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SEROPREVALENCE OF HEPATITIS C VIRUS IN OPIOID USER PATIENTS

ABSTRACT

Background- Hepatitis C Virus (HCV) infection is a major public health problem worldwide and remain a vital cause of chronic hepatitis. We characterized HCV antibody prevalence among opioid user patients in district Hospital, Hanumangarh, Rajasthan. Opioid users are categorized in high risk group for occurrence of HCV due to use of injectable equipment, sharing of equipments like pipes, inhaler etc.

Method- A cross sectional study based on demographic and behavioral characteristics were obtained by a standardized questionnaire. Serum samples were tested for HCV using Enzyme Linked Immuosorbant Assay.

Result- A total of 852 opioid users were examined and tested for anti –HCV by serological Enzyme Linked Immunosorbant Assay. Among opioid users 20.3% (173) were injectable opioid users and 79.7% (679) were non injectable opioid users. The prevalence of HCV in injectable drug users were found to be high with 27.8% (48/173) than Non injectable drug users with 3.4% (23/679). The overall prevalence of opioid users is found to be 8.3% (71/852).

Conclusion- Our study shows high prevalence in Injectable DrugUsers. The study helps us to evaluate various aspects associated with Hepatitis C Infection. The need of hour is to increase the awareness about Hepatitis C Virus among the public and practicing physicians.

Key Word- Opioid , ELISA, HCV

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Introduction:

Hepatitis C Virus is a major public health issue as 170 million people are infected with Hepatitis C Virus around the world. HCV is silent murderer as remain asymptomatic in acute phase.[37] HCV develops chronic infections in approximate 80% of cases that results into chronic liver disease.[7]

Hepatitis C is caused by HCV which is small enveloped positive sense single stranded RNA virus that belongs to Flaviviridae family and genus hepacivirus.[16] HCV is the ist virus to be identified by using molecular biology techniques.[8]HCV can be described as enveloped virus whose genetic material is single stranded RNAwith positive polarity. Being a member of family flaviviridae and genus Hepacivirus, It is surrounded by a non structural core protein and a double layer lipid membrane having two viral glycoprotein (E1 and E2).[16] Its genome encodes a large polyprotein of 3010 amino acids. These polyprotein are processed by the activity of cellular and virally encoded proteases by co and post translational modification and convert nascent polyprotein into mature non-structural and structural proteins. The size of HCV is small that is 55-65nm.

HCV is transmitted mainly through parenteral exposure to infected blood but there are several mode of transmission of HCV like unprotected sexual contact, illicit drug use, nosocomial transmission. Currently, the main reason for the transmission of HCV worldwide is injectable drug use which include risk behavior like sharing of injectable equipment like needle/syringes, cookers, cotton, rinse-water.[2] In India, blood transfusion and unsafe therapeutic injections were predominant modalities of transmission of HCV.

Material and Method-

Study Area and Period-

The study was conducted in the psychiatry OPD section of dist Hospital, Hanumangarh. The study period was conducted from 1 January, 2021 to 30 June 2021.

Study design and population

A cross sectional hospital based study was conducted on opioid users which includes Injectable drug users and Non injectable drug users

Data Collection

A brief explanation of the study objectives was given to the participants. Participants were asked to give their informed consent before any information was collected about them.

Specimen collection and processing-

From each participants, 5mL blood was collected using sterile capped tubes and centrifuged to separate out serum and stored at 2-8°C. Each specimen was than tested for anti-HCV antibody by TRUST well HCV IgG Enzyme Linked Immunosorbant Assay Kit (Athenese-Dx Pvt.Ltd) which work on the principle of indirect ELISA.This solid phase ELISA detect IgG to HCV. During the processing, Test specimen is added to antigen coated micro well which interact to form Ag-Ab complex. After the complex formation, HRP-antihuman IgG conjugates is added to interact with complex and then washed. After removal of unbounded conjugates by washing, TMB substrate is added to reaction mixtures which undergo color reaction and presence of blue color indicates the presence of IgG antibody to HCV.

Result

A total of 852 opioid user were examined to know the prevalence of HCV.Out of 852,173(20.3%) have their route of administration intravenous considered as Intravenous drug users (IVDUs) and 679 (79.7%) have their route of administration as non intravenous (smoking, oral inhaling, snorting) considered as non intravenous drug users (non-IVDUs).

