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Awareness of Biologically Confirmed HCV Among a Community Residing Sample of Drug Users in Baltimore City

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Abstract

The present study sought to examine: (1) the prevalence and correlates of biologically confirmed Hepatitis C (HCV) and (2) the prevalence and correlates of prior HCV diagnosis and an unmet need for HCV treatment, among a community residing sample of drug users. The current study used a subset of HCV tested participants from the larger NEURO-HIV Epidemiologic Study from Baltimore, Maryland ($M_{age} = 34.81$, $SD = 9.25$; 46 % female). All participants were tested for HCV at baseline. Self-report was used to assess awareness of an HCV diagnosis and participation in treatment. Of the 782 participants tested for HCV, 19 % reported having received an HCV diagnosis in the past while 48 % tested positive for HCV. Only 6 % reported having received treatment for any form of hepatitis. Of those who tested HCV positive, 63 % reported never being diagnosed, and only 13 % received any treatment for HCV. We found that only 35 % of those who reported a prior HCV diagnosis received any treatment. The findings regarding lack of HCV awareness and diagnosis were considerable as expected. These deficits suggest that there are numerous gaps in patients' knowledge and beliefs regarding HCV that may interfere at multiple steps along the path from diagnosis to treatment. This study clearly demonstrates that a critical need exists to improve public knowledge of HCV risk factors, the need for testing, and the availability of effective treatment.

Keywords

Hepatitis C awareness; Hepatitis C treatment; Drug use

Introduction

Hepatitis C (HCV) is a significant public health issue. In the US, HCV infection is the most prevalent chronic blood borne infection and is the leading cause of hepatocellular carcinoma and liver transplant [1–4]. Current estimates of the economic impact of the disease are alarming. The health care costs are estimated at \$360 million annually to treat currently infected patients [5].

Chronic HCV infection can remain asymptomatic for years, hence under diagnosis of HCV remains a significant challenge [6]. Underdiagnosis of HCV is a significant public health problem which contributes to large proportions of HCV infected people being unaware of their disease status [1, 7, 8]. Approximately 50–75 % of the estimated 5.2 million HCV-positive individuals in the United States are unaware of their diagnosis [9–11]. The high prevalence of HCV and equally high prevalence of morbidity and mortality that occurs when the disease is undetected and untreated led the CDC to its recent recommendation that all adults born between 1945 and 1965 be tested [12]. This recent recommendation complemented the longstanding recommendation to regularly test high-risk groups. However, under diagnosis remains a significant problem, especially among high risk populations. Therefore, we need to better understand correlates associated with under diagnosis of HCV in high risk groups.

Since 1998, the CDC has recommended routine screening for persons at risk for HCV, including persons with a history of injection drug use and recipients of blood transfusions prior to 1992 [13]. However, due to patient and system obstacles, screening levels have fallen short of this recommendation. This leaves a large proportion of infected individuals unaware of their HCV status and demonstrates the challenges and shortfalls of our current screening strategies [6, 14, 15]. Though there is strong evidence that HCV infection is under diagnosed, there is very limited understanding of the factors influencing under diagnosis among high risk populations. A greater understanding of factors associated with lack of awareness of HCV diagnosis would enable us to address disparities in HCV screening and diagnosis.

A consequence of inadequate screening and detection of HCV infection is that most infected with HCV do not receive needed care such as education, counseling or medical monitoring [16]. In addition, although effective treatments are available, lack of awareness leaves those most in need of treatment with an unmet need for treatment [17]. Although extant literature has documented that many of those diagnosed do not receive needed treatment, few prior studies have measured the unmet need for treatment among those diagnosed.

The current study sought to address these gaps in our understanding of diagnosis and treatment of HCV in a community residing sample of drug users in Baltimore City, a population at high risk of HCV infection. Therefore, the present study sought to examine (1)

the prevalence and correlates of biologically confirmed Hepatitis C (HCV) and (2) the prevalence and correlates of prior HCV diagnosis and unmet need for HCV treatment, among those with biologically-confirmed HCV.

