International Journal of Medical and Health Research
ISSN: 2454-9142; Impact Factor: RJIF 5.54
Received: 23-05-2019; Accepted: 24-06-2019
www.medicalsciencejournal.com
Volume 5; Issue 7; July 2019; Page No. 171-176

Prevalence, knowledge and barriers to treatment of Hepatitis C virus infection in intravenous drug users in Jammu region, India

Dr. Abhishek Chowhan[1], Dr. Arti Sakral[2*]

[1] Consultant Psychiatrist, Department of Psychiatry, Government Medical College, Jammu, Jammu & Kashmir, India
[2] Assistant Professor, Department of Dermatology, Government Medical College, Kathua, Jammu & Kashmir, India

Abstract
Intravenous drug use is associated with many medical complications. Some infections like Hepatitis C, Hepatitis B and HIV are particularly troublesome. The current study was planned to find out the prevalence of Hepatitis C in intravenous drug users. In addition, the knowledge of such patients regarding HCV infection and barrier to treatment perceived by such patients for getting treated were studied. A total of 268 patients were evaluated for their HCV status. 42.16 % patients had current HCV infection. The prevalence of HCV was more in adolescents, singles, those from lower socio-economic classes and those with poor social support. Knowledge regarding HCV infection in IDUs was very poor. About 17% did not seek treatment for HCV infection despite being told to do so. Financial constraints were the main reasons for not seeking the treatment.

Keywords: intravenous drug users, hepatitis C, prevalence, knowledge, treatment non-seeking

Introduction

Drug addiction has spread like an epidemic all over the world. Of various illicit drugs available, opium through its derivatives like heroin and hydromorphone, fentanyl etc. are most dangerous because of risk of overdose deaths and deadly infections. Unfortunately, India is surrounded on both sides by countries that produce about 95% of world's opium. Hence, it has easily fallen prey to opium use epidemic. As per the latest data provided by UN office on drugs and crime there are about 2 million opiate users in our country. The International Narcotics Control Board in its report released in Vienna pointed out that in India, persons addicted to opiates are shifting their drug of choice from opium to heroin [1]. Mizoram, Punjab and Manipur are the most affected states in India. With Jammu's proximity to Punjab it is also getting badly affected by the drug epidemic. Another misfortune of Jammu and Kashmir is its proximity to 'golden crescent', it's a major transit point in illicit drug trade [2]. The golden crescent is the name given to one of the world's two principal areas of illicit opium production (other being golden triangle), located at the crossroads of Afghanistan, Pakistan and Iran. What is disturbing is the intravenous use of potent derivatives of opium like heroin and buprenorphine that too in young population. A study conducted in treatment seeking population in Jammu region revealed that about 80% heroin users are below 30 years of age [3]. The most sinister aspect of heroin use is its intravenous use. With intravenous use heroin can not only cause sudden accidental death but it can also lead to a host of infection in the intravenous drug user (IDU). Infections like Human Immune Virus (HIV), Hepatitis C, Hepatitis B, Endocarditis, cellulitis, abscesses etc. are widely prevalent in IDUs.

The hepatitis C virus (HCV) is a major cause of hepatitis (acute and chronic) and cirrhosis the world over. The HCV is a single-stranded RNA virus of the Hepacivirus genus in the Flaviviridae family. It was discovered in 1990 as a causative agent for post-transfusion non-A, non-B hepatitis. Worldwide prevalence rates of HCV infection range from 0.01 to 20%, and the world health organization (WHO) estimates that up to 3% of the world's population (170 million) have been infected with HCV. In developing countries where resources and facilities may be significantly limited, the prevalence of HCV is higher than in the developed world [4]. The predominant mode of transmission for hepatitis C has shifted from post-transfusion infection to injection drug use [5]. Other modes of transmission include nosocomial (e.g., in hemodialysis units), intranasal cocaine use, tattoos, body piercing, sexual transmission, and perinatal exposure. Approximately 20 percent of those exposed to HCV develop symptoms such as jaundice, fatigue, dark-coloured urine, stomach pain, loss of appetite and nausea. The other approximate 80 percent show no signs of illness and it can be 10-15 years before they are diagnosed with HCV. After the initial infection, 15-20 percent will recover and clear the virus, but the majority, 75-85 percent, will become chronically infected. Chronic HCV progresses gradually, and a majority of individuals do not advance to cirrhosis for 25-40 years or longer following infection [6]. Patients with chronic HCV and cirrhosis are at risk to develop hepatocellular carcinoma (HCC), hepatic decompensation and die from the complications of end-stage liver disease during this time period [7].

