Incidence of newly diagnosed HIV, HBV, HCV infections in a tertiary care hospital in rural setting

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Abstract

Aim: the study is conducted to estimate the incidence of newly acquired HIV, HBV, and HCV infections in patients comprising of paying and non paying cases in a tertiary care hospital in suburbs of Hyderabad. The study period included a duration of 1 year starting from 1st January 2016 to 31st December 2016. The two groups represent the difference in the socio economic status.

Materials and Methods: the serum samples were received in microbiology laboratory from patients as routine surgical screening or anti natal screening. The testing for HIV, HBV, HCV is done according to the policy of the laboratory.

Results: In the paying group, out of 4055 patients tested for HIV, and HBV the percentage of positivity are 0.62 and 2.34 respectively and HCV was positive in 0.73% of 2846 patients. In non paying group, the percentages of positive results are 1.066, 1.243 and 0.61 for HIV, HBV, HCV out of 3094, 2956, and 1140 respectively. These results show interesting trends in these two groups. In paying group the predominant infection is HBV infection while in nonpaying group the predominant one is HIV infection.

Conclusions: these observations emphasize the role of socio economic status in the occurrence of HIV infection and the need for increasing efforts for education of this population, and the need for more wide spread vaccination of the population against HBV.

Keywords: HIV, HBV, HCV, Socio economic status.

Introduction

Prevalence of blood borne viral infections varies worldwide depending on the type of infectious agent, and the population group. The important agents are human immunodeficiency virus (HIV), Hepatitis B virus (HBV) and Hepatitis C virus (HCV). India has the third largest HIV epidemic in the world. Every year 86,000 new cases are diagnosed. 68,000 die of AIDS related complications.[1] Hepatitis B and Hepatitis C infections are silently spreading to epidemic proportions in India. Every year one million Indians are at risk for HBV infection, and 100,000 die from HBV infection.[2] The point prevalence of HIV, HBV, HCV infections in India are 0.26%,[1] 3.7%, and 1%[2] respectively. The routes of infection are similar in all three infections so co infections are also seen. However each of these infections affect particular group more than other people because of differences in the epidemiology and transmission properties. HIV more commonly affects commercial sex workers with an average rate of 2.2% and, men who have sex with men with a rate of 4.3% because of the effective route being sexual contact, followed by injected drug users with an estimated rate of 9.9% in 2015.[1] HBV infection is another important blood borne infection, the magnitude and significance of which vary from country to country. The major health problem in HBV infection is the morbidity due to liver involvement leading to complications like chronic liver disease, cirrhosis of liver and hepatocellular carcinoma.[3] One of the earlier studies reported that HBV was the etiological agent in 42% of acute liver failure and 45% of chronic liver failure cases with 60% of hepatocellular carcinoma cases being HBV marker positive.[4] In developed countries like America and Europe prevalence is less than 1% while in developing countries in Asia, Africa, Far East it is 5-10%.[5] In these intermediate level prevalence countries HBV infection spreads by horizontal transmission.[6] Blood transfusion is the common route of infection in adults. The risk groups are overcrowded inhabitants, injectable drug users using contaminated syringes, and professional blood donors.[4] The professional blood donors constitute nearly 40% of all blood donors in India. They represent major high risk group for HBV infection in this country, with a hepatitis B surface antigen (HBsAg) positivity rate of 15% - about five times the prevalence of HBsAg in healthy volunteer blood donors.[4] Peri natal transmission of HBV is less important in India.[5]

HCV infection is commonly associated with blood transfusion and dialysis, the incidence of which is less than HBV infection. Some of the factors influencing the prevalence of these infections are socio economic status, and rural versus urban populations. Socio economic status itself is composed of various factors like educational status, occupation and household utilities which influence more HIV infection.[7] These variations and inequalities in wealth and quality of life are affecting everyone and increasing globally. Wealthier populations do better than poorer ones on most indicator scales of health status including nutrition, morbidity, mortality and health care utilization. Rural population is at higher risk than urban population due to multiple reasons, like poverty, unsafe

injection practices, orthodox beliefs including female vulnerability.

There are many studies about the seroprevalence of HIV, HBV, and HCV among blood donors[8,9] and specific groups like patients attending sexually transmitted diseases (STD) clinics,[10] and reproductive age females[11,12] but few studies about the prevalence among all the patients attending the hospital in general. We studied the same in a tertiary care teaching hospital in the rural area of Hyderabad. The study done in Malla Reddy Narayana Multispeciality hospital, Suraram, Hyderabad. The hospital has paying cases as well as patients who are treated free of cost as they are economically backward. This may represent difference in their socio economic status. We studied the incidence of newly diagnosed HIV, HBV, and HCV infections in these groups and whether the economic status has any influence on the incidence of these infections.

