

Seroprevalence of Human Immunodeficiency Virus, Hepatitis B Virus and Hepatitis C Virus in Nepalgunj Medical College, Nepal

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ABSTRACT

Introduction: Human immune deficiency viruses (HIV), Hepatitis B viruses (HBV) and Hepatitis C viruses (HCV) are the three most common chronic viral pathogens known. The viruses have common routes of transmission (such as blood and blood products, sharing needles to inject drugs and sexual activities) and similar risk factors.

Aim and objective: The aim of study was to determine the seroprevalence of HIV, HBV and HCV in Kohalpur Teaching Hospital, Nepalgunj Medical College.

Materials and methods: This is a descriptive hospital based study. The study was conducted at Nepalgunj Medical College, KTH, Banke. In this study, 2865 were tested for HIV, 2849 were tested for HBV and 2950 were tested for HCV from 12-01-2017 to 06-07-2017.

Results: In case of HIV, 1781 (62.16%) were male and 1064 (37.84%) were female. The study revealed that in HIV reactive case was found to be 0.14% where 0.16% (3) were males and 0.09% (1) were females. In case of HBV, 1743 (61.18%) were males and 1106 (38.82%) were females. The prevalence of HBV reactive was found to be 1.65% where 1.2% (34) in male and 0.45% (13) in female. In case of HCV, 1200 (40.67%) were male and 1750 (59.33%) were female. The prevalence of HCV reactive was found to be 0.03% (1) which was only in female.

Conclusion: We found that the prevalence of HIV was more predominant in males 0.16% (3). The HBV was more prevalent followed by HIV and HCV and the prevalence of HBV in male was more 1.2% (34) as compared to females 0.45% (13).

Key words: HIV, HBV, HCV, Seroprevalence

INTRODUCTION

Human immune deficiency viruses (HIV), Hepatitis B viruses (HBV) and Hepatitis C viruses (HCV) are the three most common chronic viral pathogens known. Despite their biological differences and natural history of chronic infection, the viruses have common routes of transmission (such as blood and blood products, sharing needles to inject drugs and sexual activities) and similar risk factors¹.

The HIV is the etiologic agent of AIDS. AIDS was first recognized clinically in 1981, although the first known case of AIDS has been traced to 1959. HIV exists as two major viral species; HIV-1 and HIV-2. HIV-1 was initially discovered in 1983 and HIV-2 in

1986. These two viruses belong to the retrovirus group and are slow viruses².

HIV/AIDS has had a great impact on society, both as an illness and as a source of discrimination. The disease also has large economic impacts. There are many misconceptions about HIV/AIDS such as the belief that it can be transmitted by casual non-sexual contact. There is no cure or vaccine available as on date, however, antiretroviral treatment can slow the course of the disease and may lead to a near-normal life expectancy. Treatment is recommended as soon as the diagnosis is made. Without treatment, the average survival time after infection may be around 10 years³.

As of 2016, approximately 36.7 million people are living with HIV globally. In 2016, approximately half are men and half are women. There were about 1.0 million deaths from AIDS in 2016⁴.

Hepatitis B virus (HBV) is a member of the hepadnavirus family. HBs Ag (also known as the Australia antigen) is the surface antigen of the hepatitis B virus (HBV). It indicates current hepatitis B infection. This is because it was first isolated by the American research physician and Nobel Prize winner Baruch S.

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Blumberg in the serum of an Australian Aboriginal person. It was discovered to be part of the virus that caused serum hepatitis by virologist Alfred Prince in 1968³. The term Hepatitis B was adopted by the World Health Organization (WHO) in 1973².

The infection can be diagnosed 30 to 60 days after exposure. Diagnosis is typically by testing the blood for parts of the virus and for antibodies against the virus. It is one of six known hepatitis viruses i.e. A, B, C, D, E and G³. Recent estimates of the number of people chronically infected with HBV have ranged from 240 million to 350 million, with more than two billion humans globally ever having been infected⁵.

Hepatitis C Virus (HCV) was identified in 1989 as the main etiological agent of non-A, non-B hepatitis (NANBH) accounting for greater than 90% of post-transfusion hepatitis cases. Hepatitis C Virus (HCV) is a flavivirus which belongs to Flaviviridae family. It is now the commonest cause of post-transfusion hepatitis in the various developed countries.

