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Injection and Non-Injection Drug Use and Infectious Disease in Baltimore City: Differences by Race

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Abstract

Purpose—The current study examines differences in the prevalence of biologically-confirmed hepatitis C virus (HCV), HIV, and coinfection between Black and White adult cocaine/heroin users across three drug use subgroups identified in previous research (Harrell et al, 2012): non-injection smoking crack/nasal heroin users, heroin injectors, and polydrug injectors.

Results—59% of the 482 participants in the study were male. Significant race differences emerged between drug use subgroup memberships. Non-injection smoking crack/nasal heroin users were predominantly Black (75%), while heroin injectors and polydrug injectors were predominantly White (69% and 72%, respectively). Polydrug injectors accounted for nearly three quarters of the HCV positive diagnoses in Whites. Though HIV disease status, stratified by race, did not differ significantly between drug use subgroups, the non-injection smoking crack/nasal heroin subgroup contained over half of the HIV positive diagnoses in the sample and was predominantly Black. Despite much lower rates of injection, Blacks (8%) had a higher prevalence of coinfection than Whites (3%; $X^2(2) = 6.18, p = .015$).

Conclusions—The current findings are consistent with trends in recent HIV transmission statistics where sexual activity has overtaken injection drug use as a HIV risk factor. The current findings also provide further support to the notion of injection drug use as an exceedingly high-risk behavior for HCV and coinfection, specifically those who are polysubstance injectors.

Keywords

Heroin; Cocaine; Non-injection drug use; Injection Drug Use; HCV; HIV; Coinfection; Race Disparities

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Author Disclosures

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Introduction

HIV and Hepatitis C virus (HCV) continue to be critical public health priorities in the US. Since the 1990s HIV incidence has remained stable with approximately 50,000 new HIV cases detected annually while HCV has remained the most common chronic blood borne infection (CDC, 2011). These infections also commonly co-occur given the central role of parenteral transmission for both infections, with approximately 30% of individuals living with HIV also are infected with HCV (Sherman, Rouster, Chung, Rajicic, 2002), while there is evidence that 90% of some HIV-infected drug-using groups are co-infected (Bessone, 2009). There is a race disparity in prevalence of HIV, HCV, and co-infection with both HIV and HCV. The HIV/AIDS case rate among Black men (104 per 100,000) is disproportionately high compared to that of White men (16 per 100,000), while Blacks are twice as likely to be infected with HCV (Armstrong 2006 et al., 2006). There is a need to identify the unique factors that drive infections in each race group to reduce transmission overall and help address the race disparity in infection.

Injection drug use (IDU) is the primary route of transmission of HCV transmission and remains one of the leading causes of HIV transmission (CDC, 2012). Non-injection drug use (NIDU) is also a well-established determinant of high-risk sexual behavior and HIV infection (Celentano, Latimore and Mehta, 2008), while there also is evidence that those who currently use NIDU also face high risk of HCV infection given prior injection histories (Strader, 2005; Bessone, 2009). Previous research has indicated that different subgroups of drug users that exhibit different patterns of drug use face differential risk of drug-related infectious disease transmission (Carlson, R., Wang, J., Falck, R., Siegal, H., 2005; Agrawal, A., Lynskey, M., Madden, P., Bucholz, K., Heath, A., 2006; Monga, N, et al, 2007). Improved understanding of the role of different patterns of drug use – including the importance of injection versus non-injection drug use -- in the infectious disease risk of Blacks versus Whites is needed to best tailor population-specific interventions to address race differences in dynamics of infectious disease epidemics.

