

Predictors of HIV Testing Among Latinos in Baltimore City

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Abstract To better understand access to HIV testing and prevention services experienced by Latinos, we evaluated data compiled through Baltimore City Health Department HIV outreach efforts in 2008. Of 6,443 clients served, Latinos were more likely male, young, and less-educated than non-Latinos. A greater proportion of Latinos had never been tested for HIV compared to non-Latinos (63% vs. 20%, $P < 0.001$). Male gender (AOR 1.58, 95% CI 1.04, 2.44), >8th grade education (AOR 2.4, 95% CI 1.60, 3.60) were associated with accessing HIV testing in the past. Increasing age, identifying as gay or bisexual, history of sexually-transmitted disease, and injection drug use were also associated with reporting prior HIV testing. HIV prevention services for Latinos should expand to reach those who are younger, heterosexual, of lower educational level, and female.

Keywords HIV · HIV prevention · Latinos · Hispanic Americans

Introduction

In the US, Latinos are disproportionately affected by HIV and AIDS. Approximately one-fifth of AIDS cases in the US occur in Latinos, and Latinos are often diagnosed late in the disease, resulting in decreased survival [1]. Latinos comprise 14% of the US population and are the largest and fastest growing ethnic minority group [2]. A large proportion of growth is due to immigration; approximately 63% of Latinos are foreign-born [3]. Migrant populations are at increased risk for poor health outcomes, including HIV [4–7]. After African-Americans, Latinos have the second highest rate of HIV diagnosis, and available data suggests that most HIV infections among Latinos occur after entry to the US [7–10].

The recent influx of Latinos to Baltimore has raised concerns about the need for targeted HIV prevention efforts to this community. As the number of Latinos in Baltimore has increased, the impact of HIV/AIDS on the Latino community has also risen dramatically. Baltimore is home to 51%(1,093 cases) of the incident HIV cases and 46% (595) of the incident AIDS cases in all of Maryland [11]. In Baltimore City from 1997 to 2006, while rates of AIDS cases decreased among non-Hispanic Blacks and Whites, AIDS incidence among Latinos nearly doubled (from 40.8 to 80.0 cases/100,000) [12]. Data from the Baltimore City Health Department (BCHD) Sexually Transmitted Diseases (STD) clinics indicate that Latino patients present for HIV care with more advanced disease than other patient populations. In addition, BCHD outreach workers noticed very low levels of HIV knowledge among the general Latino population, with limited perception of HIV risk and need for testing.

To improve timely access to HIV testing and care among Spanish-speaking patients, BCHD hired four Latino

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outreach workers in 2008 to screen Latinos for HIV and syphilis. We evaluated the BCHD Outreach Program intake data and test results. We compared the characteristics of the Latino, Black and White individuals accessing HIV outreach services in Baltimore City. We used history of previous HIV testing as a marker of HIV awareness and use of prevention services because HIV counseling/testing have historically been tightly linked services. We identified predictors of previous HIV testing in the Latino population.

Methods

Baltimore City Outreach Program

This was a cross-sectional study of BCHD outreach surveys and test results conducted from August 1–December 18, 2008 by BCHD Outreach Program. Locations and venues for regular outreach activities are guided by data from interviewing index cases of syphilis or HIV. Outreach activities are targeted to locations where a concentration of cases reside or to venues where infected persons meet sex partners. Because less data had accumulated on high risk venues for Latinos, the street outreach focused on predominantly Latino neighborhoods. They also provided informational sessions at Latino community-based organizations (CBO) and collaborated with a local hospital's mobile clinic prenatal referral service that was known to be heavily utilized by the Latino community. Outreach workers obtained written consent from participants and administered a short face-to-face health behavior questionnaire. Blood was drawn for HIV and syphilis testing. Participants were provided a phone number to call for their results after two weeks. Patients with any positive result were asked to come into the clinic, and an assigned Disease Intervention Specialist ensured follow up.

