

SEROPREVALENCE OF HIV, HBV, AND HCV AMONG INDIVIDUALS ATTENDING ICTC OF A TERTIARY CARE HOSPITAL IN NORTHERN INDIA.



Microbiology

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ABSTRACT

Introduction: Hepatitis B and Hepatitis C share common transmission routes with HIV and coinfection with either can lead to adverse clinical outcomes in patients. This study planned to estimate coinfections with HBV and HCV among HIV positive subjects at a single Integrated Testing and Counselling Center (ICTC) in Kashmir valley.

Methods: The study employed a cross-sectional study design from 2017 to 2019. After pretest counselling all subjects underwent HIV testing as per National AIDS Control guidelines. HIV positive subjects were included in this study. Samples of HIV positive subjects were then tested for HBV by ELISA detecting HbsAg whereas HCV was diagnosed by Anti HCV antibodies and HCV-RNA. Data was entered in excel and analyzed using SPSS. Means and percentages were calculated for relevant variables.

Results: A total of 20070 subjects were tested during the study period of which 34 (0.169%) were HIV positive. Around 60% positive subjects were males. Co-infection with HBV was detected in 11.7% subjects whereas 8.8% had an HCV coinfection. One subject had coinfection with both HBV and HCV. There was no significant association of coinfection with gender or age.

Conclusion: Considering the adverse impact of coinfection on disease course and outcome, screening for HBV and HCV should be a component in diagnostic workup of all HIV positive subjects followed by linkage with specialized treatment services.

KEYWORDS

HIV, Hepatitis B, Hepatitis C, Coinfection.

INTRODUCTION:

HIV/AIDS is one of the most feared diseases that has emerged in current times. India is estimated to have around 23.49 lakh Persons Living with HIV (PLHIV) with an adult HIV prevalence of 0.2%⁽¹⁾. Viral hepatitis and HIV are major community health problems with a high burden of morbidity and mortality. Detection of Hepatitis B and Hepatitis C in high-risk behavior clients is important for several aspects, the first being that both hepatitis viruses (HBV and HCV) and HIV can be transmitted through the use of intravenous drugs in adults or unprotected sexual intercourse⁽²⁾. As all three share a common route of transmission and also can be prevented by common measures⁽³⁾. Co-infection is associated with increased morbidity and mortality ⁽⁶⁾ ⁽⁹⁾. Patients with coinfection with HIV tend to have a faster progression of cirrhosis⁽³⁾.

Global estimation of the burden of HCV-HIV is 2.75 million and HBV-HCV co-infection is 2.6 million⁽⁴⁾. 38 million are living with HIV/AIDS whereas 257 million & 71 million are living with hepatitis B and hepatitis C respectively ⁽⁵⁾⁽⁶⁾. It is also estimated that HCV infects 2-15% of PLHIV and that chronic HBV infections affect an estimated 5-20% of PLHIV⁽⁷⁾. Among states, J&K has the lowest adult HIV prevalence with an estimated prevalence of 0.03% ⁽⁸⁾.

There are not any valid estimates regarding co-infection rates with HBV and HCV among HIV-positive clients in Kashmir valley. This is the first study in the Kashmir division and will help us to estimate the co-infection rate of HBV and HCV among HIV-positive clients attending ICTC of a tertiary care center. Analysis of their high-risk behavior, high-risk group, demographic predominance, and mode of transmission can be used for giving counseling to those individuals showing high-risk behavior and still negative. Positive individuals identified could be counseled and appropriately referred for treatment and thus decreasing morbidity and mortality in them. Apart from counseling the patients with high-risk behavior who are negative, early identification of Co-infection in these patients might help in their early treatment and progression of liver diseases.

AIMS AND OBJECTIVES:

- To estimate the co-infection rate of HBV and HCV among HIV-positive clients attending ICTC of a tertiary care center.
- To estimate the risk factors associated with co-infection by HBV and HCV.