Baltimore is as an epicenter of IDU in the US, ranked second in estimated IDUs per capita (Friedman, S., Tempalski, B., Cooper, H., Perlis, T., Keem, M., Friedman, R., Flom, P., 2004) and hence faces high rates of both HIV and HCV. Using the NEURO-HIV Epidemiologic Study, a study of NIDUs and IDUs in Baltimore, Harrell et al. (2012) examined patterns of drug use in the sample and identified three distinct drug use subgroups of drug users: crack/nasal heroin users (who primarily were NIDU), heroin injectors, and polydrug injectors (primarily injected heroin, cocaine and the combination of heroin and cocaine; “speedball”). Examination of disease risk between drug use subgroups indicated that the crack/nasal heroin users were less likely to be HCV-infected than the injecting groups, while levels of HIV were comparable across the groups. However, these results are difficult to interpret without taking into account the role of race. In particular, crack/nasal-heroin users were almost 7 times more likely to identify as Black (Harrell et al., 2012). Given the well-known racial disparities in HIV (Sutton, Jones, Wlitski, Cleveland, Dean and Fenton, 2009), it is imperative to clarify this relationship.

The purpose of the current study is to build from the work of Harrell et al. (2012) to examine race differences in patterns of drug use and in the relationship between drug use and HIV and HCV infections in the NEURO-HIV Epidemiologic Study sample. Specifically, we compared White (N=244) and Black (N=238) drug users in Baltimore on patterns of drug use and evaluated whether there were race differences in associations between drug use pattern and infection with HIV, HCV, and both HIV and HCV.

1. Method

1.1. Participants

The current study utilized baseline data from the *NEURO-HIV Epidemiologic Study*, a NIDA-funded longitudinal study conducted to identify neuropsychological and social-behavioral risk factors for blood borne infectious diseases among injection and non-injection drug users in Baltimore, Maryland. Only individuals with biologically confirmed results for HIV and HCV were included in this study. Participants in the current study were a subsample of 482 IDU and NIDU from the parent study who were chosen based on complete data for HIV and HCV, 18–50 years of age ($M = 32.63$; $S.D. = 7.01$), 51% Whites and 49% Black. Of the full sample, 42 (8.7%) were HIV+, 248 (51.5%) were HCV+, and 26 (5.4%) were coinfecting with both HIV and HCV. A total of nine males reported having sex with another man in their lifetime (six White men and three Black men). Details regarding recruitment and participant characteristics of the parent study have been previously presented (Harrell, P., Mancha, B., Petras, H., Trenez, R., and Latimer, W., 2012). The current study was approved by the University of Florida Institutional Review Board and has received annual renewals.

1.2. Drug Group Status

Participants, who used cocaine and/or heroin in, but not via injection, were classified as “Crack/Nasal-Heroin” users. This subgroup also used cigarettes and drank alcohol in the past month with more than 50% probability. Crack/Nasal Heroin users had 112 (53%) men, with 36 (17%) reported being homeless in the last six months and 104 (49%) reported having a regular income in the past six months. This subgroup had a mean age of 34.48 ($SD = 6.29$). Individuals who primarily injected heroin were classified as “Heroin Injectors”. The Heroin Injectors had a mean age of 31.74 ($SD = 7.38$). These participants also used cigarettes. However, no other substance yielded above a 25% probability of use in the past month. Heroin Injectors subgroup was comprised of 62 (59%) men, with 22 (21%) of the subgroup reporting being homeless in the past six months, and 61 (58%) of these participants reported having regular income in the past six months. Those who injected more than one substance were deemed “Polydrug Injectors”. This subgroup primarily injected heroin, cocaine and speedball. They also reported smoking cigarettes with more than 90% probability. Polydrug injectors included 110 (67%) men, with 44 (27%) of this subgroup reporting being homeless in the past six months, and 91 (55%) reporting not having regular income in the past six months.

1.3. Race & Disease Status

Participants self-reported demographic data including race, gender, and age as part of the HIV Risk Behavior Assessment interview (Dowling-Guyer, et al., 1994). HIV and HCV status was determined from serum blood samples collected from participants upon entry into the study.

1.4. Statistical Analysis

Descriptive statistics were used to determine HCV and HIV prevalence by race within each drug use subgroup. Chi square analyses were employed to examine differences in HCV and HIV based on race and drug use subgroup.

