Short Communication

Prevalence of HCV infection and associated factors among illicit drug users in Breves, State of Pará, Northern Brazil

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ABSTRACT

Introduction: Illicit drug users (DUs) are vulnerable to hepatitis C virus (HCV) infection. The shared use of illicit drugs is the main method of HCV transmission. **Methods:** A cross-sectional study was conducted in Breves, in northern Brazil. We surveyed 187 DUs to determine the prevalence of and factors associated with HCV infection. **Results:** The prevalence of anti-HCV antibodies was 36.9%, and the prevalence of hepatitis C virus-ribonucleic acid (HCV-RNA) was 31%. Hepatitis C virus infection was associated with tattoos, intravenous drug use, shared use of equipment for drug use, drug use for longer than 3 years, and daily drug use. **Conclusions:** Strategies for preventing and controlling HCV transmission should be implemented among DUs.

Keywords: Hepatitis C virus. Illicit drug users. Northern Brazil.

Currently, the sharing of drug paraphernalia is the main transmission method for hepatitis C virus (HCV) worldwide. It is estimated that more than 60% of new HCV infection cases recorded each year are related to the use of illicit drugs, particularly injected drugs[1,2]. In Brazil, epidemiological studies of HCV infection in illicit drug users are still rare. The prevalence of HCV infection in illicit drug users sampled in metropolitan areas in the Northeast, Midwest, South and Southeast regions of Brazil ranged from 5% to 36%[3-7]. There are frequent reports of clinical cases of hepatitis or pathologies associated with HCV infection in other population groups in northern Brazil[8-11]. It is known that most illicit drug users in Pará do not consume injected drugs and are infected with HCV genotype 1[10,11]. This study estimated the prevalence of HCV infection and assessed the factors associated with HCV infection in illicit drug users in the municipality of Breves, State of Pará, northern Brazil.

This cross-sectional study of a non-probabilistic convenience sample was based on information and biological samples provided by illicit drug users in an area of intense illicit drug use located in Breves (01° 40' 55" S 50° 28' 48" O), Archipelago of Marajó, Pará, northern Brazil. Illicit drug users in areas of intense drug consumption were sampled using the snowball technique[11]. Individuals were eligible for the study if they were older than 17 years of age and agreed to answer a specific questionnaire and have a blood sample taken and tested for molecular and serologic markers in the period from August to December 2012. The Research and Ethics Committee of the *Núcleo de Medicina Tropical* of the *Universidade Federal do Pará* approved the study protocol (041/2004-CEP/NMT).

All samples were tested for HCV antibodies and hepatitis C virus-ribonucleic acid (HCV-RNA). Anti-HCV antibodies were tested by enzyme immunoassay (EIA; Murex anti-HCV 4.0, Murex Biotech). HCV RNA was detected by real-time polymerase chain reaction (PCR) using 67 base pairs of the 5' untranslated region (UTR), as described elsewhere[9]. Confidence intervals (CIs) were determined for infection prevalence estimates. Simple and multiple logistic regressions were calculated to assess the independent effects of variables[12]. The fit of the final model was assessed using the Hosmer-Lemeshow goodness-of-fit test. Two definitions of HCV infection were used: I) anti-HCV positivity shown by EIA, and II) HCV-RNA detection by real-time PCR. All statistical analyses were performed using IBM SPSS Statistics 18.

In total, 187 illicit drug users participated in this study. The majority of participants were male (82.3%). The mean age was 28.5 years (range, 18-51 years; standard deviation [SD] ± 9.5 years). The majority of participants had > 7 years of education (55.6%) and belonged to families with monthly incomes of up to R$1,090.00 (US$545.00). **Table 1** shows the demographic and epidemiological characteristics of the participants. In this study, most (78.1%) participants reported having consumed more than one illicit drug during their lifetimes. Thus, illicit drug users were grouped according to the most frequently used drug. Drug preference was grouped into five categories: cannabis (21.9%), cocaine paste (20.9%), cannabis and cocaine paste (13.4%), cocaine powder (18.2%), and oxi cocaine (25.6%).