Data Source

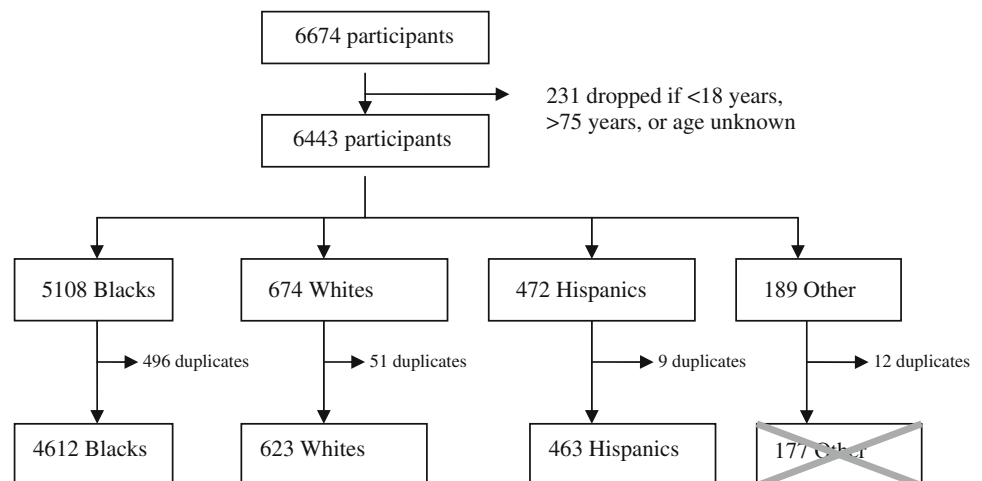
We analyzed data collected by outreach workers on the standard risk behavior form linked to a laboratory test result. The form recorded demographic characteristics as well as sexual orientation, STD history, injection drug use (last 6 months), sexual risk factors (last 6 months), condom use (last 6 months), and history of previous HIV testing. Race and ethnicity was determined by self-report. Phlebotomists took blood samples which were tested for both HIV and syphilis as described in previous studies [13, 14]. These data were collected in the course of routine outreach activities and use of these data for this analysis was approved by the Institutional Review Board of Johns Hopkins Medical Institutions.

Statistical Analysis

Over the period from August 1, 2008 to December 18, 2008, 6,674 surveys were conducted (Fig. 1). We excluded 231 records of individuals <18 years-old, >75 years, or with unknown age. In addition, we kept only the initial records of individuals who tested more than once, excluding all subsequent duplicate records (568 records). This resulted in a sample of 4,612 non-Latino Blacks (which we will refer to as “Black”), 623 non-Latino Whites (“White”), and 463 Latinos. Due to the small number of participants of other ethnicities, we excluded them from analysis.

We first compared sociodemographic variables and risk behaviors by race/ethnicity. We used Chi-Squared analysis to test differences between categorical variables and Analysis of Variance (ANOVA) F test for continuous data. Among Latinos, we performed univariate logistic regression analysis to identify factors associated with previous HIV testing. We then performed multivariate logistic regression including all variables that had a significance

Fig. 1 Participant profile



level <10% in the univariate analyses. In addition, we kept variables in the model if prior knowledge suggested an association. We used the likelihood ratio test to compare nested models, using a significance level of 5%. All statistical analysis was done using STATA statistical software version 10.0 (College Station, TX).

Results

Table 1 shows that Latinos tested for HIV during outreach activities differ significantly from Blacks and Whites in many characteristics. Latinos reported lower educational attainment, (39% receiving only an eighth-grade education