IDUs represent the majority of persons with HCV in many countries throughout the world. However, many IDUs do not receive treatment despite knowing their HCV status. Many reasons have been found for this so-called treatment gap. IDUs are younger, have no other medical disorders and therefore do not require or seek medical care [5]. Many IDUs are isolated from society, live in poverty, are homeless, have a higher rate of mental health issues, have little access to healthcare or are unable to navigate the complex healthcare system without assistance. Nearly 60% of IDUs have history of legal issues and arrests and hence do not access social

services for fear of being discovered and incarcerated [8]. Thus, many physicians consider IDUs poor candidates for initiating HCV therapy. Many insurance carriers require drug testing and documented abstinence before approving payment for HCV treatment [9]. With the burden of IDUs increasing in Jammu region, it is perceived that infections like HCV may also be increasing. However, no systematic study has been conducted to gauge this burden. This study endeavours to find the prevalence of HCV in IDUs and to scrutinise the knowledge of IDUs regarding this deadly illness. In addition, risk factors associated with this illness and factors which are preventing some patients to seek treatment will also be studied.

Materials and Methods

Participants and Setting

This study was designed as a cross sectional study in the patients attending a private de-addiction clinic in the Jammu city of the state of Jammu and Kashmir in India. The patients were intravenous drug users (IDUs) from the treatment seeking population visiting the clinic. The study intake lasted six months from August 2018 to February 2019.

Tools

The evaluation tool comprised of five questionnaires. All the questions about substance abuse were open-ended.

Socio-economic and risk factor questionnaire A questionnaire was designed to obtain detailed information regarding demographic characteristics (age, sex, marital status, area of residence, education, socioeconomic class, family type and occupation) and associated risk factors like needle sharing, multiple sex partners, duration of drug use, tattooing, blood transfusion, multiple drug use, history of psychiatric illness and history of surgery.

Knowledge, attitude and practices questionnaire (KAP-HCV) A questionnaire was designed to inquire about the knowledge, attitude and practices related to HCV infection. It consisted of questions related to the HCV infection e.g., its transmission, infectivity, morbidity, risks etc. The questionnaire comprised of 12 items, which can be answered as yes or no. Yes was scored as 1, and no as 0. Thus, the score ranged from 0-12, more score meant better knowledge. *Barriers to seek treatment for HCV infection (BST-HCV)* A third questionnaire was designed to evaluate the barriers felt by patient to seek HCV treatment. It had questions which dealt with the reasons why a particular person infected with HCV may not seek treatment for HCV infection. These were some realistic problems and some myths associated with HCV. It consisted of 11 items which can be answered as true or false. True were coded as 1 and false as 0. A higher score meant more barriers to HCV treatment. *Modified Kuppuswamy's Socioeconomic Status Scale, 2019* This scale was devised by Kuppuswamy in 1976 and is the most widely used scale for determining the socio-economic status of an individual or a family. The initial scale included index parameters like education, occupation, and total income which was further modified in later years to include head of families educational status, occupational status and overall aggregate income of the whole family, pooled from all sources. The scale has been revised interminable over the past years because the parameter of overall income of the family from all the sources scale loses its pertinence following the devaluation in the worth of Indian rupee. Then scale was modified in 2019 by Saleem SM [10].

Oslo 3 Social Support Scale (OSS-3)

The OSS-3 provides a brief measure of social functioning and it is considered to be one of the best predictors of mental health. It covers different fields of social support by measuring the number of people the respondent feels close to, the interest and concern shown by others, and the ease of obtaining practical help from others [11].

