



Research Article

Correlates of Never Having Been Tested for HIV among American Indians/Alaskan Natives in the United States: Analysis of the National Health Interview Survey, 2015-2016

Eric Leveille, Audrey Funk, Joseph N Inungu*, Mark Minelli and Shayesteh Jahanfar

Master of Public Health Program, School of Health Sciences, Central Michigan University, Michigan, USA

Abstract

Background: American Indians/Alaska Natives (AI/AN) represent only 1.2% of the U.S. population; however, AIs/ANs ranked fifth in rate of Human Immunodeficiency Virus (HIV) diagnoses in 2015 compared with other racial/ethnic groups. Of the 3,600 AIs/ANs estimated to be living with HIV in 2013, 18% (630) were not aware of their condition. This paper examines the proportion of AIs/ANs who have never been tested for HIV and its correlates.

Methods: Secondary analysis of the 2015 and 2016 National Health Interview Survey (NHIS) data was carried out using descriptive and logistic regression analyses to determine the prevalence of recent HIV testing and factors associated with never having been tested for HIV.

*Corresponding author: Joseph N Inungu, Master of Public Health Program, School of Health Sciences, Central Michigan University, Mt Pleasant, MI, USA, Tel: +1 9897744476; Fax: +1 9897742908; E-mail: inung1j@cmich.edu

Citation: Leveille E, Funk A, Inungu JN, Minelli M, Jahanfar S (2018) Correlates of Never Having Been Tested for HIV among American Indians/Alaskan Natives in the United States: Analysis of the National Health Interview Survey, 2015-2016. J AIDS Clin Res Sex Transm Dis 5: 020.

Received: July 04, 2018; **Accepted:** July 25, 2018; **Published:** August 08, 2018

Copyright: © 2018 Leveille E, et al., This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Results: Of the 66,700 individuals included in both the sample adult cores, 749 individuals (1.1%) were AI/AN only, the sample of the study. Of the 711 participants who had valid results, 52.9% reported to have ever been tested for HIV. Respondents aged 25-34 years (OR=2.460, $p<0.001$), 35-44 years (OR=2.755, $p<0.001$) and respondents age 45-54 years (OR=2.341, $p<0.001$) were significantly more likely than participants 55 years and older to report never having been tested for HIV. Additionally, respondents who are separated or divorced were significantly more likely to report never having been tested for HIV compared to respondents who are living in union (OR=2.128, $p<0.05$).

Conclusion: Although HIV is a public health problem among AI/AN, many people most at risk for HIV do not know their serostatus, making any prevention effort impossible. HIV testing is the cornerstone for any intervention to prevent HIV transmission. The high proportion of the population that had never been tested for HIV underscores the needs for more efforts to promote the benefits of HIV testing in this community.

Introduction

After 37 years of the Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Virus (AIDs) pandemic, an estimated 35 million people live with HIV globally with more than 1.2 million people living with HIV in the United States [1,2]. Despite the recent small decrease in the incidence of HIV in the United States from 2014 to 2015 (12.6 to 12.3 per 100,000 population), HIV remains a threat to the health of individuals in the United States [3]. While there is no cure for this disease, the existing antiretroviral therapy allows individuals infected with HIV to live longer and healthier lives [4]. HIV is a public health issue among American Indians and Alaska Natives (AIs/ANs). HIV affects AIs/ANs in ways that are not always obvious because of their small population sizes. While they represent only 1.2% of the U.S. population, AIs/ANs ranked fifth in rate of HIV diagnoses in 2015 compared with other racial/ethnic groups. Although AIs/ANs have a lower rate of HIV than African Americans, Hispanics/Latinos and Native Hawaiians/other Pacific Islanders, they experience a higher rate than Asians and whites [3,5]. In 2015, 39,513 new HIV cases were diagnosed in the United States; 1% (209) were among AIs/ANs. Of those, 73% (152) were men and 26% (55) were women. Most of the 55 women were infected through heterosexual contacts [3].

Several factors affect the spread of HIV infection among AIs/ANs including lack of awareness of HIV status [3]. Of the 3,600 AIs/ANs estimated to be living with HIV in 2013, 18% (630) were not aware of their condition. People who do not know they have HIV cannot take advantage of HIV care and treatment and may unknowingly pass HIV to others. From 2011 to 2015, AIs/ANs had the second highest rates of chlamydia and gonorrhea among all racial/ethnic groups in the US. Most Sexually Transmitted Infections (STIs), including Herpes Simplex 2 (HSV-2), syphilis, gonorrhea and chlamydia, are known to increase the risk of HIV infection in HIV-negative persons. STIs also lead to increased shedding of HIV from the genitals of HIV-positive individuals, increasing the risk of transmitting HIV to others [6].