Table 1 Demographic characteristics and risk behaviors

	Latino <i>n</i> = 463	Black <i>n</i> = 4,612	White <i>n</i> = 623	<i>P</i> -value
Age, mean (SD)	31 (10.0)	41 (12.1)	39 (11.8)	<0.001
Male sex, no. (%)	269 (58.1)	2,602 (56.4)	387 (62.1)	0.089
Education level, no. (%)				
≤8th grade	180 (38.9)	179 (3.9)	47 (7.5)	<0.001
>8th grade	233 (50.3)	4,065 (88.1)	525 (84.3)	
Refused answer	50 (10.8)	368 (8.0)	51 (8.2)	
Sexual orientation, no. (%)				
Heterosexual	445 (96.1)	4,176 (90.6)	542 (87.0)	<0.001
Bisexual/gay/other/refused	18 (3.9)	436 (9.45)	81 (13.0)	
Marital status, no. (%)	(<i>N</i> = 459)	(<i>N</i> = 4,430)	(<i>N</i> = 589)	<0.001
S/Div/W/Sep	260 (56.6)	3,817 (86.2)	498 (84.6)	
In a relationship	199 (43.4)	613 (13.8)	91 (15.4)	
STD history, no. (%)				
No STD	355 (76.7)	2,691 (58.3)	378 (60.6)	<0.001
1 or more	78 (16.9)	1,862 (40.4)	235 (37.7)	
Don't know	30 (6.5)	59 (1.3)	10 (1.6)	
# Partners (last 6 months) no. (%)				
0–1	145 (31.3)	1,848 (40.1)	244 (39.3)	0.150
≥2	86 (18.6)	921 (20.0)	146 (20.2)	
No answer	232 (50.1)	1,843 (40.0)	233 (37.4)	
Condom use (last 6 months), no. (%)				
Did not use condom	105 (22.7)	1,674 (36.3)	226 (36.3)	<0.001
Used condom always	114 (24.6)	1,049 (22.8)	156 (25.0)	
No answer	244 (52.7)	1,889 (41.0)	241 (38.7)	
≥1 sex partner in 1 week (last 6 months), no. (%)				
No	120 (25.9)	2,517 (54.6)	341 (54.7)	<0.001
Yes	20 (4.3)	214 (4.6)	42 (6.7)	
No answer	323 (69.8)	1,881 (40.8)	240 (38.5)	
IDU (last 6 months), no. (%)				
No	457 (98.7)	4,282 (92.8)	533 (85.5)	<0.001
Yes	6 (1.3)	330 (7.2)	90 (14.5)	
HIV test, no. (%)	(<i>N</i> = 461)	(<i>N</i> = 4,602)	(<i>N</i> = 623)	
Negative	458 (99.4)	4,312 (93.7)	604 (97.0)	<0.001
Positive	3 (0.7)	290 (6.3)	19 (3.1)	
Syphilis/HIV, no. (%)	(<i>N</i> = 450)	(<i>N</i> = 3,826)	(<i>N</i> = 584)	
Negative	437 (97.1)	3,486 (91.1)	560 (95.9)	<0.001
Positive	13 (2.9)	340 (8.9)	24 (4.1)	
History of HIV test, no. (%)				
No previous	290 (62.6)	972 (21.1)	149 (23.9)	<0.001
Previous	173 (37.4)	3,640 (78.9)	474 (76.1)	

S/Div/W/Sep single/divorced/widowed/separated, STD sexually transmitted disease, IDU injection drug use

or less compared to >84% of Blacks and Whites who had received some high-school education). Latinos were also younger (mean age of 31, compared to 41 and 39 for Blacks and Whites respectively). Despite the younger age, a larger proportion of Latinos were married or in a committed relationship (43% compared to 14% of Blacks or 15% of Whites).

Latinos generally had similar or lower rates of risk behaviors than Blacks and Whites. Self-reported condom use was low among all racial groups (22–25%), but even lower among women (7.7%, 19.7%, and 26.3% in Latinos, Blacks and Whites, respectively with no significant difference between racial groups). Rates of injection drug use (IDU) were much lower among Latinos at 1.3% compared to 7.2% among Blacks and 14.5% among Whites. A significantly smaller proportion of Latinos reported having been tested for HIV in the past (37% of Latinos versus 75% of Blacks and Whites).

Overall only three (0.7%) Latinos tested positive for HIV and ten (2.2%) for syphilis, resulting in a total of 2.9% of all Latinos surveyed testing positive for either HIV or syphilis. Blacks had the highest rates of infection, with 8.9% testing positive for either HIV or syphilis while 4.1% of Whites tested positive for either disease. All three Latinos testing positive for HIV were <35 years of age, heterosexual, and had less than high school education. None had ever been tested for HIV in the past.