Procedure

The participants contacted the substance abuse clinic for heroin de-addiction by word of mouth. The data collection was done by convenient sampling and later through snowball sampling. The participants were told in detail about the purpose, nature and utility of the study. An informed consent was taken from the participating patients on first contact. Those who didn't consented for the study or for blood sample were excluded from the study. The patients of substance use disorder were diagnosed according to the International Classification of Diseases-10 (ICD-10) criteria and interviewed using the Socio-economic & risk factor questionnaire, Modified Kuppuswamy's socioeconomic status scale, OSS-3 and KAP-HCV questionnaire (defined above). An IDU was defined as one who has been using any type of drug by intravenous route for more than 6 weeks prior to the study interview. The patients were also assessed for any past or current psychiatric disorder as per ICD-10 criteria and the results were noted in the questionnaire. After pre-test counselling, blood samples were collected and tested for HCV. HCV cases were recognized when the initial anti-HCV antibody immunoassay was positive. This test provides evidence of present or past infection. Additionally, a quantitative HCV-RNA test was conducted to diagnose the presence and magnitude of a current infection. Those with current HCV infections were referred to a hepatologist or a gastroenterologist for further management. These referred patients were then asked again on next follow up or telephonically on whether they have sought advice and started treatment of HCV infection. Those who haven't started treatment for HCV infection within a month of diagnosis were then assessed on BST-HCV questionnaire. BST-HCV questionnaire was applied telephonically on those patients who refused to follow up.

Statistics

Percentages were computed and descriptive statistics used as per basic assumptions. Contingency tables were analysed for significance using fisher's exact test or chi square test wherever applicable. Strength of association between risk factors and HCV was calculated by odds ratio. P value of less than 0.05 was considered significant.

Results

A total of 294 IDUs contacted the clinic for treatment during the study period of six months. 26 of them didn't consented for the study and were hence excluded from the study. Thus, a total of 268 IDUs were included in the study. Of these 268 IDUs, 203 were using heroin and 65 were using buprenorphine. Seroprevalence of HCV infection in both the groups is presented in table 1. As can be seen 46.27% (124) of IDUs had evidence of past or current HCV infection i.e., exposure to virus and 42.16% (113) had

current HCV infection. Table 2 depicts the socio-demographic variables of the study participants. It was observed that prevalence of HCV infection was more in those under 18 years of age (68.85%), singles (62.69%), those who were lesser educated (64.615), lower socio-economic classes (49.7%) and those with poor social support (45.2%). Those who were unemployed and those in unskilled job also has higher prevalence of HCV. The risk factors associated with HCV infection are presented in table 3. The only risk factors significantly associated with HCV positivity in IDUs is sharing of needles and long duration of IDU. The knowledge about the HCV infection in IDUs is presented in table 4. The mean score on KAP-HCV in those with HCV and without HCV was 2.306 and 1.653 respectively which can be considered very low. Response to BST-HCV items i.e., barriers felt by the patients to seek treatment is presented in figure 1. As can be seen a large number of those who didn't seek treatment cited the financial reasons.

Table 1: Seroprevalence of HCV antibody and confirmed current infection by HCV-RNA

Intravenous Drug Used	Total Patients	HCV Antibody (past or current infection)		Presence of HCV-RNA (Current infection)	
Heroin	203	101 (49.75%)	P value 0.2420	93 (45.81%)	P value 0.179
Buprenorphine	65	23 (35.38%)		20 (30.77%)	
Total	268	124 (46.27%)		113 (42.16%)	