MATERIALS AND METHODS:

STUDY AREA: The study employed a cross-sectional study design and was conducted at the ICTC of the Department of Microbiology, in SMHS a tertiary care hospital, which caters to a large proportion of the population in the valley. The ICTC in the hospital works under the aegis of the department of microbiology and provides counseling and testing services on an outpatient basis as well as to the inpatients admitted to the hospital. The ICTC follows the protocol set by National Aids Control Organization (NACO)⁽¹⁰⁾.

STUDY DESIGN: The primary data collection was done from January 2017 to December 2019. All the clients who availed of ICTC services were offered pre-test counseling following which high-risk clients were identified. Informed consent for participation in the study was taken from all clients. A pretested schedule was used to record basic socio-demographic and clinical information. Pre and post-test counseling were done before and after HIV screening tests and informed consent was taken from all participants. All the samples were stored at 4°C and tested for Hepatitis B surface antigen and IgG antibodies against hepatitis C. The following variables were considered: Age, gender, marital status, level of education, sexual preferences, intravenous drug users, Occupation, and H/O blood transfusion. Posttest counseling was offered to HIV-positive patients.

Participants: Out of a total of 20070 clients who attended ICTC during the 3 years (January 2017 to December 2019), 603 clients gave H/O any one of the high-risk behaviors.

Viral Diagnosis:

Specimen: All subjects who consented to the study were explained the process and 5ml of venous blood was collected following standards protocols. The sample was kept at room temperature for 45 minutes, allowed to clot following which serum was separated by centrifugation.

Detection Of HIV Infection: Standard procedures as defined in National AIDS Control Guidelines were followed for diagnosis of HIV infection. Approved rapid test kits were used for diagnosis. The samples were first tested using COMBAIDS rapid test kit (HIV1+2 Immuno dot test kit, ARKAY Health care Pvt Ltd, Surat, India). Reactive tests were rechecked by two other rapid test kits namely **MERISCREEN 1-2**, (one step Rapid Test for detection of anti-HIV in Human Serum/ Plasma/ Whole blood, Meril Diagnostics Pvt Ltd, Gujarat, India) and **Trispot** (Bhat bi-tech) / **Signal HIV** (ARKAY Health care Pvt Ltd, Surat, India) / **Tredro** (Meril diagnostic pvt ltd).

These are specific tests for categorization into HIV 1 and HIV 2. All three diagnostic tests are based on different principles. Testing algorithm adhered to National AIDS Control Organization (NACO)(10). HIV-positive serum samples were labeled and stored at -20°C. These samples were then tested for HBV and HCV using ELISA kits.

Detection of HBV co-infection: HbsAg was detected by ELISA using (HbsAg ELISA OSCAR Medicare, New Delhi, India) as per the manufacturer's instructions(12).

Detection of HCV co-infection: Detection of HCV was done by ELISA (HCV ELISA OSCAR Medicare, New Delhi, India) employing conserved antigenic segments of core, NS3, NS4, and NS5 antigens(12). HCV-RNA detection was also done.

RESULTS:

A total of 3% of clients out of 20070 ICTC attendees gave H/O any one of the high-risk behavior for HIV infection. Out of these 20070 attendees, 34(0.169%) were positive for HIV antibodies. Out of these 34 HIV-positive patients, 21 (61.7%) belonged to the age group of 21-40 years which 11 of these belonging to the age group of 21-40 years. 3 belonged to the age group of fewer than 10 years. 21 out of these 34 were Males which accounted for 61.7% of cases. **Table 1**

Table 1: Age and Gender distribution of HIV-Positive subjects

AGE	Total HIV positive (n=34)		
	MALE	FEMALE	TOTAL%
<10 YEARS	01	02	03 (8.8%)
11-20 YEARS	-	-	-
21-30 YEARS	06	04	10(29.4%)
31-40 YEARS	07	04	11 (32.3%)
41-50 YEARS	04	01	05 (14.7%)
>50 YEARS	03	02	05 (14.7%)
TOTAL	21 (61.7%)	13 (38.23%)	34

HBV co-infection: A total of 4 (11.7%) HIV-positive clients were co-infected with HBV. Out of these, 3 were in the age group of 31-40 years and 1 subject belonged to the age group of 21-30 years. The prevalence was 14.2% in males and 7.6% in females.

