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High prevalence of disability and HIV risk among low socioeconomic status urban adults, 17 U.S. cities

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Abstract

Background—In the United States, approximately 10% of adults 18–64 years are disabled. However, there is scarce literature on the associations between disability and HIV risk.

Objective—To assess disability prevalence and its associations to health and HIV risk factors among low socioeconomic status (SES) (≤high school education or ≤ poverty guidelines) urban adults.

Methods—We assessed disability prevalence from a cross-sectional sample of low SES urban heterosexually active adults at risk for HIV participating in the 2016 National HIV Behavioral Surveillance (NHBS) and calculated crude and adjusted prevalence ratios and 95% confidence intervals of disability for health and HIV risk behaviors.

Results—In the NHBS sample, 39.6% of participants reported any disability. Disability was associated with health care utilization and risk behaviors, even when adjusting for demographics. Participants with disabilities were more likely to have condomless sex with a casual partner and engage in exchange sex.

Conclusions—Low SES urban heterosexually active adults reported high prevalence of disabilities and differences in health, health care utilization, and risk factors. Disability might contribute to sexual risk behaviors that increase the likelihood of HIV infection. Further investigations into the intersection of disability and HIV risk are needed, especially in poor communities often excluded from national assessments.

Keywords

Disability; HIV; Low SES; Urban; Adults

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Disability is not distributed equally by demographic and certain characteristic groups. Disability increases with age across the population, but its prevalence is higher in groups that may already experience health disparities. Individuals with lower socioeconomic status (SES), as measured by education and income levels, have higher prevalence of disability than those with higher SES.[1, 2, 3] Women report higher prevalence of disability than men, and racial and ethnic minorities report higher prevalence of disability than whites.[4, 5, 6] The relationship between minority race and higher prevalence of disability has been shown to persist even when accounting for SES.[7,8] Those with disabilities also have poorer access to preventive care and greater unmet need for health care.[9, 10, 11] The intersection of disability and race/ethnicity, gender, and SES may cause or compound poor health outcomes.[12,13]

Disability and sexual health are also interrelated. Previous studies have shown that individuals with disabilities may have a harder time accessing sexual health care and information, including HIV education and care.[14,15] The relationship between HIV and disability has not received much attention, although persons with disabilities are among all key populations at higher risk of exposure to HIV.[15] Disability may influence development of and be a consequence of HIV.[16] Individuals with HIV may have a disability due to their HIV, or the disability may precede HIV infection.[15] Despite this relationship, there is scarce literature on the associations between disability and HIV risk.[17,18]

While the 2011–2015 American Community Survey estimated approximately 10% of US working-aged adults between 18 and 64 years are disabled[19] and a recent study found that in 2016 about 25% of U.S. adults aged ≥18 had a disability,[20] to the best of our knowledge the associations between disability and HIV risk among low SES urban adults in the U.S. is unknown. Therefore, the objective of our study was to assess the prevalence of disability and describe the associations between disability and health outcomes and HIV risk factors using a cross-sectional sample of low SES urban adults participating in the National HIV Behavioral Surveillance (NHBS) in 2016.

Methods

National HIV Behavioral Surveillance (NHBS)

NHBS (https://www.cdc.gov/hiv/statistics/systems/nhbs/index.html) is an annual cross-sectional survey that monitors prevalence in HIV infection, risk behaviors, and prevention services among three populations at increased risk for HIV infection: men who have sex with men, persons who inject drugs, and heterosexually active men and women at increased risk for HIV infection.[21] Participants are surveyed in metropolitan statistical areas (MSAs) with high prevalence of HIV throughout the U.S. Participants complete an extensive interviewer-administered survey and provide biologic samples for HIV testing.

