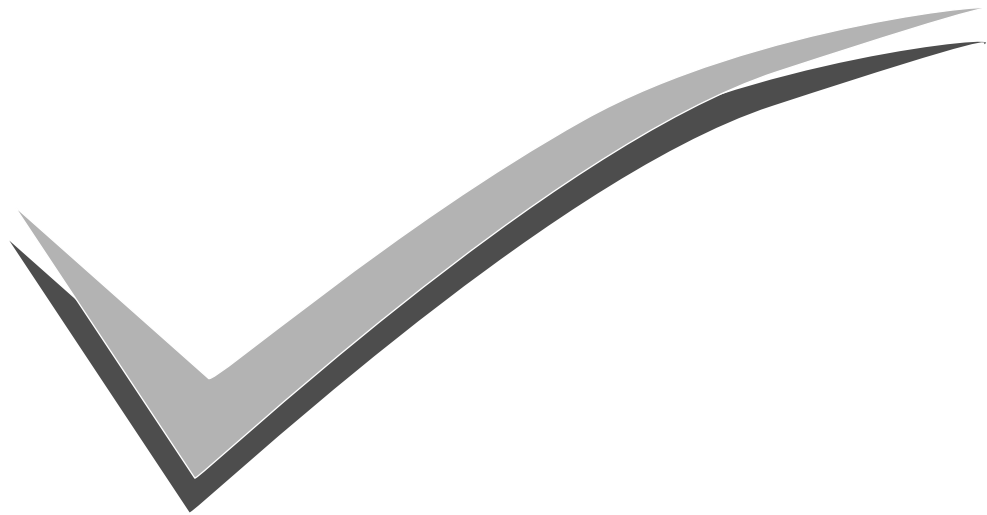




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4.	Indian Journal of Medical Microbiology,(2004) 22 (2)	136-137
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Evaluation of two immunochromatographic assays in relation to `RAPID«SQ» Screening of HBsAG

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ABSTRACT: Two immunochromatography based assays used for purposes of rapid screening for Hepatitis B surface antigen (HBsAG) were compared to our in-use third generation HBsAG ELISA, using a panel of 50 sera. Both assays yielded a similar sensitivity and specificity of 90 percent and 100 percent respectively. However, when both assays were evaluated independently using two sets of 400 consecutive sera, the Quickchaser and Virucheck assays yielded a sensitivity of 77 percent and 79 percent respectively and specificity of 99 percent and 97 percent respectively. the HBsAG positive sera missed by the Quickchaser assay were of significantly lower reactivity compared to those HBsAG containing sera that were positive by this assay and the ELISA, whereas for the Virucheck assay there was no such significant difference. The difference in evaluation results while using a smaller evaluation panel of 50 sera and large evaluation panel of 400 sera could be explained by a difference in the range of reactivities within both the panels and also a difference in panel size. This study reveals the need for a large panel of sera while evaluating tests to avoid overestimating the accuracy indices.

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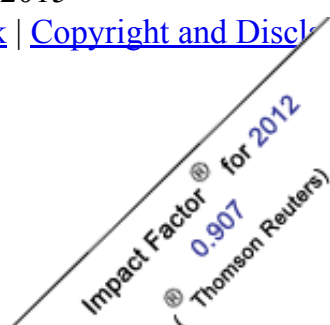
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Article

Evaluation of the performance of four rapid tests for detection of hepatitis B surface antigen in Antananarivo, Madagascar.

 Frédérique Randrianirina  Jean-François Carod  **Elisoa Ratsima Hariniana**

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Journal of Virological Methods (Impact Factor: 1.88). 09/2008; 151(2):294-7.

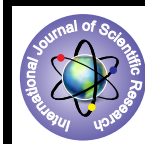
DOI: 10.1016/j.jviromet.2008.03.019

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ABSTRACT Four rapid immunochromatographic assays--Determine HBsAg, Virucheck HBsAg, Cypress HBsAg Dipstick and Hexagon HBsAg--for human hepatitis B surface antigen (HBsAg) detection in human serum were evaluated. A collection of reference serum samples (91 HBsAg positive and 109 HBsAg negative) stored at -80 degrees C was used. Sensitivity and positive predictive value (PPV) exceeded 95%, and specificity and negative predictive value (NPV) exceeded 96% for all tests. The Determine HBsAg test performed best in this study, with a sensitivity of 97.8%, a specificity and PPV of 100%, a NPV of 98.2% and an accuracy rate of 99.0%. However, the differences between the tests were not significant. Other factors should therefore also be taken into account by the Ministry of Health in its decision to recommend a particular test: price, availability, delivery time and feasibility of whole-blood testing. The Determine test appears to be the most suitable for Madagascar, based on all these criteria. The use of this test, despite its lower sensitivity, could prevent blood-borne transmission of hepatitis B virus (HBV) in areas with limited resources.

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Co-Infection of Hepatitis C Virus and Hepatitis B Virus in Human Immuno Deficiency Virus Positive Population in Ahmedabad, Gujarat.



Medical Science

KEYWORDS : Prevalence, HCV, HBV, Co-infection

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ABSTRACT

Introduction: Co-infection of HIV positive patients with hepatitis viruses worsens the long term prognosis. The viruses has similar route of transmission, through blood and blood products, sharing of needles and sexual activity, enabling co-infection with these viruses a common event.
Methodology: A total of 718 HIV infected patients participated in study, who attended HAART clinic at B. J. Medical College, Ahmedabad during January to December 2012. ELISA (Qualisa) was used for the detection of HCV antibodies, Rapid Virucheck and ELISA (ERBALISA) was used for the detection of HBsAg.
Results: 31(4.31%) patients had antibodies to HCV and 25(3.48%) patients had antigen (HBsAg) of HBV in serum. Co-infection of HIV/HBV and HIV/HCV is more common in male aged 21-40 years. No patient had both HBV and HCV co-infection simultaneously.
Conclusion: The results indicate a low sero-prevalence of HIV/HCV and HIV/HBV co-infection, in which heterosexual transmission is the major transmission route of the virus.