P value **significant ***highly significant

Table 2: Socio-demographic profile of the participants

Sociodemographic Features	A. IDUs	B. Current HCV Infection (% of A)		C. Did not seek treatment for HCV (% of B)	
	n (Percentage)	n (Percentage)	P value	n (Percentage)	P value
Age (years)					
Below 18	61 (22.76%)	42 (68.85%)		13 (30.95%)	0.013*
18 to 36	198 (73.88%)	68 (34.34%)		6 (8.82%)	
Above 36	9 (3.36%)	3 (33.33%)	0.015*	0 -	
Sex					
Males	261 (97.39%)	111 (42.52%)		19 (17.12%)	-
Females	7 (2.61%)	2 (28.57%)	0.655	0 -	
Marital Status					
Single	168 (62.69%)	83(49.40%)		15 (18.07%)	0.249
Married	96 (35.82%)	29(30.21%)		3 (10.34%)	
Divorced	4 (1.49%)	1 (25%)	0.127*	1 (100%)	
Occupation					
Student	132 (49.25%)	49 (37.12%)		6 (12.24%)	0.162
Professional job	6 (2.24%)	2 (33.33%)		0 -	
Skilled/ semi- skilled job	30 (11.19%)	13 (43.33%)		1 (7.69%)	
Unskilled job	39 (14.55%)	19 (48.72%)		2 (10.53%)	
Unemployed	61 (22.76%)	30 (49.18%)	0.841	10 (33.33%)	
Education					
10th Standard or below					0.698
11th std to Below	65 (24.25%)	42 (64.61%)		9 (21.42%)	
graduation	154 (57.46%)	56 (36.36%)		8 (14.29%)	
Graduate and above	49 (18.28%)	15 (30.61%)	0.033*	2 (13.33%)	
Area of Residence					
Rural	158 (58.95%)	64 (40.5%)		14 (21.87%)	0.162
Urban	110 (41.05%)	49 (44.54%)	0.675	5 (10.20%)	
Socio-economic class					
Lower	44 (16.42%)	27 (61.36%)		9 (33.33%)	0.209
Upper lower	121 (45.15%)	55 (45.45%)		7 (12.73%)	
Lower middle	70 (26.12%)	22 (31.43%)		2 (9.09%)	
Upper middle	28 (10.45%)	8 (28.57%)		1 (9.09%)	
Upper	5 (1.87%)	1 (40%)	0.173	0 -	
Family Type					
Nuclear	219 (81.72%)	91 (41.55%)		16 (17.58%)	0.705
Joint/ extended	49 (18.28%)	22 (44.9%)	0.786	3 (13.67%)	
Social Support					
Good/Fair	91 (33.96%)	33 (37.28%)		3 (9.09%)	0.109
Poor	177 (66.04%)	80 (45.2%)	0.365	20 (%)	
Total	N=268	113 (42.16%)		19 (16.81%)	

P value * not significant **significant ***highly significant

Table 3: Risk factors associated with IDU and HCV seropositivity

Risk Factors	D. Exposure to risk factors in participants (% of N)	HCV Seropositivity in those exposed to risk factors (% of D)	Odds ratio	P Value
Needle Sharing				<0.0001**
Duration of drug use	189 (70.52%)	121 (64.02%)	16.86	0.018*
Less than 6 months	78 (29.1%)	18 (23.08%)	0.4988	
6 months to 2 years	135 (50.37%)	51 (37.78%)		
More than 2 years	85 (31.72%)	55 (64.71%)		
Multiple drug use	173 (64.55%)	77 (44.51%)	0.899	0.72
H/o psychiatric illness	109 (40.67%)	54 (49.54%)	1.125	0.67
Multiple sex partners	81 (30.22%)	42 (51.85%)	0.845	0.54
Blood transfusion	21 (7.84%)	8 (38.09%)	0.811	0.77
Tattooing	115 (42.91%)	58 (50.43%)	1.1692	0.54
H/o surgery	16 (5.97%)	7 (43.75%)	0.9423	0.92

P value *significant **highly significant

Table 4: KAP-HCV scores in HCV positive and HCV negative

KAP-HCV Item	HCV Antibody positive, n=124	HCV Ab negative, n=144
	Those who responded yes to the item	
Do you know there is an infection called hepatitis C?	34	57
Do you know hepatitis C can affect your liver?	24	44
Do you know that hepatitis C can cause liver failure if untreated?	10	22
Is it possible to have hepatitis C without any apparent signs and symptoms?	5	10
Do you know hepatitis C can stay in your body permanently even after successful treatment as carrier state?	1	2
Can hepatitis C kill you if untreated?	8	17
Is treatment available for hepatitis C?	18	28
Did you know that I/V drug use can cause hepatitis C?	30	50
Can sharing the needles from an infected person lead to hepatitis C?	32	51
Do you know HCV spread from infected blood transfusion?	21	29
Can hepatitis C spread by sexual contact?	22	22
Mean KAP-HCV score	1.653	2.306