Alcohol and substance use can impair judgment and lead to behaviors that increase the risk of HIV. Injection drug use can directly increase the risk of HIV through sharing contaminated needles, syringes and other equipment. The National Survey on Drug Use and Health (NSDUH) data for American Indian/Alaska Natives (AI/AN) reported that native adolescents had the highest rates of lifetime tobacco product use, marijuana use, nonmedical use of pain relievers and non-medical use of prescription-type psychotherapeutics compared with the national average for adolescents aged 12 to 17 [7].

HIV is prevalent in poor communities. Poverty, including limited access to high-quality housing, directly and indirectly increases the risk for HIV infection and affects the health of people living with and at risk for HIV infection. Compared with other racial/ethnic groups, AIs/ ANs have higher poverty rates, have completed fewer years of education, are younger and less likely to be employed and have lower rates of health insurance coverage [8]. In the United States, there are currently 567 federally recognized AI/AN tribes that consist of 5.4 million individuals that are AI/AN only or AI/AN in combination with one or more races [9,10]. The fact that 73% of the population are living in health professional shortage areas resulting in lack of access to health care providers in primary care, dental health, or mental health [11,12]. The high number of tribes with different cultures and values and speaking different languages makes it difficult to organize HIV prevention intervention among AIs/ANs.

Fortunately, there is a branch of the Department of Health and Human Services that provides federal health care to AI/AN people called the United state and the district (IHS) [13]. IHS is using a comprehensive public health approach called the IHS National HIV/AIDS Program that coordinates and promotes HIV/AIDS prevention and treatment activities specific to Indians [14]. Recently, IHS has looked to implement HIV screening of adults and adolescents per national recommendations because in 2015 it was found that electronic clinical reminders, standing order/test policies and delegation of screening is correlated to HIV screening [13]. Despite the high incidence of HIV among AIs/ANs, there is a dearth of information about HIV testing in this population. The purpose of this study is to examine the characteristics of people who never tested for HIV. A good understanding of these factors is critical to inform the design of a more targeted intervention to increase HIV testing, the starting point for any intervention to prevent HIV.

Methods

The NHIS is an annual cross-sectional household interview survey that follows a multistage area probability design that permits representative sampling of households and non-institutional group quarters within each state and the district [15]. The NHIS is conducted by interviewers employed and trained by the U.S. Census Bureau according to the procedures specified by the National Center of Health Statistics. These interviewers use a computer assisted personal interviewing mode version of the NHIS questionnaire and directly enter the responses of the interviewee into the computer during the interview [15]. Overall, within the NHIS 2015 and NHIS 2016 sample adult files data was gathered from 66,700 respondents which included 749 AI/AN (1.12%) respondents only. While data was collected on AI/ANs of mixed, that information was excluded due to the impact the other race could have on HIV testing status. Additionally, the impact from these individuals on the sample size was small.

Measures

Dependent variable

The dependent variable for this study was whether respondents had ever tested for HIV. This variable was determined in the 2015 and 2016 NHIS surveys by the participants' answer to the question: "Have you ever been tested for HIV?"

Independent variables

Sociodemographic characteristics including gender, age (<25 years, 25-34, 35-44, 45-54 and 55 years and older), region of residence within the United States (Northeast, Midwest, South or West), marital status (living in union, separated/divorced/widow) and work status during the last 12 months were examined as independent variables within this study. Unfortunately, due to the utilization of NHIS, a secondary data source, the selection of independent variables was limited based on variables available.

Data analysis

To test the association between the sociodemographic characteristics and whether a person never tested for HIV a Pearson's chi-square test was performed. Also, regression estimates from logistic model are expressed as Odds Ratios (OR) and their 95% confidence interval (95% CI) and p-values. Statistical analyses were performed using IBM SPSS Statistics 24 (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.).

Results

Participant characteristics

Sociodemographic characteristics and history HIV testing among AI/AN only subgroup (n=749) are summarized in table 1. Of the 749 AI/AN individuals who participated in the 2015 and 2016 NHIS, 50.2% of the population had never been tested for HIV. The mean age of participants was 45.31 years (SD: 16.804), ranging from 18 to 85 years. Of the 749 AI/AN only population sample, 54.7% were female and 45.3% were male. The mean age for female AI/AN population was 44.19 years (SD: 16.641) and the mean age for male AI/AN population was 46.67 years (SD: 16.925).