Methods

Study Design

Data for this study were obtained from the baseline assessment of the NEURO-HIV Epidemiologic Study. This study was approved by the University of Florida's Institutional Review Board and has received annual renewals. The baseline assessment was designed to examine neuropsychological and social-behavioral risk factors of HIV, hepatitis A, hepatitis B, and hepatitis C among both injection and non-injection drug users. In order to be eligible for participation in the parent study, participants had to be 18 and older and report use of non-injection and/or injection drugs in the past 6 months. Recruitment strategies for participation included advertisements in local newspapers, street outreach, and referrals from local service agencies. Participants were paid \$45 for the baseline assessment. Participants provided written informed consent and completed a face to face HIV Risk Behavior Interview. Blood and urine samples were also collected at the baseline assessment. Blood was drawn by a phlebotomist and tested for HIV, hepatitis A, B, and C. Urine samples were tested for the presence of drugs. Participants were subsequently notified of their HIV and/or viral hepatitis status and were referred to drug treatment and social services for counseling with respect to their blood and urine analysis results.

Measures

Biological Measures

Biologically Confirmed HCV: Blood samples were taken at baseline and HCV antibody testing was performed. HCV antibodies are assessed by enzyme immunoassays (either EISA 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.

Biologically Confirmed HIV: Blood samples were taken at baseline and HIV antibody testing was performed standard ELISA screening and confirmatory Western Blots.

Urinalysis: Urine samples were collected from all participants immediately following informed consent. Urine was analyzed for the presence of drugs including opiates, cocaine, cannabinoids, amphetamines, methamphetamines, methadone, PCP, barbiturates, benzodiazepines, MDMA, and oxycodone.

Self-report Measures

HIV Risk Behavior Interview: Self-report measures were collected using the HIV Risk Behavior Interview a detailed behavioral assessment of drug use and sexual practices. This assessment was adapted from a similar interview used in the REACH and ALIVE studies [18, 19]. Questions addressed demographic, educational, medical and neuro developmental variables along with a detailed assessment of lifetime and recent drug use and sexual practices.

Self-report HCV Status: Participants were asked “Have you ever been told by a Health Professional that you had Hepatitis?” “What type of Hepatitis were you told you have (response choices: Hepatitis A, Hepatitis B, Hepatitis C, Unknown Hepatitis)?” Those who responded yes to both “ever told you had Hepatitis” and “Hepatitis C” were coded as 1; those responded negatively to both or were diagnosed with a different type of hepatitis were coded as 0.

HCV Treatment: Participants who responded yes to “ever been told you have Hepatitis C” were then asked “Was treatment given?”; Those who responded yes were coded as a 1 and those who responded no were coded as 0.

Demographics: Study demographic questionnaire include questions regarding gender, race, education, marital status, source of income, and stability of housing resources.

Injection Drug Risk Behaviors: Participants were asked: “Have you ever used a needle that you know someone else used?”; “Have you ever backloaded?”; “Have you ever shared a cooker?”; “Have you ever shared cotton?”; and “Have you ever shared rinse water?” Those who endorsed any of the five drug risk behaviors were then coded as a 1 and those who did not endorse any of those behaviors were coded as 0.

Data Analysis: To meet study aims, descriptive statistics were used to calculate frequencies, means, and percentages for each variable of interest. The sample was divided into two groups: those who tested positive for HCV and those who tested negative. Chi square (χ^2) and t test analyses compared the two groups on demographic and predictor variables of interest. We then examined the subset of HCV-positive participants. Frequencies, means, and percentages for each variable of interest were calculated in order to examine differences between those who reported being given a positive HCV diagnosis versus those who reported never receiving an HCV diagnosis. Logistic regression analyses were then conducted to assess the influence of demographic and relevant behavioral variables in relation to self-reported HCV diagnosis. Descriptive data analyses and regression analysis were performed using IBM SPSS Statistics 21 (2013).