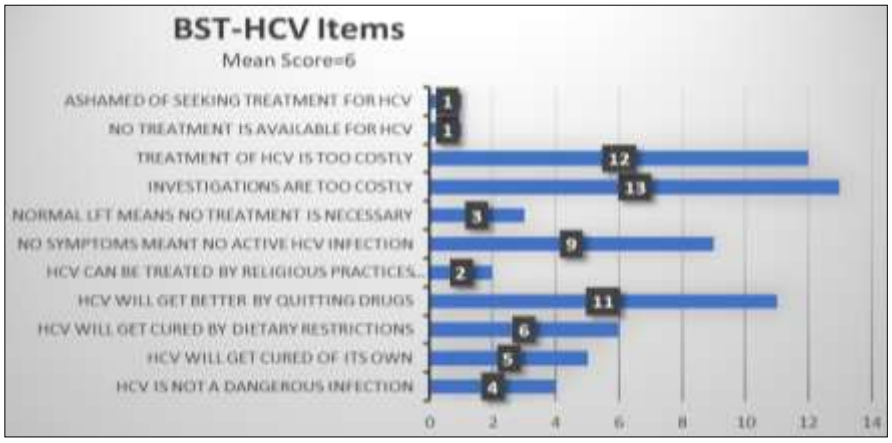

Fig 1: BST-HCV; reasons for not seeking treatment

Discussion

The euphoric effects of opium have been known since long. Morphine was first isolated from opium poppy between 1803 and 1805 by Friedrich Sertürner. Heroin was first made by C. R. Alder Wright in 1874 from morphine, a natural product of the opium poppy [12]. Ironically, it was produced as a non-addictive substitute for Morphine addiction, but was eventually found to be more addictive than heroin. Internationally, heroin is controlled under Schedules I and IV of the Single Convention on Narcotic Drugs [13], and it is generally illegal to make, possess, or sell without a license [14]. Afghanistan produces about 66-percent of the world's opium, almost entire of which is channelled through illegal means [15]. Due to close proximity of India to the Afghanistan and both golden crescent and golden triangle, India is affected seriously by the heroin menace [16]. Jammu and Kashmir due to its geographical closeness to the golden crescent has got entangled in the web of heroin dependence. As discussed, the most ominous aspect of heroin dependence is its intravenous use and consequent medical complications. One such medical consequence is HCV infection. Thus, this study was planned to find out the prevalence, socio-demographic correlates, knowledge and treatment fads associated with HCV in IDUs.

It was observed that in 268 patients who completed the study 113 (42.16%) had current HCV infection. This finding is comparable with earlier studies on HCV in IDUs. Basu D *et al* in their study found almost one-third of the IDUs (64 of 201; 31.8%) were positive for anti-HCV antibody.[17]

Akhtar AM *et al* in Pakistan and Alavi SM in Iran found the prevalence of HCV to be 36.09% and 34.5% in IDUs respectively [18, 19]. Some studies like Norouzian H *et al* in Iran with 16.2% and Li Zhi-Bin *et al* in China with 70% found particularly high and low prevalence rates in their studies respectively [20, 21].

Seropositivity was highest in participants below 18 years of age (42 of 61; 68.85%). This age group is more likely to involve in high risk activities like needle sharing. Comradery is high in this age group thus they are more likely to involve in group activities and hence chances of needle sharing is high. Also due to the fact that a majority of them are still studying so the financial resources to buy fresh syringes would be limited. Seropositivity was high in singles/never married as compared to married (49.4% vs 30.21%). Singles represented the younger subgroup of the sample and hence prevalence of HCV was high. Similar high prevalence of HCV in Un-Married was detected in studies by Norouzian H *et al* in Iran and Akhtar AM *et al* in Pakistan. [20, 18]

A particularly high prevalence of HCV was found in those who were lesser educated. Education is known protective factor for any kind of communicable disease. A person who is educated would refrain from needle sharing and would adopt aseptic practices. Similar high prevalence of HCV in lesser educated has been noticed by earlier studies as well [18, 21].