2. Results

2.1. Race Differences in Patterns of Drug Use

As seen in Table 1, there were significant race differences in patterns of drug use ($X^2(2) = 97.84, p = .001$). Blacks were more likely to be crack/nasal heroin users (66%) than heroin injectors (14%) and polydrug injectors (20%). However, whites were more likely to be polydrug and heroin injectors (48% and 30%, respectively) than crack/nasal heroin users (22%).

2.2. HIV

HIV levels were comparable across drug using patterns within both Whites ($X^2(2, N = 244) = 2.36, p = .307$) and Blacks ($X^2(2, N = 238) = .283, p = .868$). Moreover, there was no significant difference between races ($X^2(2, N = 482) = 1.52, p = .469$) relative to the drug using subgroups. Though HIV disease status did not differ significantly between drug use groups, it is worth noting that the Crack/Nasal Heroin group contained 22 of the 42 HIV positive diagnoses in the sample. Moreover, all 22 HIV positive individuals were Black. These results can be seen in Table 2.

2.3. HCV

Stratifying by race, injectors were much more likely to be HCV-infected than Crack/Nasal Heroin users between both Whites ($X^2(2) = 35.37, p = .001$) and Blacks ($X^2(2) = 88.06, p = .001$). Among Whites, polydrug injectors accounted for nearly three-quarters of HCV diagnoses. Among Blacks, the distribution of HCV diagnoses between drug use subgroups was similar to the distribution presented in the White sample, with the highest rates seen in the polydrug injection subgroup and lowest rates in the non-injection smoking crack/nasal heroin subgroup. Across drug use subgroups, the prevalence of HCV was significantly higher among Whites compared to Blacks, $X^2(2) = 140.87, p = .001$, respectively.

2.4. Coinfection

Blacks had a significantly higher prevalence of coinfection (8%) than Whites (3%; $X^2(2) = 6.18, p = .015$). Among whites, drug use pattern was not associated with co-infection (Table 2). Among Blacks, there was a significant difference among the drug use sub groups ($X^2(2)$

= 11.30, $p = .004$). Polydrug users had the highest prevalence of coinfection (17%), followed by the heroin injectors (15%) and crack/nasal heroin user group (4%).

3. Discussion

In a community sample of cocaine and heroin users in Baltimore, Maryland, Blacks were more likely than whites to test positive for HIV, but whites were more likely to test positive for HCV. Blacks were more likely to experience coinfection from both HIV and HCV. Whites reported higher prevalence of injection drug use for both heroin and cocaine. When stratifying by race and examining drug disease status by drug use group, polydrug injectors experienced higher prevalence of HIV, HCV, and coinfection than both heroin-only injectors and crack/nasal-heroin non-injection users. The findings highlight the importance of both race and type of drug use in blood borne infections.

Overall, the smoking crack/nasal heroin subgroup had the most HIV diagnoses of the three drug use subgroups. This finding is consistent with the literature documenting that crack/cocaine use is associated with risky sexual behavior (Sterk, Elifson and German, 2000; Wechsberg, et al., 2003; Harzke, A., Williams, M., Bowen, A., 2008). Moreover, in a recent community based study of heterosexual residents in Washington, DC, Kuo et al (2011) found non-injection crack users had the highest prevalence of sexual risk behaviors in comparison to non-drug users and other substance users. Previous research from this research group reported on the fairly large race disparity in HIV infection observed in this Baltimore sample of drug users (Trenz et al. 2012). The current study sought to assess the degree to which patterns of IDU versus NIDU may play a role in the HIV epidemic among drug users in Baltimore and the race disparity in infection. The findings underscore the potential importance of NIDU and associated high-risk sexual behavior versus parenteral transmission among Black drug users in Baltimore. In this drug-using sample, nearly two-thirds of Black drug users were NIDU. Considering we found the prevalence of HIV infection was comparable between Black IDU and NIDU, in addition to the high population-prevalence of NIDU, the vast majority of HIV infections clustered in NIDU. Overall, Black drug users in this sample were characterized by significantly lower rates of IDU compared to their White counterparts.

