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Epidemiology, risk factors and quality of life among Hepatitis C Virus(HCV) infected people who inject drugs (PWID) in Manipur, India

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Abstract

Injecting drug use is widespread globally, with people who inject drugs (PWID) present in 179 nations. The occurrence of the Hepatitis C Virus (HCV) is also associated with PWID. A recent extensive investigation revealed that the estimated prevalence of HCV infection in India varies from 1% to 1.9%, with significant variations in occurrence depending on the geographical area and associated risk behaviors. Consequently, the objective of our investigation was to evaluate the level of knowledge among people who inject drugs (PWID) with respect to the accessibility of HCV vaccination, the potential for HCV curability, and the risk factors associated with HCV infection. Using an explanatory research design, we examined a sample of 150 PWID who were receiving treatments and support services relevant to their drug use practices, including Opioid Substitution Therapy (OST) in Community Care Centres (CCC). Our findings indicate that a significant majority (65.3%) of the PWID were knowledgeable about the impact of HCV on the liver, while 68.7% of them believed that hepatitis C is curable. We found PWID, who were infected by HCV, experiencing severe symptoms of sexual dysfunction, fever, altered taste perception, gastric discomfort, breathlessness, cough, muscle soreness, and change in body shape. Our analysis found no noticeable differences between FWID (Female who inject drugs) and MWID (male who inject drugs) in the risk of health complications caused by hepatitis C transmission. However, rural PWID were more susceptible to these problems than urban PWID. Furthermore, we found that the improved physical health conditions resulted in an enhanced quality of life among the PWID.

Keywords

Hepatitis C Virus, HCV, PWID, Epidemiology, Physical Health Status, Quality of Life, Good Health and Well-being

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Introduction

Infection with the hepatitis C virus (HCV) results in the development of liver disease in humans. The virus can cause both chronic and acute hepatitis, with varying degrees of severity, ranging from a slight ailment to a continuous and severe condition that has the potential to result in cancer and liver cirrhosis. Hepatitis C is a virus that is transmitted by blood, and most infections develop due to exposure to blood from hazardous injecting practices, unsafe healthcare, unscreened blood transfusions, injectable drug usage, and sexual behaviors that result in blood exposure (Chen & Morgan, 2006).

Hepatitis C virus (HCV) infection is a significant public health concern, affecting more than 58 million individuals who have chronic hepatitis virus infection. Additionally, roughly 1.5 million new infections are reported each year. If untreated, a significant proportion of individuals, ranging from 55% to 85%, who are infected with this condition may develop chronic illness, which can ultimately result in cirrhosis, hepatocellular carcinoma, and liver failure. In 2019, the World Health Organisation (WHO) estimated that approximately 290,000 individuals succumbed to hepatitis C, primarily as a result of cirrhosis and hepatocellular carcinoma (HCC) (WHO, 2024). Although death rates for HIV, TB, and malaria are currently decreasing, mortality rates due to viral hepatitis are increasing (Thoraval, 2021).

The Global Health Sector Strategy (GHSS) on viral hepatitis was enacted by the World Health Assembly in May 2016. The objective of this strategy is to eliminate viral hepatitis as a public health issue by 2030, with a target of reducing mortality by 65% and incidence by 90%. To eliminate viral hepatitis as a public health concern, 90% of those infected individuals must be diagnosed, and treatment must be provided to 80% of those diagnosed (WHO, 2016).

Globally, an estimated 12 to 18 million individuals are infected with HCV, which accounts for a significant portion of the global HCV toll. In certain populations, HCV infection is more prevalent. They include patients who are undergoing hemodialysis, individuals who inject drugs, people living with HIV (PLHIV), those who require frequent

blood transfusions (e.g., for thalassemia major), and healthcare workers (HCWs). HCV infection is a significant burden in India, and the country has pledged to eliminate it nationwide by 2030. Implementing this will necessitate a significant increase in countrywide testing and treatment efforts (Grebely et al., 2018).

A recent extensive study found that the estimated rate of HCV infection in India ranges from 1% to 1.9%, with significant variations in incidence depending on the geographical location. Delhi, the primary metropolis of India, is home to over 18 million individuals and has an estimated hepatitis C virus (HCV) prevalence rate of 1%, meaning there are around 1.8 million citizens diagnosed with HCV. The prevalence of HCV among PLHIV pregnant women blood donors was recently reported as 3.51%, 0.71%, and 0.59%, respectively (Welzel et al., 2017).