Introduction:

Human immunodeficiency virus (HIV), Hepatitis B and C viruses (HBV and HCV) are the three most common chronic viral infections documented worldwide ⁽¹⁾. In patients already infected with HIV and either hepatitis B or C, the prognosis is made much worse with additional infection by other hepatotropic viruses ⁽²⁾. HIV positive individuals are at risk of co-infection with HBV and HCV infection ⁽³⁾. The viruses has similar route of transmission, namely through blood and blood products, sharing of needles to inject drugs and sexual activity, enabling co-infection with these viruses a common event ⁽⁴⁾. With the advent of highly active antiretroviral therapy (HAART) regime capable of dramatically prolonging the survival of HIV infected patients, the impact of co-morbid infections such as HBV and HCV has come into focus ⁽⁵⁾. Co-infection with HCV and HBV increases the risk for hepatotoxicity of HAART and likelihood of onset of an AIDS-defining illness, compared with infection HIV alone ⁽⁶⁾. HCV or HBV co-infection in HIV positive individuals is of utmost importance due to the underlying consequences such as the hepatological problem associated with these viruses, which have been shown to decrease the life expectancy in HIV infected patients ⁽⁷⁾.

HIV and HBV/HCV co-infection without any evidence of chronic active hepatitis, ART should be started if CD4 count <350 cells/cu.mm. and with evidence of chronic active hepatitis, ART should be started at any CD4 count according to NACO guideline.⁽⁸⁾ According to the Joint United Nations Program on HIV/AIDS (UNAIDS), about 33 million people are infected with HIV worldwide, and the majority of them live in Asia and Africa. 2.3 to 2.5 million of these are in India. Approximately 10% of the HIV-infected population has concurrent chronic hepatitis B, with coinfection more common in areas of high prevalence for both viruses⁽⁹⁾. This study was therefore carried out to estimate the prevalence of HCV and HBV seropositivity in patients living with HIV/AIDS in Ahmedabad.

Materials and Methods:

A cross sectional study was carried out at the B.J. Medical College, Ahmedabad, Gujarat, India. Only confirm positive HIV positive serum samples were included in the study. Samples were collected between January 2012 to December 2012 from HIV seropositive patients who attended HAART clinic for follow up and other health need. HIV status was confirmed by three

tests (Rapid Combaid, Rapid pareekhah-Triline and Rapid pareekhah-Tridot) according to National AIDS Control Organisation (NACO) guideline.

A total of 718 HIV infected patients (426 males and 292 females) participated in this study with age range of 18-65years. Detailed clinical history along with blood samples was collected. Serum separated in vials and stored at -20°C. Epi info version 7 was used for statistical analysis at 95% confidence level.

Enzyme linked immunosorbent assay test was used for detection of antibodies to HCV in human serum following manufacturer's instruction. (Qualisa, microwell enzyme immune assay for HCV, Qualpro Diagnostics, India) Positive samples were retested in duplicate and sample that reacts in either or both duplicates are considered repeatedly positive. The Qualisa -HCV had 100% sensitivity and 100% specificity. Rapid Virucheck kit was used for detection of antigen of HBV (HBsAg). Positive samples were confirmed by Enzyme linked immunosorbent assay test (ERBALISA, microwell enzyme immune assay- HBsAg) in duplicate. Rapid Virucheck -HBsAg had 100% sensitivity and 100% specificity. The Erbalisa -HBsAg had 100% sensitivity and 100% specificity.

Results:

Table (1) Age and sex distribution in study group is as follows:

Age Group (years)	Male	Female	Total
20 or less	26	28	54
21-30	134	109	243
31-40	151	84	235
41-50	67	47	114
>50	48	24	72
TOTAL	426	292	718

Out of 718 HIV infected patients, 31 (4.31%) patients had antibodies to HCV and 25(3.48%) patients had antigen (HBsAg) of HBV.

Co-infection of hepatitis C is more in male 19 (4.46%) than fe-

male 12 (4.10%) subjects. Statistical analysis showed no significant difference ($p>0.05$). Age group 21-30 years had the highest prevalence of HCV (32.25%). No significant difference was observed in association between age and prevalence of HCV antibodies ($p>0.05$).

Co-infection of hepatitis B is more in male 20 (4.69%) than female 5(1.71%) subjects. Statistical analysis showed significant difference ($p<0.05$). Age group 31-40 years had the highest prevalence of HBV (44%). No significant difference was observed in association between age and prevalence of HBV ($p>0.05$).

Table (2) Age related prevalence of HCV antibodies and HBsAg in the HIV infected patients:

Age groups (years)	HIV and HCV co-infection	HIV and HBV co-infection
< 20	4 (12.9 %)	1 (4.0 %)
21-30	10 (32.25 %)	6 (24.0 %)
31-40	8 (25.8 %)	11 (44.0 %)
41-50	8 (25.8 %)	5 (20.0 %)
>50	1 (3.22 %)	2 (8.0 %)

Table (3) Sex related prevalence of HCV antibodies and HBsAg in the HIV infected patients:

Sex	HIV and HCV co-infection	HIV and HBV co-infection
Male	19 (61.3%)	20 (80.0%)
Female	12 (38.7%)	5 (20.0%)

Most common route of transmission of HIV included in study patients is heterosexual transmission (73.26%), followed by homosexual transmission (20.48%), through blood and blood products (4.04%) and congenital transmission (2.09%). IV drug abuse was not present in any patient.