In 2016, NHBS surveyed heterosexually active men and women at increased risk for HIV infection in 17 cities (Atlanta, Boston, Dallas, Denver, Los Angeles, Memphis, Miami, Nassau-Suffolk NY, New Orleans, Newark, Virginia Beach, Philadelphia, Portland, San Diego, San Francisco, San Juan, Washington DC) with a high HIV prevalence. Participants were recruited through respondent-driven sampling (RDS), a social network-based sampling method with a dual incentive structure. These procedures are described elsewhere.[22]

Participants were eligible to complete the survey if they reported male or female gender, age between 18 and 60 years, residence in the participating area, vaginal or anal sex with a partner of the opposite gender in the past 12 months, and were able to provide informed consent, and to complete the survey in English or Spanish. Eligible participants were offered up to 5 recruitment coupons to recruit their peers until sample size was reached. By tracking coupon numbers of participants we followed recruitment progress and constructed recruitment chains, which allowed us to adjust the analysis for the complex design of RDS. Participants who completed the anonymous NHBS interview were offered an anonymous HIV test. All participants provided informed consent. The 2016 NHBS data were used in this analysis to determine disability status and potential correlates, including HIV status, history of sexually transmitted infections, indicators of health care access and use, and HIV risk factors. HIV status was determined by blood-based rapid testing, performed in the field for participants who consented to the optional NHBS HIV test[22]; all other measures were based on self-report, as described below.

Disability was measured using the six question data standard for disability released by the U.S. Department of Health and Human Services in 2011 in an effort to collect, address, and report health disparities data.[23] The items assess difficulty in six basic areas of functioning (hearing, vision, cognition, walking, self-care, and independent living), consistent with the International Classification of Functioning, Disability, and Health,[24] and have been cognitively tested and piloted.[25,26] Participants were asked if they have difficulty hearing (without the use of hearing aids), seeing (even while wearing glasses), remembering or concentrating, walking or climbing stairs, dressing or bathing, or doing errands alone. Those who responded “yes” to one or more items were classified as having a disability.

Participants were asked if, in the 12 months prior to the interview, they did not get medical care they needed due to cost. Respondents who indicated “yes” were considered to have an unmet need for care. Participants self-reported their current health insurance status and whether they had seen a health care provider during the 12 months before interview. Participants were asked about their history of HIV testing and whether they had ever tested HIV-positive. Those who reported a prior negative HIV test result were classified as having had an HIV test in the past 12 months or not, based on the month and year of their most recent HIV test. Participants were asked if they had ever been told by a doctor, nurse or other health care provider that they had hepatitis C. Participants who indicated “yes” were considered to have been diagnosed with hepatitis C. Participants were asked if they had ever been told by a doctor, nurse or other health care provider that they had genital herpes or genital warts. Participants who indicated “yes” to either question were considered to have ever had a viral STI. Participants were asked if they had been diagnosed with gonorrhea, chlamydia, or syphilis in the past 12 months; if they responded “yes” to any, they were considered to have had a bacterial STI. Participants were asked if they had used non-injection drugs in the 12 months prior to the interview; if “yes”, they were asked how frequently they used various drugs, including crack that is smoked or snorted and painkillers (opioids) that were not prescribed to them. For condomless sex with a casual partner, participants were asked the number of sex partners they had had in the past 12 months, and then how many they would consider “casual” partners (“someone you do not feel committed to”). If the participant reported any casual partners, they were asked with how many had they engaged in vaginal or anal sex without a condom. For female participants, “exchange sex” refers to receiving money or drugs from a casual male partner in exchange for sex. For male participants, “exchange sex” refers to giving money or drugs to a casual female partner in exchange for sex. Participants were considered to have experienced intimate partner violence in the past 12 months if they reported that a sex partner had physically hurt them. We assessed social network size by asking each participant the number of male and female friends, relatives or people they associate with and they have seen in the past 30 days, who were at least 18 years old, and lived in the designated city.

The 2016 NHBS sample includes data from 7,560 heterosexually active men and women of low SES (defined as a household income at or below the 2015 US Department of Health and Human Services poverty guidelines[27] or an educational attainment no greater than high school).[22] Respondents who had any history of injection drug use or had any history of male-male sex were excluded from this analysis. For this study, we limited analyses to the 7,475 participants who had a valid HIV test result and had answered all six disability questions.