Manipur state covers approximately 2.7 million. 5.4% of the general population tested positive for HCV antibodies in a sero-survey conducted among individuals who use health services. Out of those who inject drugs (PWID) and have HIV, 95% of them also have a co-infection with HCV (Kermode et al., 2016). Individuals who engage in drug injection, also known as People who inject drugs (PWID), are a demographic that experiences a significant prevalence of HCV infection (Ivins & Marsh, 2018). They are also very much involved in the continuous HCV transmission. However, evidence is scarce about the expansion of HCV therapy and the resulting outcomes in this specific population during the current era of direct-acting antivirals (DAA).

Hence, there is a need to instigate and launch community-sensitive HCV prevention, care, and support initiatives, which include employing peer approaches. The National Viral Hepatitis Control Programme (NVHCP) has the capacity to address the need for increasing community-based and community-anchored approaches in the overall enhancement of HCV care for the deserving population. The NVHCP strives to advance toward the elimination level by addressing social, behavioral, and environmental factors in relation to highly vulnerable groups. The report of the NFHS-5 reveals the role of the private sector in attaining UHC (Universal Health Coverage). The NVHCP still has the capability of strengthening the

decentralized approach to tackling the Hepatitis C Virus, for instance, by engaging the private sector (Mason et al., 2015).

In order to build on the already available efficacy and authority of the response to HCV, it is imperative to start ongoing research on fundamental scientific knowledge, tools, proper technologies, and services to deliver the best response. Further, it is essential to begin operational research, particularly in matters involving intercession that targets specific population groups. To address the inefficiency of primary healthcare successfully, strategies reform must concentrate on optimizing diagnosis and medical examination, boosting the quantity and quality of services available. Thus, the efficacy of preventive, diagnostic, and treatment strategies for HCV may be improved by advancements in research. Furthermore, it is crucial to develop creative approaches to address the social and structural factors that affect the involvement of Key Populations in the community. This is necessary to ensure that efforts to prevent the spread of diseases do not come to a halt. To create a significant influence on public health, it is imperative to widely spread innovative techniques and implement them on a larger scale.

Methods

In the present study, we adopted an ontological approach and quantitative method, employing explanatory research design. By applying a disproportionate stratified random sampling technique, we obtained primary data from a sample of 150 HCV-infected people who inject drugs (PWID) in Manipur, a northeastern state of India. We used an interview schedule to conduct interviews with the respondents at the CCC (Community Care Centre), specifically targeting those who sought antiviral therapy. Later, we tested the tool with Cronbach's alpha reliability and Intrinsic Validity tests for standardization. The prevalence, risk factors, physical health conditions, and quality of life of the PWID were measured using the Itemised Rating Scale (1=Severe, 2. Moderate, 3=Mild for physical health conditions on various symptoms; 1=Not at all, 2=To least extent, 3=To some extent, 4=To great extent, 5=To greater extent for psychological well-being and Quality of Life). The data was collected in 2022. Through the application of an explanatory study design, we have developed research inquiries, such as: what is the extent of the different symptoms linked to

individuals infected with HCV and who inject drugs? What is the level of awareness among people who inject drugs (PWID) regarding the treatment of HCV infection? Is there a correlation between the physical health status, psychological well-being, Community Care Centre (CCC) support system, and the Quality of Life (QoL) among people who inject drugs (PWID)? Thus, our primary emphasis was on the epidemiological and good health & well-being aspects of those engaging in drug injection.

Data Processing

For the development of our instrument and data analysis, we examined two categorical variables: gender and living area. Additionally, we considered awareness level, physical health, psychological well-being, Community Care Centres support system, and quality of life. In order to do data analysis, the attributes were categorized into qualitative and quantitative variables, each having four levels of measurement: Nominal, Ordinal, Interval, and Ratio variables. The variables in ratio form were arithmetically computed to facilitate the application of inferential statistics.

Data Analysis

We utilized the IBM SPSS software (version 22) to transcribe, categorize, edit, compute, and analyze the data. The prevalence difference between female and male PWID was determined using Inferential Statistics, specifically the Independent Sample t-test. The Person's Correlation coefficient was employed to determine the degree of collinearity between physical health conditions and quality of life among people who inject drugs (PWID).