Correlates of never having been tested for HIV

Results of the unadjusted regression analysis between never being tested for HIV and selected independent factors among AI/AN are shown in table 2. There was no difference between men and women with regards to HIV testing history. Respondents aged 25-34 years (OR=2.46, CI=1.61-3.75, p<0.001), 35-44 years (OR=2.77, CI=1.76-4.32, p<0.001) and respondents age 45-54 years (OR=2.34, CI=1.50-3.65, p<0.001) were significantly more likely than participants 55 years and older to report never having been tested for HIV. Additionally, respondents who are separated or divorced were significantly more likely to report never having been tested for HIV compared to respondents who are living in union (OR=2.13, CI=1.12-3.64, p<0.05).

The adjusted logistic regression model can be seen in table 3. After adjusting for the other independent variables, respondents aged 25-34 years (OR=2.43, CI=1.56-3.79, p<0.001), 35-44 years (OR=2.85, CI=1.77-4.59, p<0.001) and respondents age 45-54 years (OR=2.28, CI=1.43-3.61, p<0.001) were significantly more likely

than those aged ≥ 55 years to report never having been tested for HIV. Respondents who were separated were significantly more likely to report never having been tested for HIV than those living in union (OR=2.37, CI=1.28-4.36, $p<0.01$).

Characteristics		Male N=339 (45.3%)		Female N=410 (54.7%)		Total N=749	Chi-Square	P-value
Age							4.75	0.31
	≤ 24	32	9.4%	48	11.7%	80		
	25-34	68	20.1%	94	22.9%	162		
	35-44	60	17.7%	76	18.5%	136		
	45-54	60	17.7%	77	18.8%	137		
	≥ 55	119	35.1%	115	28.0%	234		
Marital Status							1.58	0.46
	Single	162	47.9%	188	46.1%	350		
	Separated	23	6.8%	38	9.3%	61		
	Living in union	153	45.3%	182	44.6%	335		
Region							0.29	0.96
	Northeast	20	5.9%	26	6.3%	46		
	Midwest	58	17.1%	68	16.6%	126		
	South	83	24.5%	95	23.2%	178		
	West	178	52.5%	221	53.9%	399		
Employment							0.14	0.71
	Not working	157	4.4%	196	47.8%	353		
	Working	181	53.6%	214	52.2%	395		
Tested for HIV							0.34	0.56
	No	172	54.1%	204	51.9%	376		
	Yes	146	45.9%	189	48.1%	335		

Table 1: Socio-demographic characteristics of the study sample.

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Characteristics		Never tested for HIV N=376 (52.9%)		Ever tested for HIV N=335 (47.1%)		Unadjusted Odds Ratio	95% CI	P-value
Sex	Male	172	45.7%	146	43.6%	0.92	0.68-1.23	0.56
	Female	204	54.3%	189	56.4%	1.00		
Age	≤ 24	47	12.5%	30	9.0%	1.26	0.74-2.15	0.40
	25-34	69	18.4%	86	25.7%	2.46	1.61-3.75	0.001***
	35-44	53	14.1%	74	22.1%	2.76	1.76-4.32	0.001***
	45-54	59	15.7%	70	20.9%	2.34	1.50-3.65	0.001***
	≥ 55	148	39.4%	75	22.4%	1.00		
Marital Status	Single	180	47.9%	148	44.3%	0.95	0.70-1.29	0.73
	Separated	20	5.3%	35	10.5%	2.13	1.12-3.64	0.02*
	Living in union	174	46.5%	151	45.3%	1.00		
Region	Northeast	23	6.1%	21	6.3%	1.00	0.53-1.87	1.00
	Midwest	59	15.7%	63	18.8%	1.17	0.78-1.76	0.46
	South	695	25.0%	69	20.6%	0.79	0.55-1.15	0.22
	West	199	52.9%	182	54.3%	1.00		
Employment	Not working	187	49.9%	144	43.0%	0.76	0.56-1.02	0.07
	Working	188	50.1%	191	57.0%	1.00		

Table 2: Unadjusted odds ratio of having never been tested for HIV among American Indians/Alaska Natives in 2015 and 2016.