Data analysis

To compare NHBS participants with and without a disability on demographic characteristics, we conducted chi-square and Cochran-Armitage tests for trend (for age), with Bonferroni adjustments when pairwise comparisons were performed. For analyses of health behaviors and risk factors, we used log-linked Poisson regression with generalized estimating equations (GEE) and robust standard errors to estimate crude and adjusted prevalence ratios of disability with respect to health and HIV risk behaviors. Disability was the primary independent variable in these models, with each health (HIV-positive, Hepatitis C diagnosis, bacterial STI diagnosis, viral STI diagnosis) and health care utilization (HIV test, health care provider visit, unmet need for health care due to cost) and HIV risk behavior (non-injection drug use, non-injection crack use, non-injection opioid use, binge drinking, condomless sex with a casual partner, exchange sex, intimate partner violence) treated as outcome variables. Participants in the RDS surveys recruit each other to the survey, and therefore, they are not independently and randomly selected in the sample. Since outcomes within a recruitment chain cannot be assumed statistically independent, we used GEE models with repeated subject function clustered on the recruitment chains to account for the intra-class correlation between recruiter and recruit. Additionally, persons with larger social network are more likely to be recruited with RDS method. To account for the overrepresentation of participants with the larger network in our sample we adjusted our models for the reported social network size. Gender, race/ethnicity, poverty level, and education level were included in the adjusted analyses to estimate the direct effect of disability. Employment status was not adjusted for in the model as one of the employment categories included those who are unable to work for health reasons. Additionally, homelessness was not adjusted for in the model due to collinearity with poverty. Statistical analyses were conducted in SAS 9.4 (Cary, NC).

Results

NHBS sample demographics

Of 7,475 participants in the NHBS sample, more than half were female (55.3%) and most were black (72.0%), and lived at or below the HHS poverty level (84.2%). More than half had only a high school education (54.0%) and 28.6% had less than a high school education. Nearly a quarter were currently homeless or had been homeless in the past 12 months (24.3%), and most had health insurance (76.2%). There were 37.7% that reported either full- or part-time employment, and 16.0% were unable to work for health reasons. In the NHBS sample, 39.6% reported any disability: 23.7% reported cognitive difficulty; 17.3% reported difficulty walking; 9.9% reported difficulty seeing; 9.2% reported difficulty with independent activities; 6.0% reported difficulty hearing; and 3.5% reported difficulty with self-care.

There were differences in disability by demographic and SES groups. Disability increased with increasing age (Cochran-Armitage test for trend, $p < 0.0001$) (Table 1). Disability differed by race/ethnicity (chi-squared test, $p < 0.0001$); white participants had higher prevalence of disability (54.2%) than black and Latino participants (38.5% and 40.0%, respectively). Women reported higher prevalence of any disability compared to men (44.1% vs 34.0%, $p < 0.0001$). Disability prevalence differed by homelessness status ($p < 0.0001$). Disability differed by income; those at or below the poverty level had a higher prevalence of disability than those above (41.2% vs. 31.2%, $p < 0.0001$). Disability prevalence differed by education; individuals with less than a high school degree were more likely to report disability than those with a high school diploma (or equivalent) or some college (pairwise comparisons with Bonferroni corrections, $p < 0.0001$