Ethical Consideration

We obtained agreement from the chosen Community Care Centres (CCC) and ensured that all respondents provided informed consent, fully understanding the objectives of the study and their possible involvement. We implemented safeguards to ensure the privacy and confidentiality of the personal information and responses provided by the respondents. Wherever possible, data was anonymized to prevent the exposure of sensitive information.

Results

Table 1: Awareness about the effects, vaccination, and curability of HCV among PWID

Awareness	HCV has an impact on the liver		HCV Vaccine Accessibility		HCV is Curable	
	N	%	N	%	N	%
Yes	98	65.3	25	16.7	103	68.7
No	22	14.7	99	66.0	40	26.7
Don't Know	30	20.0	26	17.3	7	4.7
Total	150	100	150	100	150	100

The liver is the most affected organ in the body due to the hepatitis C virus, and that can lead to death, according to the majority (65.3%) of the respondents. One-fifth of the respondents fall into the "don't know" group about this matter. In addition, 66.00 per cent of the respondents stated that there is no vaccination available now for HCV. A minor percentage of them (17.3%) were unaware of the present status of the HCV vaccine. However, a substantial majority (68.7%) of people who inject drugs (PWID) are of the opinion that hepatitis C virus (HCV) infections can be cured. This optimistic perspective is particularly encouraging for healthcare clinicians and administrators who are considering ways to eliminate the disease. However, positive outcomes necessitate prompt identification and intervention.

Table 2: General symptoms observed among PWID infected by HCV

Symptoms	N	Mean	Rank
Feeling like being often cold	150	3.31	1
Feeling dizzy and lightheaded	150	3.02	2
Swarming around the mouth	150	2.95	3
Loss of appetite	150	2.52	4
Headache	150	2.43	5
Difficulty falling or staying sleep	150	2.09	6
Weight loss	150	2.03	7
Fever	150	2.00	8
Problems with having sex	150	1.96	9

Fatigue	150	1.82	10
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We offered respondents various choices to report their general symptoms as people who inject drugs (PWID) and are infected with the hepatitis C virus (HCV). The PWIDs reported their general symptoms and identified 'fatigue' (mean=1.82) and 'problems with having sex' (mean=1.96) as commonly experienced physical health problems. However, there were indications that a few PWIDs reported feeling 'often cold' with a mean score of 3.31 and 'dizzy and lightheaded' with a mean score of 3.02, which they considered to be minor health issues.

Table 3: Digestive symptoms observed among PWID infected by HCV

Symptoms	N	Mean	Rank
Nausea	150	3.27	1
Diarrhoea	150	3.26	2
Vomiting	150	3.17	3
Burning in the stomach	150	2.95	4
Change in the taste of food	150	2.47	5

People who inject drugs and are afflicted with hepatitis C virus (HCV) have reported experiencing symptoms such as 'burning in the stomach' (mean=2.95) and 'change in taste of food' (mean=2.47) as most affecting gastrointestinal complications. However, there were signs of 'nausea' with an average score of 3.27, and 'diarrhoea' with an average score of 3.26, which were regarded as the least disturbing gastrointestinal problems encountered by PWID.

Table 4: Respiratory symptoms observed among PWID infected by HCV

Symptoms	N	Mean	Rank
Sinusitis	150	4.19	1
Gorge pain	150	3.51	2
Cough	150	3.24	3
Breathlessness	150	3.00	4

Individuals who engage in drug injection and are affected by the hepatitis C virus (HCV) have reported enduring the most respiratory issues, specifically symptoms of 'breathlessness' (mean=3.00) and 'cough' (mean=3.24). Nevertheless, there were indications of 'sinusitis' with an average score of 4.19, and 'gorge pain' with an average score of 4.19,

considered the least affecting respiratory issues experienced by PWID.

Table 5: PWID infected by HCV exhibiting Locomotion symptoms

Symptoms	N	Mean	Rank
Muscle aches	150	2.60	1
Bone/joint issues	150	2.32	2
Muscle soreness	150	2.23	3

People who inject drugs and have hepatitis C virus (HCV) have reported experiencing the highest level of locomotion-related symptoms i.e. muscle soreness' (mean=2.23). However, there were signs of 'muscle aches, with an average score of 2.60, which was identified as the least impactful locomotion symptoms faced by PWID.