Discussion:

Chronic viral hepatitis is a leading cause of liver related death among patients with HIV/AIDS worldwide⁽¹⁰⁾. Our findings showed a prevalence of 4.31% co-infection of HCV in HIV infected patient in Ahmedabad which is lower than 8.2% reported by Agwale *et al*⁽¹²⁾ in northern Nigeria, lower than the 11.1% reported by Forbi *et al* in Keffi⁽¹⁴⁾ and somewhat in agreement with 4.8% reported by Jesses *et al*⁽¹¹⁾ in Ibadan and 5.7% reported by Inyama *et al*⁽¹⁷⁾ in Jos. The factor responsible for these regional variations are unclear, although the reported co-infec-

tion rates of HCV in HIV patients have been variable worldwide depending on the geographic regions, risk groups and the types of exposure involved⁽¹³⁾. The results indicate a low seroprevalence of HIV/HCV coinfection in present study population, in which sexual transmission, characterized by sexual promiscuity among heterosexual individuals, is the major transmission route of the virus rather than the use of injection drugs.

Our finding shows prevalence of 3.48% co-infection of HBV in HIV infected patient in Ahmedabad which is lower than 6.2% reported by C Hawkins in Tanzania⁽¹⁸⁾.

Of people with HIV in the United States, about 25% are coinfected with HCV, and about 10% are coinfected with HBV. About 80% of people with HIV who inject drugs also have HCV. HIV co-infection more than triples the risk for liver disease, liver failure, and liver-related death from HCV.

HAART has transformed HIV/AIDS from a uniformly fatal illness into a manageable chronic infection and has been shown to be able to restore CD4⁺ cells in HIV infected patients.⁽¹⁵⁾ Early diagnosis of HCV in HIV individuals have not been given enough priority it deserves in Health Care delivery system possibly due to the low awareness of the burden and risk of HCV infection in HIV. The gains of HAART could be compromised by co-infection with hepatitis viruses as they are known to have adverse effects on the prognosis of HIV/hepatitis co-infection.⁽¹⁶⁾

Conclusion:

This study was able to demonstrate that co-infection of HIV/HCV and HIV/HBV is on the increase in this part of the world. The high prevalence of hepatitis virus co-infection with HIV is a cause for concern. Therefore, routine screening for hepatitis C and hepatitis B viral infections in all HIV positive patients is needed as it is now evident that early initiation of therapy before marked immunosuppression sets in could be highly beneficial for the HIV infected patients in order to decrease the long term mortality and morbidity associated with these co-infections. So routine screening of patients with HIV infection for HCV antibodies and Hepatitis B virus antigen should be encouraged.

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Seroprevalence of Hepatitis B Virus and Hepatitis C Virus among Hepatic Disorders and Injecting Drug Users in Manipur - A Preliminary Report

Dear Editor,

Viral hepatitis, which causes acute infection and chronic sequelae, is an important world health problem. Hepatitis C virus (HCV), since its identification in the year 1989, has been shown to be a major cause of parenterally transmitted Non A Non B (NANB) hepatitis. It has been estimated that at least 200 million people are affected world wide and the infection leads to progressive disease.¹ Different studies have shown that hepatitis B virus (HBV) and HCV are endemic in India and have an a etiological role in acute hepatitis, 50-70% of which lead to chronic liver disease.^{2,3} The present study was undertaken to find the seroprevalence of HBV and HCV among hepatic disorders and injecting drug users (IDUs) in Manipur, the north eastern state of India. Manipur is geographically very close to the notorious golden triangle between Myanmar, Thailand and Laos, known for poppy cultivation.

The study included 100 cases with hepatic disorders comprising of 30 acute viral hepatitis, 36 alcoholic hepatitis and 34 cirrhosis of liver, admitted in RIMS hospital during the period between January 2000 and August 2001 and 250 IDUs from a deaddiction centre, Shalom, Churachanpur, Manipur. Diagnosis of the individual liver disease was made by detailed history, clinical examination and relevant biochemical tests. Fine needle aspiration, cytology and CT scan were done as and when indicated. Serum samples from all the patients were tested for HBsAg by immunochromatography using virucheck (Orchid Biomedical Systems) and detection of anti HCV antibody was done by third generation ELISA test using LGHCD3.0 (LG Chemicals Ltd.). For each test, manufacturer's instructions were strictly followed.

The patients of hepatic disorders under study comprised of 87 males and 13 females and among the 250 IDUs only 6 were females. Among the hepatic disorders, HCV sero positivity was found maximum in the age group 33-42 (46.6%) whereas HBsAg was found highest in the age groups 22-32 years (42.3%). Nine out of 30 (30%) of viral hepatitis, 10 out of 36 (27.7%) alcoholic hepatitis and 11 out of 34 (32.35%) cirrhosis of liver were positive for anti HCV antibody. Co-infection of HBV and HCV was found in 5% of hepatic disorders (1 viral hepatitis, 3 alcoholic hepatitis and 1 cirrhosis of liver). HBsAg was positive in 20% of viral hepatitis, 22.2% of alcoholic hepatitis and 35.29% of cirrhosis of

liver. Out of the 100 cases of hepatic disorder, 34 had history of risk factors like blood transfusion (12), IDU (5), IDU with blood transfusion (2) and multiple sexual contacts (10) and others (5).

Among the IDUs, HBsAg was positive in 27 cases (10.8%) and anti HCV antibody was positive in 226 cases (90.4%) and 12 cases (4.8%) were positive for both HBV and HCV. Maximum number of positive cases belonged to age group 23-32 years.

