

DOI: 10.21767/2472-5048.100006

# Prevalence of Hepatitis-C Viral Infection among Opioid Dependent Injectable Drug Users: A Study Conducted at Swami Vivekananda Drug De-Addiction and Treatment Centre, Amritsar

Piyush Mahajan\*, Manjit Singh, Aseem Garg, Parshotam Dass Garg and Gurpreet Singh

Government Medical College, Amritsar, Punjab, India

\*Corresponding author: Piyush Mahajan, Department of Psychiatry, Government Medical College, Amritsar, Punjab, India, Tel: 919888689299; E-mail: mahajns@gmail.com

Received date: January 18, 2016; Accepted date: March 07, 2016; Published date: March 11, 2016

Citation: Mahajan P\*, Manjit Singh, Garg A, Garg PD and Gurpreet Singh (2016) Prevalence of Hepatitis-C Viral Infection among Opioid Dependent Injectable Drug Users: A Study Conducted at Swami Vivekananda Drug De-Addiction and Treatment Centre, Amritsar. Dual Diagn Open Acc 1:26. doi: 10.21767/2472-5048.100006

Copyright: © 2016, Mahajan, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

## Abstract

**Background:** Injecting drug use is a major route of hepatitis C virus (HCV) infection in north India especially Punjab with very high rates of substance abuse. The present study was attempted to study the prevalence of hepatitis C among the injectable drug users, which is more important in a country like India where viral hepatitis is estimated to be among the top ten causes of deaths.

**Methods and findings:** A study was conducted in 2014-2015 (FEB-FEB). The subjects included were 1162 IDUs who were opioid dependent as diagnosed by ICD-10 and confirmed for opioid in urine with help of Instant-View opiates (300) urine cassette test and IDU status was confirmed by observing injection marks on body parts. After that every patient was subjected to blood sampling for anti HCV antibodies using immunoassay technique and opioid dependent IDUs positive for anti HCV antibodies were interviewed regarding demographics, injecting and sexual behaviours. Seroprevalence of HCV was found to be 38.12 % (443 positives). Out of 443 positives about 98.6% were males, 63% were of rural background, 60% were married and 43% unemployed. Majority was between the age group of 25-30 years age (58%).

**Conclusion:** Our study shows a high seroprevalence of HCV in IDUs. The study helps us to evaluate various aspects associated with Hepatitis C infection in Punjab. The need of the hour is to increase awareness about HCV among the public and practicing physicians.

**Keywords:** Hepatitis-C; Viral infection; Opioid dependent; Drug de-addiction

## Introduction

It is estimated that 170 million people worldwide are infected with the hepatitis C virus (HCV). HCV is a single stranded RNA flavivirus, originally identified in 1989 as the major cause of non-

A and non-B hepatitis [1]. Although only a small proportion of acute HCV infections are symptomatic, HCV progresses to chronic infection in approximately 80% of cases and is an important cause of chronic liver disease worldwide [2,3]. Approximately 15 to 20% of persons who acquire HCV infection progress to potentially serious cirrhosis and end-stage liver disease [4].

HCV is transmitted most effectively through parenteral exposures to infected blood. Prior to the virus' discovery, transfusion of blood or blood products was a major mode of transmission. Since testing of blood supplies began, new cases of transfusion-transmitted hepatitis C has been virtually eliminated. Sexual transmission of HCV appears to be inefficient as most sexual risk behaviours have not been shown to be associated with HCV infection [5]. Nosocomial transmission of HCV is possible if infection control measures are inadequate, such as the use of multi dose vials, dialysis, and colonoscopy [6]. HCV is readily transmitted through micro transfusions of infected blood through the shared use of syringes and other injection paraphernalia used to inject illicit drugs. Currently, the major mode of HCV transmission worldwide is injection drug use [5,6]. Injection risk behaviours such as the multi-person use (sharing) of injection equipment (i.e., needles/syringes, cookers, cotton, rinse-water) can transmit HCV and potentially HIV and other blood-borne pathogens [3,7].

