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Original Article

Frequency of Hepatitis C Virus and Human Immunodeficiency Virus Coinfection among Intravenous Drug Abusers; Experience from A Single Rehabilitation Center

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ABSTRACT

Objectives: To determine the frequency of Hepatitis C virus and Human Immunodeficiency Virus (HIV) Coinfection among Intravenous drug abusers in a rehabilitation Centre.

Study Design: Cross-sectional analytical study.

Place and Duration of Study: Medical and Rehabilitation Centre of District Jail, Lahore Pakistan, from Jul to Dec 2019.

Methodology: A total of 220 participants with a history of intravenous drug abuse were screened for Human immunodeficiency virus, Hepatitis C virus, and hepatitis B virus, with positive cases confirmed by polymerase chain reaction tests.

Results: The median was age 27(8.0) years. Only 12 (5.5) had above higher secondary education. Injectable heroin and methamphetamine used by the respondents were 182 (82.7) and 41 (22.5), respectively. Human immunodeficiency virus infection was present in 163 (74.1), Hepatitis C infection in 149 (67.7), Hepatitis B infection in 9 (4.09), and co-infection of human immunodeficiency and hepatitis C virus infections in 118 (53.6) respectively. Human immunodeficiency virus infection showed a significant association with education level (p<0.01) and drug use (p=0.01). Hepatitis C infection showed association with marital status (p=0.04), religion (p<0.01) and drugs used, while Co-infection showed association with religion and drug used (p=0.01 and p=0.004 respectively).

Conclusion: Intravenous drug users have a significantly higher prevalence of Human immunodeficiency and hepatitis C infection and their co-infection, occurring in more than half of injectable users. In addition, these infections show significant association with education status, marital status and type of injectable drug used.

Keywords: Co-infection, Hepatitis C, Hepatitis B, HIV, Intravenous drug abuse.

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INTRODUCTION

Injectable drug use is a slowly growing pandemic, with the varying prevalence reported in up to 148 countries worldwide.[1] Number of countries with IV drug use (IVDU) increased over the last decade, and, globally, the number of intravenous drug users has reached approximately 15.9 million.[2] IVDU patients are prone to developing a myriad of clinical syndromes, including bacterial bloodstream infections, infective endocarditis and chronic viral infections like HIV, Hepatitis B and C.[3] A global estimate of 17·8 of IVDU is reported to screen positive for HIV, 52.3 are HCV-antibody positive, and 90 are HB surface antigen positive.[4] A significant majority of IVDUs are younger than 25 years of age, with homelessness, unstable housing, male gender, ethnicity, and incarceration being prevalent risk factors.[5] Younger age, unemployment, marital status, low or no education, urban residence, smoking, and incarceration are significantly associated with a higher likelihood of injection initiation.[6] Multiple sex partners and experience of sex abuse are also associated with an increased risk of injection initiation. Besides, the type of first drug use is also a risk factor for initiating injectable drugs, with heroin users at higher risk of injectable than stimulants.[6] The global rise in IVDU has also been seen in Pakistan, a country that not only is in the neighbourhood of Afghanistan, the biggest producer of opium plant production but also has reports of Opium plant production in its northern parts. There is a gradually progressive increase in the number of IVDUs across the country and an increasing prevalence of seroconversion of different viral serology, including HIV, Hepatitis C, and Hepatitis B. The number of IVDUs has significantly increased from 1.8 reported in 1993 to almost 9 in 2004, both from Karachi.[7] Published data of the country is reaching an alarming figure of multiple outbreaks of HIV positivity among IVDU since the first outbreak in 2003 in Larkana, and the country is no more in nascent but a concentrated epidemic state.[8-10] We presented our experience with drug addicts at a rehabilitation Centre. We aimed to present the prevalence of different types of viral infections separately and co-infections among IVDUs. In

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addition, we aimed to present the effect of demographics on these infections among IVDUs, which suffers a paucity of research.

METHODOLOGY

It was a cross-sectional analytical study conducted at the Medical and Rehabilitation Centre of District Jail, Lahore Pakistan from July to December 2019. The study was approved by the Governing Body of the Rehabilitation Centre for any ethical concerns with Ethical Review Committee No: 13305-1-2-20200229.

Inclusion Criteria: All the patients aged 17 years or above coming to the rehabilitation ward were screened for intravenous drug use by history and/or physical examination by the physician were included in the study.

Exclusion Criteria: Patients with the history of chronic liver disease due to vertical transmission (from mother) or blood transfusion prior to IV drug use initiation were excluded.

All the patients with positive IV drug use history were screened for HIV by 3 kit HIV screening methods, Anti HCV by Elisa technique using Alinity s Anti-HCV, and HBV Surface Antigen (HBS-Ag) by Elisa technique using Alinity s HBsAg Confirmatory screening tests, and syphilis serology tests followed by confirmation of positive results by Polymerase chain reaction (PCR) confirmatory tests. Demographic data, type of drug used (including Iv Heroin, IV Met-Amphetamine, IV Cannabis), and mode of other addictions were also noted. The Government of Panjab funded all the screening and confirmatory tests.