The prevalence of HCV and HBV infections is not uniform throughout India.^{2,3} Our findings were comparable with some studies^{3,4} while it is higher than other studies.⁵ The increased prevalence of HCV in alcoholic patients with severe liver disease with impaired liver function suggests that HCV is involved in liver damage in chronic alcoholic patients. The HCV prevalence among the IDUs in the study was quite high (90.4%) and the IDUs were in the sexually active age group of 23-32 years. Sexual partners of these IDUs are at a risk of infection. HBsAg was positive in 10.8% of IDUs and this might indicate persistent infection or carrier state. By using other HBV markers like anti HBe antibody, anti HBs antibody, more HBV infection could have been detected. In our study, co-infection of HBV and HCV was 5% and 4.8% among the hepatic disorders and IDUs respectively. Co-infection leads to more aggressive liver disease with the two viruses interacting in poorly defined ways to increase the rate of hepatic fibrosis. This preliminary study shows that HBV and HCV infections are common in Manipur. There is high prevalence of HCV among IDUs who are in sexually active age group. Need for implementation of control measures is emphasised.

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SEROPREVALENCE OF HEPATITIS-B VIRUS IN MID AND FAR WESTERN REGION IN NEPAL

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ABSTRACT

Hepatitis B is significant health problems that might involve the late sequel of liver cirrhosis and hepatocellular carcinoma. The present study aimed to know the seroprevalence of hepatitis B virus (HBV) in mid and far western region in Nepal with various clinical conditions.

This was a retrospective study conducted in mid and far western region in Nepal, which was performed in the Central Laboratory of Microbiology at Nepalgunj Medical College and Teaching Hospital, Banke, Nepal during the period of September 2010 to April 2012. The serum samples were tested for Hepatitis B surface Antigen (HBsAg) by Sandwich immunoassay. Total 7010 patients including 43.72% male and 56.28% female were tested for HBsAg. Of them, 135 were positive and 6875 were negative.

In 135 positive cases 84 (62.22%) were male and 51 (37.77%) were female. In 6875 negative cases 2981 were male and 3894 were female. The seroprevalence rate of HBV was 1.93% in mid and far western region in Nepal. Seroprevalence of HBV seems to be higher in male than the female; it was 2.75% in male and 1.29% in female.

The study revealed that the seroprevalence of HBV was alarmingly higher in such a population, which probably reflects a high background prevalence of HBV infections should be taken into consideration and implementation of community-based preventive measures and improved strategies for safe blood supply might prove useful to decrease the seroprevalence.

Keywords: seroprevalence , hepatitis B virus, Hepatitis B surface Antigen.

INTRODUCTION

There is high global prevalence of hepatitis-B. The Hepatitis-B virus (HBV) was discovered by Baruch Blumberg, he discovered the Australia antigen (Hepatitis B surface antigen, or HBsAg) in the blood of Australian aboriginal people in 1965.¹ Approximately, there are one-third of the world population has serological evidence of the past or present Hepatitis-B virus (HBV) infection, resulting in 350 million chronically infected people.² And over 1 million die annually of HBV-related chronic liver disease. Although many individuals eventually achieve a state of non-replicative infection, the prolonged immunologic response to infection leads to the development of cirrhosis, liver failure, or hepatocellular carcinoma (HCC) in up to 40% of patients.³ In Nepal, seroprevalence of HBsAg has been reported ranging from 0.3% to 4.0% in general population by various studies conducted from 1990 to

2003.⁴⁻¹⁰ The presence of HBsAg, the main surface protein of HBV, in serum indicates infection. Persistent presence of Hepatitis B surface antigen (HBsAg) for at least six months defines the chronic hepatitis B (CHB) carrier state. Conventionally, presence of secretory version of HBV core protein, the e antigen (HBeAg), associated with high viral load and serves as a marker for viral replication.¹¹ After the initial characterization of HBeAg, a truncated form of the core (nucleocapsid) protein, all patients with both HBsAg and HBeAg are considered highly infectious.¹² HBeAg seroconversion (HBeAg negative and anti HBe) is associated with liver disease remission and marks the transition from chronic Hepatitis B to asymptomatic HBsAg carrier state. At the time of HBeAg seroconversion, a small percentage of patients continue to show raised Alanine aminotransferase (ALT) and serum HBV DNA levels.¹¹ This group of patients is called as HBeAg negative chronic hepatitis B (CHB) which continues to have liver damage but due to frequent changes of ALT levels, become difficult to differentiate from inactive carriers.^{13,14} Viral load quantification by PCR plays a vital role in the better management of this dreadful pathogen as diagnosis of different stages of HBV

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infection can be defined by serum HBV DNA levels especially in differentiating HBeAg negative CHB patients from inactive carriers.¹⁵

MATERIALS AND METHODS

Serum samples were collected from 7010 patients between the periods of September 2010 to April 2012. Samples were collected in clean, sterile, small test tube from suspected HBV infections and its sequelae patients attending out-patients and in-patients departments at Microbiology Laboratory of Nepalgunj College Medical & Teaching Hospital in Banke, Nepal. All the serum samples were tested by Virucheck-HBsAg kit (Orchid Biomedical system, Goa, India). The instructions, test procedure, reagents and accessories to follow were supplied with the kit.

RESULTS

Total 7010 patients were included in this study. 43.72% male and 56.28% female were tested for HBsAg (Figure 1).