Injection drug use is the main mode of transmission of HCV in developed countries, transmitted through blood-to blood contact, either via direct or indirect sharing of injecting equipment [2]. In India, blood transfusions and unsafe therapeutic injections were the predominant modalities of transmission of HCV. However, after HCV screening of blood products was made mandatory in India, injection drug use is gradually becoming the major route of HCV infection.

Punjab is a state in the North West of the Republic of India. A decade ago Punjab was one of the wealthiest states. In 2004, it was ranked as the "second richest" state. Now, however, the success story of Punjab's economy has seemingly come to an end. A drug epidemic has swept across the state, accompanying

the decline in economic growth. District Amritsar being close to border has been deeply influenced. So in this scenario it becomes all the more important to first study about HCV infection and then takes measures to curtail the menace.

A systematic review of 1125 articles reported around 10 million injecting drug users (IDUs) being HCV positive with Eastern Europe, East Asia, and Southeast Asia is having the largest infected populations [8]. Indian studies have reported HCV seropositivity in IDUs to be in the range of 20 to 90 per cent; there are pockets of very high HCV seroprevalence in India, otherwise the range is moderate (30-50%) compared to western studies (40 -90%) [9]. In Manipur, various studies have shown a very high prevalence (90.4-98%) of HCV in IDUs [10-12]. Challeng et al. in 2008 studied the risk behaviours of IDUs for HCV in Mizoram and showed that the prevalence of HCV antibodies was 71.2 per cent among the active IDUs. On univariate analysis increasing duration of injection, syringe sharing and heroin (diacetylmorphine) injectors were at a significantly higher risk of acquiring HCV antibodies ( $P < 0.001$ ). On multivariate analysis, HCV antibody prevalence showed a strong association with the type of drugs injected ( $P = 0.001$ ), frequency of injecting ( $P = 0.013$ ), multiplicity of drugs abused ( $P = 0.004$ ), and needle syringe sharing ( $P = 0.003$ ) [13].

A recent study conducted in PGI, Chandigarh by Basu et al. in 2015 on HCV infection and risk factors in substance users showed that the seroprevalence of anti-HCV antibody was 31.8% among injectable drug users compared to 3.2% among the non-injectable drug users [14].

So from the above mentioned studies we conclude that there is a paucity of published data on seroprevalence and epidemiology of Hepatitis C infection in Punjab.

The specific objectives of the present study were to find out the seroprevalence of anti-HCV antibody in IDUs attending a de-addiction centre in north India, and to study the risk estimates for HCV seropositivity in the total sample of opioid users with regard to various demographic, clinical, behavioural and personality factors.

## Method of Study and Study Population

The study was carried out at Swami Vivekananda Drug DE addiction and treatment centre which is a part of government medical college, a multispecialty tertiary care teaching hospital at Amritsar, Punjab, India. The study protocol was approved by the Institute Ethics Committee. Informed written consent was obtained from the patients prior to study.

The study population comprised all patients who were registered in Swami Vivekananda Drug De-addiction and Treatment Centre (SVNDDTC), department of Psychiatry, Government Medical College Amritsar, during the study period (February 2014 to February 2015). The sample was drawn from this population. The subjects included were 1162 IDUs who were opioid dependent as diagnosed by ICD-10 and confirmed for opioid in urine with help of Instant-View opiates (300) urine cassette test and IDU status was confirmed by observing injection marks on body parts.

After that every patient was subjected to blood sampling for anti HCV antibodies using immunoassay technique. The participants were required to give a venous blood sample of 5 ml, which was obtained by a trained laboratory technician using standard aseptic procedure. The blood samples were tested for hepatitis C antibody using ELISA method (SP-NANBASE c-96 3.0, General Biologicals Corporation, Taiwan). HCV reactive samples by ELISA were confirmed by supplemental HCV RIBA (recombinant immunoblot assay) test as false positive results or optical density (OD) value in HCV ELISA representing in grey zones had to be ruled out by serology. Only the confirmed positives were included in this study. Opioid dependent IDUs positive for anti-HCV antibodies were interviewed by a trained psychiatrist regarding demographics, injecting and sexual behaviours at once.

