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Original Article

Serological Prevalence of Antibodies to Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV) among Healthy Nepalese Males – A Retrospective Study

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Abstract
A retrospective data analysis for sero-prevalence of antibodies to HIV, HBV and syphilis was carried out during the period 3rd September 2003 to 3rd June 2004 in 627 apparently healthy Nepalese males aged 17 to 48 years and association of the diseases with age group and blood group were analyzed. The study showed the prevalence of HIV, HBV and syphilis being 1.6%, 2.7% and 0.6% respectively. Analysis of blood group showed that 97.76% of total male population having Rhesus positive blood. Among them, O "positive" was the most common blood group with 31.9% followed by A "positive", B "positive" and AB "positive" respectively. The analysis of relationship showed a tendency of high affinity of those diseases in the subjects with O "positive" blood group. However, no real association of those infections was found with the blood group (HIV: $X^2 = 0.902$, P = 0.99; HBsAg: $X^2 = 1.212$, P = 0.99; RPR: $X^2 = 3.975$, P = 0.789).

Key Words: HIV, AIDS, HBV, HBsAg, STD, RPR, Nepal

Despite having abundant natural resources and favorable geographical diversities, Nepal still falls in the category of least developed countries in the world. In general, the developmental status of a nation also reflects the health status of her people and the health indicators of Nepal are not satisfactory as well. Though we don't have adequate researches done in the field of health, the situation is changing. Recently, there is increasing tendency of carrying out mini researches, which could be very valuable for meta- analysis in future.

Recently, there is an increasing trend of migration in young Nepalese population to Western and Gulf countries for further study or employment. The pre-existing poverty, pressure of unemployment, widespread exposure to modern information technology, desire for higher study in selected subjects and psychological impact of recent insurgency all seem to have combined impact on this trend of migration. According to the informal source, more than 200,000 Nepalese workers are working in the Gulf region. Since, general heath check-up including blood grouping, serological screening for Human Immunodeficiency Virus (HIV), Hepatitis B (HBV) infection and syphilis are made mandatory for applying visa to those foreign countries, this provision has compelled many healthy young Nepalese people to have screening done for these diseases of global importance.

Since last decade both HIV and HBV infections have drawn global attention owing to their grievous public health impact. HIV infection is caused by a retro-virus known as Human Immunodeficiency Virus (type1 and 2) which breaks down the body's immune system and leads to Acquired Immune Deficiency Syndrome (AIDS) leaving the person susceptible to opportunistic infections and some malignancies. AIDS in human was first reported in 1981 in USA and HIV was first isolated in 1983.[1] Since then, it has killed more than 22 million people in the world. Over 3 million people died due to AIDS in the year 2002 and more than 40 million people are now living with HIV/AIDS.

In Nepal, HIV was first seen in July 1988[2]. As of January 31, 2003, the National Center for AIDS and STD Control in Nepal had reported 626 confirmed

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AIDS cases and 2,665 confirmed HIV-positive people. Looking at the existing medical and public health infrastructure in Nepal and the lack of proper national HIV/AIDS surveillance systems, it is very likely that the actual number of cases is many times higher. UNAIDS/WHO estimate for December 2002 that around 60,018 people living with HIV/AIDS and 2958 AIDS related deaths in that year alone. It is estimated that 0.5 percent of all adults in Nepal are HIV positive, and the male to female ratio of infection is 3 to 1.[3]

Similarly, Hepatitis B is another pandemic disease caused by hepatitis B virus having some 10 times great impact than AIDS. It has been estimated that more than 2 billion people worldwide have evidence of past or current HBV infection and at least 350 million people are carrying virus. Out of them, one fourth are dying due to cancer or cirrhosis of liver. The reported prevalence of carrier varies greatly from 0.1% in the developed countries to 20% in some developing countries and it is more than 5% in South East Asia.

Many hospital based studies have been carried out on these diseases but still we are lacking larger community based study which could represent the real impact of those diseases in Nepal because the study population of these hospital based researches are selected after clinical suspicion from those patients presenting to the hospital with complaints which doesn't necessarily represent the disease status in the apparently healthy community. That applies also to the voluntary blood donors since some of them are previously screened regular donors. So this study can better reflect the disease status in larger Nepalese male community and here lies the key importance of this study.