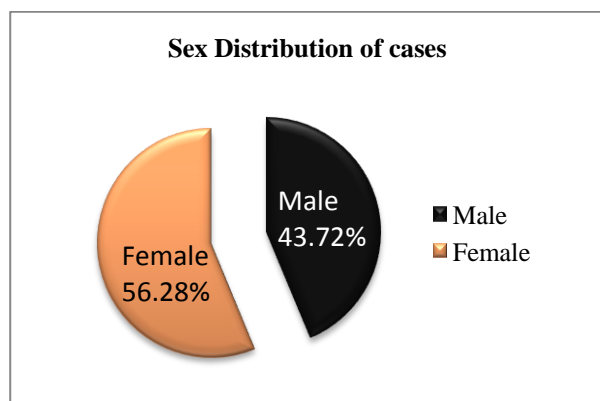


Figure.1
Sex Distribution of Cases

In this study, it was observed that 135 were positive and 6875 were negative. In 135 positive cases 84 were male and 51 were female. In 6875 negative cases 2981 were male and 3894 were female. Highest positive case were found in the age group of 21- 30 (Table 1 and Figure 2).

The seroprevalence of total case was 1.93%. Seroprevalence of total female was 1.29% and the seroprevalence of total male was 2.74% (Table 2). The highest seroprevalence of male found in the age group 21–30 was 4.53 and the highest seroprevalence of female found in the age group 0–10 was 5.37 (Table 3 and Figure 3).

Table 1
Seroprevalence of HBV According to Age Group Wise Distribution

Age	HBsAg		Total	seroprevalence rate (%)
	Positive	Negative		
0-10	12	472	484	2.58
11-20	4	1059	1063	0.38
21-30	49	1836	1885	2.60
31-40	16	1279	1295	1.24
41-50	23	927	950	2.42
51-60	11	634	645	1.71
61-70	14	412	426	3.29
> 70	6	256	262	2.29
Total	135	6875	7010	1.93

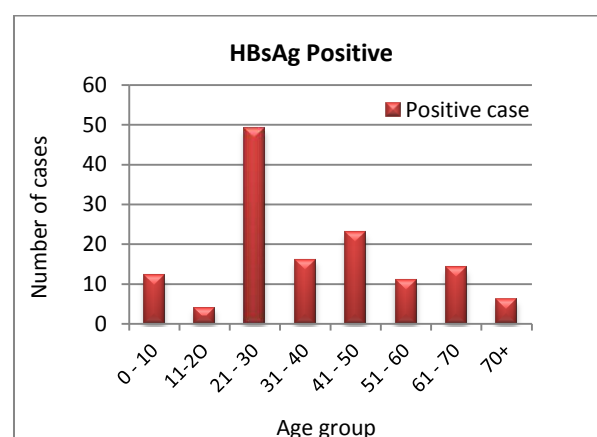


Figure.2
Age group wise distribution of total positive case.

Table 2
Sex Wise Seroprevalence of all Cases

Sex	HBsAg		Total	Sero prevalence rate (%)
	Positive	Negative		
Male	84	2981	3065 (43.72%)	2.74
Female	51	3894	3945 (56.28%)	1.29
Total	135	6875	7010 (100%)	1.93

DISCUSSION

The hepatitis B occurs throughout the world. It has no seasonal distribution. In the developed countries, the incidence is more in adults than in children and more in urban than in rural areas.

Table 3
 Seroprevalence of HBV According to Sex Wise
 Distribution in different Age Groups.

Age	Sex	
	Male	Female
0-10	0.67	5.37
11-20	0.59	0.27
21-30	4.53	1.25
31-40	1.50	1.04
41-50	3.16	1.77
51-60	2.85	0.60
61-70	3.63	2.91
> 70	3.94	00.00
Total	2.74	1.29

However, in Africa and the Far East, where it is transmitted from mother to offspring or through close personal contact, it is more common in infants and children. In endemic areas, where carrier rates are >5%, most individuals are infected perinatally, by vertical transmission, or in early childhood.¹⁶

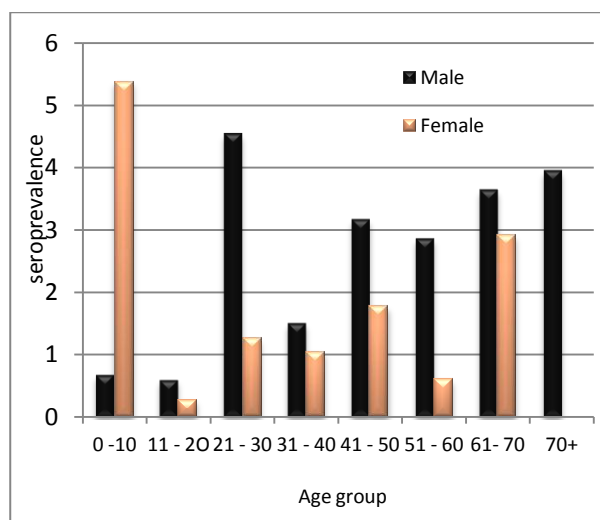


Figure 3

The comparative seroprevalence of male & female in different age group.

The carrier rate is higher in the tropical than in the temperate regions, more in males than in females. HBV is present in blood, saliva, semen, vaginal secretions and menstrual blood of infected individuals. Because HBV is resistant to breakdown outside the body, it is easily transmitted through contact with infected bodily fluids¹⁷. Perinatal vertical transmission is the most common mode of transmission worldwide. Presence of HBV e antigen (HBeAg) in the mother's serum is associated with greater infectivity^{18,19}. The risk of perinatal HBV infection among infants born to HBV-infected mothers ranges from 10–40% in HBeAg

negative mothers to 70–90% in HBeAg-positive mothers²⁰. Children of HBsAg-positive mothers who do not become infected perinatally remain at high risk of infection during early childhood. In households of a chronically infected individual, HBV infection can occur via person-to-person, nonsexual contact²⁰. Transmission is mainly by the percutaneous route. Besides blood transfusion, a number of therapeutic, prophylactic and diagnostic procedures can convey the infection. The virus is highly infectious and very minute amounts of some carrier sera (as little as 0.00001 ml) can transmit the disease. Therefore, any procedure that can convey traces of blood or serum from one person to another can serve to spread the infection. The disease is particularly common among drug addicts, prostitutes and male homosexuals. Certain groups and occupations carry a high risk of developing infection. These include medical and

paramedical personnel, staff of blood banks and hemodialysis units, laboratory worker and staff of institutions for the mentally retarded. Outbreaks have occurred in hospital staff and patients.²¹