The age of opioid users lie between 16 to 69.The mean age of opioid users calculated statistically is 31.15 years with standard deviation of 8.025 as shown in **Table no 1**.The age group is divided into following parts ;<20 years,20-29 years,30-39 years,40-49 years and ≥50 years. There were 21 subject of <20 years,380 subjects of 20-29 years,335 subjects of 30-39 years,81 subjects of 40-49 years and 35 subjects of ≥50 years of age group among Intravenous drug users .In our study, <20 years individuals are categorized in younger population,20-39 years individuals are categorized in youth population,40-40 years individuals are categorized in middle age people and ≥50 years are included in old age people.

Distribution of opioid in non IVDUs and age wise trends show 17 opioid dependent (non IVDUs) of <20 years , 293addicts of 20-29years , 275 addicts of 30-39 years, 60

addicts of 40-49 years and 34 opioid dependent individuals of ≥50 years of age.

Out of 852 subject recruited for Hepatitis C Virus prevalence, 846 (99.3%) were male and 6 (0.7%) were female opioid users as shown by **Observation Table no 1.** In our study, female are less involve in drug abuse. On the basis of collected data, in our study highest seropositivity of HCV is observed among male IVDUs than in male non IVDUs. The overall prevalence in male opioid dependents is high as comparison to female as shown in **Table no 2.**

There were 424(49.8%) married individuals and 428(50.8%) unmarried individuals as shown in **Table no 1**. There were 94 married and 79 unmarried opioid dependents in intravenous drug dependents. There were 330 married and 349 unmarried non intravenous opioid users.

Distribution of opioid users on the basis of region includes 476 (55.9%) opioid users belongs to rural area and 376(44.13%) opioid users belongs to urban area as shown by **Table No 1.**The regional status among IVDUs. includes 96 individuals of rural residency and 77 individuals of urban residency. The regional status of HCV among Non IVDUs includes 380 rural subject and 299 urban subjects.

Discussion-

Injectable drug use is a most common route for transmission of viral Hepatitis C.**[2]** In Punjab, it is considered as driver of HCV transmission. The most commonly reported drug injected were heroine and opioid pharmaceuticals. These substances can be injected alone or in combination with anti-histaminic or sedatives preparations. In North east India, most common drug of choice is heroine while in north/Central India, most common drug of choice is Buprenorphine**[24]**. There are several route of administration of these drugs like snorting, smoking, sniffing and injecting via needles/syringes. The sharing of equipments used to administer drugs increases the chances of HCV transmission with a higher rate in the opioid users.

Present study include 173 IVDU subject which coincide with the sample size of D Basu et al., enrolls 201 IDUs[2]; E F White et al., enrolls 222 & 206 IDUs[38]; Jose Damas et al., enrolls 160 IDUs.[5] The reason for small sample size for IVDUs is due to high prevalence of HCV in IVDUs.

Present study include 679 (79.7%) subject in their study who are not injecting drugs and this lies close to with the sample size of D H Osmond et al., recruits' 589

NIDUs[22]; Fuller C M et al., recruits 683 NIDUs[13] and Howe C J et al., recruits 740 NIDUs[15]. The reason for high sample size for NIVDUs is its low prevalence for VHC infection.

The total subjects included in the our study is 852 which matches with the study of Weill-Barillet et al., enrolls 960 opioid users[36]; D H Osmond et al., enrolls 727 opioid users[22] and Wang et al., enrolls 1179 opioid users[35].

Our study include 99.3% male opioid users and 6% female opioid users means high percentage of male individuals is involve in drug abuse as compared to the female and this coincide with the study of Dedsy Yajaira Berbesi –Fernandez et al., includes 82.2% male[12]; Enea Spada et al., includes 83.4% male[31]; Singh P et al., includes72.8% male & 27.2% female[28] ; Howe C J et al., includes 70% male & 30% female[15]; Kushal Verma et al., includes 100% male[34]; Suzy Danielly Barbosa Pacheco et al., includes 82.3% male & 17.7% female[23] and Mohsen Malekine jad et al., includes 87.4% male &13.6% female[18].

Among IVDUs males are predominant with 100% and among NIVDUs,99.11% were male and 0.9% were female and this matches with the IDVUs participants of Haya Altawalah et al., select 93.9% male[1] & 6.1% female; Lopamudra Ray Saraswati et al., select 100% male IDUs[26]; Piyush Mahajan et al., select 98.65% male IDUs[17]; Shruti H Mehta et al. selects 99 % male[19] and Mary Nakhoul et al., selects 98% male[20].

In most of studies, male drug users are more than female drug users as in present study. The reason for this may be high indulgence of male in drug abuse than female. Female are found more in non intravenous drug user. In most of female, oral route of administration of drug is more common than injections.