Table 6: Changes in physical appearance due to drug injecting practices and HCV infection

Symptoms	N	Mean	Rank
Accumulation of fat in the neck	150	3.41	1
Bigger breasts	150	3.15	2
Bigger belly or wider waist	150	2.97	3
Slimmer legs	150	2.90	4
Slimmer buttocks	150	2.77	5
Slimmer arms	150	2.68	6
Hollow cheeks	150	2.25	7
Veins on the legs more visible	150	2.19	8
Wasting	150	2.09	9
Change in the body shape	150	1.84	10

The PWID has provided a few observations in response to a query on the changes that have occurred to their physical appearance as a result of their drug-injecting practices and HCV infection. The researchers identified 'change in body shape' (mean=1.84) and 'wasting' (mean=2.09) as the most unfavorable physical changes resulting from HCV treatment. Nevertheless, there were indications of 'accumulation of fat in the neck, with an average score of 3.15, and 'bigger breasts,' with an average score of 3.41. The PWID perceived these changes as the least severe modifications in their physical appearance

resulting from drug injecting practices and HCV infection.

Table 7: Independent Sample t-test for the overall physical health status between males and females; rural and urban PWID diagnosed with HCV

	Category	N	Mean	SD	t	P
Gender	Female	8	92.75	5.849	0.135	0.893
	Male	142	92.37	7.909		
Area	Rural	50	90.52	7.760	-2.096	0.038
	Urban	100	93.32	7.687		

When comparing the physical health status of female and male PWID (people who inject drugs), including general symptoms, digestive symptoms, respiratory symptoms, physical appearance, and locomotion-related concerns, no statistically significant differences were observed. Thus, the study revealed that the physical health status of both female and male PWID was similar (female=92.75±5.849, male=92.37±7.909; $t = 0.135$) with a P value of 0.893, which is significantly higher than the crucial region of 0.05. Due to the inherent biological differences between females and males, both sexes may experience changes in their physical health conditions as a result of drug injection and HCV infection. However, there were no notable disparities in the physical health status between female and male PWID under such circumstances. Thus, it may be inferred that people who inject drugs (PWID) and are infected with HCV share similarities in terms of their physical health status, regardless of their gender.

An independent sample t-test was employed to determine the variations in physical health status among people who live in two demographic regions, who inject drugs (PWID), and who are infected by HCV. The result indicated a significant disparity between PWID residing in rural and urban areas. Among the population of PWID residing in the two different regions, those living in rural areas (with a mean and SD scores of 90.52±7.760) exhibited poorer health conditions compared to urban PWID (with a mean and SD scores of 93.32±7.687). The statistical significance of this discrepancy was supported by the t value (-2.096) and P value (0.038). Consequently, rural people who inject drugs (PWID) are more susceptible to physical health issues caused by hepatitis C virus (HCV) infection compared to urban PWID.

Table 8: Correlation between Physical Status of the PWID and their Quality of Life

Variables	1	2	3	4
1. Physical Health Status	1			
2. Psychological Well-being	0.006 0.945	1		
3. CCC Support System	-0.069 0.404	-0.106 0.198	1	
4. Quality of Life	0.234** 0.004	-0.089 0.280	0.153 0.061	1

The correlation between the physical health status, psychological well-being, Community Care Centre support system of PWID, and their Quality of Life was assessed using Pearson's Correlation Coefficient. Consequently, a significant and positive correlation between the physical health and quality of life of the PWID was determined ($r = 0.234$, $P=0.004$). This finding suggests that PWID in superior physical condition experienced a higher quality of life. Therefore, PWID with normal digestive symptoms, respiratory symptoms, locomotion symptoms, and a healthy physical appearance had a better quality of life. On the other hand, psychological well-being and the CCC support system did not have any significant relationship with the Quality of life of the PWID.

Discussion

This study assessed the risk factors related to HCV transformation in people who inject drugs. The results of our study validate that a significant proportion (65.3%) of people who inject drugs (PWID) in Manipur are cognizant of the fact that the liver is the organ most susceptible to hepatic failure, which can ultimately result in mortality. This corroborates the preexisting evidence that HCV is a primary contributor to hepatic failure

and mortality associated with liver diseases. (Grabely & Dore, 2014). Our findings show that a significant majority (68.7%) of PWID believe that hepatitis C virus infections can be cured. This supports the current evidence that Direct-acting antiviral agents (DAA) for HCV, which have a cure rate of over 95 per cent, offer a means to address the burden of HCV-related liver damage in PWID (Grebely, Hajarizadeh, & Dore, 2017). According to our findings, nearly two-thirds (66.0%) of the PWID reported that there is now no vaccination for Hepatitis C. This confirms the existing trend and evidence that in order to halve the prevalence within a span of 20 years, the rates of HCV vaccination (limited to vaccines with moderate and high efficiency) were increased by 50 per cent while the vaccination-to-treatment ratio rose to 20 per cent (Stone et al., 2016).