In this study, The seroprevalence rate of HBV was 1.93% in mid and far western region in Nepal. The seroprevalence of HBV seems to be higher in male than the female; it was 2.75% in male and 1.29% in female. The age specific seroprevalence in this study was also found to be higher (2.60%) in 21-30 year age groups.

CONCLUSION

This study shows that seroprevalence of viral hepatitis B was 1.93% and most commonly observed in males. The incidence is higher in adult age groups. Since there is no specific treatment, prevention has been the major aim in managing viral hepatitis B. Both pre-exposure and post-exposure administration of hepatitis B vaccine has been recommended. The policy to give pre-exposure prophylaxis to general population should be adopted as soon as possible, to prevent it emerging as a public health problem.

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The seroprevalence of hepatitis B surface antigen among first time blood donors in Antananarivo (Madagascar) from 2003 to 2009

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Dear Editor,

Hepatitis B virus infection is highly endemic in Madagascar¹. The last data about blood donation safety and hepatitis B were obtained in the late 1990s², so it is important to update these data in order to determine the evolution in this viral infection and to estimate the current safety of blood donation in Madagascan healthcare structures.

The aim of this study was to determine the prevalence of hepatitis B surface antigen (HBsAg) among Antananarivo blood donors between 2003 and 2009. We did this by retrospectively examining all recorded data of blood donor candidates at the National Transfusion Centre (NTC) located in Antananarivo, the capital of Madagascar, from 2003 to May 2009. The reason why 2003 was chosen as the beginning of this study is that before this data screening for hepatitis B virus was performed using an enzyme linked immunosorbent assay (ELISA); in 2003, immunochromatographic testing was introduced, so the data from 2003 onwards are homogenous.

We included all first time blood donors (both new volunteer and replacement blood donors). The data considered included the age and sex of each donor and the results of blood serology screening.

Donor selection in the NTC was performed by physicians. The first step of blood donation consisted of interviewing each candidate using a predefined questionnaire with the aim of excluding candidates who had a potential risk of having an infectious diseases because of their behaviour and sexual attitudes and would, therefore, be at risk of transmitting such diseases through donated blood. Those who did not know anything about human immunodeficiency virus/acquired immune deficiency syndrome were counselled by the physicians.

A physical examination was then performed and, at this step, candidate donors were deferred if they had a systolic blood pressure higher than 180 mmHg, a heart rate faster than 120 bpm, a weight less than 48 kg or any clinical symptoms of dermatosis or anaemia (haemoglobin levels were not routinely assessed by biochemical or other techniques). Some donors were temporarily excluded on the basis of other criteria: women during menstrual bleeding, a person who had slept less than 4 hours prior to the proposed donation, recent alcohol drinking (within the preceding 72 hours), dental care within the last 6 months, and if the donor's blood pressure was measured just after a physical effort.

For this study, a first time blood donor was identified as a donor who donated for first time.

Serum samples were screened for blood-borne infectious agents. Screening for HBsAg was performed using a rapid test (Virucheck[®] - Orchid Biomedical System, India) which had a sensitivity of 95.6% and specificity of 98.2%³. Virucheck is an immunochromatographic test which can be stored at 4 °C-30 °C and requires 100 µL of serum. The test result can be read in 15 minutes. The definitive result was obtained after a double readout, the first by the laboratory technician who performed the test, and the second by the physician. The national policy for blood donations does not involve either confirmatory tests or additional tests, so all reactive donations were excluded.

Prevalence rates were calculated using univariate analyses, and then bivariate analyses, using chi square testing, were performed with Excel and Epiinfo 2000 ver. 3.5.1 software (CDC, Atlanta, USA). Results with a p value less than 0.05 were retained as statistically significant.

Given the nature of the study, a retrospective review of blood donors, no informed consent of individuals included in the study was needed.

Results

About two-thirds of all donors who came to the NTS during the period of our study were first time blood donors. Overall, there were 47,636 first time donors from among whom we retained 47,597 individuals for this study. The others were excluded because of incomplete information on gender, age or serum screening. The mean age of our donors was 33.3±10.4 years (35.8±11.0 for males, and 32.6±10.1 for females) (p<0.05) and 62.38% of all donors were aged between 20 and 35 years. Most of the donors were male (38,299/47,597; 80.47%).

Throughout the whole study period 1,810 of the 47,597 first-time donors were found to be positive for HBsAg, for a prevalence of 3.84% (95% CI, 3.7 - 4.0). There was a significant relationship between age and HBsAg seropositivity (p<0.05), which, overall, decreased with age. In detail, HBsAg positivity increased with age up to 35 years, then decreased until 50 years of age, before increasing again after this age in both male and female donors (Figures 1 and 2).

HBsAg-positive candidate donors were younger than HBsAg-negative ones (mean age: 31.7±9.7 versus 33.3±10.3 years) (p< 0.05). The prevalence of HbsAg positivity was higher among male candidate donors than among female ones (4.54% versus 1.80%, respectively) (p<0.05). The prevalence of HBsAg positivity in male donors appeared to decrease over time, whereas that in women remained relatively stable (Figure 3).