Results

Sample Characteristics

The current study includes a subset of the larger study consisting of men and women who were HCV tested ($n = 782$). Of excluded cases the only significant demographic differences was that sixty-six percent of those missing an HCV test were female. Table 1 shows a complete summary of participant demographics for the current sample. The study sample was 36 % white and 60 % Black/African American, and 4 % other. Fifty-four percent of the sample was male, with 40 % having completed high school or equivalent. The majority of the sample, 67 %, was single-never married. In the past 6 months, 19 % of the sample reported being homeless, 51 % reported receiving public assistance and 40 % reported having money from a regular job. The sample ranged in age from 18 to 68 with a mean of 34.81 and a standard deviation of 9.25 years. Fifty-four percent reported having seen a mental health professional for an emotional or behavioral problem at some point in their life

and 65 % reported seeking treatment for a physical or medical illness in their life. Eighty-five percent of the sample urine tested positive for illicit drug use at baseline. Of the 782 participants tested for HCV 19 % reported having received an HCV diagnosis in the past while 48 % tested positive for HCV. Only 6 % reported having received treatment for any form of hepatitis. Eleven percent of the sample tested positive for HIV. Five participants who tested HCV negative reported having received an HCV diagnosis and of those four reported having received treatment.

Demographics Stratified by HCV Status

Frequency distributions for demographic and study variables for the entire sample were stratified by biologically confirmed HCV status (Table 1). Those who tested positive for HCV were slightly older ($M = 35.65$, $SD = 9.30$) than those who tested negative ($M = 34.03$, $SD = 9.14$) ($t(780) = -2.45$, $p = 0.014$). Males were more likely to be HCV positive ($\chi^2(1, n = 782) = 3.79$, $p = 0.051$) than females. African Americans were more likely to be HCV negative ($\chi^2(2, n = 778) = 43.20$, $p < 0.001$) than whites. In addition, those who had an education of 11th grade or less ($\chi^2(2, n = 781) = 36.84$, $p = 0.001$) and had not received money from a regular job ($\chi^2(1, n = 780) = 28.57$, $p < 0.001$) in the past 6 months were more likely to be HCV positive. Both groups differed as expected on drug risk taking ($\chi^2(1, n = 780) = 156.04$, $p < 0.001$), with more HCV-positive individuals engaging in drug risk behaviors, and on HIV status with more HCV-positive individuals being HIV-positive. There were no differences between the two groups in receipt of public assistance, homelessness, biologically confirmed drug use, seeking help for emotional/behavioral problem or seeking help for a physical/medical illness.

Prevalence and Correlates of HCV Diagnosis, Among Those Infected with HCV

Of those who tested HCV positive 63 % reported never being diagnosed (Fig. 1). We then examined the characteristics of those who tested positive for HCV and reported receiving an HCV diagnosis versus those who reported not receiving any diagnosis (Table 2). Using logistic regression analyses we examined the association between demographic and drug risk behavior variables as predictors of self-reported HCV diagnosis. We found that age, gender, education, marital status, homelessness, public assistance, and HIV status were not significantly associated with self-reported HCV diagnosis. African Americans were less ($AOR = .525$, 95 % $CI = .279-.985$, $p = .04$) likely to self-report an HCV diagnosis than whites; those who self-reported seeking help for an emotional or behavioral problem were two times more likely to self-report ($AOR = 2.11$, 95 % $CI = 1.29-3.74$, $p = .003$) an HCV diagnosis than those who did not seek care; and those who engaged in drug risk behaviors were almost 5 times ($AOR = 4.90$, 95 % $CI = 2.71-8.86$, $p < .0001$) more likely to self-report an HCV diagnosis than those who reported no drug risk behaviors.

Unmet Need for HCV Treatment

Of those who reported an HCV diagnosis, 35 % reported receiving treatment. Using logistic regression analysis we examined differences in demographic and drug risk variables for those who reported receiving treatment versus those who reported they did not receive treatment; however no significant differences were found between these groups.