Hepatitis C is an infection that mostly affects the liver. Often, a person with Hepatitis C does not have any symptoms. However, chronic infection can scar the liver. Many years of infection may cause cirrhosis. Sometimes, people with cirrhosis also have liver failure or liver cancer. They can also have very swollen veins of the oesophagus and stomach. Scientists began studying the Hepatitis C virus in the 1970s, and in 1989 they proved that the virus exists. As far as scientists know, this virus does not cause disease in any animals other than humans. The medications that are normally used to treat Hepatitis C are called peg interferon and ribavirin. Between 50-80% of people who are treated (5 to 8 out of every 10) are cured. However, if a person's Hepatitis C has progressed (or gotten worse) so much that the person has cirrhosis or liver cancer, the person might need a liver transplant. This makes it possible for the person to survive, but the Hepatitis C virus usually comes back after the transplant. There is no vaccine that works to prevent people from getting Hepatitis C³.

Total global HCV prevalence is estimated at 2.5% (177.5 million of HCV infected adults), ranging from 2.9% in Africa and 1.3% in Americas, with a global viraemic rate of 67% (118.9 million of HCV RNA positive cases), varying from 64.4% in Asia to 74.8% in Australia⁶.

MATERIALS AND METHODS

This was a descriptive hospital based study, 2865 were tested for HIV, 2849 were tested for HBV and 2950 were tested for

HCV, attending to Nepalgunj Medical College, KTH, Nepal, were investigated for HBV, HCV and HIV from 12-01-2017 to 06-07-2017. The prevalence of HBV, HCV and HIV in the male was compared with that in the female.

HIV test

Tri Dot test is manufactured and marketed by DIAGNOSTIC ENTERPRISES, (de@diagnosticenterprises.com).

Based on flow through technology, HIV TRI-DOT test is a visual, rapid, sensitive and accurate immunoassay for the differential detection of HIV-1 and HIV-2 antibodies (IgG) in Human Serum or Plasma using HIV-1 and HIV-2 Antigens immobilized on an immunofiltration membrane. The test is a screening test for anti-HIV-1 and anti-HIV-2 and is for in vitro diagnostic use only. HIV TRI-DOT has been developed and designed using gp41, C-terminal of gp120 and gp36 representing the immunodominant regions of HIV-1 & HIV-2 envelope gene structure respectively.

The test is named for the three dots that appear to give the result: one pink dot is a control dot, showing the test is functioning properly; one dot shows the presence of HIV-1 antibodies and one dot shows the presence of HIV-2 antibodies.

HBV

Virucheck is manufactured by Orchid Biomedical System, 88/89, Phase II C, Verna Industrial Estate, Verna Goa-403722, India.

It one step test for HBsAg is a rapid, quantitative, two side sandwich immunoassay for detection of Hepatitis B surface antigen, a marker for Hepatitis B infections, in serum/plasma specimen.

Virucheck one step test for HBsAg utilizes the principle of IMMUNOCHROMATOGRAPHY, a unique two site immunoassay on a membrane. As the test sample flows through the membrane assembly of the test device, the colored polyclonal anti-HBsAg-colloidal gold conjugate complexes with the HBsAg in the sample. This complex moves further on the membrane to the test region where it is immobilized by a monoclonal anti-HBsAg antiserum coated on the membrane leading to formation of a pink-purple colored band which confirms a positive test result. Absence of this colored band in the test region indicates a negative test result. The unreacted conjugate and unbound complex if anyone further on the membrane and are subsequently immobilized by

the anti-rabbit antiserum coated on the membrane at the control region, forming a pink-purple band. This control band serves to validate the test results.

HCV

Tri Dot test is manufactured and marketed by DIAGNOSTIC ENTERPRISES, (de@diagnosticenterprises.com).

The 4th generation HCV TRI-DOT is ha rapid, visual, sensitive and qualitative in vitro diagnostic test for the detection of antibodies to Hepatitis C virus in human serum or plasma.

The 4th generation HCV TRI-DOT has been developed and designed with increased sensitivity for core and NS3 antibodies using a unique combination of modified HCV antigens. They are for the putative core (structural), protease/helicase NS3 (non-structural), NS4 (non-structural) and replicase NS5 (non-structural) regions of the virus in the form of two test dots “T₁” & “T₂” to provide a highly sensitive and specific diagnostic test. The test is named for the three dots that appear to give the result: one pink dot is a control dot, either pink dot on each “T₁” & “T₂” or both regions indicate that the specimen is reactive for antibodies to HCV.

RESULTS

Our study has aimed to determine the seroprevalence of HIV, HBV and HCV. In the present study, 2865 patients were tested for HIV, 2849 patients were tested for HBV and 2950 patients were tested for HCV, attending to Nepalgunj Medical College, KTH, and Nepal.

Among 2865 patients who were tested for HIV, 1781 (62.16%) were male and 1084 (37.84%) were female. The prevalence of HIV reactive was found to be 0.14% (4) where 0.16% (3) in male and 0.09% (1) in female. Out of 2849 were tested for HBV, 1743 (61.18%) were male and 1106 (38.82%) were female. The prevalence of HBV reactive was found to be 1.65% (47) where 1.2% (34) in male and 0.45% (13) in female.

