

Use of injected heroin and risk of hepatitis C in three cities in Colombia

Uso de heroína inyectada y el riesgo de hepatitis C en tres ciudades de Colombia

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ABSTRACT: *Introduction:* Hepatitis C is one of the most neglected diseases by governments internationally. *Objective:* Identify the prevalence of hepatitis C and associated injection drug users in three cities of factors Colombia. *Methods:* Cross-sectional study of 668 injecting drug users recruited through respondent-driven sampling, inquired about demographic characteristics and risk behaviors. Laboratory testing was used on filter paper and cases of hepatitis C viral load tests with RNA were confirmed. Hepatitis C prevalence and associated factors was estimated with Chi-square test statistics and reasons for crude and adjusted prevalence were calculated using logistic regression. *Results:* The prevalence of hepatitis C was 17.5% and were found as factors that increase the prevalence of hepatitis: having HIV, injecting another person carrying the virus dose used was sharing a syringe, injected with a syringe and consume marijuana. As a factor that reduces the prevalence, purchase syringes in drug stores or other stores. *Conclusion:* This research evidence established consumption of drugs by injection, and the presence of hepatitis C in social networks of IDUs and highlights the importance of developing interventions for harm reduction and prevention of hepatitis C in this population these three cities.

Keywords: Hepatitis C. Epidemiology. Prevalence. Cross-Sectional Studies. Heroin Dependence. Colombia.

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RESUMEN: Introducción: La hepatitis C es uno de los grandes problemas de salud pública en el mundo, especialmente por su alta transmisibilidad por vía inyectada. **Objetivo:** Identificar la prevalencia de la infección por VHC, y factores asociados en usuarios de drogas psicoactivas inyectables en tres ciudades (Armenia, Bogotá y Cúcuta) de Colombia. **Métodos:** Estudio descriptivo transversal en 668 usuarios de drogas inyectables captados a través de muestreo guiado por el respondiente, a quienes se indagó sobre características demográficas y comportamientos de riesgo. Se utilizó la prueba de Anticuerpos, tomado en papel de filtro y se confirmaron los casos de VHC, con pruebas de carga viral de RNA. Se estimó la prevalencia de VHC y los factores asociados con pruebas estadísticas Chi-cuadrado y se calcularon razones de prevalencia crudas y ajustadas con regresión logística usando RDSAT y SPSS. **Resultados:** La prevalencia de infección por VHC fue del 17,5% y se encontraron como factores que aumentan la prevalencia de hepatitis: tener VIH, inyectarse con otra persona portadora del virus, utilizar dosis de una jeringa que estaba compartiendo, inyectarse con una jeringa casera y consumir marihuana. Como factor que reduce la prevalencia, el adquirir jeringas en droguerías u otras tiendas. **Conclusión:** Se evidencia un consumo establecido de drogas por vía inyectada, poniendo de relieve la importancia de generar intervenciones para la reducción de daños y la prevención de hepatitis C en estas tres ciudades del país.

Palabras clave: Hepatitis C. Epidemiología. Prevalencia. Estudios Transversales. Dependencia de Heroína. Colombia.

INTRODUCTION

The hepatitis C virus (HCV) is one of the greatest public health problems worldwide, transmitted through parenteral route, and is an important reason for chronic liver disease, cirrhosis and hepatocellular carcinoma¹. The World Health Organization (WHO) reports a prevalence of 3% of HCV infections world wide². Their geographic distribution is not homogeneous, with the most people infected by hepatitis C virus residing in Asia and Africa, which is equivalent to 70.6% of the total reported cases. Recent estimates for South America indicate a prevalence of HCV between 1.5 and 3.5%³.

In 1990, the main forms of HCV transmission were through hemoderivative products, hemodialysis and organ transplants^{4,5}, which were later minimized with the advances in biosecurity, though in the last few years, most people presenting as new cases in developed countries are injection drugs users⁶ and people involved in high risk sexual activities, such as men who have sex with men⁷.

There are differences regarding age and geographic distribution of the infection, in the United States and Australia, for example, it is more often observed among young adults due to use of intravenous drugs⁸. In addition to that, this virus is the main cause for liver transplantation in countries such as the United States (USA) with 30% of occurrence, and up to 50% in Europe^{9,10}. Although the topic has been widely discussed in many countries¹¹⁻¹⁹, hepatitis C has been little studied in Colombia^{11,20-24}.