The present study reveal high prevalence in female than male opioid users this matches with the Aryan Esmaeili et al.[11]; B Denis et al., reports 84.8% in female and 75.8% in male[6]. The prevalence among the female in our study lie close to the Jose Damas et al., reports 21.3% among female[5]. The reason for high prevalence in female may be related to the co factor associated with female population. These co factors are the HIV co-infection, involvement of female in sexual activity like extramarital and premarital , having relation with injectable partner and less participation of female in study due to cultural restriction in India and more frequent

blood transfusion due to anemic condition.

In the present study, the difference between males of intravenous drug users and non intravenous drug users for Hepatitis C infection when calculated statistically, it was found insignificant with p value of 0.319.This is in concordant with gender association of Chih Wen Wang et al.[35]; Dedsy Yajaira et al., (p value= 0.11)[12]; B Denis et al.,[6]; Haya Altawalah et al., (p value = 0.159)[1].

Present study show frequency of Hepatitis C Virus as 27.8% among intravenous drug users which is in concordant with the study of Nirmala Poddar et al., reports 28%[25] and close to Piyush Mahajan et al., in Amritsar, reports as 38.12%[17]; Baveja et al., in Delhi,36.45%[3]; Debasish Basu et al., in Chandigarh 31.8%[2]; Sunil Suhas Solomon et al., 37.2%[30]; Mary Nakhoul et al.,(2020)15.6% in Lebanese drug users[20]; Shah Jahan Shyam et al., in Afghanistan reports 37.3%[27]; Dadsy Yajaira Barbesi Fernandez et al., reports 17.5%[12] and Suzy Danielly Barbosa Pacheco et al., reports 36.9%[23].

The reason for the very high prevalence of HCV may be due to the increasing number of drug users worldwide due to easy availability of drugs, unawareness of the youth, lack of education and unemployment in youth and all these factors are responsible for drowning the youth in illegal activities and thus indirectly responsible for transmission of Hepatitis C and other related disease

Present study show 3.4% among non intravenous drug users and this is in consistent to the study of Howe C J et al.,reports 3.4%[15] ,Debashish Basu et al., reports 3.2%[2]. The present study lies close to the B Dennis et al., reports 2.4%[6], D H Osmond et al., reports 1.5%[22], C H S B Van Den Berg et al., reports 4.0%[33] and Beryl A Koblin et al.,(2003) reports 4.7%. Our study show4.6% less prevalence than Mohsen Malekinejad et al., reports 8%[18] and 11.3% from Chai Jan Chang et al., reports 14.7%[4].

The reason for the prevalence of Hepatitis C infection among non injectable drug users is not certain however some cofactors and risk factors are found to be associated with the transmission of HCV among NIVDUs. These co factors are HIV, HBV and blood transfusion.

Present study show higher prevalence in injectable drug users than non injectable drug users which coincide with Mohsen Malekinejad et al., (45%> 8%)[18]; Chai-Jan Chang

et al., (67.2%>14.7%)[4]; D H Osmond et al., (18%>1.5%)[22];B Denis et al., (78.3%>2.4%)[6];Debasish Basu et al., (31.8%>3.2%)[2]

The reason for the high prevalence of HCV in injectable drug user is associated with risk factors like sharing of needles, syringes and other injection accessories like mixer/vial/cotton between the group members, reuse of needles due to their unawareness. Study also reports that most of drug users do not aware of status of Hepatitis C due its silent nature or being asymptomatic and this makes them to transmit disease to their partners.

Over all prevalence of opioid user in present study is 8.3% which lies close to the study of Liesl M Hagan et al., reports 7.7%[14].

Present study show maximum sero positivity among Youth population whose age lie between 20-40 years and this is coincide with the Benjamin Eckhardt et al.[9]; Lorna E Thorpe et al.[32]; Nirmala Poddar et al.[25]; Devi et al; Piyush Mahajan et al.[17]; Kushal Verma et al.[34]; Aldemir B Oliveira et al.[21]; B Denis et al.[6].

The reason for high prevalence in the youth is the easy availability of drug and indulging in high risk behavior like sharing of equipment to inhale, snort and injecting drugs, involving in the illegal sex activities or having an HCV infected partner. Tattooing is also a common cause of HCV transmission among youth in this fascinating era. Use of unsterile dental procedure at dental clinic and unsafe medical practices also responsible for transmission of HCV. Having unprotected sex with more than one partner or with HCV infected partner is also increase the chance of transmitting Hepatitis C among youth.

It is evident that the difference of 20-29 years individuals with 30-30 years and 40-49 years was calculated statistically insignificant with p value of 0.969 and 0.476, respectively. Similarly the association of 30-39 years opioid users with 40-49 years drug users observed as not significant with p value of 0.412.The association between 20-29 years age group with 30-39 years age group is calculated statistically not significant(p value=0.412) . This relationship of association with age for HCV is consistent with Shruti H Mehta et al.[19].