Similarly, out of 2950 were tested for HCV, 1200 (40.67%) were male and 1750 (59.33%) were female. The prevalence of HCV reactive was found to be 0.03% (1) which was only in female.

HIV			HBV			HCV		
Male	Female	Total	Male	Female	Total	Male	Female	Total
1781	1084	2865	1743	1106	2849	1200	1750	2950
62.16%	37.84%		61.18%	38.82%		40.67%	59.33%	

Table I: Total number of subjects with respect to gender

Table II: Distribution HIV, HBV and HCV with respect to gender

	Gender	Reactive	Non-reactive	Total
HIV	Male	3	1778	1781
	Female	1	1083	1084
Total (%)		4 (0.14%)	2861 (99.86%)	2865
HBV	Male	34	1709	1743
	Female	13	1093	1106
Total (%)		47 (1.65%)	2802 (98.35%)	2849
HCV	Male	0	1200	1200
	Female	1	1749	1750
Total (%)		1 (0.03%)	2949 (99.97%)	2950

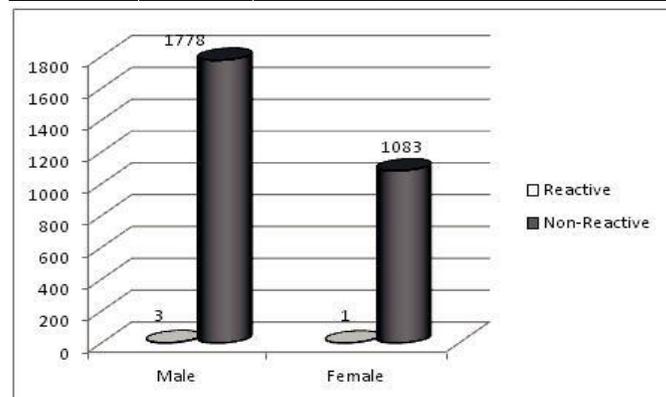


Figure 1: Showing graphic analysis of reactive and non-reactive with respect to gender in HIV

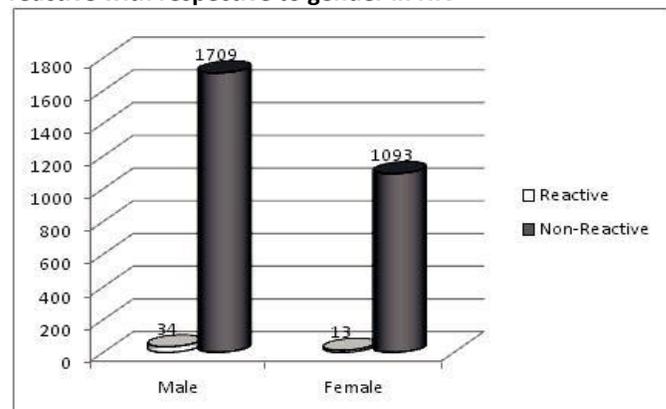


Figure 2: Showing graphic analysis of reactive and non-reactive with respect to gender in HBV

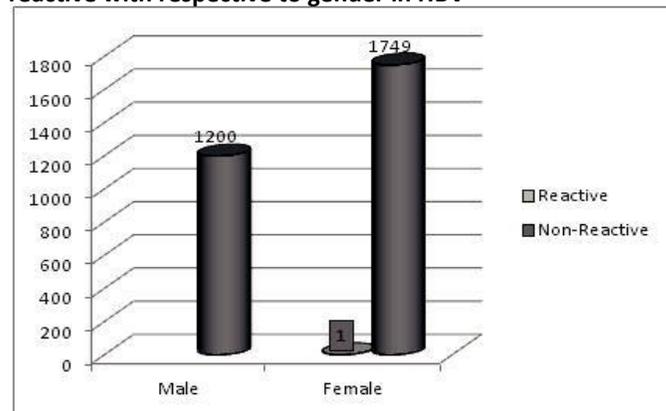


Figure 3: Showing graphic analysis of reactive and non-reactive with respect to gender in HCV

DISCUSSION

The study conducted in Western Region of Nepal the seroprevalence of HIV, HBV and HCV showed the prevalence of 0.5% in HIV, 1.1% in HBV and 0.3% in HCV⁷. In another study done in Eastern Region of Nepal, the prevalence of HIV, HBV and HCV and their co-infection during primary investigation and before ART showed 2.7% in HIV, 1.4% in HBV and 0.4% in HCV.

Karki S et al conducted a study, in which the seroprevalence of HIV was 0.19%⁹. Another study revealed that the seroprevalence of HIV was 0.33%¹⁰. The study of seroprevalence of HBV in two different places of Eastern part of Nepal showed that 0.52% and 0.64% respectively¹¹. Another study of seoprevalance of HBV was 4.19%¹².