In the current study, White drug users were more prone to HCV diagnosis in comparison to Black drug users. Consistent with previous research documenting IDU as the primary route of HCV transmission (Center for Disease Control, 2008), the majority of Whites in the current sample were characterized as heroin injectors or polydrug injectors. Interestingly, the prevalence of HCV among individuals in the current study was relatively high within both the NIDU and IDU subgroups. This speaks to the need for screening for all drug users, in case of history of IDU.

It is also noteworthy that the HIV, HCV and coinfection serostatus among drug using Whites were consistent with degree of risky drug use behaviors, such that the lowest rates of HIV were found among NIDU, followed by HIV rates for heroin only injectors, and the highest rates among the polydrug injectors. However, the high rates of coinfections in Blacks in the current sample, across all three subgroups, were unexpected. Participants with

HIV immune systems eventually become compromised, especially when this disease goes untreated. When compounded by HCV diagnosis, this exponentially increases the chance of the individual developing liver related conditions (Rockstroh and Spengler, 2004). Given the increased prevalence of coinfection in the United States, it is imperative to test for both HCV and HIV in drug using samples. This is especially true in IDU, where individuals are more likely to be exposed to others blood.

5. Conclusions

Overall, findings with HCV, HIV and coinfection helps to inform prevention based policies and interventions for IDU, NIDU and disease transmission. Specifically, the NIDU subgrouping receives far less attention than the IDUs. Creating an intervention program that is specific to the needs of NIDUs may be critical in the reduction of HIV in the Black community. Tailoring interventions for particular patterns of drug use and corollary sexual risk behaviors could be key in making an impact on health outcomes in these high-risk drug-using subpopulations. Future research should examine the neuropsychological, psychosocial, and behavioral profiles of NIDUs, in effort to identify imperative determinants of HIV-related risk behaviors that are distinctive to this particular subgroup of drug users. These results will inform researchers and interventionist in their efforts to design, develop and test an intervention program tailored specifically for this unique subgroup of drug users. Moreover, researchers may use these findings to tailor an evidence-based intervention program already endorsed by the CDC (2013), such as the Cognitive Behavioral STD/HIV Risk-Reduction intervention.

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Highlights

- Race differences emerged between injection and non-injection drug using subgroups
- Polydrug injectors accounted for three quarters of Hepatitis C diagnoses in Whites
- The smoking crack/nasal heroin subgroup contained over half of the HIV+ diagnoses
- The smoking crack/nasal heroin subgroup was predominantly Black
- Blacks had a higher prevalence of coinfection than Whites.

Table 1

Differences Between Drug Use Groups by Race

N=482	White (244)	Black (238)	p-value (χ^2 test)
	% (n)	% (n)	
<i>Drug Use Group</i>			
Crack/Nasal	22% (53)	66% (158)	
<i>Heroin</i>			
Heroin Injectors	30% (73)	14% (33)	.001
Polydrug Injectors	48% (118)	20% (47)	
<i>Disease Status</i>			
HIV+ (42)	3% (7)	15% (35)	.001
HCV+ (n=248)	63% (154)	40% (94)	.001
HIV+ & HCV+ (n=26)	3% (7)	8% (19)	.015

Table 2

Differences in HIV, HCV, and Coinfection Prevalence Within Race

N = 482				
	White n=244 % (n)	p-value (X ² test)	Black n=238 % (n)	p-value (X ² test)
<i>HIV+</i>				
Crack/Nasal	0% (0)		14% (22)	
Heroin (n=211)				
Heroin Injectors (n=106)	3% (2)	.307	15% (5)	.868
Polydrug	4% (5)		17% (9)	
Injectors (n=165)				
<i>HCV+</i>				
Crack/Nasal	28% (15)		18% (29)	
Heroin (n=211)				
Heroin Injectors (n=106)	71% (52)	.001	79% (26)	.001
Polydrug	74% (87)		83% (39)	
Injectors (n=165)				
<i>HCV and HIV</i>				
Crack/Nasal	0% (0)		4% (6)	
Heroin (n=211)				
Heroin Injectors (n=106)	3% (2)	.307	15% (5)	.004
Polydrug	4% (5)		17% (8)	
Injectors (n=165)				