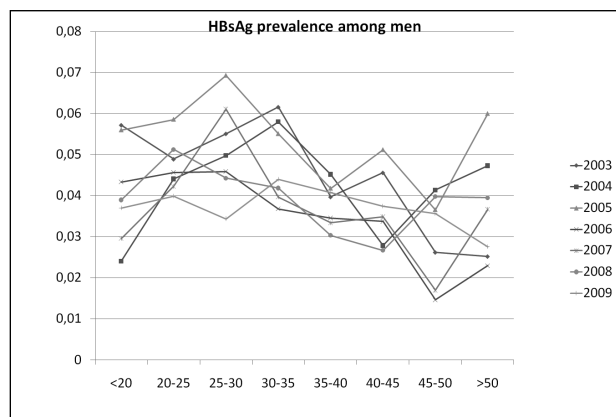


Figure 1 - Prevalence of HBsAg among first time male donors in Antananarivo, Madagascar between 2003 and 2009.

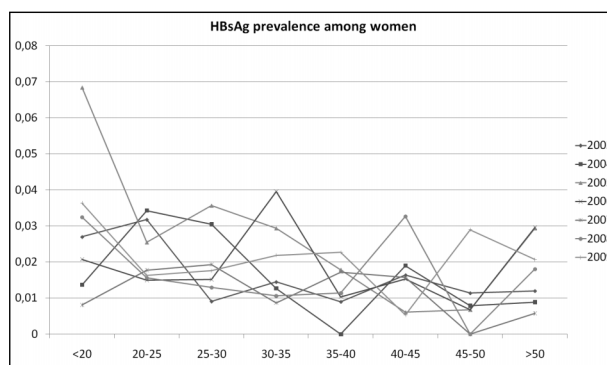


Figure 2 - Prevalence of HBsAg among first time female donors in Antananarivo, Madagascar between 2003 and 2009.

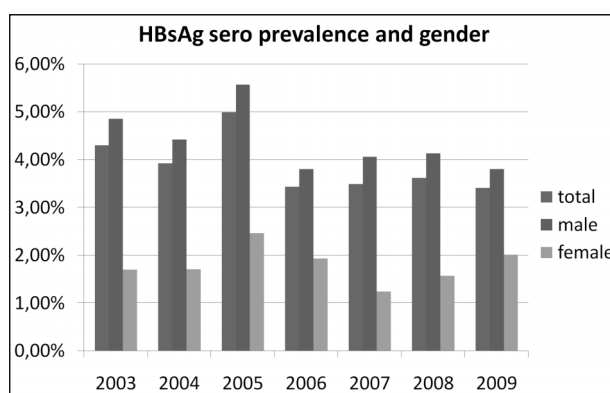


Figure 3 - Prevalence of HBsAg among all first time donors and male and female donors in Antananarivo, Madagascar between 2003 and 2009.

Discussion

Data are scarce about hepatitis B infection in Madagascar. In 1972, the prevalence of HBsAg was estimated to be 3%⁴. In 1996, the prevalence ranged from 5.3% in urban areas to 26.0% in rural areas in Madagascar². The prevalence of HBV carriers was estimated to be less than 5% in the capital and about 23% in the general population and it was supposed that transmission during childhood and infancy are very high, with estimates of 10 to 35% in children less than 5 years old⁴.

Even though about two-thirds of our donors were replacement blood donors, the prevalence of HBsAg we found is not as high as that seen in other countries in West Africa where reported HBsAg prevalence rates ranged from 13.8 to 14.9% after the first step of screening⁵. Furthermore, the prevalence in our country has decreased slightly compared with previous data.

Our data showed that HBsAg positivity decreased with age. We thought that a possible reason for this was an inability of the immunochromatographic technique to detect occult hepatitis B infection and HBV carriers who had undetectable viral loads even if they were still infected.

Finally, we found that being male is a strong risk factor for hepatitis B virus infection among Madagascans, as usual in this particular population.

Our study has some potential limitations. First, we did not separate replacement donors from volunteer blood donors, so it was not possible to determine whether the prevalence of the HBsAg was the same within these two categories, or to show trends of HBV positivity among them. Secondly, the immunochromatographic technique used for screening HBsAg is not as sensitive as ELISA at detecting HBsAg mutants and it cannot detect very low HBsAg levels in the blood and can, therefore, give false negative results. Our hepatitis B virus screening using rapid testing may not, therefore, reveal the true prevalence of this disease. However, due to financial constraints and a lack of means, other tests for hepatitis B virus, such as anti-HBc and anti-HBs, are not available for routine screening of donors. The apparently negative donors may, therefore, have included some truly infected donors who were in the window period or in an early phase of acute infection.

Conclusion

Hepatitis B envelop surface HBsAg was found in 3.84% of first time blood donors in Antananarivo. The prevalence was highest in young people aged less than 35 years. It then decreased, probably due to occult hepatitis B infection and undetectable viral loads among HBV carriers. It is, therefore, essential to find other ways to improve blood safety by adding another test, such as anti-HBc testing, because there is currently no possibility of using a molecular technique in public health centres in Antananarivo.

Many campaigns also need to be carried out in Madagascar in order to sensitise the population about the importance of blood donation, especially volunteer donation instead of replacement donation, as recommended by the World Health Organization. Worldwide data indicate that volunteer donations are safer than replacement ones. Volunteer and non-remunerated blood donors currently account for about one-third of all donations and, although the total number of donors is increasing year by year, this only reflects the increasing need for blood transfusions, while new volunteer donors are rare.