A study done in Nepal showed the prevalence of HBV and HCV were 2.1% and 0.33% respectively¹³. Another study of the seroprevalence of HCV was 0.66%¹⁴. In Our study, the prevalence of HIV was 0.13%, HBV was 1.65% and HCV was 0.03% among 1865, 2849 and 2950 patients attending the hospital, which are not very different from the previous studies done in different parts of Nepal. The prevalence was higher in HBV followed by HIV and HCV. The prevalence in male was seen higher in HIV and HBV but the prevalence was higher in female seen in HCV.

CONCLUSION

The seroprevalence of HIV was 0.14% in 2864, HBV was 1.65% in 2849 and HCV was 0.03% in 2950. HBV was more prevalent followed by HIV and HCV in the Mid-Western part on Nepal who visited in Nepalgunj Medical College, Kohalpur Teaching Hospital. Higher prevalence was seen in males than in females in HIV and HBV. In HCV, reactive cases were seen only in one female not in male.

HIV/AIDS is the burning crisis worldwide. However, the approach for the management of the issue is dissimilar in different countries. In low prevalence countries like Nepal, the Government of Nepal could deliver the different prevention activities. The disease management and prevention is necessary. Since HIV, HBV and HCV infections have high mortality; population at risk should be screened to know the burden of infections nationwide to make the plans and policies for disease prevention.

REFERENCES

1. Kellerman S. E., Hanson D. L., McNaghten A. D. et al (2003). Prevalence of chronic hepatitis B and incidence of acute hepatitis B infection in human immunodeficiency virus-infected subjects. *J. Infect. Dis.* 188:571–577.
2. Patrick R. Murray. *Manual of Clinical Microbiology*. 9th ed. ASM Press. Washington, D. C. 2007.p.1308
3. Priyanka Khanna, Jaspal Kaur* and Kailash Chand. Seroprevalence of Human Immunodeficiency Virus, Hepatitis C Virus and Hepatitis B Virus in Police Personals. *Int.J.Curr.Microbiol.App.Sci* 2017;6(12): 928-934 "[Fact Sheet](#)"
4. .UNAIDS.org. 2016. Retrieved 23 September 2017.
5. Hepatitis B Virus Epidemiology, Jennifer H. MacLachlan^{1,2} and Benjamin C. Cowie, Cold Spring Harbor Laboratory Press; all rights reserved; doi: 10.1101/cshperspect.a021410 Cite this article as Cold Spring Harb Perspect Med 2015;5:a021410
6. Arnolfo Petruzzello, Samantha Marigliano, Giovanna Loquercio et al. Global epidemiology of hepatitis C virus infection: an up-date of the distribution and circulation of hepatitis C virus genotypes, *World J Gastroenterol* 2016 September 14; 22(34): 7824-7840
7. Umid Kumar Shrestha, Bhup Dev Bhatta. Seroprevalence of hepatitis B virus, hepatitis C virus and human immunodeficiency virus in the western region of Nepal *JAIM*. 2016 Jan-Jun; 5(1):9
8. Sanjay Mahato, Asmita Mahato and Jaybendra Yadav. Prevalence of HIV, HBV and HCV and their co-infection during primary investigation and before ART in Eastern Region of Nepal. *IJAMBR* 5 (2017) 123-131
9. Surendra Karki, Prakash Ghimire, Bishnu Raj Tiwari et al. Seroprevalence Of Hiv And Hepatitis C Co-Infection Among Blood Donors In Kathmandu Valley, Nepal. *Southeast Asian J Trop Med Public Health* 2009 Jan;40(1)
10. Tiwari BR, Karki S, Ghimire P et al. Prevalence of HIV in blood donors. *J Nepal Health Res Counc* 2008 Oct;6(13):93-7
11. Khanal H, Bhatta DR, Tiwari BR et al. Seroprevalence Of Hepatitis B Among Blood Donors In Jhapa, Nepal. *Sun Tech Col J* 2012 Oct; 1(1), ISSN 2091-2102
12. Bibek Bhatta¹, Roshina Thapa¹, Pankaj Pant et al. A Retrospective Hospital Based Study In Kathmandu to Assess the Seroprevalence of Hepatitis B Virus. *JMMIHS*; 2016: Vol 2; 3. ISSN: 2091-1041
13. Pokharel N, Bhandari D, Jha B. Pattern of hepatitis B and C infections among patients attending a tertiary care hospital in Kathmandu, Nepal. *J Inst Med* 2016 Aug-Dec;38:2-3
14. Karki S, Ghimire P, Tiwari BR. Seroprevalence of anti HCV antibodies among blood donors in Kathmandu valley, Nepal; *KUMJ* 2008; 6(4): 24: 491-496

