

# Prevalence of Hepatitis B, Hepatitis C and HIV Infections among People Who Inject Drugs- A Study from Tertiary Care Centre of Kashmir Valley, India

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## ABSTRACT

**Introduction:** Drug addiction one of the greatest challenges face across the globe. The parenterally transmitted viruses like Hepatitis B Virus (HBV), Hepatitis C Virus (HCV) and Human Immunodeficiency Virus (HIV) occur more frequently in this high-risk group of population as compared with the general population.

**Aim:** To find the prevalence of HBV, HCV and HIV in People Who Inject Drugs (PWIDs) attending a tertiary care hospital in Kashmir valley, India.

**Materials and Methods:** A prospective descriptive study was conducted from October 2017 to October 2020 in the Department of Microbiology of a tertiary care hospital in Kashmir. Subjects included 200 (PWIDs) who voluntarily presented themselves at the drug clinic. Participants were tested for HBV, HCV and HIV infections. For HBV, surface antigen was detected using Enzyme-linked Immunosorbent Assay (ELISA), HCV was detected by

HCV antibody test using ELISA and HIV was detected using combination of three rapid kits, COMBAIDS-RS ADVANTAGE ST, MERISCREEN HIV 1-2 WB and TREDRO HIV 1-2 Ab. Demographic data was collected from all the PWIDs.

**Results:** Among 200 PWIDs, 138 (69%) were in the age group of 16-25 years and none of them was more than 35 years of age. The mean age of PWIDs was 22.9 years. Out of 200, 20 (10%) PWIDs had HCV antibodies, 7 (3.5%) were positive for HBV, and 1 (0.5%) had anti-HIV antibodies. A 73.5% of PWIDs belonged to urban Kashmir and majority of them (62.5%) were college going students.

**Conclusion:** From present study, authors report a high prevalence of hepatitis C and B in PWIDs of Kashmir. It is also the fact that these figures are just the tip of the iceberg. Targeted intervention programs should make HBV/HCV testing, prevention and care more accessible for PWIDs.

**Keywords:** Antibodies, Drug users, Serology, Viral infections

## INTRODUCTION

The HBV, HCV and HIV infections are major global health issues. World Health Organisation (WHO) has reported that across the globe there are 257 million people living with chronic HBV infection, 71 million have chronic HCV infection and 36.7 million people are living with HIV [1]. PWIDs are more prone to acquire the blood borne viruses like HIV, HCV and HBV because of their unsafe behavioural practices [2]. The problem of drug addiction has engulfed the whole world like a rapid fire. According to the reports of the United Nations office on Drugs and Crime in 2018, 269 million people used drugs throughout the world and this figure is 30% more than in 2009. The report further emphasises upon the COVID-19 pandemic and the economic downturn to compound the drug dangers further still [3].

According to the National Survey on Extent and Pattern of Substance Use in India 2019, there are 8.5 lac PWID in India [4]. Because of the turmoil in the Kashmir valley, unfortunately the youth have taken help of the drugs. Kashmir valley has seen a monstrous rise in the drug menace over the past decade [5]. It not only is a problem in itself but its off shoots are equally disastrous. According to a recent study from Kashmir, the current prevalence of injection drug users in valley is 0.95%. The most common opiod used by injection drug users was heroin which was used by 91.12% of PWIDs followed by pentazocine [6]. According to a report published by United Nations Office on Drugs and Crime (UNDCP), around 70,000 people are drug addicts in Kashmir valley and 31% among them are women [7]. According to Government Psychiatric Hospital, Srinagar, 90% of the drug abusers belong to age group 17-35 years [8]. PWIDs are at higher risk of transmitting the blood borne infections like HIV, HBV and HCV [9]. HIV, Hepatitis B and C are efficiently transmitted

parentally. These viruses can be transmitted from one abuser to other efficiently through microtransfusions of infected blood by sharing of needles and other injectable paraphernalia used by these PWIDs. In addition to this the other high-risk behaviours of the PWIDs put them at higher risk of transmission of the blood borne diseases, these high-risk behavioural practices include: sharing of needles, syringes, cotton, rinsing water and risky sexual behaviour [10].