Gender Differences

Latina women were more likely than their male counterparts to be married or in a committed relationship (53% versus 36%) (Table 2). Fewer women had had a previous HIV test (30% compared to 43% of men). In addition, women had lower rates of condom use in the last 6 months (7.7% of women compared to 37% of men.) Because some

Table 2 Gender differences in baseline characteristics among Latinos

	Men <i>n</i> = 269	Women <i>n</i> = 194	<i>P</i> -Value
Age, median (SD)	32 (10.35)	27 (9.01)	<0.001 ANOVA
Education level, no. (%)			
≤8th grade	122 (45.4)	59 (30.4)	<0.001
>8th grade	131 (48.7)	101 (52.1)	
Refused answer	16 (6.0)	34 (17.5)	
Marital status, no. (%)			
S/Div/W/Sep	171 (63.6)	92 (47.4)	<0.001
In a relationship	98 (36.4)	192 (52.6)	
# Partners (last 6 months), no. (%)			
0–1	104 (38.7)	41 (21.1)	<0.001
≥2	81 (30.1)	5 (2.6)	
No answer	84 (31.2)	148 (76.3)	
Condom use (last 6 months), no. (%)			
Did not use condom	77 (28.6)	28 (14.4)	0.008
Always used condom	99 (36.8)	15 (7.7)	
No answer	93 (34.6)	151 (77.8)	
≥1 sex partner in 1 week (last 6 months), no. (%)	(<i>N</i> = 111)	(<i>N</i> = 29)	
No	94 (84.7)	27 (93.1)	0.239
Yes	17 (15.3)	2 (6.9)	
HIV test, no. (%)	(<i>N</i> = 268)	(<i>N</i> = 193)	
Negative	265 (98.9)	193 (100.)	<0.001
Positive	3 (1.1)	0	
Syphilis test, no. (%)	(<i>N</i> = 266)	(<i>N</i> = 184)	
Negative	257 (96.6)	183 (99.5)	0.045
Positive	9 (3.38)	1 (0.54)	
History of HIV test, no. (%)			
No previous	153 (56.9)	137 (70.6)	0.002
Previous	116 (43.1)	57 (29.4)	

S/Div/W/Sep single/divorced/widowed/separated, *STD* sexually transmitted disease, *IDU* injection drug use

of the outreach activities specifically targeted pregnant women, a large proportion of the Latino women in our study were pregnant (63%) (Table 3).

Correlates of Previous Testing in Latinos

Given the late presentation to HIV care observed among Latinos attending the BCHD STD clinic and the marked difference in previous HIV testing among Latinos (37%) compared to Blacks (79%) and Whites (76%), we characterized factors associated with HIV testing among Latinos. Among Latinos, after multivariate adjustment (for age, education, gender, marital status, IDU, history of STD, and sexual orientation), young age, female gender, and low educational level were significantly associated with decreased likelihood of previous HIV testing (Table 4). Individuals who were not injection drug users, had no history of prior STD, were heterosexual, and were married were also less likely to have been tested for HIV in the past, although these relationships were not statistically significant.

Among Latino women (Table 3), current pregnancy was also significantly associated with lack of previous HIV testing. After controlling for age, education, history of STD, sexual orientation, marital status, and IDU, pregnant women without prenatal care were 68% less likely to have been tested for HIV in the past than non-pregnant women (95%CI 26%, 86%).

Discussion

With the recent influx of Latinos to the Baltimore area and the increase in Latino patients presenting with advanced HIV to the BCHD STD clinic, a culturally-sensitive outreach program was implemented to improve access to HIV testing for Latinos. Prior to this analysis, the impression from the outreach team was that Baltimore Latinos had low levels of HIV knowledge, resulting in decreased awareness of the need for HIV testing; this could, in part, contribute to late presentation for HIV care when infected. Analysis of

the BCHD outreach data confirmed this, as a substantial proportion of Latinos have never been tested for HIV (63%). When we analyzed the factors associated with previous HIV testing, we found that low educational status and young age are not only characteristic of a migrant population, [4] but also associated with lower HIV testing rates than other Latinos. In addition, women were less likely than men to have ever been tested for HIV. The data suggests that HIV education and prevention efforts for Latinos in Baltimore need to reach a younger and less-educated population, as well as intensify efforts in women.

