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Age Cohort Differences in Illicit Drug Use and HCV among African American Substance Users

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Abstract

Identifying prognostic indicators for undiagnosed HCV is crucial to attenuate the negative impact of this disease. This study explored the influence of recent and more distal injection drug use on biologically-confirmed HCV infection among a sample ($N = 260$) of older and younger African Americans. Data from the baseline assessment of the NEURO-HIV epidemiologic study was analyzed using confounder adjusted regression techniques. Older adults were more likely to test positive for HCV ($OR = 2.80$, 95% CI = 1.53-5.11) due to lifetime injection drug use ($AOR = 5.37$, 95% CI = 3.10-9.28). Clinical implications are discussed.

Keywords

HCV; Older Adult; Substance Use; Medically Underserved

Introduction

In the United States 5.2 million people are living with Hepatitis C (HCV)¹. Injection drug use accounts for approximately two-thirds of cases, and efforts to improve injection practices have likely contributed to the declining HCV incidence since 1992^{2, 3}. Nevertheless, African Americans continue to have higher seroprevalence of HCV and higher prevalence of chronic infection compared to other groups^{4, 5}. Most infected individuals are unaware of their infection as up to 70% of cases are asymptomatic; therefore, testing is crucial to identify infected persons^{6, 7}. Advanced disease stages are associated with poorer treatment outcomes, and extant literature suggests that African Americans have decreased treatment response compared to other groups^{8, 9; 10, 11}.

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Since 1998, the Centers for Disease Control and Prevention (CDC) has recommended routine testing for persons with HCV risk factors¹². However, many high-risk individuals lack access to health care^{13; 14} and remain undiagnosed until the end stages of the disease. Also, many physicians do not ask patients about risk factors and do not order testing for patients reporting risk factors¹⁵. In low-income, medically underserved areas, physicians report competing medical complaints and constrained appointment times may cause many HCV risk patients to go untested¹⁶. Additionally, patient-related factors may contribute to inadequate HCV screening. Several studies report African Americans have lower levels of trust in the healthcare system and delay seeking care^{17, 18}. Racial disparities have been reported in HCV knowledge, with African Americans less aware of HCV transmission routes and risk factors than Whites¹⁹. Furthermore, patients may underreport their substance use history, affecting the physician's decision to screen for HCV²⁰. Moreover, there is evidence that the accuracy of patient's recall of risk behaviors decreases over time, which may influence older adults' perception of their risk for HCV²¹. Due to these challenges it appears that populations in need of screening and treatment remain hidden.

Approximately 75% of HCV-infected adults were born between 1945 and 1965, of these adults most acquired HCV earlier in their lives^{22; 23}. In response to these findings, the CDC issued a recommendation that adults born between 1945 and 1965 undergo a one-time HCV test highlighting the sizable number of undiagnosed HCV infections in this group²⁴. Older adults whom formerly injected drugs may represent a population that is not perceived to be at risk by itself or by healthcare providers. African Americans in this birth cohort may have a higher prevalence of undiagnosed HCV infections due to lack of awareness and greater disconnection from the healthcare system.

In order to elucidate ways to identify those who may be hidden from screening, this study explored the influence of recent and more distal injection drug use on biologically-confirmed HCV infection among a sample of older and younger African Americans.

Method

Study Design

Data for this study were obtained from the baseline assessment of the NEURO-HIV Epidemiologic Study. This study was originally designed to examine neuropsychological, social, and behavioral risk factors of HIV, hepatitis A, hepatitis B, and hepatitis C among both injection and non- injection drug users. This study was approved by the University of Florida's Institutional Review Board and has received annual renewals. In order to be eligible for the parent study, participants had to be 18 years of age and older and report the use of non-injection and/or injection drugs in the past six months. Recruitment strategies for participation included advertisements in local papers, street outreach, and referrals from local service agencies.

Participants were remunerated \$45 for the baseline assessment. Participants provided written informed consent and completed a face-to-face HIV-Risk Behavior Interview. In addition, urine samples were tested for the presence of drugs including opiates, cocaine, cannabinoids,

amphetamines, methamphetamines, methadone, PCP, barbiturates, benzodiazepines, MDMA, and oxycodone.