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Characteristics		Adjusted OR	95% CI	P-value
Sex	Male	0.98	0.72-1.33	0.90
	Female	1.00		
Age	≤ 24	1.27	0.73-2.21	0.4
	25-34	2.43	1.56-3.79	0.001***
	35-44	2.85	1.77-4.59	0.001***
	45-54	2.28	1.43-3.61	0.001***
	≥ 55	1.00		
Marital Status	Single	1.08	0.78-1.49	0.64
	Separated	2.37	1.28-4.36	0.01**
	Living in union	1.00		
Region	Northeast	1.04	0.55-1.99	0.90
	Midwest	1.18	0.77-1.80	0.44
	South	0.84	0.67-1.29	0.36
	West	1.00		
Employment	Not working	0.93	0.67-1.29	0.67
	Working	1.00		

Table 3: Adjusted odds ratio of having never been tested for HIV among American Indians/Alaska natives in 2015 and 2016.

*p<0.05 **p<0.01 ***p<0.001

Discussion

This study was undertaken to describe the characteristics of AI/AN adults who participated in the 2015 and 2016 NHIS. Testing for HIV is essential for improving the health of people living with HIV and helping to prevent new infections. The results of our study showed that 52.9% of adults who participated in the 2015 and 2016 surveys had never been tested for HIV. This proportion is significantly lower than the national average of 59% reported among adults in the United States [16]. Considering recent reports about the increase in the incidence of HIV among AI/AN, more efforts are needed to increase the number of people who seek HIV test to know their HIV serostatus [3].

Our study also showed that respondents aged 25-34, 35-44 years and 45-54 years were significantly more likely than those aged ≥55 years to report not having been tested for HIV. This finding is worrisome considering the fact that a high percentage of new HIV diagnoses in this population are among individuals aged 25-34 years in 2008-2011 [17]. Furthermore, our results showed no statistical difference in HIV testing among individuals ≤ 24 years old compared to those aged ≥ 55 years and older. Adolescents and young adults are generally at higher risk for HIV due to many developmental, psychological, social and structural transitions that occur in this age group [18]. Alcohol and substance abuse further compound the problem.

The third significant finding of our study is that individuals who were divorced or separated were significantly more likely to have not been tested for HIV compared to those living in union. This is a major concern considering that individuals who are divorced or separated are 4 times more likely to die from HIV/AIDS in the general population [19]. Moreover, individuals who are single/never married are 13 times more likely to die from HIV/AIDS than married individuals [19]. Single/never married individuals tend to have a wider sexual network which increases their risk of contracting HIV [20]. Yet, our results showed a lack of significant difference in HIV testing between single/never married individuals and those living in union.

Policy makers and public health officials should focus their preventive efforts on groups that are at high risk for HIV to yield a high return on investment.

The use of a representative sample of AI/AN (1.1%) is a big strength of this study. This proportion is similar to the 9% reported in 2010 in the United States population [21]. This suggests that NHIS respondent distribution by race is similar to the national statistics and; therefore, represents the total population. This study fills the information gap regarding possible barriers related to HIV testing among AI/AN. This study has some limitations. One limitation is that the sampling for the NHIS only permits the representative sampling of households and noninstitutionalized group quarters which does not include long-term care institutionalized, hospitalized, active duty, or incarcerated individuals [22]. This may raise an issue because in 2010, the rate of diagnosed HIV infection among inmates in state and federal prison was five times greater than the rate among individuals who were not incarcerated [23]. This is an issue because according to the United States Sentencing Commission the number of AI offenders has increased by 27.2% over the last five years [24]. Leaving a large portion of individuals who would be very relevant to this study inaccessible. Additionally, there is the possibility of self-report biases even though NHIS data collection techniques are designed to limit reporting biases. Self-reporting bias may arise due to the individual not remembering previous HIV testing or the individual refuses to answer due to the stigma and possible discrimination associated with HIV testing [25]. Another limitation of this study is the inability of the researchers to examine if sexual identity (heterosexuality, homosexuality and bisexuality) was a barrier to HIV testing among AI/AN. This is an imperative issue that requires further examination because nationally within all races, gay and bisexual men account for an estimated 70% of new HIV infections in the United States during 2014 [26]. A previous study found that HIV prevalence among homosexual males was 34% and HIV prevalence among bisexual females was 15% [27]. This indicates that in future studies sexual orientation should be examined in more depth to assess possible barriers to HIV testing that may exist between those at risk groups. Finally, this examined only a few sociodemographic characters as they relate to HIV testing status due to the limited nature of the NHIS surveys, information related to health insurance status, education level, self-perceived HIV risk, importance of testing and even tribal affiliation as it relates to AI/ANs should be gathered in future NHIS surveys.