Although men who have sex with men (MSM) is the highest HIV transmission-risk category among Latinos nationally, [1] there may be some evidence that the HIV epidemic is disproportionately affecting foreign-born heterosexual men and women [10, 15]. The proportion of HIV infection attributable to MSM transmission varies by country of origin [1]. National statistics of Latinos often reflect the trends among individuals of Mexican descent, who account for 64% of US Latinos [3]. In Baltimore City, Latinos of Mexican descent comprise <50% of the Latino population, while Central and South Americans are over-represented compared to national demographics [16]. In our study sample, although the number of new HIV diagnoses was small, all three newly-identified HIV diagnoses and the majority of syphilis infections (60%) were identified among heterosexual men. Because we identified so few HIV-positive individuals in our sample, we can not make any definitive conclusions. However, since there is evidence that the HIV epidemic disproportionately affects foreign-born heterosexual men and women, [10, 15] regions with recent influx of foreign-born Latinos such as Baltimore, should target prevention efforts among heterosexual men and women as well as traditional high-risk groups.

In our analysis, Latino women were less likely to have been previously tested for HIV than men, another result that differs from national data on HIV testing in which Latino women are more likely to be tested [17]. Nationally many women are tested through prenatal screening. However many of the pregnant women in our study were not

Table 3 Association of previous HIV testing among Latino women stratified by pregnancy status

	Total, no (%) N = 178	Never tested N = 126	Previously tested N = 52	Adjusted OR (95% CI) ^a
Not pregnant	56 (31)	28	28	1.00
Pregnant, no prenatal care	93 (52)	74	19	0.32 (0.14, 0.74)
Pregnant with prenatal care	20 (11)	17	3	0.24 (0.05, 1.06)
Unknown	9 (5)	7	2	0.21 (0.03, 1.53)

CI confidence interval

^a Odds ratios adjusted for age, education, sexual preference, marital status, and history of STD

Table 4 Unadjusted and adjusted odds ratios for predictors of previous HIV testing

	Never tested <i>N</i> = 290, no. (%)	Previously tested <i>N</i> = 173, no. (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI) ^a
Age				
18–24	101 (34.8)	41 (23.7)	1.00	1.00
25–34	117 (40.3)	64 (37.0)	1.35 (0.84, 2.16)	1.47 (0.89, 2.43)
35–45	44 (15.2)	37 (21.4)	2.07 (1.17, 3.66)	2.03 (1.10, 3.77)
≥ 45	28 (9.7)	31 (17.9)	2.72 (1.45, 5.10)	2.44 (1.25, 4.78)
Gender				
Male	153 (52.8)	116 (67.1)	1.00	1.00
Female	137 (47.2)	57 (33.0)	0.55 (0.37, 0.81)	0.63 (0.41, 0.96)
Education				
≤8/refused	165 (56.9)	65 (37.6)	1.00	1.00
>8th	125 (43.1)	108 (62.4)	2.19 (1.49, 3.22)	2.40 (1.60, 3.60)
Sexual orientation				
Heterosexual	284 (97.9)	161 (93.1)	1.00	1.00
Gay/bisexual/refused	6 (2.1)	12 (6.9)	3.52 (1.30, 9.58)	2.74 (0.96, 7.80)
Marital status				
S/Div/W/Sep	154 (53.9)	106 (61.3)	1.00	1.00
In a relationship	132 (46.1)	67 (38.7)	0.73 (0.50, 1.08)	0.74 (0.48, 1.13)
History of STD				
None/don't know	250 (86.2)	135 (78.0)	1.00	1.00
≥1	40 (13.8)	38 (22.0)	1.76 (1.08, 2.87)	1.67 (0.99, 2.84)
# of Partners (last 6 months)				
0–1	78 (63.9)	67 (61.5)	1.00	
>2	44 (36.1)	42 (38.5)	1.11 (0.65, 1.90)	
Condom use (last 6 months)				
Used condom	66 (57.9)	48 (45.7)	1.00	
No condom	48 (42.1)	57 (54.3)	1.63 (0.96, 2.79)	
IDU (last 6 months)				
No	289 (99.7)	168 (97.1)	1.00	
Yes	1 (0.3)	5 (2.9)	8.60 (1.00, 74.24)	7.24 (0.76, 69.31)
Concurrent partner (last 6 months)				
No	57 (86.4)	63 (85.1)	1.00	
Yes	9 (13.6)	11 (4.9)	1.10 (0.43–2.86)	