Discussion

The findings regarding HCV prevalence and lack of awareness were considerable as expected. Of the 782 drug users tested for HCV 48 % were HCV-positive. These findings are similar to other high-risk groups. Urban homeless in San Francisco had an infection rate of 73 %; HIV-positive veterans on antiretroviral treatment had a 37 % HCV infection rate; and former heroin addicts in treatment had a 26 % infection rate [20–22]. Interestingly, HIV infection in the current sample was 11 %, and for those infected with HCV the rate of HIV infection was 14 %, significantly lower than expected given the shared routes of transmission. Of those infected with HCV in the present study, 63 % were unaware of their positive HCV status. These findings suggest that current screening practices are not reaching those at highest risk, leaving a significant number of infected individuals unaware of their diagnosis and need of treatment.

The literature indicates that patient knowledge gaps and beliefs may interfere at multiple steps along the path from diagnosis to treatment. In a sample of HCV+ injection drug users, only 22 % reported understanding that HCV is curable, and in a sample of HIV+ women, 58 % did not have an opinion on the effectiveness of HCV treatment [16, 23]. Due to a combination of provider judgment and patient beliefs, only 21 % of HCV+ patients had a conversation about treatment with their physician. Of those that discussed treatment, 30 % started treatment [23]. Similarly, we found that only 35 % of those who reported receiving an HCV diagnosis received any treatment. Among a sample of HCV-infected injection drug users, the most common reasons for refusing or deferring treatment included treatment-related perceptions (e.g., the side effects are bad), lack of perceived need for treatment, and competing priorities [23].

Common barriers to HCV screening cited by physicians include: other medical complaints that command priority during time-constrained appointments; demonstrated patient noncompliance; co-morbidities that are contraindicated for antiviral treatment; and patients' financial barriers to affording specialist care [24]. Access to a physician and attendance at follow-up appointments is essential for both screening and receiving a diagnosis. In addition to the financial and transportation challenges to completing an initial appointment, patient no-show at screening follow-up appointments means that many HCV-positive individuals do not receive their diagnosis or counseling [25, 26].

The implementation of oral swab, rapid HCV screening could reduce many of the challenges of diagnosing infected individuals. Without a need for a follow-up visit to receive screening results, more individuals could learn their HCV status. Additionally, the oral test may attract individuals with concerns about undergoing a blood test (e.g., IDU's worried about locating a usable vein) [25, 27]. Diagnosis, coupled with counseling about disease management, risk reduction practices to limit spread to others, and referral to treatment providers can begin to bridge the gap in HCV status awareness and treatment initiation.

While negative provider evaluation of a patient's eligibility for treatment, based on the presence of medical and psychiatric co-morbidities or illicit drug use, may prevent specialist referral, Morrill et al. [28] found through medical record reviews and physician interviews

that these cited reasons did not correlate with actual patients' treatment status [28, 29]. Increasing evidence suggests that individuals with contraindicated conditions associated with decreased adherence to medical treatments, such as depression, can have successful outcomes with antiviral therapy under proper management [30]. Similarly, Cohen et al. [16] found that a majority of the women who were referred for liver biopsy or HCV treatment did follow physician recommendations despite ongoing poverty, HIV infection, and substance use [16].

Our data indicates that those who have engaged in drug risk behaviors are more likely to be aware of their positive HCV status. Those who self-reported an HCV diagnosis were 5 times more likely to acknowledge engaging in drug risk behaviors during their lifetime. Programs that test people who inject drugs (PWID) where they receive services may be contributing to these results and serve as an effective method of identifying and educating those with HCV infection [31]. Through needle exchange programs (NEP), those who inject drugs may be tested at the site where they receive services. In addition, NEP's also provide participants with needed education about risk behaviors and its relationship to HCV disease. While it was a small subset of the current sample, those at greatest risk and those who encountered the healthcare system were the most likely to be aware of their HCV status. This supports the possible effectiveness of increasing public awareness regarding risk factors and testing sources for HCV.