Sample Characteristics

The current study was a subset of a larger study consisting of African American men and women ($N = 260$). Table 1 shows a complete summary of participant demographics and recent substance use. The study sample was 100% African American, 59% female, with 39% having completed high school or equivalent. In the past six months, 16% of the sample reported being homeless and 80% reported receiving public assistance and having no income from a regular job. The sample ranged in age from 18-68 with a mean of 42.35 and a standard deviation of 9.27 years.

Measures

Demographics—The study demographic questionnaire included questions regarding sex, ethnicity, education, marital status, source of income, and stability of housing resources.

HIV Risk Behavior Interview—The HIV Risk Behavior Interview is a detailed behavioral assessment of drug use and sexual practices. Questions addressed demographic, educational, medical and neurodevelopmental variables along with a detailed assessment of lifetime and recent drug use and sexual practices and risk behaviors.

Drug Use the Last 6 Months—Participants were asked “In the last six months have you used (specific drug and route of administration named)?” to evaluate past 6-month heroin, speedball, cocaine, amphetamines, methamphetamines, and heroin-amphetamines. For example, “In the last six months have you injected heroin by itself?” Negative responses were coded 0 and positive responses were coded 1.

Drug Use Lifetime—Participants were asked “Have you ever used (specific drug and route of administration named)?” to evaluate lifetime injection and nasal drug use for heroin, speedball, cocaine, amphetamines, methamphetamines, and heroin-amphetamines by varying routes of administration. For example, “Have you ever injected speedball?” Negative responses were coded 0 and positive responses were coded 1.

Biologically confirmed HCV—Blood samples were taken at baseline and HCV antibody testing was performed. HCV antibodies were assessed by enzyme immunoassays (either EIA 2.0, Abbot or ELISA 3.0, Ortho Diagnostic Systems, Inc. Raritan, NJ). Reactive sera were then re-tested by RIBA 3.0 strip immunoblot assay (Chiron) in order to confirm diagnosis.

Age Cohort—Age cohort was defined using the current age in years. Participants 18-44 were defined as “younger” and those 45-68 were defined as “older.”

Data Analysis—To meet study aims, descriptive statistics were used to calculate frequencies, means, and percentages for each variable of interest. Age cohorts were created and chi-square (χ^2) and t-test analyses were conducted for demographic variables and recent

substance use. Multivariate logistic regression analyses were then used to assess the relationship between age cohort and recent and lifetime injection drug use. Each drug (heroin, speedball and cocaine) was initially assessed independently. Although lifetime injection amphetamines, methamphetamines, and heroin-amphetamines use was low, less than 5 % for each drug, we created a composite variable to assess total lifetime injection drug use which included heroin, speedball, cocaine, crack, heroin-amphetamines, amphetamines and methamphetamines, in order to capture all injection drug use in the sample.

Biologically confirmed HCV was initially assessed independently to ascertain the relationship to age cohort. A confounder adjusted model was then developed by controlling for factors significantly associated with age cohort and HCV. Lifetime injection drug use, the primary dependent variable of interest, was standardized and the residuals were used in the regression analysis. Descriptive data analysis and regression analyses were performed using IBM SPSS Statistics 21 (2013).

Results

Demographics stratified by age cohort

Frequency distributions for each of the demographic and study variables determined for the entire sample were stratified by age cohort (See Table 1). Notably, younger adults started using illicit substances at a younger age on average ($M = 17.65$, $SD = 5.08$) as compared to their older counterparts ($M = 20.32$, $SD = 8.43$) ($t(237) = -2.98$, $p = .003$).

Recent and Lifetime Injection Drug Use by Age Cohort

The cohorts did not differ on positive urinalysis, with 57% of younger adults and 62% of older adults testing positive for current illicit substance use at baseline. The cohorts did not differ on recent injection or nasal drug use in the past six months (see Table 2). The cohorts differed on lifetime injection use with older adults having higher rates of injection drug use across all three drugs examined, heroin ($OR = 2.28$, 95% $CI = 1.35-3.82$); speedball ($OR = 2.13$, 95% $CI = 1.25-3.63$); and cocaine ($OR = 2.48$, 95% $CI = 1.41-4.36$). There were no significant differences between the cohorts on lifetime use of nasal heroin or nasal speedball, however, the cohorts differed on nasal cocaine use ($OR = 2.09$, 95% $CI = 1.26-3.44$).