CI confidence interval, *S/Div/W/Sep* single/divorced/widowed/separated, *STD* sexually transmitted disease, *IDU* injection drug use

^a Adjusted for age, gender, education, sexual orientation, marital status, history of STD, and IDU

engaged in prenatal care. Among Latinas, pregnant women who were not receiving prenatal care were 68% less likely to have been tested for HIV in the past (95% CI 26%, 86%) than non-pregnant women. Several of our outreach workers noted that women refused testing, citing the need to get their husband's permission for testing or that they did not need to be tested because their partners were tested. In our study, a large proportion of Latino women did agree to have HIV testing done only in conjunction with the prenatal referral program. This highlights two important points. First, to improve testing among women, HIV prevention programs among foreign-born Latinos need to address gender-role issues in providing a culturally

acceptable way for Latina women to accept HIV testing. Secondly, it reflects how the Latino population in Baltimore, which is predominantly foreign-born, accesses health care. Many foreign-born Latinos are uninsured and/or undocumented, with limited access to regular medical care. They rely heavily on community-based health initiatives for their care. Many women received HIV testing in concert with the outreach program that facilitates referrals for prenatal care, underscoring the importance of linking HIV testing to other community health priorities.

Our study has several limitations. First, because our study is based on the existing BCHD Outreach Program data, it may not be a representative sample of the Baltimore

City Latino community. Our data was limited to individuals who participated in the current HIV testing intervention. Therefore, we could not evaluate the characteristics of Latinos who never access or refuse HIV testing. Furthermore, our findings are not generalizable to the entire US Latino population, but may be applicable to the unique experience of urban centers with a recent influx of foreign-born Latinos. As it is an observational study, we were not able to control for all potential unmeasured confounders. In addition, because our data were based upon self-report, there was potential for social desirability bias, resulting in under-reporting or differential reporting of risk behavior [18].

We used history of previous HIV testing as a surrogate marker for HIV awareness and access to care, but were not able to distinguish which of these factors played a predominant role in HIV screening. Several patient-related factors could impact previous HIV testing, including lack of easily accessible HIV testing venues, lack of HIV knowledge or perception of risk, or fear of stigma. In addition, medical provider perception of risk may influence whether a patient is screened for HIV. Although recent CDC guidelines recommend HIV testing at least once in a lifetime for all adults receiving medical care for any condition, universal screening is not yet widely implemented [19].

The reasons why the Latino population is disproportionately affected by HIV/AIDS are not completely clear. Many US urban centers that do not have the well-established Latino communities present in Border States or large metropolitan cities (such as New York City) have experienced a similar recent dramatic influx of Latino migrants as Baltimore. The foreign-born Latino population represents a vulnerable group with poor access to health care due to their constant migration, unstable housing, lack of English proficiency, and other issues associated with acculturation. Because migrant work has substantial impact on health outcomes including risk of HIV/STD acquisition [4–7] and given the rising incidence of AIDS among Baltimore City Latinos, [12] more work needs to be done to improve timely access to HIV testing and care for the Baltimore City Latino population. The STD Screening Intake Form used in this study was developed for a US-born population and did not assess factors relevant to migrant populations such as country of origin, English language proficiency, or level of acculturation. However, our results provide a basis for developing a research tool tailored to address specific factors relevant to a Latino migrant population.

Our study shows that Latinos are less likely to have been previously tested for HIV than other populations accessing community-based HIV screening, and suggests that the BCHD Latino Outreach Program is providing a much needed service in the City by raising HIV awareness and

providing culturally-sensitive testing venues. The large proportion of pregnant women who accessed HIV testing through the prenatal referral program suggests that bundling HIV testing with other health initiatives may improve HIV knowledge, testing, and diagnosis in the Latino community. Further studies evaluating how specific factors related to migration impact HIV/AIDS acquisition are needed so that effective testing and prevention strategies can be implemented to control the HIV epidemic in the Latinos.

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