Present study shows the higher prevalence in rural population as 30.2% than in urban population as 24.7% among Intravenous drug users and also higher frequency in rural as 3.42% than in urban as 3.34% among Non Intravenous

drug users. The difference of rural IVDU v/s rural Non IVDU, urban IVDU v/s urban Non IVDU was not statistically significant using chi square test with p value of 0.437&0.406, respectively. For HCV, the difference of rural v/s urban among IVDU and rural v/s urban among Non IVDU was found to be **statistically insignificant** , using chi square test with p value of 0.869 & 0.756.

Present study include 55.9% rural and 44.13% urban population which lies close to the Kamalpreet et al.,(2015) enrolls 51% rural & 49% urban IVDUs. Prevalence of HCV in Hanumangarh dist Hospital among rural population is 30.2% in IVDUs which lies close to the Zary Nokhodian et al., 2012 reports 33.3% HCV sero positivity in rural people.

Present study evaluate high prevalence in rural than in urban among both IVDU and Non IVDU (30.2> 24.7, 3.42>3.34, respectively) and this is in consisted with the P Mahanjan et al., report (63.21% in rural>36.79% in urban)[17]. The reason for high prevalence in rural area may be due to lack of awareness about Hepatitis C, more dependence on drug use, lack of literacy.

Present study is showing statistically insignificant association of rural and urban residency for HCV which is in concordant with the J Edeh et al.[10]; Zary Nokhodian et al., 2012 & Kamalpreet et al., 2015.

Conclusion:

Study concludes higher HCV prevalence in intravenous drug users than non intravenous drug users so it focuses on awareness programs, counseling programs; use of sterilize and new syringes and other equipments so that problem of HCV transmission can be prevented among drug users. Unmarried being single are found to involve more in drug abuse activity in present study among opioid users and thus are responsible for spread of Hepatitis C Infection either directly or indirectly. Loneliness and homelessness is the common factor which make them to involve in high risk activities.

The HCV positivity among 20-29, 30-39, 40-49 and ≥ 50 years of age group showing a **decreasing trends or inverse co-relation** among opioid users(62.9%, 28.6%, 5.7% and 2.9%). This was found **statistically highly significant** by using chi-square test.

Among opioid users, 20-29 and 30-39 years youth were observe to involve in drug abuse activity and high risk behavior.

Conflict of Interest- There is no conflict of interest**.**

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Table 1 showing general characters of opioid users

General Characteristic	Subject	Percentage
IVDUs	173	20.3%
Non IVDUs	679	79.7%
Total	852	100%
Male	846	99.3%
Female	6	0.7%
Married	424	49.8%
Unmarried	428	50.2%
Rural	476	55.9%
Urban	376	44.13%
Mean Age with standard deviation	31.15±8.025, Range-16-69 years	

Table no .2 showing socio-demographic profile of HCV positives in Intravenous and Non intravenous Drug users among opioid users.

Sociodemographic parameters of HCV positives	Intravenous Drug Users	Non Intravenous Drug Users
Age wise (Years)	**ELISA**	**ELISA**
<20 years	25%(1/4)	0%(0/17)
20-29 years	33.3%(29/87)	5.11%(15/293)
30-39 years	23.3%(14/60)	2.18%(6/275)
40-49 years	14.28%(3/21)	1.67%(1/60)
≥50 years	100%(1/1)	2.94%(1/34)
Gender wise		
Male	27.8%(48/173)	3.27%(22/673)
Female	0%(0/0)	16.7%(1/6)
Area wise		
Rural	30.2%(29/96)	50%(5/10)
Urban	24.7%(19/77)	87.5%(7/8)

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Table No .3 HCV Seropositivity of opioid users using chi square test.

HCV Seropositivity	**P value**	**Statistical Significance**
Agewise	IVDUs v/s Non IVDUs	
<20 years		
20-29 years	0.534	NS
30-39 years	0.211	NS
40-49 years		
≥50 years		
Genderwise		
Male	IVDUS v/s Non IVDUs, 0.319	N S
Female	IVDUs v/s Non IVDUs	
IVDUs	Male v/s Female	
Non IVDUs	Male v/s Female	
Areawise		
Rural	IVDUs v/s Non IVDUs,0.473	NS
Urban	IVDUs v/s Non IVDUs,0.406	NS
IVDUs	Rural v/s Urban, 0.869	NS
Non IVDUs	Rural v/s Urban, 0.756	NS