Association with health outcomes

Participants with a disability had a similar prevalence of HIV (3.0%) compared with those without a disability (adjusted prevalence ratio (aPR) 1.16 [95% CI: 0.90, 1.51]) (Table 2). Both participants with and without a disability were similarly likely to report testing for HIV in the past 12 months (39.1% vs 41.7%). Participants with disabilities were more likely to report diagnosis of a bacterial STI in the past 12 months (aPR 1.66 [95% CI: 1.43, 1.94]), as well as any previous diagnosis of Hepatitis C (aPR 1.48 [95% CI: 1.03, 2.12]). Participants with disabilities were also more likely to report non-injection drug use in the past 12 months (aPR 1.20 [95% CI: 1.14, 1.26]), including higher reports for both crack and opioid use (aPRs 1.55 [95% CI: 1.35, 1.79] and 1.71 [95% CI: 1.47, 1.99], respectively). Sexual risk behaviors were also higher among participants with disabilities, including intimate partner violence (aPR 2.05 [95% CI: 1.81, 2.33]), exchange sex (aPR 1.61 [95% CI: 1.40, 1.85]), and condomless sex with a casual partner (aPR 1.25 [95% CI: 1.18, 1.32]).

Discussion

Low SES urban heterosexually active adults reported high prevalence of disability and differences in health, health care utilization, and risk factors. NHBS participants reported higher prevalence of disability in women than men and high prevalence of disability across all race/ethnicity groups, with whites reporting the highest prevalence. Although by design the NHBS sample was of low SES, we found higher proportions reporting any disability among those at or below poverty, those with less than a high school education, and those who were unemployed or out of the labor force compared to their counterparts. These findings by gender and low SES are similar to previous studies in the general population.[2,4] However, the results by race/ethnicity are different from those typically found in the general population, where whites have the lowest prevalence of disability.[20] Our study further identifies disparities in disability in a population that is already at increased risk for health and social disparities.

Conceptually, the temporal relationship between some demographic variables and disability is not clear-cut. While race/ethnicity and gender precede functional impairment, homelessness and employment can both cause disability and result from disability.[28] Disability is an iterative, constructed process, and relates to its social context. Men and women in impoverished communities may have fewer opportunities for employment. While this analysis cannot establish a causal relationship, we provide further evidence that the burden of disability is higher in low SES, urban communities. Regardless of causality, programs that provide services to populations with high prevalence of poverty, disability, or HIV risk should be aware of the complex and interrelated conditions and needs faced by these populations.

Disability was associated with health care utilization and risk behaviors. Participants with a disability had higher unmet need for health care due to cost, which was similar to other studies.[5] This relationship may be due increased needs for care among persons with a disability,[20] or as a result of having difficulty accessing affordable care.[29] No difference in HIV status or testing within the last year were found between those with and without a disability, which can be due to the fact that the study participants are at increased risk for HIV and are, therefore, tested and know their HIV status regardless of any other medical condition they may have. Persons with a disability were more likely to have a previous diagnosis for Hepatitis C or an STI; some disability may result from one of these conditions. For example, fatigue is the most frequent and disabling extrahepatic symptom of Hepatitis C.[30] While we are not aware of other studies assessing these sexual health outcomes in the context of disability, these differences may be due to the frequent interaction of people with disability with the healthcare system due to their disability; hence the increased opportunities to be tested and diagnosed. Persons with a disability were more likely to use non-injection drugs, including opioids and crack, and to binge drink; some difficulties may be associated with substance use. Participants with disabilities were more likely to have condomless sex with a casual partner and to engage in exchange sex. Both of these behaviors increase the risk for HIV infection. Finally, persons with a disability were more than twice as likely as those without to be physically abused by a sex partner. A previous study found greater vulnerability to intimate partner violence victimization among those with a disability.[31] These results highlight the impact of disability on low SES adults who are at risk for HIV infection and the need to recognize disability as key determinant when addressing the health, health care utilization, and risk factors of this population.

This study has several limitations. First, NHBS participants are not representative of all low SES, heterosexually active men and women in the MSA or MSA division from which they were sampled. RDS might be preferentially sampling those with disabilities because they are more likely to need the incentive due to poverty and have the time to participate due to lack of employment. RDS sampling weights were not used, although we accounted for sampling bias by accounting for recruitment chain and adjusting for network size in GEE. Second, since NHBS interviews were conducted by interviewers, respondents may have underreported socially undesirable (or over-reported socially desirable) behaviors. Finally, NHBS data are cross-sectional, the causal relationship between disability and health outcomes cannot be established.