At present the main mode of transmission of HCV worldwide is injection drug use [11,12]. Hepatitis C has been found to be the most common viral infection affecting PWIDs [9]. In India the epidemic of HIV is concentrated among sex workers, PWIDs and men who have sex with men [13]. Both hepatitis B and C can cause chronic diseases and lead to long term sequelae like cirrhosis, end stage liver disease and hepatocellular carcinoma while HIV infection opens the pandora's box of opportunistic infections [14,15]. PWIDs are at higher risk of infections and severe disease due to higher rate of co-morbid health conditions, homelessness and other sub optimal social conditions [16].

To best of authors knowledge this was the first study done in the Kashmir valley to find the prevalence of HBV, HCV and HIV infections among PWIDs attending the tertiary care hospital of the valley. Not only will it help us to know the burden of these infections among this high-risk group but can help concerned authorities in targeting them for proper counselling and better treatment.

## MATERIALS AND METHODS

The present study was a prospective descriptive study done from October 2017 to October 2020 conducted in the Viral Research and Diagnostic Laboratory, Department of Microbiology,

Government Medical College Srinagar in collaboration with Institute of Mental Health and Neurosciences (IMHANS), Srinagar, Jammu and Kashmir, India. Institutional Ethical Committee (IEC) approval was obtained (No: IEC-GMC-Sgr/28).

The study population consisted of PWIDs and gave written consent for withdrawal of blood samples. The participants were further questioned for necessary details which were filled in the proforma and then blood sample (3-5 mL) was withdrawn by trained persons under aseptic precautions.

**Inclusion criteria:** Subjects attending drug clinic and who used injectable drugs were included in this study.

**Exclusion criteria:** Subjects attending drug clinic using oral or sniffing drugs were excluded in this study.

**Sample size calculation:** Sample size was calculated based on PWIDs prevalence in previous five years. The following simple formula was used for calculating the adequate sample size in prevalence study;  $n = Z^2P(1-P)/d^2$ , where, n is the sample size, Z is the statistic corresponding to level of confidence, P is expected prevalence and d is precision (corresponding to effect size) [17].

## Serological Assays

Enzyme-linked immunosorbent assay for hepatitis B and C for the samples received were conducted in the laboratory. For detection of HIV positives, three different types of rapid tests were used. All the samples were initially screened for differential detection of HIV 1 and HIV 2 antibodies using a highly sensitive, rapid immunoassay COMBAIDS -RS ADVANTAGE-ST (ARKRAY Healthcare, Noida, India) which detects HIV 1 and 2 and is an immunodot assay employing same principle as enzyme immunoassay. Patients testing positive in the initial screening test for either HIV 1 or HIV 2 were subjected to two different confirmatory ELISA tests using two different types of antigens, as recommended by the National AIDS Control Organisation, India [18]. They are MERISCREEN HIV 1-2 WB (MERIL DIAGNOSTIC, Gujrat, India) also detects HIV 1 and 2 and is a lateral flow assay and third test used for detection of both HIV 1 AND 2 is a TRIDOT test named TREDRO HIV1-2 Ab (MERIL DIAGNOSTICS, Gujrat, India). All the tests were done following manufacturer's guidelines. Patients testing positive in all three were labelled as HIV infected individuals.

Hepatitis C antibodies were detected by ELISA (HCV ELISA OSCAR Medicare, New Delhi, India) employing conserved antigenic segments of core, NS3, NS4 and NS5 antigens. Hepatitis B infection was detected by using ELISA (HBs Ag ELISA OSCAR Medicare, New Delhi, India) for detection of hepatitis B surface antigen.