The objective of this article was to identify factors associated to the prevalence of HCV infection in injection drugs users in three Colombian cities (Armenia, Bogotá and Cucuta).

METHODS

A cross-sectional descriptive study was carried out using survey-guided sampling and the inclusion criteria were: to be active users of injection drugs (more than 6 months of being injected), to be between 18 and 59 years of age, to sign the Informed Consent and to have a valid respondent driven sampling (RDS), except the seeds.

Due to the type of population studied, it was not possible to count on a known sample framework which would allow designing a conventional probabilistic sample, hence the option for a referenced chain sample based on the interviewees, a method proven useful to reach populations of difficult access such as users of injection drugs and which consists of a sample based on chains, though incorporating social networks theories in order to obtain a sample that approaches the population studied^{25,26}.

This sampling method allows evaluating the probabilities of inclusion in relation to population, with a mathematical model, derived from the theory of Markov chains. This calculation estimates the population and their corresponding confidence intervals. Those numbers derive from the information about interviewees regarding their relations both with their recruiters and the size of their own social networks. Thus, this sampling method inferences from the population's social networks²⁷.

Recruitment begins with a group of "seeds" or non-random participants in the target population. In the case of the present survey, an initial amount of three seeds was determined, out of the possible ones for each city; The size of the sample was calculated by using the formula for one proportion, confidence level at $1-\alpha$ 95%, absolute precision at 5%, the minimum sample size for each city was 196 people, 668 users of injection drugs were questioned in all three cities using the same methodological design.

An applied and reviewed instrument was used in an investigation from UDI in 2010²⁸, based on an instrument designed in 2000 by the WHO, in Bogotá²⁹. The form included questions regarding demographic and behavioral characteristics of risk and a laboratory testing on filter paper to detect hepatitis C (antibody test)³⁰, the cases were confirmed by RNA viral load tests (the viral load was performed by the m2000 real time HCV system of Abbott, based on the real-time polymerase chain reaction (PCR), with filter paper sensitivity samples of 400 UI/mL).

As a control measure for information bias among interviewers, a training was conducted prior to the collection of information; confidentiality of the information provided by the population was ensured. The project was approved by the Research Ethics Committee of *Universidad CES*.

The statistical analysis and result tables were built in RDSAT[®] and SPSS[®] 21.0. They present the description of UDI characteristics and the estimated prevalence of hepatitis C with confidence interval (CI) of 95%. In order to establish the association between exposure factors and the prevalence of hepatitis C, the statistical χ^2 and Fisher's exact tests were performed, with significance level of 5%; Likewise, gross prevalence ratios (PR) with values of $p < 0.25$ in the bivariate were adjusted through logistic regression.

RESULTS

The total users of injection drugs included was 668, of which 265 (39.7%) were from Armenia, 193 (28.9%) from Bogotá and 210 (31.4%) from Cucuta; with mean age of 26 years old (minimum 18 and maximum 59 years of age); 82.2% (549) were men; 73.7% (492) did not have stable partners; 50% had complete secondary education; the socioeconomic level of living, before starting to use drugs decreased 68.7% and right after using drugs, it increased by 16%. As for drug consumption, the mean time of drug consumption was 5.74 (DS: 5.2) years (Table 1).

The estimated prevalence for HCV infection in the total study population was 17.5% and for HIV infection was 4.2%. The highest HCV prevalence population were the users from the city in Armenia with 22.3% (95%CI 12.3% – 23.5%) previously published data³¹, followed by Cucuta with 21.4% (95%CI 15.7% – 26.4%) and finally Bogotá with 7.6% (95%CI 3.2% – 13.3%).

Fifty-four percent (14/26) of injection drugs users with HIV infection had HCV infection; it was observed, in all three cities, that having HCV infection increased by six times the risk of having HIV (PRaj 6.87; 95%CI 2.86 – 16.06); the population with the highest frequency of HIV/HCV co-infections was the group of users from Cucuta, 75%, followed by Armenia with 42.9% and Bogotá with 28.6%.

Three times the risk of having HCV was observed in people who at any given time in their lives injected themselves along with other users who reported having HCV (PRaj 2.45; 95%CI 1.33 – 4.53). Another associated factor observed was taking doses of a drug mixture shared by other people (PR 1.9; 95%CI 1.12 – 3.21); likewise, not purchasing needles and syringes in pharmacies increased twice the risk of having HCV (PR 1.86; 95%CI 0.94 – 3.69) (Table 2).