HCV co-infection: A total of 3 (8.8%) HIV-positive clients were co-infected with HBV. Out of these, 2 were in the age group of 41-50 years and 1 subject belonged to the age group of 31-40 years.

The prevalence was 9.5% in males and 7.6% in females **Table 2, Table 3**

Table 2: Co-infection rates as per age

AGE	HIV positive (n=34)			
	HIV POSITIVE	HIV-HBV coinfection	HIV-HCV coinfection	HIV-HBV-HCV triple-infection
<10 Years	03	-	-	-
11-20 Years	-	-	-	-
21-30 Years	10	01(10%)	-	-
31-40 Years	11	03 (27.27%)	01(9.09%)	01
41-50 Years	05	-	02(40%)	-
>50 Years	05	-	-	-
TOTAL	34	04 (11.76%)	03 (8.8%)	01 (2.9%)

Table 3: Gender wise distribution of co-infection

GENDER	HIV Positive	HIV-HBV Coinfection	HIV-HCV Coinfection	HIV-HBV-HCV Triple-Infection
MALE	21	03(14.2%)	02(9.5%)	01(4.7%)
FEMALE	13	01(7.6%)	01(7.6%)	-
TOTAL	34	04(11.7%)	03(8.8%)	01(2.9%)

Among HIV positives, 11 (32.3%) were housewives followed by businessmen and service class people 08 (23.5%) for both. 52.9% acquired HIV through heterosexual contact followed by intravenous drug use i.e., 10 (29.4%) and blood transfusion (8.8%) **Table 4**

Table 4: Occupation and probable route of transmission.

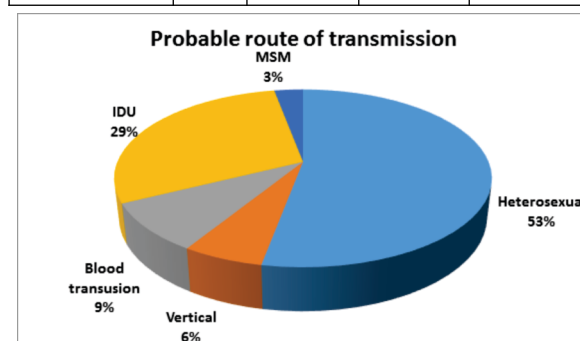
OCCUPATION	MALE (%)	FEMALE (%)	TOTAL (%)
Unemployed	-	-	-
Laborer	01 (4.8%)	-	01 (2.9%)

Long route drivers	02 (9.5%)	-	02(5.8%)
Business	08 (38.1%)	-	08(23.5%)
Student	01 (4.8%)	01	02(5.8%)
Housewife	-	11	11(32.3%)
Service class	08 (38.1%)	-	08(23.5%)
Baby	01	01	02(5.8%)
Probably route of transmission			
Vertical	01	01	02(5.8%)
Heterosexual	10	08	18(52.9%)
Blood transfusion	01	02	03(8.8%)
IDU	08	02	10(29.4%)
MSM	01	-	01(2.9%)
TOTAL	21	13	34

Among HIV-positive patients, 04 patients had coinfection with HBV. Out of these 04 patients, 01 patient had a history of previous blood transfusion and 01 patient had a H/O intravenous drug misuse. Among 03 HCV positives, 02 had a H/O blood transfusion and 01 patient was an intravenous drug user. **TABLE 5**

Table 5: Probable route of transmission in HBV & HCV.