## STATISTICAL ANALYSIS

Descriptive statistics were analysed with the Statistical Package for the Social Sciences (SPSS) Inc. International Business Machines (IBM) statistics for Windows, version 17.0. Chicago: SPSS Inc. Continuous variable was presented as mean and standard deviation. Categorical variables were expressed as frequencies and percentages.

## RESULTS

A total of 200 PWIDs were included, among whom 195 (97.5%) were male and 5 (2.5%) were female. The mean age of the subjects was 22.9 years. Among the subjects 138 (69%), were in the age group of 16-25 years and 62 (31%) were in the age group of 26-35 years [Table/Fig-1]. None of the subjects was more than 35 years of age. Among the 200 PWIDs, 20 were positive for Hepatitis C which is 10% of the total PWIDs. All the HCV positives were males [Table/Fig-2]. HBs antigen was detected in 7 PWIDs (i.e., 3.5%) and all of

Age group (years)	No (%)	Male	Female	Urban	Rural	Educated	Uneducated	HBV+	HCV+	HIV+
16-25	138 (69)	135	3	115	23	130	8	5	15	1
26-35	62 (31)	60	2	32	30	59	3	2	5	0

**[Table/Fig-1]:** Age group distribution of PWIDs viz-a-viz epidemiological factors.

them were males. HIV infection was found in only one (0.5%) PWID who also was male [Table/Fig-2]. The female PWIDs in the study did not suffer from any blood borne viruses.

Variables	Total	Male	Female
Number (n=200) (%)	200	195 (97.5%)	5 (2.5%)
Anti-HCV Ab positive n (%)	20	20 (10.26%)	0
HBs Ag positive n (%)	7	7 (3.6%)	0
HIV positive n (%)	1	1 (0.5%)	0

**[Table/Fig-2]:** HCV, HBS Ag and HIV distribution by gender among PWIDs in a tertiary care centre.

None of the subjects had co-infections. Majority of the PWIDs (73.5%) belonged to urban Kashmir and only a little proportion of them (26.5%) belonged to the rural areas. When the literacy level of the subjects was checked, it was found that major chunk of them (62.5%) were college going students. In [Table/Fig-1] shows the demographic profile and overall picture of the study. Majority of the PWIDs in present study were in the age group of 16-25 years and most of them were males. Female PWIDs in present study were only five. As expected due to the lockdown in this pandemic the PWIDs attending the drug clinic reduced drastically in year 2020. Year wise distribution is shown in [Table/Fig-3].

Year	Total	Males	Females
Oct 2017-Oct 2018	92	89	3
Nov 2018-Oct 2019	88	86	2
Nov 2019-Oct 2020	30	30	0

**[Table/Fig-3]:** Year wise distribution of PWIDs.

## DISCUSSION

Majority of the people living in Kashmir valley belong to a very conservative society where word "drugs" is still not very openly talked about and was perhaps unheard of a decade back. The political conflict has unfortunately hit the mental health of major chunk of the population of the valley, the youth being hit worst. The youth has taken help of drugs and it is very disturbing. Authors are aware of the fact that the PWIDs who presented themselves in the hospital and further who reported to the laboratory are just the tip of the iceberg, with the pandemic hitting it hard further. To the best of our knowledge present study is the first of its kind to report the blood borne viral infections in PWIDs from Kashmir. Drug use is a major problem in both developed and developing countries. PWIDs put themselves at risk of easily acquiring and even transmitting the blood borne infections, this primarily occurs due to sharing of needles and having unprotected sex with infected partners because of the judgement being affected by drug use [19].

Prevalence of blood borne infections in PWIDs is higher as compared to the general population [20]. As previously discussed, the most common route of HCV transmission throughout the world is injection drug abuse, in present study also the most common infection among the three viruses which were aimed at, was HCV infection with a percentage of 10% which is much higher than the prevalence of 1.9% in general population [21]. Similar findings have been reported by various studies from different regions of India like prevalence of 36.45% reported from Delhi by Baveja UK et al., 38.12% reported by Mahajan P et al., from Amritsar, and 42.96% prevalence reported from Kolkata by Pal D and Ojha SK., [20,22,23].