Statistical Package for Social Sciences (SPSS) version 23.0 was used for the data analysis. A descriptive analysis was performed on all the variables. Categorical variables like HIV, HCV, HBV, Co-infection & Syphilis and demographic variables such as education level, religion and marital status were presented in the form of frequency and percentages, and continuous variables such as age were presented in the form of the median (IQR) as it was a non-normal variable. The normality of data was assessed by using Kolmogorov Simonov's test. Association between demographic variables and HIV, HCV, HBV, and HIV-HCV co-infection was assessed by Chi-Square and Fisher's exact test. For the variables with the crosstabs of r×c: Chi-Square (was used if assumption, 'no cell has expected count less than 5' was fulfilled, otherwise, likelihood ratio test (was applied. For the 2x2 table, Fisher's exact test was applied. The p-value of ≤0.05 was considered significant.

RESULT

A total of 220 male patients were included in the study, with a median age of 27 (8.0). Among our study respondents, 122 (55.5) were single, while 98 (44.5) were married. The majority, 126 (57.3) of the patients, had schooling up to primary level, and 73 (33.2) had secondary level schooling.

Amongst our respondents, 205 (93.2) were Muslims, and the remaining 15 (6.8) were Christians. IV Heroin was used by 182 (82.7), and 38 (17.3) patients used IV Met-amphetamine (Table-I).

Table-I: Demographic Characteristics of the Patients with In-Travenous Drug Abuse (n=220)

Demographics	n (%)
Age Median (IQR)	27 (8.0)
Marital Status	
Single	122 (55.5)
Married	98 (44.5)
Religion	
Islam	205 (93.2)
Cristian	15 (6.8)
Education Level	
Illiterate	9 (4.1)
Primary	126 (57.3)
Secondary	73 (33.2)
Higher Secondary	12 (5.5)
Drug Used	
Met-amphetamine	38 (17.3)
Heroine	182 (82.7)

A total of 211 (95.9) patients used non-injectable addictions as well, with 59 (28) users of Cannabis, 46 (22.1) users of Heroin snuffers, and 48 (23) white Heroin snort users. As patients used multiple addictions, thus non-injectable addictions were not analyzed further. Out of 220, 163 (74.1) were positive for HIV infection, 149 (67.7) were positive for HCV, and 9 (4.09) were positive for HBV. HIV-HCV Co-infection (co-infection in this paper) was positive in 118 (53.6) patients. Among demographics, HIV was associated with education level (p<0.01) and was more prevalent in respondents having education above primary. HIV was associated with drugs used (p=0.01) and was more prevalent in IV Met-amphetamine abusers than in IV Heroin. While HIV showed no significant association with marital status (p=0.30), or religion (p=0.39), HCV was associated with marital status rea-ching near the statistically significant value of p =0.08 and odds were 1.71 times higher in singles. A signifi-cant association (p <0.01) between religion and HCV was observed,

with a higher prevalence in Muslims than Christians. The odds of having HCV in IV heroin abusers were 4.9 times higher than in IV Met-amphe-tamine abusers. Co-infection showed a significant association with religion and type of drug used (p=0.01 and p=0.004 respectively), with higher prevalence in Muslims and a near significant association with marital status (p=0.08). HBV infection did not show any significant association with any demographic charac-teristic (Table-II).

Table-II: Association of Demographics with Human Immunodeficiency Virus (HIV), Hepatitis C, Hepatitis B and Coinfection(n=220)

Demographics	Human Immunodeficiency Virus n (%)	Hepatitis C n (%)	Co-Infection n (%)	Hepatitis B
Frequency (%)	163 (74.1)	149 (67.7)	118 (53.6)	9 (4.09)
Marital Status				
Single	89 (54.6)	89 (59.7)	72 (61.0)	4 (44.4)
Married	74 (45.4)	60 (40.3)	46 (39.0)	5 (55.6)
p-Value	0.76	0.08	0.08	0.52
Religion				
Islam	152 (93.3)	144 (96.6)	115 (97.5)	8 (88.9)
Cristian	11 (6.7)	5 (3.4)	3 (2.5)	1 (11.1)
p-value	1.00	0.01	0.01	0.47
Education Level				
Illiterate	9 (5.5)	6 (4.0)	6 (5.1)	0 (0.0)
Primary	90 (55.2)	84 (56.4)	65 (55.1)	5 (55.6)
Secondary	58 (35.6)	50 (33.6)	42 (35.6)	4 (44.4)
Higher Secondary	6 (3.7)	9 (6.0)	5 (4.2)	0 (0.0)
p-value*	0.01	0.94	0.57	0.56
Drug Used				
Heroine	127 (77.9)	135 (90.6)	106 (89.8)	7 (77.8)
Methamphetamine	36 (22.1)	14 (9.4)	12 (10.2)	2 (22.2)
p-value	<0.01	<0.01	0.04	0.66

n=Number of patients which screened positive for each infection, Coinfection= positive for both HIV, and HCV, HIV+= Serology positive for HIV, HCV= Anti HCV antibody positive, HBV+= HB surface Ag positive, HIV-HCV coinfection=Both HIV, and HCV infection positive in same patient. Age was given as median age, Parenthesis=Percentage, Data is presented only for patients with positive serology among all cohort.

