexual risks, and partner characteristics were assessed via logistic regression models. Within gender strata, cross-tabulations of past-year HIV testing based on demographics, participant sexual risks, and partner characteristics were calculated, and associations evaluated via logistic regression models. For females, a multivariate logistic regression model simultaneously evaluated factors significant at $p < 0.05$ in univariate models. The sample size floated to accommodate small amounts of missing data; unweighted counts are provided in Table 1. All analyses were performed using SAS v9.3 (SAS institute INC., Cary, NC), and were weighted to estimate target population totals.

Results

Overall, 60.1% reported past-year HIV testing, with testing more prevalent among females relative to males (69.4% vs. 49.6% respectively, $p = 0.005$; Table 1). Across both genders, upwards of 95% received their test results. Young age at first sex (≤ 15) was more common among males (63.4%) than females (44.5%; $p = 0.012$). Significant gender differences included the greater portion of men with recent casual partners (68.9% vs. 32.3%, $p < 0.001$), and greater portions of women reporting partner drug selling (31.6% vs. 10.5%, $p < 0.002$), arrest (41.9% vs. 16.3%, $p < 0.001$), and incarcerated (32.3% vs. 4.4%, $p < 0.001$).

Among females, past-year HIV testing was significantly more common among those aged 19-24 relative to their younger counterparts (72.9% vs. 53.7%, OR 2.32, 95% CI 1.05-5.14;

Table 2), among African Americans relative to whites (76.5% vs. 55.7%, OR 2.59, 95% CI 1.22, 5.47), and among low relative to high SES as approximated by guardian education level (75.9% vs. 58.8%, OR 2.21, 95% CI 1.06, 4.61). Women whose recent sexual partner(s) were older by at least two years were significantly more likely to report past-year HIV testing (87.3% vs. 68.3%, OR 3.19, 95% CI 1.05, 9.71). Partner lifetime history of arrest was also associated with past-year HIV testing for women (87.1% vs. 65.2%, OR 3.61, 95% CI 1.31, 9.92). In the multivariate model, African American race (AOR 3.09, 95% CI 1.26, 7.57), low SES (AOR 3.28, 95% CI 1.18, 9.14), and having had a recent partner older by at least two years (AOR 4.04, 95% CI 1.18, 13.8) remained significantly associated with past-year HIV testing. In contrast, among men, African American race was the only factor significantly associated in univariate models with past-year HIV testing, with 58.9% engaging in testing relative to 25.3% of Whites (OR 4.23, 95% CI 1.61, 11.1), thus adjusted models were not pursued. Among males, HIV testing was most prevalent (70.4%) among those reporting same-sex behavior, though not statistically significant likely due to small cell sizes.

Conclusion

We identified prevalent past-year HIV testing among young males (49.6%) and females (69.4%) in this high-prevalence urban environment of Baltimore, MD. Consistent with national patterns (CDC., 2009; Chandra A. et al., 2012), women were significantly more likely to have been tested than young men. The low levels of testing among men ages 15-18 in particular suggests the potential value of school-based messaging. Across both men and women alike, testing was significantly more prevalent among African Americans (61% and 75.7%, respectively). Among women, both race and SES were independently associated with testing in the final adjusted model. In contrast, for men, African American race emerged as the sole predictor of HIV testing, with testing levels comparable across SES groupings. Among women, having a sexual partner older by two years or more was also significantly associated with HIV testing, corroborating past research (Siegel et al., 2010). Findings suggest the role of risk perception in women's HIV testing patterns; in contrast, no individual or partner-level risk behaviors were associated with testing among men.

Current estimates of past-year HIV testing are high relative to national estimates for youth, (CDC., 2009; Chandra A., Billioux V.G., Copen, Balaji, & E, 2012), indicative of modest success in engaging youth in HIV testing in this high-prevalence setting, particularly among African Americans. This higher testing prevalence may reflect recognition of racial disparities in the HIV epidemic or targeted outreach messages. Additional demographic and partner-related risk factors were associated with testing among women but not men, suggesting potential gender differences in HIV testing patterns. Findings suggest the utility of a gendered lens, including gender-stratified analyses, for HIV testing patterns and potentially other dimensions of access, utilization and uptake across the cascade of care. Several additional data elements would aid in interpretation, including testing-related media exposure, and reasons and locations for testing. Participants may lack knowledge concerning their partners' HIV risk behavior, thus partner-level assessments are considered perceptions. While the household-based sample enables inferences to the target population, generalizability to other settings is unclear. Findings illustrate high engagement in HIV

testing among youth in a high-prevalence urban environment, and, simultaneously, significant work remaining in realizing the US Preventive Services Task Force recommendation for HIV screening for all persons ages 15 and over.(Moyer & U. S. Preventive Services Task Force, 2013)

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Table 1Sample characteristics and prevalence of past-year HIV testing N=352[†]