Another important finding was high prevalence of HCV in lower socioeconomic classes. These classes have tight kinship and social networks that allow faster diffusion of drugs among those at risk. Low education level and paucity of finances to buy fresh syringes make them particularly prone to infections due to IDU. Similar prevalence rates have been found by earlier studies elsewhere. [18, 22] In our study HCV infection in IDUs was more in those with poor social support (45.2% vs 37.28%). IDU results in breakdown of relationships, affects sexual relationships and interaction with family members. Poor social relationships result from primarily four reasons. Firstly, the stigma attached with the substance abuse. Those around would not like to be associated with a person with IDU for fear of shame and being labelled. Secondly, people would like to stay away from a person with IDU to prevent themselves getting sucked into drug abuse due to peer pressure, real or perceived. Thirdly, there are some reports on low levels of family support as a risk factor for substance use itself [23]. And lastly, due to relapsing and remitting nature of the illness caregiver burnout occur frequently in substance abuse thus reducing the social and moral support warranted by such an individual.

A scrutiny of risk factors associated with HCV in IDU revealed that needle sharing and long duration of IDU was significantly associated with HCV infection. Previous studies have found these risk factors to be significantly associated with HCV [17, 18, 19].

In our study it was observed that despite knowing the current status of their HCV infection about 17% patients did not sought consultation for HCV infection, notwithstanding being repeatedly told to do so. It was also noticed in previous studies elsewhere that a majority of drug users opt out of HCV services, and few engage in antiviral treatment for HCV compared to non-drug users.[24, 25] Our study then tries to analyse the factors responsible for treatment non-seeking in HCV infection in IDUs. Financial reasons involving treatment and investigations were sited as the commonest reasons for treatment non-seeking. It is pertinent to mention that investigations and drugs used in the treatment of HCV are currently not available in government sponsored institutions. The average price for investigations like HCV-RNA, HCV genotyping, fibroscan etc. ranges from 30000- 40000 Indian Rupees (INR). The money a patient has to spend for a three-month course of medications ranges from INR 45000 to 60000. In a country where average monthly income is INR 10,534 and saving for health is not in culture, such an expenditure is considered substantial and may destabilise the financial condition of many families. Add to it the relapsing remitting nature of IDU, this problem seems substantial. Beside these, other reasons given by treatment non-seekers were related to low knowledge and myths related to the HCV infection. It was amusing to notice that a couple of patients also stated that HCV infection can get better by a religious practice called as 'fanda' in this part of world.

Conclusion

IDU is increasing in Jammu and consequently incidence of HCV is getting high, reaching epidemic proportions. What this study reveals could just be tip of iceberg as it focuses only on treatment seeking population. If untreated this infection is going to lead to a secondary epidemic of cirrhosis, liver decompensation and hepatocellular carcinoma 20-30 years from now. People need to be educated about drug abuse and its complications like HCV, HBV and HIV. Financial constraints are preventing some from seeking treatment for HCV. Government need to take steps to provide free treatment to patients with HCV atleast at tertiary level institutions. Programs like needle exchange programmes and oral substitution therapy need to be bought to forefront from the dark stigmatised alleys. It is relevant to mention that ambiguous laws related to buprenorphine in India need to be clarified so that more psychiatrists are comfortable with using the drug. This would help in reducing the prevalence of IDU and its associated complications. Road ahead is longer and full of potholes but a stepwise approach would go a long way in ameliorating this menacing malady.

References

1. United Nations Office on Drugs and Crime, World Drug Report (ISBN: 978-92-1-148291-1, eISBN 978-92- 1-060623-3, United Nations publication, Sales No. E.17.XI.6, 2017.
2. Chowhan A. An epidemic of Addiction. June 26, 2015. Daily Excelsior Newspaper…….
3. Chowhan A, Sakral AA. Study of social and cultural aspects of heroin use in Jammu region, India. International Journal of Current Research. 2019; 11(06):4897-4900.
4. Wild CP, Hall AJ. Primary prevention of hepatocellular carcinoma in developing countries. *Mutat Res.* 2000; 462(2-3):381-93.
5. Shiffman ML. The next wave of hepatitis C virus: The epidemic of intravenous drug use. *Liver Int.* 2018; 38(1):34-39.
6. Seeff LB, Hollinger FB, Alter HJ. Long-term mortality and morbidity of transfusion-associated non-A, non-B, and type C hepatitis: A National Heart, Lung, and Blood Institute collaborative study. *Hepatology.* 2001;