## Excluded population

Patients with mental retardation or organic brain syndrome (both determined by a clinical interview and examination by a qualified psychiatrist), or those who refused to give informed consent were excluded. None of the patients reported in this study were part of the previously published study from our centre. The main substances used by IDUs were heroin and buprenorphine. Buprenorphine and heroin were mixed with some solvent either distilled water or tap water and was further injected intravenously.

## Baseline instruments were administered as follows:

Socio-demographic proformato study the demographics- age, sex, marital status, educational status, family income, occupational status, religion, family type and region.

Semi structured self-made questionnaire to study the injecting and sexual behaviours- covered the types of age of onset, durations of injecting career, sharing of needles/syringes, number of sharing partners, back loading and sexual history like age at first sexual intercourse, number of sexual partners, intercourse with an IDU patient, sexual preferences, paid sex etc.

## Statistical analysis

The data was evaluated using Microsoft Office Excel worksheet and percentage and proportions for every variable was calculated.

## Results

In the present study, out of total of 1162 subjects, the number of seropositive patients of HCV were found to be 443. So the prevalence of HCV in our centre comes to be around 38.12% (Table 1). It was observed that out of the total of 443, majority were males contributing about 98.65% to the sample of seropositives. A large proportion of our sample i.e., about 95% were in the age group of 15-44 years. Of these, maximum number (45.15%) of subjects belonged to the age group of 25-34 years. Majority was married (60.05%) while others contributing only a small share to the total i.e. unmarried were 29.35% and divorcee about 10.61%. Most (55.98%) of the seropositives were

living in small nuclear families and were primarily from a rural Sikh background. A poor educational status of the subjects was evident on interviews as only about 25% of the subjects had a qualification of matric and above. Further all families were financially burdened with the monthly family income of the majority (32.05%) ranging between Rs 5000-10000. Unemployment was observed in 43.12% of cases and self-employed people were 31.60% and majority of those self-employed were farmers (Table 2).

**Table 1:** showing the prevalence of HCV (38.12%) among the IDUs attending Swami Vivekananda drug de-addiction and treatment centre.

HCV status	N	%
Positive	443	38.12
Negative	719	61.88
Total	1162	100

**Table 2:** showing the socio-demographic profile of the HCV positive IDUs.

Socio-demographic parameters of HCV positive patients	Percentages of different variables
<b>Age (years)</b>	<b>n (%)</b>
15-24	105(23.70%)
25-34	200(45.15%)
35-44	120(27.09%)
45-55	18(4.06%)
<b>Gender</b>	<b>n (%)</b>
Male	437(98.65%)
Female	6(1.35%)
<b>Marital status</b>	<b>n (%)</b>
Married	266(60.05%)
Unmarried	130(29.35%)
Divorced/Death of other partner	47(10.61%)
<b>Education status</b>	<b>n (%)</b>
Illiterate	105 (23.70%)
Primary pass	102 (23.02%)
Middle pass	120 (27.10%)
High school	70 (15.80%)
High secondary	40 (9.03%)
Graduate	6 (1.35%)
<b>Monthly family income</b>	<b>n (%)</b>
Below Rs5000	130 (29.35%)
Rs5000-10000	142 (32.05%)
Rs10000-15000	107 (24.15%)
Above Rs15000	64 (14.45%)
<b>Occupational status</b>	<b>n (%)</b>
Unemployed	191 (43.12%)
Employed by others	112 (25.28%)
Self employed	140 (31.60%)

Religion	n (%)
Sikh	225 (50.79%)
Hindu	140 (31.60%)
Others	78 (17.61%)
<b>Family type</b>	<b>n (%)</b>
Nuclear	248 (55.98%)
Joint	195 (44.02%)
<b>Region</b>	<b>n (%)</b>
Rural	280 (63.21%)
Urban	163 (36.79%)

Detailed interviews regarding injection use provided further information regarding the injectable practices. 68.17% of the seropositives had their first injectable drug use before 18 years of age and duration of the injecting career exceeded one year in more than 68% of our subjects. About 72% of the subjects gave history of injecting drugs with already used syringes once in their lifetime. A total of 63.21% of subjects confirmed using injectable drugs in the last one month with 70.20% of them limiting the use of injections to one per day. 60.95% of the population had a contact with more than two needle sharing partners in their life. Back loading that refers to squirting contents from one syringe into the barrel of second syringe was seen in 52.82% of the subjects (Table 3).