Conclusions

Disability might contribute to sexual risk behaviors that increase the likelihood of HIV infection. Health care providers and HIV prevention programs who serve poor communities should be aware of the high prevalence of disability, especially among those who are at risk for HIV infection. Targeted programs and interventions to prevent and reduce HIV among those with disabilities may help to reduce the rate of HIV infection in this already vulnerable group. Interventions to increase knowledge of safer sexual behaviors and practices may serve as a starting point. Persons with disabilities are more likely to need and/or seek health care for disability-associated healthcare. At the time of routine appointments, healthcare providers can incorporate such interventions. Community-based programs that are accessible for persons with disabilities would be beneficial in educating and providing resources for reduction and prevention of HIV in this demographic group. Disability-related disparities are understudied, and their intersection with social determinants of health require further examination, especially among poor communities, including the homeless who are often excluded from national prevalence of health outcomes.[13,28,32, 33, 34]

Supplementary data

Appendix A.

Appendix A. Members of the NHBS Study Group:

Atlanta, GA: Pascale Wortley, Jeff Todd, David Melton; Boston, MA: Monina Klevens, Rose Doherty, Chris Wittke; Chicago, IL: Stephanie Masiello Schuette, David Kern, Antonio D. Jimenez; Dallas, TX: Jonathon Poe, Shane Sheu, Alicia Novoa; Denver, CO: Alia Al-Tayyib, Melanie Mattson; Detroit, MI: Vivian Griffin, Emily Higgins, Kathryn Macomber; Houston, TX: Salma Khuwaja, Zaida Lopez, Paige Padgett; Los Angeles, CA: Ekow Kwa Sey, Yingbo Ma; Memphis, TN: Shanell McGoy, Samantha Mathieson, Ayesha Sarwar; Miami, FL: Emma Spencer, John-Mark Schacht, David Forrest; Nassau-Suffolk, NY: Bridget Anderson, Ashley Tate, Anthony Romano; New Orleans, LA: William T. Robinson, Narquis Barak, Jeremy M. Beckford; New York City, NY: Sarah Braunstein, Alexis Rivera, Sidney Carrillo Newark, NJ: Barbara Bolden, Afework Wogayehu, Henry Godette; Philadelphia, PA: Kathleen A. Brady, Chrysanthus Nnumolu, Jennifer Shinefeld; Portland, OR: Sean Schafer, E. Roberto Orellana, Amisha Bhattari San Diego, CA: Lynn Walton-

Hayes, Anna Flynn, Elizabeth Lampley; San Francisco, CA: H. Fisher Raymond, Theresa Ick; San Juan, PR: Sandra Miranda De León, Yadira Rolón-Colón; Seattle, WA: Tom Jaenicke, Sara Glick, Richard Burt; Virginia Beach, VA: Celestine Buyu, Toyah Reid, Karen Diepstra Washington, DC: Jenevieve Opoku, Irene Kuo; CDC: Behavioral Surveillance Team.

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Table 1.

Disability prevalence by selected characteristics, National HIV Behavioral Surveillance, 2016.

	Total[a]	Prevalence of disabilities (any)		p-value[b]
		n	(%)	
Age				<0.0001
18–24	1,518	423	27.9	
25–29	1,074	323	30.1	
30–39	1,573	555	35.3	
40–49	1,496	681	45.5	
50–60	1,814	979	54.0	
Race/Ethnicity				<0.0001
Black/African-American	5,372	2,070	38.5	
Hispanic/Latino[c]	1,491	597	40.0	
White	229	124	54.2	
Other	370	167	45.1	
Gender				<0.0001
Male	3,344	1,138	34.0	
Female	4,131	1,823	44.1	
Homelessness				<0.0001
Currently homeless	964	515	53.4	
Homeless, past 12 months but not currently	852	417	48.9	
Not homeless, past 12 months	5,658	2,029	35.9	
Poverty				<0.0001
At or below federal poverty level	6,227	2,566	41.2	
Above federal poverty level	1,171	365	31.2	
Education level				<0.0001
Less than high school	2,141	999	46.7	
High school diploma or equivalent	4,040	1,451	35.9	
Some college or above	1,294	511	39.5	
Employment status				<0.0001
Employed	2,818	768	27.3	
Not working (retired, student, homemaker)	688	283	41.1	
Unable to work for health reasons	1,199	815	68.0	
Unemployed	2,418	949	39.3	
Health insurance status				0.0008
Has health insurance	5,672	2,310	40.7	
Does not have health insurance	1,773	643	36.3	
Total	7,475	2,961	39.6	