Route of Transmission	TOTAL	HIV-HBV Coinfection	HIV-HCV Coinfection	HIV-HBV-HCV Triple-Infection
Vertical	02	0	0	0
Heterosexual	18	02	0	0
Blood transfusion	03	01	02	01
IDU	10	01	01	0
MSM	01	0	0	0
TOTAL	34	04	03	01



DISCUSSION:

A total of 34 subjects were HIV-positive out of the 20070 subjects who underwent testing at the ICTC center. The positivity rate was 0.169%. Among HIV-positive clients 61.7% were males the higher number in the study can be attributed to the higher proportion of ICTC attendees being males, HIV still carries a stigma which particularly decreases footfall due to female clients. Studies conducted at other ICTC centers also have reported similar findings. (13).

The age distribution of HIV-positive clients depicts that the highest number belongs to the age group of 31-40 years (32.3%). This was closely followed by the age group of 21-30 years with 29.4% cases. This is in line with the epidemiology of HIV which primarily affects young people and multiple other studies have also estimated the highest prevalence in this age group (3)(13).

The most common occupation was business/self-employed and service class for males and homemakers for females. A total of 2 cases from 21 males were long-distance truckers. This implies that most cases in the current study did not belong to any high-risk occupations which are usually targeted using targeted interventions. Other studies have also reported similar findings (2). The most probable mode of transmission in both males and females was heterosexual contact (52.9%). This was followed by intravenous drug abusers which was the probable source of transmission for 38% males and 15% females. (2)(3)(13).

Detection of Hepatitis B and Hepatitis C in HIV-infected individuals is important as co-infection is associated with increased morbidity and mortality (3) (13). The prevalence of HBV infection is different for different countries depending upon host factors, environmental and

behavioral factors. It's very low in developed countries and high in developing countries like India, China, Africa (15). There is a dearth of data regarding co-infection with hepatitis viruses in HIV-positive clients. In this study, a total of 4 (11.7%) HIV-positive clients were co-infected with HBV. Out of these, 3 were in the age group of 31-40 years and 1 subject belonged to the age group of 21-30 years. The prevalence was 14.2% in males and 7.6% in females. A total of 3 (8.8%) HIV-positive clients were co-infected with HCV. Out of these, 2 were in the age group of 41-50 years and 1 subject belonged to the age group of 31-40 years. The prevalence was 9.5% in males and 7.6% in females. The figures are higher than studies done in central India and comparable to studies done in southern India (14)(15). *Mittal et al* reported a prevalence lower than in our study (2). One previous study in Jaipur India did not find any HBV Co-infection in HIV-infected individuals though HIV was higher than in our study 0.11%(16).

In the present study, co-infection with HBV was highest in the age group of 31-40 years (27.27%) followed by the age group of 21-30 years. This reaffirms the findings from multiple studies which have found a higher prevalence of both these diseases in younger populations.

In the present study, HCV co-infection was primarily found in patients aged between 41-50 years which is not following many studies where the majority of cases fall in the sexually active age group (31-40 years) (3)(13).

HCV co-infection was highest in blood transfusion cases followed by intravenous drug users. (12).

CONCLUSION:

The study found a low HIV positivity rate among general clients although the prevalence was high among high-risk clients. Co-infection with hepatitis B & C was high among injectable drug misusers and long-distance drivers. There is a need to screen for coinfection among HIV infected, as co-infection with either has an impact on the course of both diseases. Taking appropriate preventive measures would prevent the development of dreadful diseases.

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Conflict of Interest: The authors have no conflict of interest.

Author's Contribution: Dr. Anjum Farhana conceptualized the study and developed data collection tools. Dr. Seema Aleem developed the methodology, case definitions and was involved in testing. Dr. Humaira Bashir was involved in data collection and testing. All the authors contributed to the write-up for the paper.

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Data Availability: Final and compiled data set have been incorporated in the manuscript.

Ethics Statement: The study was approved by the institutional review committee of GMC, Srinagar.

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