The HIV prevalence in PWIDs in present study was 0.5%. The prevalence of HIV in PWIDs in Kashmir was higher than the prevalence in general population (0.28%) reported in 2017-18 [24].

Authors and Year	State	HCV prevalence in PWIDs	HIV prevalence in PWIDs	HBV prevalence in PWIDs	Female PWIDs	Male PWIDs
Mahajan P et al., [22] 2016	Punjab	38.12%	Not done	Not done	1.35%	98.6%
Ray Saraswati L et al., [25] 2015	Delhi	53.7%	25.9%	9.7%	Only males included	
Mahanta J et al., [29] 2009	Mizoram and Nagaland	47.8%	10.8%	3.85		
Mehta SH et al., [14] 2010	Chennai	55%	7%	Not done	1%	99%
Solomon SS et al., [30] 2015	15 cities of 11 states	37.2%			7.6%	92.4%
Wani SR et al., 2021	Present study (Kashmir)	10%	0.5%	3.5%	2.5%	97.5%

**[Table/Fig-4]:** Comparison of studies about PWIDs from different states [14,22,25,29,30].

This prevalence was low in comparison to the studies that have reported prevalence of HIV as high as 25.9% from India, 21.1% from Pakistan and 35.7% in Latin America [25-27]. The prevalence of HIV in PWIDs in present study was comparable to a study conducted by Altawalrah H et al., in Kuwait on HBV, HCV and HIV among PWID, where the prevalence of HIV was 0.77% [28]. In [Table/Fig-4] comparison of prevalence from different states of India is shown [14,22,25,29,30]. These figures are really worrisome as maximum HCV positive injection drug users are in the prime of their youth. This is equally disastrous for the nation as well because the youth are the driving forces of a nations economy. Treatment of HCV is not easy and takes a toll on one's pocket and puts the sufferer into more agony because of the side effects of the drugs including the neuropsychiatric effects.

Hepatitis B prevalence was 3.5% in PWIDs, which is slightly higher than the prevalence of 2.4% reported in general population of Kashmir [31]. Study from India has reported a prevalence of 9.7% among PWIDs [25]. In this study, prevalence of HBV in PWIDs was comparable to a study by Komal A et al., in Pakistan among drug users where they found it to be 3.2% [26]. The strength of this study was that to our knowledge it was the first study from Kashmir giving the seroprevalence of blood borne infections in PWIDs. All these diseases are a burden for their life time. As it is known that the risk-taking behaviour is increased in this set of population, the only way to curb it is to address this problem on a very large scale and to educate the people about the diseases which come along with the injection drug abuse.

### Limitation(s)

For hepatitis C detection only ELISA was done and RNA detection could not be done because of the lack of infrastructure and kits for the same at the time of the study.

### CONCLUSION(S)

There was higher prevalence of HCV, HBV and HIV in this high-risk group of Kashmir population as compared to the general population. Authors recommend the public service authorities will gear up more and necessary actions will be taken in time which should primarily include educating the school and college going students by means of lectures, audio visuals and social networking sites against the ill-effects of drugs. Needless to say that Integrated Counselling and Testing Centres (ICTC) have also a big role to play as they deal with the high-risk population. It is also recommended for immunisation against hepatitis B to all the college going students because of their high-risk behaviour. Strict punishment should be given to drug peddlers and effective rehabilitation should be made available for those addicts who want to revert from this abuse.