Other more frequent factors in people with hepatitis C were the consumption of marijuana (PR 1.54; 95%CI 0.15 – 15.43) and the consumption of basuco (PR 1.47; 95%CI 0.42 – 5.13). On the other hand, the consumption of cocaine (62.2%) and alcohol (95.6%) did not report differences in the proportions.

DISCUSSION

There are few studies on hepatitis C in Colombia³², and this investigation identified a significant number of injection drugs users who share and reuse injection equipment, similarly to what was observed in other cities of Colombia in 2010³³⁻³⁵; widely documented and discussed factors in other countries, though for Colombia, represent the first step toward intervention strategies³⁶.

Co-infections of HIV and HCV have been reported among drug users in different countries. In Tijuana, a seven times higher risk of hepatitis C was observed³⁷ and in Ireland, 62% of people with hepatitis had HIV; in Hong Kong, the co-infection was between 46% and 74%

Table 1. Sociodemographic and risk behavior characteristics associated with hepatitis C in injection drugs users.

Variable	HCV		No HCV		χ^2	p-value
	n	%	n	%		
HIV						
Positive	14	53.85	12	46.15	24.72	0.00*
Negative	103	16.04	539	83.96		
Marital Status						
With partner	90	18.29	402	81.71	0.78	0.22
Without partner	27	15.34	149	84.66		
Gender						
Female	12	12.63	83	87.37	1.76	0.11
Male	100	18.21	449	81.79		
Injection with people with hepatitis						
Yes	19	27.94	49	72.06	5.59	0.01*
No	98	16.42	499	83.58		
Gets syringes in drugstores						
Yes	99	16.34	507	83.66	6.28	0.13
No	18	29.03	44	70.97		
Uses doses of shared syringes						
Yes	24	11.43	186	88.57	6.95	0.00*
No	88	19.73	358	80.27		
Uses homemade syringes						
Yes	2	7.14	26	92.86	2.08	0.11
No	111	17.65	518	82.35		
Education						
Primary	41	16.60	206	83.40	5.56	0.06
Secondary	53	15.87	281	84.13		
College	23	26.44	64	73.56		
Use of marijuana						
Annual	100	16.98	489	83.02	1.27	0.52
Former consumption	16	22.22	56	77.78		
Never	1	14.29	6	85.71		
Use of basuco						
Annual	71	18.93	304	81.07	1.57	0.66
Former consumption	17	14.41	101	85.59		
Never	26	16.99	127	83.01		

Table 2. Adjusted model of factors associated with hepatitis C.

Variable	PRc	95%CI		PRaj	95%CI	
HIV	6.11	2.75	13.58	6.87	2.86	16.33
Gender	1.54	0.81	2.93	1.32	0.67	2.59
Injection with people with hepatitis	1.97	1.11	3.50	2.45	1.33	4.53
Does not get syringes in drugstores	2.10	1.16	3.78	1.86	0.94	3.69
Used dosis in shared syringes	1.91	1.17	3.09	1.90	1.12	3.21
Used homemade syringes	2.79	0.65	11.91	3.07	0.65	14.39

and in Thailand, up to 90% of UDI had these infections³⁸. The present study also observed that UDI with HIV had six times the risk of contracting hepatitis C infection.

An UDI study was carried out in San Diego, California, with a sample of 510 people³⁹, mostly men (74%), finding prevalences of hepatitis C at 26.9% (95%CI 23.0 – 30.7%) and HIV at 4.2% (95%CI 2.4 – 5.9%)¹⁴.

In all three cities in Colombia, the UDI population behaved similarly to what was reported in California, obtaining a sample of 668 people, of which 82.2% were men, with prevalence of 17.5% (95%CI 14.55 – 20.47) for HCV and 3.9% (95%CI 2.35 – 5.43) for HIV. Likewise, this study and others in the world on UDI have observed that men have greater prevalence of HCV infection; in Colombia, 18,2% of men had hepatitis C in comparison to 12.6% of women, without statistically significant differences.

A study carried out in Iran found that injection drugs users who shared syringes had three times higher probability of getting infected than the ones who did not share needles¹². Differences between the cities were found in Colombia, considering the one who shared syringes the most: Bogota (58.5%), followed by Armenia (37.2%) and finally Cucuta (26.8%), justifying the need to install damage reduction and control programs.