**Table 3:** showing different variables of injectable drug use among HCV positive; \*Back loading refers to squirting contents from one syringe into the barrel of second syringe.

Variables	n (%)
<b>Duration of injecting career (year)</b>	
≤ 1	139 (31.38%)
>1	304 (68.62%)
<b>Frequency of injecting last one month</b>	
Once a day	311 (70.20%)
More than once a day	132 (29.80%)
<b>Ever injecting with used syringe</b>	
Yes	320 (72.23%)
No	123 (27.77%)
<b>Number of substances abused</b>	
1	143 (32.28%)
≥ 1	300 (67.72%)
<b>Syringe sharing last 1 month</b>	
No	163 (36.79%)
Yes	280 (63.21%)
<b>No. of needle sharing partners</b>	
≤ 2	173 (39.05%)
>2	270 (60.95%)
<b>Sharing injecting containers last month</b>	
No	123 (27.77%)

Yes	320 (72.23%)
<b>Age at first injection(years)</b>	
≤ 18	302 (68.17%)
>18	141 (31.83%)
<b>Back loading*</b>	
Yes	234 (52.82%)
No	209 (47.18%)

Sexual history revealed that the age of first sexual intercourse among the studied population was >16 years in the majority. Nevertheless, age below 16 years for first sexual intercourse was pretty common accounting 44% of the total. 42.66% of the subjects reported of having sex with persons who were IDU while 69% of subjects stated of having more than one sexual partner in their lifetime. Heterosexuals accounted for 83.75% of the total. About 66% of the total stated that they had paid sex once (Table 4).

**Table 4:** showing different aspects of sexual behaviour noticed in HCV positive IDUs.

Variables	n (%)
<b>1.Age at 1st sexual intercourse(years)</b>	
≤ 16	196 (44.24%)
>16	247 (55.76%)
<b>2.Total number of sex partners</b>	
=1	137 (30.93%)
>1	306 (69.07%)
<b>3.Any sex partners who are IDUs</b>	
Yes	189 (42.66%)
No	254 (57.34%)
<b>4.Sexual preference</b>	
Homosexual or bisexual	72 (16.25%)
Heterosexual	371 (83.75%)
<b>5.Received money or drugs for sex in the past 6 months</b>	
Yes	194 (43.79%)
No	249 (56.21%)
<b>Before or after initiation of injection drug use</b>	
Yes	105 (23.70%)
No	338 (76.30%)

## Discussion

The seroprevalence of anti-HCV antibody among IDUs in the current study (38.12%). Earlier studies from PGI, a premier institute of north India too have reported high prevalence rates of anti-HCV antibody among IDUs [15]. In studies from Kolkata and Delhi, anti-HCV prevalence in IDUs was also found to be quite high (42.96 and 36.45% respectively) [16,17]. High anti-HCV seroprevalence of 80 per cent has been reported among a cohort of IDUs from Kolkata, India [18].

We can interpret from the above literature that the prevalence of HCV among IDUs is on the rise in India particularly North India. The present study was aimed at studying the prevalence in our area where research is lacking. From our study we had an estimate of current HCV prevalence in IDUs and further those HCV positive IDUs were interviewed regarding their socio-demographic profile, injectable drug use behaviour and sexual behaviour. It was observed that majority of the HCV positive IDUs were in their youthful years of life with males getting the predominant share. This is alarming as young people are the main force for any economy and if they are lost that means progress shall hamper. Another worrisome point is the figures from our data showing a small part of HCV affected female population of IDUs. Whatever be the reason, be it sexual abuse, any stressors or be it anything but one thing is sure that if the problem of drug abuse is not controlled it will uproot our society. Stating further, majority of affected population belonged to rural Sikh background. As we all know it is this population of rural and Sikhs who provide food to the nation through farming. These people give up on everything even their education for the sole purpose of farming. This entire drug menace has created a drug dependent population and left the majority as unemployed further adding to the burden. The study also showed that it was the married population that was mainly affected with HCV and IDUs with nuclear families suffering the most. This is again disturbing because to control the drug abuse situation supportive care is required that is lacking in nuclear families.