	Total (n=352)	Females (n=220)	Males (n=132)	p-value
	% ^{††} (n) ^{†††}	% ^{††} (n) ^{†††}	% ^{††} (n) ^{†††}	
Past year HIV testing	60.1 (216)	69.4 (153)	49.6 (63)	0.005
Obtained results	97.2 (210)	98.3 (150)	95.4 (60)	0.259
Demographics				
Age				0.043
15-18	24.0 (79)	18.5 (46)	30.4 (33)	
19-24	76.0 (272)	81.5 (174)	69.6 (98)	
Race				0.542
White	29.5 (122)	31.3 (70)	27.5 (52)	
African American	70.5 (228)	68.7 (148)	72.4 (80)	
Parental education [SES proxy]				0.077
high school	52.9 (145)	58.9 (99)	46.1 (46)	
> high school	47.1 (203)	41.1 (118)	53.9 (85)	
Individual Sexual Behavior				
Sexual Behavior				0.044
Heterosexual	79.9 (271)	74.2 (159)	86.4 (112)	
Same sex partner	20.1 (74)	25.8 (57)	13.6 (17)	
Age at first vaginal sex				0.012
15 yrs	53.1 (171)	44.5 (100)	63.4 (71)	
>15 yrs	46.9 (163)	55.5 (113)	36.6 (50)	
# of Partners last 6 months				<.0001
0-1	59.9 (236)	72.5 (160)	45.6 (76)	
2	40.1 (116)	27.5 (60)	54.4 (56)	
<i>Of those in a relationship in the past 6 months (n=282)</i>				
Index concurrency	25.0 (64)	22.5 (38)	27.5 (26)	0.486
Unprotected vaginal sex	73.5 (179)	76.8 (118)	69.8 (61)	0.342
Unprotected anal sex	68.6 (57)	72.5 (30)	66.6 (27)	0.643
Partner characteristics				
Any "casual" partners	51.1 (119)	32.3 (56)	68.9 (63)	<.0001
Partner sexual risk				
Older by >2 yrs	30.3 (81)	34.4 (59)	26.2 (22)	0.292
Partner concurrency	26.9 (67)	31.4 (47)	22.6 (20)	0.242
Partner STD/HIV	12.1 (31)	12.1 (19)	12.1 (12)	0.988
Partner drug-related risk				
Partner injection drugs	2.0 (4)	1.1 (2)	3.0 (2)	0.399
Partner sells drugs	21.1 (57)	31.6 (47)	10.5 (10)	0.002

	Total (n=352)	Females (n=220)	Males (n=132)	p-value
	% ^{††} (n) ^{†††}	% ^{††} (n) ^{†††}	% ^{††} (n) ^{†††}	
Partner criminal involvement				
Partner gang involvement	11.9 (29)	13.5 (18)	10.4 (11)	0.551
Partner arrest	29.2 (79)	41.9 (64)	16.3 (15)	0.0007
Partner incarcerated	18.4 (52)	32.3 (48)	4.4 (4)	0.0002

[†] Sample size floats to accommodate small amounts of missing data

^{††} Column %

^{†††} unweighted counts and weighted percentages presented

Table 2

Associations of demographics, individual sexual behavior, & partner-level risk with past-year HIV testing[†]

	Females (N=220)			Males (N=132)		
	% tested	OR (95% CI)	AOR (95% CI)	% tested	OR (95% CI)	
Demographics						
Age 15-18	53.7	---		34.8	---	
Age 19-24	72.9	2.32 (1.05-5.14)*	1.04 (0.33,3.26)	57.8	2.57 (0.83,7.95)	
White	55.7	---		25.3	---	
African American	76.5	2.59 (1.22,5.47)*	3.09 (1.26,7.57)*	58.9	4.23 (1.61,11.1)*	
Parental Education [SES proxy]						
> high school	58.8	---		47.0	---	
high school	75.9	2.21 (1.06,4.61)*	3.28 (1.18,9.14)*	52.9	1.27 (0.51,3.18)	
Individual Sexual Behavior						
Same sex partner						
No	68.1	---		47.5	---	
Yes	76.3	1.51 (0.63,3.60)		70.4	2.63 (0.66,10.5)	
Age at first vaginal sex						
>15	73.0	---		53.0	---	
15	68.1	1.27 (0.61,2.65)		44.3	1.42 (0.53,3.83)	
No. of partners last 6 mo						
0-1	67.3	---		45.8	---	
2	74.8	1.44 (0.62,3.35)		52.8	1.33 (0.56,3.16)	
Of those in a relationship in the past 6 months (n=282)						
Index concurrency						
No	75.8	---		46.7	---	
Yes	71.4	0.80 (0.29,2.17)		59.7	1.69 (0.54,5.28)	

		Females (N=220)		Males (N=132)	
		% tested	OR (95% CI)	% tested	OR (95% CI)
Unprotected vaginal sex					
No		60.9	---	64.2	---
Yes		80.8	1.33 (0.54,3.30)	49.1	0.80 (0.30,2.19)
Unprotected anal sex					
No		67.7	---	36.9	---
Yes		80.2	1.54 (0.42,5.68)	57.4	1.19 (0.36,3.92)
Partner characteristics					
Any "casual" partners					
No		77.8	---	53.7	---
Yes		67.4	0.59 (0.24,1.43)	48.7	0.82 (0.33,2.06)
Partner sexual risk					
Older Partner by 2 years					
No		68.3	---	47.0	---
Yes		87.3	3.19 (1.05,9.71)*	63.1	1.93 (0.60,6.25)
Partner concurrency					
No		73.3	---	48.9	---
Yes		77.5	1.25 (0.46,3.38)	43.4	0.80 (0.21,3.09)
Partner STD/HIV					
No		71.0	---	51.9	---
Yes		91.6	4.49 (0.55,36.9)	20.6	0.24 (0.05,1.22)
Partner drug-related risk					
Partner sells drugs					
No		72.0	---	51.7	---
Yes		79.1	1.47 (0.55,3.96)	31.8	0.44 (0.09,2.03)

		Females (N=220)		Males (N=132)	
		% tested	OR (95% CI)	% tested	OR (95% CI)
Partner criminal involvement					
Partner gang involvement					
No		72.7	---	49.2	---
Yes		83.1	1.85 (0.38,9.02)	46.5	0.90 (0.20,3.97)
Partner arrest					
No		65.2	---	50.5	---
Yes		87.1	3.61 (1.31,9.92)*	42.1	0.71 (0.20,2.49)
Partner incarcerated					
No		69.8	---	51.2	---
Yes		87.3	2.96 (0.91,9.69)	0	

[†] weighted to estimate target population totals

* p<.05