### REFERENCES

- [1] WHO Guidelines on Hepatitis B and C Testing. Geneva: World Health Organization; 2017 Feb. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK442272>.
- [2] Haussig JM, Nielsen S, Gassowski M, Bremer V, Marcus U, Wenz B, et al. A large proportion of people who inject drugs are susceptible to hepatitis B: Results from a bio-behavioural study in eight German cities. *Int J Infectious Dis*. 2018;66:05-13. ISSN 1201-9712, <https://doi.org/10.1016/j.ijid.2017.10.008>.
- [3] United Nations Office on Drugs and Crime. World drug report 2020. 25<sup>th</sup> June 2020. <https://wdr.unodc.org/wdr2020/index.html>.
- [4] Ambekar A, Agrawal A, Rao R, Mishra AK, Khandelwal SK, Chadda RK. On behalf of the group of investigators for the National Survey on Extent and Pattern of Substance Use in India (2019). Magnitude of Substance Use in India. New Delhi: Ministry of Social Justice and Empowerment, Government of India.
- [5] Malla MA. Factors contributing to the problem of drug abuse among adolescents in Kashmir valley. *IJRAR*. 2019;6(1):248-53.
- [6] Rather YH, Bhat FR, Malla AA, Zahoor M, Ali Massodi PA, Yousuf S. Pattern and prevalence of substance use and dependence in two districts of Union Territory of Jammu & Kashmir: Special focus on opioids. *J Family Med Prim Care*. 2021;10:414-20.
- [7] United Nations Office on Drugs and Crime, World Drug Report 2014 (United Nations publication, Sales No. E.14.XI.7).
- [8] Bhat SA, Imtiaz N. Drug addiction in Kashmir: Issues and challenges. *J Drug Abuse*. 2017;3:19.
- [9] Crofts N, Dore G, Locarnini (Eds.) S. Hepatitis C: An Australian perspective. IP Communications: East Hawthorn; 2001.
- [10] Palmateer N, Hutchinson S, McAllister G, Munro A, Cameron S, Goldberg D, et al. Risk of transmission associated with sharing drug injecting paraphernalia: Analysis of recent hepatitis C virus (HCV) infection using cross-sectional survey data. *J Viral Hepat*. 2014;21(1):25-32. Doi: 10.1111/jvh.12117. Epub 2013 May 28. PMID: 24329854.
- [11] Sulikowski MS, Thomas DL. Epidemiology and natural history of hepatitis C virus infection in injection drug users: Implications for treatment. *Clin Infect Dis*. 2005;40:S263-69.
- [12] Centers for Disease Control and Prevention Recommendations for prevention and control of hepatitis C virus (HCV) infection and HCV-related chronic disease. *MMWR Recomm Rep*. 1998;47:01-39.
- [13] Excler JL. HIV prevention & treatment-Reasons to rejoice & remain vigilant. *Indian J Med Res*. 2015;142(6):633-36.
- [14] Mehta SH, Vogt SL, Srikrishnan AK, Vasudevan CK, Murugavel KG, Saravanan S, et al. Epidemiology of hepatitis C virus infection & liver disease among injection drug users (IDUs) in Chennai, India. *Indian J Med Res*. 2010;132:706-14.
- [15] Poynard T, Bedossa P, Opolon P. Natural history of liver fibrosis progression in patients with chronic hepatitis C. The OBSVIRC, METAVIR, CLINIVIR, and DOSVIRC groups. *Lancet*. 1997;349(9055):825-32.
- [16] Kinkel HT, Karmacharya D, Shakya J, Manandhar S, Panthi S, Karmacharya P, et al. Prevalence of HIV, Hepatitis B and C infections and an assessment of HCV-genotypes and two IL28B SNPs among people who inject drugs in three regions of Nepal. *PLoS ONE*. 2015;10(8):e0134455. <https://doi.org/10.1371/journal.pone.0134455>.
- [17] Daniel WW, editor. Biostatistics: A foundation for analysis in the health sciences. 7<sup>th</sup> ed. New York: John Wiley & Sons; 1999.
- [18] National AIDS Control Organization (NACO). National Guidelines on HIV Testing. New Delhi: NACO, Ministry of Health and Family Welfare, Government of India; 2015.
- [19] Oliveira ML, Bastos FI, Telles PR, Yoshida CF, Schatzmayr HG, Paetzold U, et al. Prevalence and risk factors for HBV, HCV and HDV infections among injecting drug users from Rio de Janeiro, Brazil. *Braz J Med Biol Res*. 1999;32(9):1107-14. Doi: 10.1590/S0100-879X1999000900009. PMID: 10464387.
- [20] Baveja UK, Chattopadhyay D, Khera R, Joshi PM. 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*. 2003;21(4):280-83.
- [21] Ali I, Shah NA, Singh J, Kadla SA. A study on prevalence of hepatitis c among adult population in south Kashmir. *J Clin and Experimental Hepatology*. 2017;7(2):S20-21. ISSN 0973-6883.
- [22] Mahajan P, Singh M, Garg A, Garg PD, Singh G, Garg PD, et al. 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*. 2016;1:6. Doi: 10.21767/2472-5048.100006.
- [23] Pal D, Ojha SK. Prevalence of HIV and HCV amongst intravenous drug users of Kolkata. *Indian J Med Microbiol*. 2004;22:138.
- [24] J&K AIDS PREVENTION & CONTROL SOCIETY, Department of Health & Medical Education Government of Jammu and Kashmir. Report 2020.
- [25] Ray Saraswati L, Sarna A, Sebastian MP, Sharma V, Madan I, Thiorl, et al. HIV, Hepatitis B and C among people who inject drugs: High prevalence of HIV and Hepatitis C RNA positive infections observed in Delhi, India. *BMC Public Health*. 2015;15:726. Doi: 10.1186/s12889-015-2003-z. PMID: 26223866; PMCID: PMC4520270.
- [26] Komal A, Noor S, Jalal U. Prevalence of human immunodeficiency virus and Hepatitis (B & C) among drug users in a tertiary care public hospital. *Pakistan J Med Sci*. 2019;35(2):459-63. <https://doi.org/10.12669/pjms.35.2.500>.