Risk taking behaviours are common among drug addicts and this was evident from our study through interviews regarding injectable drug use and sexual behaviours. These included sharing of used needles, multiple substance abuse, back loading, first sexual intercourse at less than 18 years of age, having paid sex and multiple sex partners. The chances of back loading or sharing of the drug from the same container is most likely with heroin users. These all are not perceived as unsafe or harmful practices by the IDUs that elicits that there is a lack of sufficient knowledge among the IDUs or there may be an associated personality disorder or any comorbid psychiatric condition that remain hidden and lead to such behaviours. Sexual risk behaviours (multiple sex partners in our study) are known to be associated with HCV positivity in India, as recently reported in commercial sex workers from Nagaland [19].

Treatment for HCV is expensive, complicated, and not always effective. Side effects of therapy can be severe, with patients experiencing flu-like symptoms, fatigue, and bone-marrow suppression. In addition, treatment may result in neuropsychiatric effects, such as apathy, irritability, and depression, which may be of special concern to IDUs, many of whom likely already suffer from such symptoms.

Due to the high expense and frequent complications of HCV treatment, measures aimed at preventing HCV transmission and reducing HCV disease progression should be expanded. However, only one-fifth of the IDUs in the study presented herein had ever been previously tested for HCV, and nearly two-thirds did not know what HCV was, illustrating the need to improve availability of HCV testing and education. Even in the

absence of HCV treatment, screening for HCV is useful as a secondary prevention measure for educating infected persons about steps they can take to reduce their risk of developing end-stage liver disease and avoiding further transmission of the virus.

Secondary prevention measures for HCV-infected IDUs include vaccination against the hepatitis A and B virus, as co-infection has been shown to contribute to the severity of hepatocellular damage. In addition, patients chronically infected with HCV should be encouraged to avoid consuming alcohol, as even moderate intakes have been shown to enhance disease progression [20].

When accompanied by appropriate counselling, HCV antibody testing may also encourage behavioural risk reductions, thereby preventing transmission of HCV, HIV and other blood borne pathogens. Primary prevention measures for anti-HCV-negative IDUs should include access to sterile injection equipment and education on proper injection practices. The use of any injection equipment that has been contaminated with HCV-infected blood, such as needles, syringes, cottons, and cookers, has been shown to be an independent risk factor for seroconversion [21].

A few limitations of this study must be acknowledged. Our study focused only on treatment seeking population; hence the results may not be a true representation of prevalence and profile in the community. Further our study could not establish an association between the risk taking behaviours and HCV among the IDUs. All risk behaviours were self-reported and possibly subject to bias from recall and socially desirable responding. IDUs may have tried to downplay the frequency of behaviours that they feel are socially undesirable, such as sharing injection equipment, on behavioural surveys.

Another limitation of this study is that, of those testing anti-HCV-positive, the proportion of actively infected individuals was not measured, as viral RNA was not determined by RT-PCR among seropositive subjects because of resource constraints.

This study indicates that there is an urgent need to expand HCV counselling and testing for IDUs in different areas of Punjab, and to implement interventions that will decrease HCV associated injection risk behaviours in order to prevent a possible surge in the incidence of HIV infection in this population.