Materials and Methods

The study population included two categories of patients visiting MallaReddy Narayana Multispeciality hospital, Suraram, one group who are paying for all the medical services provided, the other group for whom the services are free of cost as they belong to low income group by their occupation or unemployment.

The study period is 12 months from 1st January 2016 to 31st December 2016. Cases included in the study were patients attending Mallareddy Narayana Multi speciality hospital whose specimens were sent to the microbiology laboratory for routine screening for Antibodies against HIV, HBsAg, and antibodies against HCV either as surgical screening, or antenatal screening.

HIV Antibody Testing: This is done according to National Aids Control program (NACO) guidelines. The test kits are supplied by Govt. of India as part of Facility for integrated counselling and treatment center Public Private Partnership (FICTC-PPP) scheme. The first line kit used during this period is Coomb AIDS and the test is performed and interpreted according to the manufacturer's guidelines. A test which gives a negative result is reported as non reactive and no further action is taken. When test shows a positive reaction, the serum is tested with second and third line kits which are SD bioline (standard diagnostics. Inc) and HIV Tridot (J.Mithra). All these are rapid immunochromatographic tests. When the test shows positive result with all three methods, it is reported as reactive. When only two tests are reactive, it is advised to test by confirmatory tests like polymerase chain reaction (PCR), or Western Blot method in other laboratories where these tests are available.

The patients with reactive results are referred to the ICTC counsellor appointed in the hospital. Their demographic information is documented.

HBsAg Testing: The test is performed by immune chromatographic method, Hepa Card, (J.Mithra). The procedure and interpretation were followed according to the manufacturer's guidelines.

A test which gives a negative result is reported as negative. Test sample showing a positive test band is subjected to testing with other kits to rule out false positive result. The other kits included are SD Bioline (standard diagnostics Inc.), Vitros ECi (Ortho Diagnostics) method. When all three are giving positive results, it is reported as positive for HBsAg. If there is any inconclusive result the patient was advised to get a confirmatory test done by Polymerase chain reaction elsewhere.

Testing for HCV Antibodies: The test was done by HCV Tridot (J.Mithra) which is an immunochromatographic method. The test procedure and interpretation were according to the manufacturer's guidelines. A negative result (not showing a positive test dot and showing control dot) is reported as non reactive. When a test was showing a positive test dot along with control dot, the specimen was tested again with SD bioline kit (Standard diagnostics.Inc), and Vitros ECi (Orthodiagnosics) chemiluminescence method. When all three methods were giving positive results, it is reported as reactive. When in doubt, the patient was advised to get a confirmatory test done by PCR, or recombinant immunoblot assay (RIBA) in referral laboratory. As the screening tests can sometimes give false positive results due to interferences in immunoblotting, we perform the test by other test kits or method as well for confirmation.

The data was collected from the serology records and test request forms. In non paying group, HIV positive patient demographic information was documented. Total no. of samples tested, and number of tests with positive result with all three methods in each of the test were noted. The data was analyzed statistically by SPSS, using Z test and x^2 test.

Results

Total number of samples received for all three tests were 4055 for each of anti HIV, and HBsAg testing, 2846 for anti HCV in case of paying cases. In case of non paying cases, 3094 specimens for HIV testing, 2956 specimens for HBsAg testing, and 1140 specimens for HCV antibodies were received. Number of positive cases in each category and population group is shown in Table 1. The percentage positives for HIV, HBsAg, and anti HCV are 0.62%, 2.34%, 0.73% respectively in paying group, and in non paying group they are 1.066 for HIV, 1.243% for HBsAg, and 0.61% for anti HCV. A comparative depiction of the incidence of the three tests in two groups is shown in Fig. 1. Statistical analysis results of incidence of each of the viral pathogen in both groups is shown in Table 2. HIV infection was observed more frequently in the non paying group and HBV infection was observed more in the paying group.

When both groups were compared, these findings were statistically significant (p value 0.049). When compared within the group, non paying group had similar rates of HIV, and HBV infections (1.o66% and 1.243% each), but in paying group, there is a significant difference in the rates of HBV (2.34%) and HIV (0.62%).

In the non paying group, among the newly diagnosed HIV cases, 18 were males and 15 were females. All the individuals except two were employed as agricultural laborers, non agriculture laborers, domestic servant, transport workers, petty business, non governmental employment, students, and two were house wives. All non paying individuals who underwent testing for the three infections belong to the same type of occupations. It is assumed that they belong to low socioeconomic category.