Factors Associated with Biologically Confirmed HCV

The association between age cohort and biologically confirmed HCV infection was examined and it was found that older adults were almost three times more likely to test positive for HCV ($OR = 2.80$, 95% $CI = 1.53-5.11$) at baseline than their younger counterparts (See Figure 1). Controlling for age, sex, education, marital status, income resources, and recent injection drug use the impact of lifetime injection drug use on biologically confirmed HCV was examined. Lifetime injection drug use was associated with a five time greater likelihood to have a diagnosis of HCV ($AOR = 5.37$, 95% $CI = 3.10-9.28$).

Discussion

In an effort to understand factors associated with hidden populations that may enable community test and treat campaigns to be more effective, the present study examined age cohort differences in biologically confirmed HCV among a population of injection and non-injection African American cocaine and heroin users. As expected, we found the older cohort had the highest rates of HCV at 41% compared to those in the younger cohort 21%. This is consistent with epidemiological studies that have identified the 1945-1965 birth cohort as having the highest rates of HCV in the United States. These study findings are in line with current literature and support the current CDC recommendations to test older cohorts at highest risk.

Older adults in the present sample were significantly greater prevalence of lifetime injection drug use for both heroin and cocaine. However, they were comparable to younger adults on recent use. Consequently, we examined the influence of more distal injection drug use versus recent use on biologically confirmed HCV infection. Standardized residuals of lifetime injection drug use were used in order to make the variable orthogonal from age. After controlling for recent drug use, it was found that a history of injection drug use was the most salient factor associated with HCV among a sample of current African American drug users. This has significant implications for educating and testing older non-injection drug using African Americans. The authors posit, consistent with the Theory of Reasoned Action, that these results will be useful to health-care providers by influencing change in current screening practices ²⁵. Currently, as many as 75% of those living with HCV have not been tested and are unaware of their risk for the disease ²⁶. Vulnerable populations such as older African American non-injection drug users disconnected from care are at the highest risk of undiagnosed HCV. Modeling studies estimate that many of those who are HCV+ remain untested and untreated under current screening practices. The present findings suggest that older African Americans who currently use non-injections drugs may be a group at even higher risk than their younger counterparts. In addition, this population may be missed due to the current focus on testing people who inject drugs (PWID) in settings where they receive services ²⁷. Older adults who no longer use injection drugs, but may have chronic HCV infection are not likely to be diagnosed under these circumstances. The current study highlights a potential hidden population of unscreened positives who due to life circumstances are disconnected from care and other social services that would enable them to be identified.

The findings in the current study suggest that community testing and treatment programs may be needed to reach those 45 and older with a history of drug use, and more specifically, African Americans using non-injection drugs. The public health significance of this is considerable given that African Americans are less likely to be screened, diagnosed, or treated and are most likely to die of complications related to HCV. The current study suggests that among older African Americans a significant portion of those with undiagnosed HCV may be former injectors who no longer engage in injection drug use and may be unaware of their risk. While majority of the current testing efforts among drug users focus on current IDUs, it appears that former injection drug users need to be actively targeted as well.

Approximately 63% of current chronic HCV infections and 73% of HCV related deaths are among adults 47 and older²⁸. While IDUs remain the center of the HCV epidemic, former IDUs may not see themselves as at risk. Therefore by testing both IDU and non-IDU drug users over the age of 45 it may be possible to identify a hidden population of under-screened HCV+ individuals and provide targeted screening to those at highest risk. Efforts are needed to educate and test current non-injection drug users who have any history of injection drug use and may be unaware of their risk, especially those over the age of 45²⁹ and who are of a cohort that used more risky injection drug practices at a time when needle exchange programs (NEP) were not available³⁰. While both cohorts have the same average age of first injection those in the younger cohort began injecting after NEP's were in place. This could account for lower injection risk practices and greater awareness of infection risk. Younger cohorts are thought to have used safer injection practices and were better educated about the importance not engaging in risky drug behaviors³⁰.