**=Assumption of having no expected count less than 5 was not fulfilled for Chi square, hence likelihood ratio (G2) was used. Parenthesis with percentages, Illiterate= No schooling at all, Primary= 5 classes according to the system in the country (O-levels equivalent), higher secondary =beyond the school system, including college, professional institutes, and university level education. *Median (IQR), As age was a non-normal variable here.*

DISCUSSION

Our study shows a very high prevalence of viral infections like HIV (74.1), HCV (67.7), HBV (9.0) and co-infections of HIV-HCV (53.6) among IVDU with a significant association with marital status, education, and type of drug used for addiction. Our data shows alarmingly high infections compared to local and international numbers.[11-15] Degenhardt *et al*. in their systemic review, estimated 17.8 HIV, 52.3 HCV, and 90 HBV surface antigen positive; showing much lesser prevalence than 74.1 HIV, 67.7 HCV reported in our study, however, HBV prevalence was lower (4.09) in our study.[16] Geographical variation and other confounders like sexual contact history might be the cause of variable results. Saraswathi *et al*. from a neighboring country reported a much lower prevalence of HIV (25.9 vs 74.1), HCV (53.7 vs 67.7), and HIV-HCV coinfection (19.6 vs 53.6), however, HBV prevalence was similar (9.7 vs 9.0).[17] Imani *et al*. from another neighbouring country reported a lower prevalence of HIV, HCV, and HBV (0.8,11.2and 6.0, respectively).[18] Co addiction, incarceration, and lack of data on demographics might be the reasons for such low prevalence in the neighbouring country. Besides, the higher availability of opioids due to local production in our country can be another reason for the discrepancy.[19] Local studies have variable results when compared to our studies. Waheed *et al*. showed a 72 HCV positivity in Capital city, slightly higher than 67.7 in our cohort.[20] The lower results in our study could be because we checked PCR-based serology, ruling out false positives. Achakzai *et al.* reported seroprevalences of 60 of HCV, 24 HIV and 6 HBV, and 20 prevalence of HIV-HCV co-infection. The lower rates in this study from Quetta, Balochistan, a province

nearest to Afghanistan and itself an opium producer, could be due to; the time frame phenomenon being 13 years old data, smaller sample size, and volunteer patients in-stead of patients from a rehabilitation centre.[21] Akhtar *et al*. found 36.09 HCV seropositivity confir-med by PCR in IVDU of Lahore city in 2013.[22] Our study after six years showed a prevalence of 67.7, such a high number within a decade is a clear indicator of increa-sed prevalence, and the spread of the infection over time, with possible means of a needle, sharing, and possible sexual contact among the IVDU. Their study, however, did not include other viral screenings like HIV, HBV, or co-infection. Kuo *et al*. however, reported 88 HCV seropositivity and 0 HIV seropositivity in IVDU in 2006.[23] Our results show disagreement with the above results, possibly due to high false-positive results. The spike in the HIV positivity of our study is alarming. Our study has certain strengths worth men-tioning. Firstly, we selected the patients from a rehabi-litation centre of the Jail facility, targeting patients with a history of IVDU and incarceration, which may be the reason for such higher results in our study. Second, All the tests with positive serology were confirmed by the PCR test, showing all the cases were truly positive. To our knowledge, this is the first stud in the country to provide these estimates based on PCR instead of scree-ning serology. Third, we reported the co-infection of HIV-HCV, a prevalent risk factor and comorbidity in IVDU, which was not reported previously in the country to the best of our knowledge. Besides, we analyzed the effect of demographics like education, marital status, and other addictions.

LIMITATIONS OF STUDY

Our study should be reviewed in light of certain limitations. All our patients were of the male gender. However, our study lacked data on confounders like sexual contact history, other means of possible infections like blood transfusion, or any procedure. In addition, the clinical effect of these infections in the form of AIDS, or CLD, was not evaluated, which would need further evaluation. The insight of IVDU about risks of the spread of infections was another dimension of the study that will need further evaluation. The lower prevalence of these infections among the non-Muslim population might be due to the smaller sample size, so the results cannot be generalized, and future studies with a higher sample size are needed.

CONCLUSION

Intravenous drug users have a significantly higher prevalence of HIV, HCV, and their co-infection, occurring in more than half of injectable users. Furthermore, these infections show significant association with education status, marital status and type of injectable drug used. Such high numbers are alarming and need serious efforts to prevent the epidemic of such deadly infections from not only causing debilitation in the suffering patients but also from its spread to others through IV needle sharing and sexual contact with the spouse.

Conflict of Interest: None.

Author's Contribution

KS: Direct contribution to conception, design analysis and interpretation of data, AK: Conception, design, data analysis, AK: Design, analysis, data interpretation, result compilation, NAL:, HK:, AK: Data interpretation, result compilation.

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