Conclusion

Although HIV remains a public health threat among AI/AN, half (50.2%) of the population studied had never been tested for HIV, making any prevention efforts difficult. The identification of the correlates of never having been tested for HIV among AI/ANs is an important step to inform the development of more targeted interventions to increase the number of people to seek HIV testing. HIV testing is the critical starting in the continuum of HIV prevention. The high proportion of the population that had never been tested for HIV underscores the needs for more efforts to promote the benefits of HIV testing in this community.

References

1. Health and Human Services (HHS) (2016) A Timeline of HIV/AIDS. HHS, Washington, D.C, USA.

2. WHO (2018) HIV/AIDS. WHO, Geneva, Switzerland.
3. CDC (2015) HIV Surveillance Report: Diagnoses of HIV Infection in the United States and Dependent Areas, 2015. *CDC* 27: 1-114.
4. AIDS info (2018) HIV Treatment: The Basics. AIDS info, NIH, Maryland, USA.
5. CDC (2016) HIV Surveillance Report: Diagnoses of HIV Infection in the United States and Dependent Areas, 2016. *CDC* 28: 1-125.
6. CDC (2017) STDs and HIV - CDC Fact Sheet. CDC, Atlanta, USA.
7. SAMHSA (2012) American Indian/Alaska Native Data. SAMHSA, Rockville, Maryland, USA.
8. CDC (2018) HIV Among American Indians and Alaska Natives in the United States. CDC, Atlanta, USA.
9. <https://factfinder.census.gov/faces/nav/jsf/pages/programs.xhtml?program=dec>
10. Indian Affairs (2017) Frequently Asked Questions. Indian Affairs, Washington, D.C, USA.
11. Probst JC, Samuels ME, , Jespersen KP, Willert K, Swann RS, et al. (2002) Minorities in Rural America: An Overview of Population Characteristics. South Carolina Rural Health Research Center, University of South Carolina, Columbia, USA.
12. HRSA (2016) Health Professional Shortage Areas (HPSAs). HRSA, Rockville, Maryland, USA.
13. Reilley B, Leston J, Tulloch S, Neel L, Galope M, et al. (2015) Implementation of National HIV Screening Recommendations in the Indian Health Service. *J Int Assoc Provid AIDS Care* 14: 291-294.
14. Indian Health Service (IHS) (2017) HIV/AIDS. HIS, Rockville, Maryland, USA.
15. CDC, NHIS-About the National Health Interview Survey. CDC, Atlanta, USA.
16. CDC (2015) 2014 National Health Interview Survey (NHIS) Public Use Data Release: Survey Description. CDC, Atlanta, USA. Pg no: 1-105.
17. Walker FJ, Kelly JM, Doshani M, Saduvala N, Prejean J (2014) Epidemiology of HIV among American Indians and Alaska Natives - United States, 2008-2011. *Journal of Health Disparities Research and Practice* 8: 93-107.
18. Bekker LG, Hosek S (2015) HIV and adolescents: focus on young key populations. *J Int AIDS Soc* 18: 20076.
19. Kposowa AJ (2013) Marital status and HIV/AIDS mortality: evidence from the US National Longitudinal Mortality Study. *Int J Infect Dis* 17: 868-874.
20. Klovdahl AS, Potterat JJ, Woodhouse DE, Muth JB, Muth SQ, et al. (1994) Social networks and infectious disease: the Colorado Springs Study. *Soc Sci Med* 38: 79-88.
21. Norris T, Vines PL, Hoeffel EM (2012) The American Indian and Alaska Native Population: 2010. United States Census Bureau, Washington, D.C, USA.
22. CDC, Public Use Data Release: Survey Description. CDC, Atlanta, USA.
23. CDC (2015) HIV Among Incarcerated Populations. CDC, Atlanta, USA.
24. United States Sentencing Commission (2013) Quick Facts: Native Americans in the Federal Offender Population. United States Sentencing Commission, Washington, D.C, USA.
25. Johnston LG, SabinML, Prybylski D, Sabin K, McFarland W, et al. (2016) The importance of assessing self-reported HIV status in bio-behavioural surveys. *Bull World Health Organ* 94: 605-612.
26. CDC (2018) HIV Among Gay and Bisexual Men. CDC, Atlanta, USA.
27. Cassels S, Pearson CR, Walters K, Simoni JM, Morris M (2010) Sexual partner concurrency and sexual risk among gay, lesbian, bisexual, and transgender American Indian/Alaska natives. *Sex Transm Dis* 37: 272-278.