The objective of this study was to describe the prevalence of HIV and HBV infections among apparently healthy Nepalese males attending a medical center for health examination as a part of their visa process. Confidentiality of all information about the subjects was assured.

Methodology

The study was designed as a retrospective descriptive study that included health examination reports of 627 apparently healthy males who attended Baba Medical Center, Kathmandu for health check up as a part of their visa process from the period 3rd September 2003 to 3rd June 2004. Blood samples were collected aseptically by venepuncture from the subjects, which were analyzed for Blood Grouping, HIV 1 & 2, HBV, and syphilis.

Abbott Determine™ HIV-1/2 Test Cards (manufactured by Abbott Laboratories, Japan) were used for the detection of antibodies to HIV-1 and HIV-2 in the blood. It is an immunochromatographic method, which detects the presence of antibodies to HIV-1 and HIV-2 in human blood. It is in-vitro visual read qualitative test having more than 99.9% sensitivity and 99.75% specificity. All the positive cases were sent to TU Teaching Hospital for more specific immunoblot test known as Western Blot for reconfirmation of the result. On Western Blot diagnostic test, all cases were reconfirmed as HIV positive.

Abbott Determine™ HBsAg Test Cards (manufactured by Abbott Laboratories, Japan) were used to detect the HBsAg in the blood of study population, which is also a fairly reliable test having more than 99.9% sensitivity and specificity. It is also an in-vitro diagnostic test done by enzyme linked immunochromatographic method and gives qualitative visual read results.

Blood grouping was done by slide test applying standard procedure. In-vitro diagnostic ***Eryscreen***® reagent was used which contains monoclonal anti-A, anti-B and anti-D (Rho) antibodies of IgM class derived from hybridoma cell lines. Rapid Plasma Reagin (RPR) card test from Tulip Diagnostics (P) Ltd. was used for detection of Syphilis in study population. It is an in-vitro macroscopic non-treponemal flocculation test that detects and quantifies the antilipoidal antibodies in human serum or plasma.

Results

Out of 627 apparently healthy Nepalese males tested for HIV, HBsAg and syphilis, 10 (1.59%) were HIV positive, 17 (2.71%) were HBsAg positive and 4 (0.64%) were RPR positive. The result shows that majority of the subjects have blood group O "positive" with 31.9% followed by A "positive" (30.5%), B "positive" (27.9%) and AB "positive" (7.5%) respectively. Age group and blood group wise distribution of HIV, HBsAg and RPR positive cases is shown in the tables 1 and 2.

Table 1. Age group wise distribution of HIV, HBsAg and RPR positive cases

Age group	HIV +ve	HBsAg +ve	RPR +ve	Total subjects
Below 19	-	-	-	52 (8.3 %)
20 – 29	5 (1.33%)	9 (2.4%)	2 (0.53%)	375 (59.8%)
30 – 39	5 (2.94%)	7 (4.11%)	2 (1.17%)	170 (27.1%)
Above 40	-	1 (3.3%)	-	30 (4.8%)
Total	**10 (1.59%)**	**17 (2.71%)**	**4 (0.64%)**	**627 (100%)**

Table 2. Blood group wise distribution of HIV, HBsAg and RPR positive cases

Blood Group	HIV +ve	HBsAg +ve	RPR +ve	Total subjects
O +ve	4 (2%)	7 (3.5%)	3 (1.5%)	200 (31.9%)
A +ve	2 (1.05%)	4 (2.09%)	-	191 (30.5%)
B +ve	3 (1.71%)	5 (2.85%)	1 (0.57%)	175 (27.9%)
AB +ve	1 (2.12%)	1 (2.12%)	-	47 (7.5%)
O/A/B/AB –ve	-	-	-	14 (2.2%)
Total	**10 (1.59%)**	**17 (2.71%)**	**4 (0.64%)**	**627 (100%)**

No association of those infections was found with the age group (HIV: $X^2 = 3.46$, $P = 0.33$; HBsAg: $X^2 = 2.91$, $P = 0.41$; RPR: $X^2 = 1.37$, $P = 0.71$) and blood group (HIV: $X^2 = 0.90$, $P = 0.99$; HBsAg: $X^2 = 1.21$, $P = 0.99$; RPR: $X^2 = 3.98$, $P = 0.79$).