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TABLE 1 - Demographic and epidemiological characteristics of illicit drug users in the municipality of Breves, State of Pará, northern Brazil.

Characteristics	Overall sample n	Overall sample %	Anti-HCV+ n	Anti-HCV+ %	OR (CI 95%)	HCV-RNA+ n	HCV-RNA+ %	OR (CI 95%)
Total	187		69	36.90		58	31.02	
Mean age (years)	28.5			34.0			35.5	
Age ≥ 35 years	60	32.1	23	38.33	1.1 (0.6 - 2.1)	21	35.00	1.3 (0.7 - 2.5)
Male	154	82.3	55	35.75	0.7 (0.3 – 1.6)	46	29.87	0.7 (0.3 - 1.6)
Supposed route of HCV infection								
family member/close friend infected with hcv	19	10.2	8	42.1	1.1 (0.5 - 3.3)	7	36.8	1.3 (0.5 - 3.6)
recipient of blood transfusion	23	12.3	10	43.5	1.4 (0.6 - 3.3)	8	34.8	1.2 (0.5 - 3.0)
surgery	89	47.6	36	40.4	1.3 (0.7 - 2.4)	31	34.8	1.4 (0.7 - 2.6)
tattoos	125	66.8	63	50.4	9.5 (3.8 - 23.6)	55	44.0	15.4 (4.6 - 41.9)
shares razor blades in domestic environment	65	34.7	26	40.0	1.2 (0.6 - 2.3)	21	32.3	1.1 (0.6 - 2.1)
shares razor blades in barbershop/beauty salon	52	27.8	15	28.8	0.6 (0.3 - 1.2)	12	23.1	0.6 (0.3 - 1.2)
uses needle/glass syringe sterilized at home	48	25.7	19	39.6	1.2 (0.6 - 2.3)	18	37.5	1.5 (0.7 - 3.0)
does not use own nail clippers	121	64.7	40	33.0	0.6 (0.3 - 1.1)	35	28.9	0.8 (0.4 - 1.4)
invasive dental treatment	150	80.2	54	36.0	0.8 (0.4 - 1.7)	45	30.0	0.8 (0.4 - 1.7)
injecting drug use	37	19.8	27	39.1	6.7 (3.0 - 13.2)	27	46.6	9.8 (4.3 - 20.7)
shares paraphernalia during drug use	140	74.9	61	43.6	3.8 (1.6 - 8.6)	52	37.1	4.0 (1.7 - 10.2)
used drugs for more than three years	60	32.1	50	83.3	28.4 (12.3 - 65.6)	49	81.7	58.4 (22.8 - 79.7)
daily drug use	117	62.6	63	53.8	12.4 (5.0 - 31.0)	56	47.9	31.2 (7.3 - 65.4)
used drugs during detention in jail/prison	73	39.0	29	39.7	1.2 (0.6 - 2.2)	26	35.6	1.4 (0.76 - 2.7)
no use of prophylactic during intercourse	149	79.7	55	36.9	1.0 (0.5 - 2.10)	44	29.5	0.7 (0.3 - 1.5)
same-sex intercourse	86	46.0	26	30.2	0.6 (0.3 - 1.1)	22	25.6	0.6 (0.3 -1.2)
intercourse with a sex worker	121	64.7	40	33.0	0.6 (0.3 - 1.2)	33	27.3	0.6 (0.3 - 1.2)
sexual intercourse with another illicit drug user	124	63.3	45	36.3	0.9 (0.5 - 1.7)	36	29.0	0.8 (0.4 -1.5)
involvement in prostitution	73	39.0	20	27.4	0.7 (0.4 - 1.3)	17	23.3	0.5 (0.3 - 1.0)
more than 10 sexual partners over the past two years	103	55.1	34	33.0	0.7 (0.4 - 1.2)	26	25.2	0.5 (0.3 - 1.0)

Note: A univariate analysis comparing the groups that tested positive and negative for HCV is presented through odds ratios and CIs. **HCV-RNA:** hepatitis C virus-ribonucleic acid; **OR:** odds ratio; **CI:** confidence interval.