Table 1: Total no of samples tested and no. & % of positives in paying and non paying groups

Group	Paying			Nonpaying		
Test	**Anti HIV**	**HBsAg**	**Anti HCV**	**Anti HIV**	**HBsAg**	**Anti HCV**
Total no tested	4055	4055	3094	3094	2956	1140
No positive	25	95	21	33	38	7
%	0.62%	2.34%	0.73%	1.066%	1.243%	0.61%

Table 2: Significance of difference in the incidence in the two groups

Infection	HIV	HBV	HCV
Non paying group	33/3094	38/2956	7/1140
Paying group	25/4055	95/4055	21/2846
Z test	Z = 1.77: p value – 0.076	Z = 1.979: p value= 0.048	Z = 0.135: p value= 0.893
X2 test	X2= 3.876: p value = 0.049	X2 = 9.755 p value= 0.002	X2 = 0.045: p value= 0.831
Significance	Significant by x2 test	Significant by z test and x2 test	Not significant

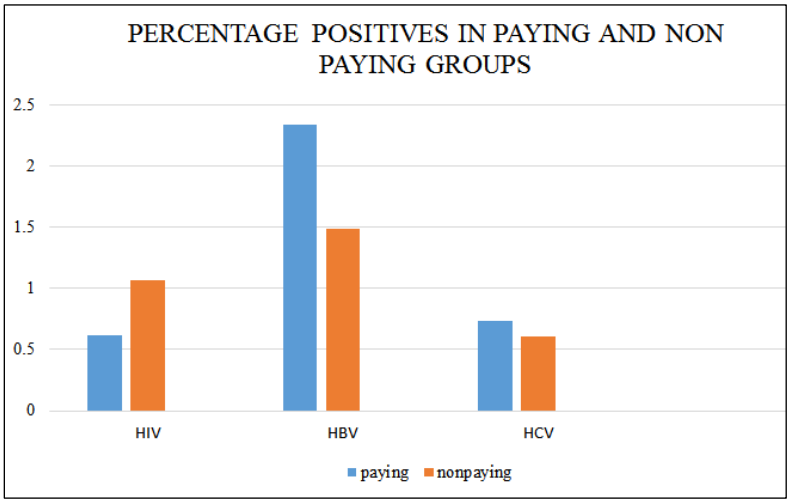

Fig. 1: Percentage positives in paying and non paying groups

Discussion

The present study shows that the low socio economic status has influence on the incidence of HIV infection, while the paying group showed higher incidence of HBV infection. HCV infection did not show much difference (0.73% vs 0.61%).

The higher incidence of HIV in non paying group can be explained on the low socio economic grounds. All belonged to low income group which is associated with low level of literacy, poor economic status which were described as main reasons for HIV infection.[7,13,14] In India, 87.4% of HIV infections are acquired by sexual transmission, the risk factors being unsafe sex and low condom use.[13]

Women and young girls were vulnerable, and economically dependent. Married women do not have adequate understanding on the perception of risk of sexually transmitted diseases/HIV from their spouses.[14] In India women cannot demand the male counterpart to use condom.

Another factor contributing for spread of HIV infection is increased mobility, eg. transport workers, and migrant laborers. Often they show risky sexual behavior which is linked to HIV infection.[11,13,14]

India has a prevalence of HBV infection ranging from 2-8%, belonging to intermediate level incidence.[6] Because of high population burden it is reported that it constitutes 10-15% of entire pool of HBV carriers in the world.[6] Though definite mode of transmission is not known, contact with non intact skin, mucous membranes, tears, saliva and blood containing secretions or sharing of tooth brushes can contribute to the spread. In low socio economic groups, poor hygienic conditions, close person to person contact, certain socio cultural practices may facilitate transmission of both HIV and HBV infections.[6] In the present study also this trend is seen, HBV and HIV infections occurring at the same rate in non paying group.

In the paying group, HIV incidence is less when compared to HBV infection. This group comprises of slightly better educated people, and economically sound population. Probably this factor influences awareness about health issues and sexually transmitted diseases, like HIV, resulting in healthy sexual behaviors.

Conclusions

In spite of many control programs for preventing blood borne viral infections, they are not showing fall in number of new infections. The present study done in our hospital clearly shows interesting trends, HIV being more in low socio economic group and HBV infection is more in other group. Reduction of the HIV, HBV, HCV disease burden in India can be achieved by educating the public with special focus on the high risk population about transfusion safety, safe sexual practices, improved sanitation, and effective vaccination against HBV. Health care workers should be educated and motivated to follow safe medical practices, and safe blood transfusion.

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