Discussion

The cases selected for our study were all male and were apparently healthy. They had come randomly from various parts of the country. The lab tests employed were all standard and fairly reliable. It is very difficult to compare our findings with other hospital based similar studies where the cases selected are the clinically suspected one coming to the hospital seeking treatment. This obviously increases the possibility of true case detection and the findings of those studies cannot represent the prevalence of disease in general community people.

The diseases we studied are fairly age specific and behavior dependent. People of age 20-40 years are sexually and economically the most active group and these diseases are at high prevalence in those groups. In our study, HIV prevalence has been found highest in age group 30-39 compared to the age group 20-29. This variation in prevalence between two groups may be attributed to the variation in duration and opportunity for risk exposure. The overall prevalence of 1.6% is fairly significant as USAIDS estimates for 2003 to have some 61000 HIV positive cases out of 25 million population of Nepal. The estimated prevalence in adult population is 0.5% with 1:3 male to female ratio. A similar community based study done in 1993[4] has shown the prevalence of HIV/AIDS in normal Nepalese people being 0.222%. Another hospital based study done in United Mission Hospital; Tansen Palpa in 2001 has shown 10% prevalence among clinically suspected cases.[5]

Regarding Hepatitis B, the prevalence of 2.7% in our study means that Nepal falls in the intermediate endemic zone for Hepatitis-B according to WHO classification. (Low→ 0.2-0.5%, Intermediate→ 2-7%, High → 8-20% prevalence). Similar studies done in 1988 and 1998 have shown the prevalence of Hepatitis B in healthy Nepalese males around 1.5 % and 3.97% respectively[6,7]. Some hospital based studies done in Dharan and Kathmandu have shown the prevalence of HBV infection 2.5% and 5% respectively in hospital attended cases.[8,9]

It has been estimated that 2,00,000 episodes of STDs occur annually in Nepal. The STD prevalence rate in women was 4.7% (ranging from 2.7% - 5.4%) and its prevalence in Kathmandu was 1 – 5% in 1998. Data about STDs in males is scarce in our country.

However, 0.64% prevalence of syphilis among healthy males in our study is significantly lower than those in the females. Prevalence of HIV, HBV infections and STDs among commercial sex workers, their clients and the intravenous drug users could be significantly higher than the results of our study as they are the people with high risk behaviors and thus incomparable.

Regarding blood group distribution in Caucasian population, blood group O positive is said to be the commonest contributing 46% followed by A positive, B positive and AB positive with 41%, 9% and 4% respectively. This study of Nepalese males also shows the similar distribution of blood group with O -33%, A – 31%, B – 28% and AB – 8% respectively. But the Rhesus group in study population was found exclusively high positive with 97.8% while, research done in Caucasian population has shown it to be 85%. This study has shown an association between blood groups and the prevalence of HIV and Hepatitis-B. People with blood group O "positive" were found to have highest prevalence with 4% and 7% for HIV and HBsAg respectively compared to other blood groups. Studies done in other countries also have shown similar positive association between HIV and HBV infections in people with O "positive" blood group.[10,11] However, in our study, statistical analysis has shown no real association of HIV infection, HBV infection and syphilis with age group and blood group. More studies with large sample size including only seropositive cases should be done in Nepal to find out if there is a real association between them.

Small sample size and exclusion of females are few of the limitations of our study. A study done on 627 males cannot provide overall prevalence of HIV and HBsAg status in the country as a whole; nevertheless, it can reflect the disease status in larger Nepalese male community. Another drawback of our study is that was a retrospective study. Hence, we could not gather information about their behavioral pattern and socio-economic status.

Seroprevalence data, behavioral pattern and socioeconomic status of our community indicate the high potential for a generalized epidemic of both HIV and HBV in Nepal. In the absence of effective interventions in time, the AIDS and Hepatitis B can be the leading cause of death of the population of productive age group over the coming years and can lead to a vicious cycle of poverty and vulnerability. Besides the negative impact on socio-economic development and loss of productive life, the burden of disease would change dramatically in geometric ratio over next 10 years that could add tremendous stress to our society.

So the timely interventions with multi-sectoral engagement and broad political commitment are strongly desirable. Similarly, involvement of civil society in various preventive strategies including stigma reduction is also important. Extension of facility for blood screening in large scale to help early detection of cases along with vaccination services (for HBV) for high risk groups and awareness program are the key to bring these diseases under control. At last but not the least, continuation of prevention to care programs taking the human right based approach into consideration are also the demand of the time.

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