- [27] Degenhardt L, Peacock A, Colledge S, Leung J, Grebely J, Vickerman P, et al. Global prevalence of injecting drug use and sociodemographic characteristics and prevalence of HIV, HBV, and HCV in people who inject drugs: A multistage systematic review. *Lancet Glob Health*. 2017;5(12):e1192-207. Doi: 10.1016/S2214-109X(17)30375-3. Epub 2017 Oct 23. Erratum in: *Lancet Glob Health*. 2017 Nov 15; PMID: 29074409; PMCID: PMC5683738.
- [28] Altawalrah H, Essa S, Ezzikouri S, Al-Nakib W. Hepatitis B virus, hepatitis C virus and human immunodeficiency virus infections among people who inject drugs in Kuwait: A cross-sectional study. *Sci Rep*. 2019;9(1):6292. Doi: 10.1038/s41598-019-42810-w. PMID: 31000775; PMCID: PMC6472359.
- [29] Mahanta J, Borkakoty B, Das HK, Chelleng PK. The risk of HIV and HCV infections among injection drug users in northeast India. *AIDS Care*. 2009;21(11):1420-24. Doi: 10.1080/09540120902862584. PMID: 20024719.
- [30] Solomon SS, Mehta SH, Srikrishnan AK, Solomon S, McFall AM, Laeyendecker O, et al. Burden of hepatitis C virus disease and access to hepatitis C virus services in people who inject drugs in India: A cross-sectional study. *Lancet Infect Dis*. 2015;15(1):36-45. Doi: 10.1016/S1473-3099(14)71045-X. Epub 2014 Dec 3. PMID: 25486851; PMCID: PMC4503257.
- [31] Kadla S, Shah N, Bhat M, Khan S, Khan B, Ali I, et al. A study on prevalence of hepatitis b among adult population in Kashmir. *JMS SKIMS*. 2017;20(2):82-89. <https://doi.org/https://doi.org/10.33883/jms.v20i2.25>.

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