33:455-463.
7. Fattovich G, Giustina G, Degos F. Morbidity and mortality in compensated cirrhosis type C: a retrospective follow-up study of 384 patients. *Gastroenterology*. 1997; 112:463-472.
8. Degenhardt L, Peacock A, Colledge S. Global prevalence oinjecting 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:e1192-e1207.
9. Barua S, Greenwald R, Grebely J. Restrictions for Medicaid reimbursement of sofosbuvir for the treatment of hepatitis C virus infection in the United States. *Ann Intern Med*. 2015; 163:215-223.
10. Sheikh Mohd Saleem. Modified Kuppuswamy socioeconomic scale updated for the year 2019. Indian J Forensic Community Med. 2019; 6(1):1-3.
11. Dalgard OS. Social support-Consequences for individual and society. In: EUPHIX, EUphact. Bilthoven: RIVM, EUphact\ Determinants of health\ Environment\ Social support, 2009a. on http://www.euphix.org/object_document/o5482n27411. html; browsed on 30-5-19.
12. Courtwright David T. *Forces of habit drugs and the making of the modern world* (1 ed.). Cambridge, Mass.: Harvard University Press, 2009, 36-37. ISBN 978-0-674-02990-3.
13. Yellow List List of Narcotic Drugs Under International Control" (PDF). International Narcotics Control Board. December, 2004.
14. Lyman MD. Drugs in Society: Causes, Concepts, and Control. Routledge, 2013, p. 45.
15. United Nations Office on Drugs and Crime (May 2016). "Statistical tables" (PDF). World Drug Report Vienna, Austria, 2016, 18:32. ISBN 978-92-1-057862-2.
16. Beyrer C, Razak MH, Lisam K, Chen J, Lui W, Yu XF. *et al* January 7th, Overland heroin trafficking routes and HIV-1 spread in south and south-east Asia. AIDS, 2000; 14(1):75-83.
17. Basu D, Sharma AK, Gupta S. 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(3): 311-316.
18. Akhtar AM, Majeed S, Jamil M, Rehman A, Majeed S. Hepatitis-C virus infection among injecting drug users in Lahore, Pakistan: A cross sectional study. Pak J Med Sci. 2016; 32(2):373-378.
19. Alavi SM, Behdad F. Seroprevalence Study of Hepatitis C and Hepatitis B Virus among Hospitalized Intravenous Drug Users in Ahvaz, Iran (2002-2006). Hepatitis Monthly. 2010; 10(2):101-104.
20. Norouzian H, Gholami M, Sakib P. Prevalence of HCV Infections and Co-Infection with HBV and HIV and Associated Risk Factors among Addicts in Drug Treatment Centers, Lorestan Province, Iran. Int J High Risk Behav Addict. 2016; 5(1):e25028.
21. Li Zhi-Bin, Zhang L, Wang J. Hepatitis C infection, elated services, and barriers to HCV treatment among drug users in methadone maintenance treatment (MMT) clinics in Shanghai, China. Harm Reduction Journal. 2017; 14:71.
22. Cooper CL, Mills EJ. Therapeutic challenges in hepatitis C-infected injection drug using Patients. Harm Reduct J. 2006; 3:31.
23. Slesnick N, Prestopnik JL. Comparison of Family Therapy Outcome with Alcohol-abusing, Runaway Adolescents. J Marital Fam Ther. 2009; 35(3):255-77.
24. Doab A, Treloar C, Dore GJ. Knowledge and attitudes about treatment for hepatitis C virus infection and barriers to treatment among current injection drug users in Australia. Clin Infect Dis. 2005; 40(5):S313-20.
25. Stoove MA, Gifford SM, Dore GJ. The impact of injecting drug use status on hepatitis C-related referral and treatment. Drug Alcohol Depend. 2005; 77(1):81-6.