These findings should be evaluated in light of the study's limitations. Self-report was used to determine treatment received, and it does not account for those referred who did not follow-up. However, this study clearly demonstrates that a critical need exists to improve public knowledge of HCV risk factors, the need for testing, and the availability of effective treatment.

Acknowledgments

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Fig. 1.

HCV status: Self reported diagnosis versus biologically confirmed disease

Table 1

Demographic comparisons by (N = 782)

Variable	Entire sample		HCV negative		HCV positive		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	782		406		376			
Age	34.81	9.25	34.03	9.14	35.65	9.3		
Gender							3.79	0.051
Male	421	54	205	51	216	57		
Female	361	46	201	49	160	43		
Race							43.2	<.001
White	281	36	107	26	174	46		
African American	468	60	287	70	181	48		
Other	29	4	9	2	20	5		
Education							36.84	<.001
<High school	332	43	133	33	199	53		
High school or GED	316	40	181	45	135	36		
Some college	133	17	91	22	42	11		
Marital status							5.79	0.055
Single never married	526	67	278	69	248	66		
Married/common law	80	10	48	12	32	8		
Divorced/widowed/separated	172	22	77	19	95	25		
Money from a regular job (yes)	311	40	198	51	113	30	28.57	<.001
Public assistance (yes)	400	51	206	51	201	54	1.55	0.23
Health problems (life)	511	65	260	64	251	67	0.64	0.45
Emotional behavioral problems (life)	420	54	213	53	207	55	0.47	0.51
Homeless in last 6 months (yes)	151	19	69	17	82	22	2.9	0.1
Biologically confirmed drug use	662	85	346	85	316	84	0.01	1
Drug risk behaviors-life	361	46	101	25	260	69	156.04	<.0001
Self-reported HCV Dx	145	19	5	1	140	37	166.6	<.0001
Self reported Hep Tx	52	6	4	1	48	13	46.42	<.0001

Variable	Entire sample		HCV negative		HCV positive		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
HIV status								
Positive	87	11	33	8	54	14		
Negative	693	89	371	91	322	86	7.53	0.006

N may vary slightly according to missing data

Table 2
Demographic comparison: self reporting HCV diagnosis versus reporting no diagnosis (N = 376)

Variable	HCV + self reporting Dx		HCV + self reporting no Dx		Test statistics		
	M or N	S.D. or %	M or N	S.D. or %	Odds ratio	95 % CI	p value
N	140		231				
Age	36.03	10.02	35.2	8.78	1.03	.995–1.06	0.09
Gender							
Male	73	52	141	61	Referent		
Female	67	48	90	39	1.19	.709–2.00	0.509
Race							
White	72	51	100	43	Referent		
African American	61	44	117	51	0.525	.279–.985	0.045
Other	7	5	13	6	0.89	.293–2.68	0.831
Education							
<High school	77	55	121	52	Referent		
High school or GED	43	31	89	39	0.73	.433–1.21	0.222
Some college	20	14	21	9	1.24	.579–2.66	0.578
Marital status							
Single never married	96	69	149	65	Referent		
Married/common law	10	7	22	9	0.59	.322–1.09	0.096
Divorced/widowed/separated	34	24	59	26	0.75	.314–1.80	0.527
Public assistance (no)					Referent		
Public assistance (yes)	87	62	76	33	1.71	.987–2.99	0.056
Sought help for emotional/behavioral problems (no)					Referent		
Sought help for emotional/behavioral problems (yes)	97	69	142	62	2.11	1.29–3.47	0.003
Homeless in last 6 months (no)					Referent		
Homeless in last 6 months (yes)	36	26	45	20	1.18	.676–2.06	0.559
HIV–					Referent		
HIV+	17	12	34	15	0.59	.284–1.20	0.147
Drug risk behaviors (no)					Referent		

Variable	HCV + self reporting Dx		HCV + self reporting no Dx		Test statistics		p value
	M or N	S.D. or %	M or N	S.D. or %	Odds ratio	95 % CI	
Drug risk behaviors (yes)	123	88	135	58	4.9	2.71–8.86	<.0001

N may vary slightly according to missing data