FWID (females who inject drugs) exhibited distinct characteristics in comparison to MWID (males who inject drugs), which may elevate the risk of HIV/Hepatitis C transmission (Gianget al., 2022). Conversely, in our investigation, there was no discernible distinction between FWID and MWID in the risk of health complications resulting from hepatitis C transmission.

An existing piece of evidence shows that PWID consistently has a very low Quality of Life regardless of their sociodemographic factors (Fischer, Conrad, Clavarino, Kemp, & Najman, 2013), while our findings indicate that only PWID who improved their physical health conditions despite the HCV transformation into their bodies could experience improved quality of life but other factors like psychological well-being and Community Care Centres (CCC) support system did not have any significant relationship with the Quality of Life of the PWID.

Implications

Based on the study findings, the following are the practical implications in responding to the Hepatitis C Virus (HCV) among people who inject drugs (PWID) via public health interventions.

1. Enhancing Awareness and Education: A surprising level of awareness of HCV and its infectiousness, as well as its ability to be treated, implies that education creates

effectiveness among PWID. This means that further actions of public health initiatives should be oriented toward strengthening such knowledge while recognizing the existing gap in understanding that there is no vaccination for HCV. Customized educational programs could enhance the knowledge of the key population about the prevention and treatment options for the conditions.

2. Targeted Intervention for Rural PWID: The study's outcome showed that PWID from rural areas revealed a lower quality of health conditions than urban PWID. This explains the exigent call for targeted public health initiatives in the rural setting, including education, improved healthcare access, and counseling that would specifically address the needs of PWID who live in rural areas.
3. Improving Access to Treatment: Since a large number of PWID are aware of the possibility of HCV curability, public health interventions should target enhanced access to DAA (Direct-acting Antiviral Agents) and other treatment possibilities. Providing effective treatment for PWID will significantly minimize the impact of HCV-related liver disease.
4. Addressing Psychological Well-being: The results showed that the psychological well-being of PWID was, in fact, not associated with their QOL (Quality of Life). It, therefore, implies that the public health initiatives should also include the provision of mental health interventions in addressing the psychological factors revolving around drug use and HCV infection, which would, in turn, improve the overall health conditions of the PWID. In pursuit of attaining the United Nations Sustainable Development Goals (UNSDG), particularly the 3rd goal (Good Health and Well-being), targeted health interventions are imperative.
5. Community Engagement and Support Systems: This study also highlights the necessity of CCC (Community Care Centres) and support systems for patients with the disease. Enhancing such support systems may lead to improved health among PWID by providing comprehensive medical attention that includes treatment, psychological support, and other welfare programs.

Conclusion

Specifically, measurements and data ought to provide precise information on demographic differences between PWID and the potential correlation between certain variables connected to the Hepatitis C Virus. The findings from this study constitute basic data on the epidemiology of HCV, associated risks, physical health conditions, and psychological health indicators, as well as the quality of life of PWID. The study's results emphasize the inevitability of targeted health care services for PWID, precisely in addressing the discrepancies between the rural and urban PWID. The findings of the study would prove useful in decision-making and resource allocation regarding healthcare interventions that potentially lessen the burden of HCV in the PWID population and consequently contribute to improved health outcomes and quality of life as envisaged in the UN Sustainable Development Goals (UNSDG). The governments and other stakeholders, who engage in the healthcare support to PWID, should ensure that they have a holistic care approach, including medical treatment, psychological support, and social reintegration, as the best ways to address the multifaceted issues of PWID with more emphasis on HCV.

Declaration of Conflicting Interests

Concerning possible conflicts of interest, the author(s) have reported that they do not hold any interest in the differences emerging from this study or the writing or publishing of this article.

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Statement on the Availability of Data

The one who is responsible for the manuscript, the corresponding author, can be referred to seek supplemental data in relation to this investigation.

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