High incidence and rapid increase in the prevalence of hepatitis C was found in young populations, with recent drug consumption, family instability, with partners who were also injection drugs users, and with a history of having injected themselves along with people with HCV^{40,41}.

This was similar to what was observed in Colombia, where the associated factors to hepatitis C were: being HIV positive, single, male, injecting along with other people with hepatitis, using doses from a shared syringe and injecting with a homemade syringe.

A high prevalence of hepatitis C was found in Brazil, associated to drug consumption, increasing the progress into chronic diseases with low response to antiviral therapy; hence the authors' proposing the use of intervention strategies as soon as possible^{40,42}. The present investigation of hepatitis C in UDI is mainly associated to the consumption of marijuana (OR 1.54) and basuco (OR 1.47); high consumptions of cocaine and alcohol was also observed.

Basuco and crack are smokable forms of cocaine, which differ in that the first is obtained through the extraction of alkaloids from the coca leaf and which are not processed until they become cocaine hydrochloride, while crack is obtained by mixing cocaine hydrochloride with sodium bicarbonate and water or ammonia. Basuco is predominant in countries of the Andean region of Latin America, whilst crack is more widely spread in North America and the rest of the world⁴³.

Basuco and crack have similar neurobiological and social deterioration effects in addition to a great addictive potential, reason why basuco is considered “equivalent” to crack in less resourceful Latin American countries such as Colombia⁴⁴. Studies evaluating crack consumption in UDI and their associated higher risk behaviors have documented that this group is more prone to promiscuity and sexual exchange for drugs⁴⁵, as well as increased seroconversion for HCV and HIV⁴⁶.

In Pakistan, an increased prevalence of hepatitis C in drug users was identified, once they prefer injecting over inhaling the drug due to the decreased availability and quality of the heroin which was often consumed inhaled; thus, new drug users prefer to initiate their consumption intravenously in order to obtain the greatest satisfactory effect from the very beginning¹⁹; The present study found that 83.6% of the studied population injected heroin at their first time, followed by cocaine and a smaller portion began with ketamine injections.

It has been proposed that HIV and HCV prevention is achieved by reducing the risk behaviors leading to the infections, such as injecting drugs, sharing syringes, using homemade syringes and the number of times a syringe is used, considering the three later ones are the factors more strongly associated to these infections; though despite the available evidence, current coverage of intervention strategies to decrease UDI damage are limited in the world⁴⁰. There are no restrictions in Colombia for the purchase of syringes, but the high reuse of syringes by users injected with drugs, and the use of homemade syringes, suggest low availability and access to clean and new syringes³³.

A study carried out in 2012 concluded the prevalence rates of hepatitis C worldwide are increasing, reason the primary prevention guided by “safe injection practices” are important, once that the mortality caused by this infection will double in the next few decades, significantly increasing direct and indirect costs, as well as the total costs for the treatment of this disease¹⁸. Thus, programs targeting illicit drugs users are imperative, in addition to an exchange program for syringes and contaminated injection objects and reinforcing education for UDIs about possible diseases transmitted by blood⁴⁷.

Drug consumption requires thinking of damage reduction strategies between active consumers who are not willing to refrain from using them. The programs emphasized to be implemented are syringe Exchange, injection workshops and safe sex programs, especially among beginners and young injectors, once that some authors suggest that the circumstances, behaviors and practices observed in the first injection are critical and may be reproduced throughout their “drug injection career”^{48,49}.

It could be noted this investigation had limitations such as its sample being interview-based and thus being considered a non-random type of selection which must fulfill a series of assumptions to be considered a sample dependent of the social network; the information about the provision of homemade syringes was not investigated in depth; furthermore, these data result from a survey which collected self-reports of drug consumption practices, and may have inaccuracies based on the honesty of the response.

CONCLUSIONS

This investigation shows an established consumption of injection drugs and the presence of hepatitis C virus in the social networks of UDIs; it was not expected that, despite the lack of intervention strategies or a plan to reduce HCV and HIV transmission, the prevalence of these infections was not as high when compared to other countries⁵⁰. It is not considered that high prevalences of these diseases should be expected in order to onset damage control programs.

The prevalence of hepatitis C and the high reuse of syringes represent an alert in the Colombian cities, indicating the presence of infection in injection networks and emphasizing the importance of generating new and specific interventions for the reduction of damage and the prevention of hepatitis C in this population.

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