## References

1. Choo QL, Kuo G, Weiner AJ, Overby LR, Bradley DW, et al. (1989) Isolation of a cDNA clone derived from a blood-borne non-A, non-B viral hepatitis genome. *Science* 244: 359–362.
2. Alter MJ (1999) Hepatitis C virus infection in the United States. *J Hepatol* 31: 88–91.
3. Hagan H, Des Jarlais DC (2000) HIV and HCV infection among injecting drug users. *Mt Sinai J Med* 67: 423–428.
4. Liang TJ, Rehermann B, Seeff LB, Hoofnagle JH (2000) Pathogenesis, natural history, treatment, and prevention of hepatitis C. *Ann Intern Med* 132: 296–305.
5. Sulkowski MS, Thomas DL (2005) Epidemiology and natural history of hepatitis C virus infection in injection drug users: implications for treatment. *Clin Infect Dis* 40: S263–S269.
6. Centers for Disease Control and Prevention (1998) Recommendations for prevention and control of hepatitis C virus (HCV) infection and HCV-related chronic disease. *MMWR Recomm Rep* 47: 1–39.
7. Alter MJ, Moyer LA (1998) The importance of preventing hepatitis C virus infection among injection drug users in the United States. *J Acquir Immune Defic Syndr Hum Retrovirol* 18: S6–S10.
8. Nelson PK, Mathers BM, Cowie B, Hagan H, Des Jarlais D, et al. (2011) Global epidemiology of hepatitis B and hepatitis C in people who inject drugs: results of systematic reviews. *Lancet* 378: 571–83.
9. Basu D (2010) Overview of substance abuse and hepatitis C virus 5. infection and coinfections in India. *J Neuroimmune Pharmacol* 5: 496–506.
10. Devi KS, Singh NB, Mara J, Singh TB, Singh YM (2004) Seroprevalence of hepatitis B virus and hepatitis C virus among hepatic disorders and injecting drug users in Manipur - A preliminary report. *Indian J Med Microbiol* 22: 136–137.
11. Eicher AD, Crofts N, Benjamin S, Deutschmann P, Rodger AJ (2000) A certain fate: spread of HIV among young injecting drug users in Manipur, north-east India. *AIDS Care* 12: 497–504.
12. Saha MK, Chakraborti S, Panda S, Naik TN, Manna B, et al. (2000) Prevalence of HCV & HBV infection amongst HIV seropositive intravenous drug users & their non-injecting wives in Manipur, India. *Indian J Med Res* 111: 37–39.
13. Chelleng PK, Borkakoty BJ, Chetia M, Das HK, Mahanta J (2008) Risk of hepatitis C infection among injection drug users in Mizoram, India. *Indian J Med Res* 128: 640–646.
14. Basu D, Sharma AK, Gupta S, Nebhinani N, Kumar V (2015) Hepatitis C virus (HCV) infection & risk factors for HCV positivity in injecting & non-injecting drug users attending a de-addiction centre in northern India. *Indian J Med Res* 142: 311–316.
15. Basu D, Kumar V, Sharma AK, Barnwal PK, Mattoo SK (2013) Seroprevalence of anti-hepatitis C virus (anti-HCV) antibody and HCV-related risk in injecting drug users in northern India: Comparison with non-injecting drug users. *Asian J Psychiatry* 6: 52–5.
16. Pal D, Ojha SK (2004) Prevalence of HIV and HCV amongst intravenous drug users of Kolkata. *Indian J Med Microbiol* 22: 138.
17. Baveja UK, Chattopadhyay D, Khera R, Joshi PM (2003) A cross sectional serological study of the co-infection of hepatitis B virus, hepatitis C virus and human immunodeficiency virus amongst a cohort of idus at Delhi. *Indian J Med Microbiol* 21: 280–283.
18. Sarkar K, Mitra S, Bal B, Charkraborty S, Bhattacharya SK (2003) Rapid spread of hepatitis C and needle exchange programme in Kolkata, India. *Lancet* 361: 1301–1302.
19. Barua P, Mahanta J, Medhi GK, Dale J, Paranjape RS, et al. (2012) Sexual activity as risk factor for hepatitis C virus (HCV) transmission among the female sex workers in Nagaland. *Indian J Med Res* 136: 30–35.
20. Szabo G, Aloman C, Polyak SJ, Weinman SA, Wands J, et al. (2006) Hepatitis C infection and alcohol use: A dangerous mix for the liver and antiviral immunity. *Alcohol ClinExp Res* 30: 709–719.

21. Hagan H, Thiede H, Weiss NS, Hopkins SG, Duchin JS, et al. (2001) Sharing of drug preparation equipment as a risk factor for hepatitis C. *Am J Public Health* 91: 42–46.