[a] Numbers might not sum to the total in the sample due to missing data.

[b] Chi-square and Cochran-Armitage tests for trend (for age).

[c] Hispanic/Latino can be of any race.

Table 2.

Comparison of health, health care utilization, and HIV risk factors between participants with and without disabilities, National HIV Behavioral Surveillance, 2016.

	Total in sample[a] (n = 7,475)		Prevalence in participants without a disability		Prevalence in participants with a disability		Prevalence ratios[b]		Adjusted prevalence ratios[c]	
	n	%	n	%	n	%	PR	(95% CI)	aPR	(95% CI)
Health and health care utilization										
HIV-positive	174	2.3	84	1.9	90	3.0	1.64	(1.27, 2.12)	1.16	(0.90, 1.51)
HIV test, past 12 months[d]	2,974	40.7	1,851	41.7	1,123	39.1	0.95	(0.90, 1.01)	0.99	(0.94, 1.05)
Health care provider visit, past 12 months	6,090	81.5	3,569	79.1	2,521	85.1	1.08	(1.05, 1.11)	1.05	(1.03, 1.08)
Unmet need for health care due to cost, past 12 months	1,493	20.0	776	17.2	717	24.2	1.44	(1.31, 1.59)	1.37	(1.23, 1.53)
Hepatitis C diagnosis, ever	151	2.1	60	1.4	91	3.2	2.23	(1.59, 3.15)	1.48	(1.03, 2.12)
Bacterial STI diagnosis, past 12 months	522	7.0	274	6.1	248	8.4	1.40	(1.20, 1.63)	1.66	(1.43, 1.94)
Viral STI diagnosis, ever	347	4.7	160	3.6	187	6.3	1.75	(1.45, 2.13)	1.36	(1.10, 1.69)
HIV Risk factors										
Non-injection drug use, past 12 months	4,222	56.5	2,400	53.2	1,822	61.5	1.14	(1.10, 1.19)	1.20	(1.14, 1.26)
Non-injection crack use, past 12 months	702	9.4	279	6.2	423	14.3	2.28	(1.96, 2.65)	1.55	(1.35, 1.79)
Non-injection opioid use, past 12 months	767	10.3	378	8.4	389	13.1	1.53	(1.32, 1.76)	1.71	(1.47, 1.99)
Binge drinking, past 30 days	2,661	35.7	1,485	32.9	1,176	39.8	1.18	(1.11, 1.26)	1.17	(1.11, 1.23)
Condomless sex with a casual partner, past 12 months	3,144	42.1	1,726	38.3	1,418	47.9	1.24	(1.17, 1.31)	1.25	(1.18, 1.32)
Exchange sex, past 12 months	1,235	16.5	544	12.1	691	23.4	2.05	(1.75, 2.40)	1.61	(1.40, 1.85)
Intimate partner violence, past 12 months	919	12.3	409	9.1	510	17.2	1.89	(1.66, 2.15)	2.05	(1.81, 2.33)

[a] National HIV Behavioral Surveillance focused on low SES (based on income or education) participants in 2016.

[b] Adjusted for recruitment chain and network size.

[c] Adjusted for recruitment chain, network size, age, race/ethnicity, gender, poverty, and education.

[d] Limited to respondents who did not self-report HIV-positive and non-missing value for whether last HIV test was in the past 12 months (n = 7,306).