All users reported a preference for using non-injected illicit drugs. However, 27 (14.4%) users reported having used injected illicit drugs at least once. Tobacco (64.7%) and alcohol (87.7%) were also commonly consumed by the subjects.

Of the 187 illicit drug users, 69 (36.9%) had anti-HCV antibodies, and 58 (31%) had HCV-RNA. Using a simple logistic regression analysis, HCV infection was associated with tattoos, intravenous drug use, shared use of equipment for drug use, drug use for longer than 3 years, and daily drug use **(Table 1)**. A multivariate analysis identified the same five risk factors for HCV infection for the two diagnostic methods employed **(Table 2)**. The Hosmer-Lemeshow goodness-of-fit test showed a good fit for final model 1 ($_{HL}\chi^2 = 3.8$; $p = 0.7$) and model 2 ($_{HL}\chi^2 = 2.7$, $p = 0.8$).

Illicit drug users are currently the main group of people infected with hepatitis C[1,13]. It is well known that such individuals tend to develop a chronic infection, ultimately leading to chronic hepatitis. Many of these individuals are not clinically ill and are, therefore, unaware of their infection, leading to activities that contribute to an increased incidence of HCV[2,15]. The prevalence of HCV infection in illicit drug users varies from 10% to 95%, reflecting the presence or absence of specific risk factors, such as having a history of drug use, sharing drug paraphernalia (e.g., needles, syringes, pipes, cans, etc.), tattooing, piercing the body/ears, using drugs while being detained in jail or prison, and the number of partners present during shared use and the method of drug consumption (i.e., inhaled or injected)[1,4,5,13,15].

TABLE 2 - Risk factors associated with HCV infection based on multiple logistic regression models.

Risk factors	Model 1*		Model 2*	
	OR (CI 95%)	p-value	OR (CI 95%)	p-value
Tattoos	15.4 (4.60 - 41.9)	< 0.01	24.6 (7.2 - 46.1)	< 0.01
Injecting drug use	13.6 (5.1 - 22.3)	< 0.01	16.3 (5.1 - 28.8)	< 0.01
Sharing of paraphernalia during drug use	9.5 (2.5 - 21.4)	0.01	7.2 (1.5 - 11.3)	0.01
Drug use for more than three years	39.4 (22.8 - 78.3)	< 0.01	71.7 (24.3 - 92.1)	< 0.01
Daily drug use	31.2 (7.3 - 83.4)	< 0.01	28.9 (9.7 - 60.2)	0.02

*HCV infection based on EIA (model 1) and PCR (model 2) results. **HCV:** hepatitis C virus; **OR:** odds ratio; **CI:** confidence interval; on EIA: enzyme immunoassay; **PCR:** polymerase chain reaction.

In Salvador (State of Bahia, northeastern Brazil)[7], the seroprevalence of HCV infection detected in injected-drug users was similar to that observed in this study. Note that most of the study participants use non-injecting illicit drugs. The sporadic use of injectable illicit drugs, shared equipment for drug use, and daily drug use for more than three years most likely contribute significantly to viral transmission and a high prevalence of HCV infection among illicit drug users in the municipality of Breves. A few studies[13,14] have reported the presence of HCV-RNA in the nasal secretions of cocaine and crack users, indicating a possible alternative route for virus transmission (i.e., sharing the paraphernalia used to consume these drugs).

The factors associated with HCV infection detected in illicit drug users in Breves are similar to those reported in epidemiological studies in different Brazilian municipalities for this risk group[3-6,11]. Specifically, the risk factors for HCV infection are identical to those detected in cocaine users in the State of Pará[11], thus confirming the local epidemiological profile of HCV transmission in illicit drug users. In summary, this study identified important epidemiological aspects of HCV infection in illicit drug users in the municipality of Breves. The findings can be used to develop measures for controlling and preventing viral transmission in this risk group and in the general population.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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