Both age cohorts reported similar rates of recent injection drug use. Rates of injection drug use in the past 6 months were low compared to other Baltimore samples however, this sample was restricted to African Americans only and previous work has identified that African Americans are less likely to use injection drugs³¹. For example, in a latent class analysis on drug use, African Americans were over 5.5 times more likely to smoke crack and use nasal heroin than Whites³². Intra-nasal heroin use had the highest prevalence of recent (28%) and lifetime (64%) use in the current sample. This finding is particularly noteworthy due to the fact that recent findings suggest that intra nasal heroin drug use is associated with lower disease prevalence and some have argued is a protective factor against infectious disease³³. Intra-nasal drug use appears to be a more accepted route of administration (ROA) among African Americans. Additional research is needed to examine factors that influence substance ROA choice in African Americans and if it may provide any protection against infectious disease.

The present study highlights a hidden population that may be unaware of their risk however, the present data are cross-sectional therefore replication of the current findings are needed. To our knowledge this is the first study to examine age cohort differences and associated risk in biologically confirmed HCV among a sample of African American drug users. An additional strength of the current study is that this is a community based sample and it highlights the needs of an underserved group.

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Figure 1. Biologically Confirmed HCV

Note. Older Adults were 2.8 times more likely 95% CI (1.53-5.11) to be HCV+

Table 1

Demographic by Age Cohort (N= 260)^a

VARIABLE	ENTIRE SAMPLE		YOUNGER		OLDER		TEST STATISTICS	
	M or N	S.D. or %	M or N	S.D. or %	M or N	S.D. or %	χ^2 or t-test	p-value
N	260		132		128			
Age	42.35	9.27	35.33	7.45	49.58	3.74	-2.98	.003
Gender							4.40	0.03
Male	107	41	46	35	61	48		
Female	153	59	86	65	67	52		
African American	260	100	132	100	128	100		
Education							6.19	0.04
< High School	106	41	62	47	44	34		
High school or GED	101	39	50	38	51	40		
Some College	53	20	20	15	33	26		
Marital Status							17.95	<.001
Single Never Married	170	65	101	76	69	54		
Married/Common Law	29	24	14	13				
Divorced/Widowed/Separated	61	23	17	11				
Money from a Regular Job (yes)	52	20	34	26	18	14	5.55	0.02
Public Assistance (yes)	208	80	102	77	106	83	1.24	0.28
Current Health Problems (yes)	134	52	85	64	49	38	16.07	<.001
Emotional Behavioral Problems (Life)	146	56	74	56	72	56	1.19	1
Homeless in last 6 mos. (yes)	41	16	20	15	21	16	0.07	0.86
Age 1st Injected	23.54	7.60	23.86	7.45	23.33	8.50	0.358	0.721

^aN may vary slightly according to missing data

Table 2

Injection Drug Use by Age Cohort (N= 260)^a

VARIABLE	ENTIRE SAMPLE		YOUNGER		OLDER		TEST STATISTICS	
	M or N	S.D. or %	M or N	S.D. or %	M or N	S.D. or %	ODDS RATIO	95% CI
6 Mos. Injection Drug Use.								
Injected Heroin	26	10	12	9	14	11	1.22	.54-2.76
Injected Speedball	24	9	12	9	12	9	0.93	.44-2.39
Injected Cocaine	20	7	10	7	10	8	1.04	.41-2.57
Nasal Heroin	73	28	35	27	38	29	1.17	.68-2.01
Nasal Speedball	17	7	8	6	9	7	1.17	.43-3.13
Nasal Cocaine	25	10	11	8	14	11	1.35	.58-3.09
Lifetime Injection Drug Use								
Injected Heroin	95	37	36	27	59	46	2.28	1.35-3.82
Injected Speedball	84	32	32	24	52	40	2.13	1.25-3.63
Injected Cocaine	72	28	25	19	47	36	2.48	1.41-4.36
Nasal Heroin	165	64	79	60	86	67	1.37	.82-2.28
Nasal Speedball	83	32	42	32	41	32	1.01	.59-1.70
Nasal Cocaine	147	57	63	48	84	65	2.09	1.26-3.44
Injection Use-Life	100	39	38	29	62	48	2.29	1.37-3.83

^aN may vary slightly according to missing data