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Transfusion-transmissible infections among blood donors in Kathmandu, Nepal

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Abstract

Background: Screening of transfusion-transmissible infections (TTIs) among blood donors can be a cost-effective approach to monitor the prevalence, distribution, and trends of the infections among healthy-looking individuals. The study aimed to determine the seroprevalence of four TTIs, human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis, among blood donors in Kathmandu, Nepal.

Methodology: A total of 21,716 units of blood were tested for the presence of anti-HIV 1/2 IgG/IgM, HBsAg, anti-HCV IgG/IgM, and anti-*Treponema pallidum* IgG/IgM/IgA using commercial ELISA kits following standard protocols. Statistical analysis was performed using WinPepi Ver 3.8.

Results: Seroprevalence of HIV, HBV (HBsAg), HCV and syphilis were observed to be 0.12% (95% CI = 0.08-0.18), 0.47% (95% CI = 0.39-0.57), 0.64% (95% CI = 0.54-0.75) and 0.48% (95% CI = 0.40-0.59) respectively. TTIs were dominant among male blood donors compared to female blood donors. Higher HCV seroprevalence among males compared to females was statistically significant. HIV prevalence was highest among blood donors in the age group 31 to 40 years ($P > 0.5$). HBV, HCV and syphilis prevalence was highest among blood donors 41 to 50 years age group, 21 to 30 years age group, and 51 to 60 years age group respectively ($P < 0.05$). HIV and HBV prevalence was relatively higher among first-time donors, whereas HCV and syphilis was relatively higher among the repeated donors ($P > 0.05$).

Conclusions: It is of utmost importance to continue screening donated blood with highly sensitive and specific tests and to counsel donors who are positive to any of the above infections. It is absolutely necessary to avoid the transmission of infection from repeat donors.

Key words: transfusion, HIV, HBV, HCV, syphilis, seroprevalence

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Introduction

Blood donation saves millions of lives; however, although blood transfusion plays an important role in the supportive care of medical and surgical patients, unsafe transfusion practices also put millions of people at risk of transfusion-transmissible infections (TTIs) [1]. Only continuous improvement and implementation of donor selection, sensitive screening tests, and effective inactivation procedures can ensure the elimination, or at least reduction, of the risk of acquiring TTIs [2]. TTIs can exist as asymptomatic diseases in their hosts, so donors must be screened for high-risk behaviour [3]. Mandatory screening tests are performed for human immunodeficiency virus (HIV) 1 and 2, hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis by blood transfusion centres in Nepal. HIV seroprevalence among blood donors in different regions of Nepal and Kathmandu Valley has been

reported to range from 0.019% to 0.41% [4-7]. HBV seroprevalence has been reported to range from 0.3% to 4.0% in the general population of Nepal by various studies conducted from 1990 to 2003 [8-13]. HBsAg seroprevalence among Nepalese blood donors has been reported to range from 0.45 to 1.26% [4,14-17]. HCV seroprevalence among Nepalese general population and blood donors has been reported to range from 0.1 to 1.7% [4,10-12,16,18-21]. Very little information is available on the prevalence of syphilis in the general population, although one of the focussed studies has reported it as 0.6% among Nepalese males [8]. So far, no study has been conducted to determine the prevalence of one or two of these infections at a time in Kathmandu, Nepal. This study was conducted to determine the seroprevalence of HIV, HBV, HCV, and syphilis. Prevalence of any infection varies with the time and

Table 1. Seroprevalence of Transfusion Transmissible Infections among blood donors in Kathmandu, Nepal.

Blood Donors	Total no.	No. of HIV	No. of HBV	No. of HCV	No. of Syphilis
Male	18,434	25 (0.13%) CI=0.09-0.20	92 (0.5%) CI=0.40-0.61	128 (0.69%)* CI=0.58-0.82	90 (0.48%) CI=0.40-0.60
Female	3,282	2 (0.06%) CI=0.01-0.20	10 (0.3%) CI=0.15-0.54	11 (0.33%) CI=0.18-0.58	16 (0.48%) CI=0.29-0.77
Total	21,716	27 (0.12%) CI=0.08-0.18	102 (0.46%) CI=0.39-0.57	139 (0.64%) CI=0.54-0.75	106 (0.48%) CI=0.40-0.59

CI refers to 95% Confidence Interval

* Significantly higher prevalence among male blood donors ($P < 0.05$).

place of a study; therefore, it is necessary to monitor the prevalence in a given area in a set course of time to understand the current scenario. The prevalence of TTIs can reveal the problem of unnoticeable infections in healthy-looking members of the general population and also provide data that is important in formulating the strategies for improving the management of a safe blood supply.

Materials and methods

This cross-sectional study was conducted from March 2008 to September 2008 at the Nepal Red Cross Society (NRCS), Central Blood Transfusion Service (CBTS). The total sample number included the number of blood donors donating blood only once during the study period. Prior to blood collection, the donors were requested to answer a questionnaire to determine whether they were eligible for donation per the criteria set by NRCS, CBTS. Donors were both new first-time donors and repeated donors. Five millilitres of each donor's blood was dispensed in a small clean test tube labelled with a unique sample number for mandatory screening of the TTIs. Serum samples were tested as follows: for anti-HIV IgG and IgM using Enzygnost Anti * HIV ½ Plus, Dade Behring, Germany; for HBsAg using Enzygnost HBsAg 5.0, Dade Behring, Germany; for anti-HCV IgG and IgM using EIAgen HCV Ab kit, Adaltis, Italy; and for anti-*Treponema pallidum* IgG, IgM and IgA using SD Syphilis ELISA 3.0, Standard Diagnostics, Inc., Korea. The tests were performed using automated Behring ELISA Processor III (Dade Behring, Marburg, Germany) and the positive samples were confirmed with respective immunochromatographic test kits (SD Bioline HIV – ½ 3.0, Standard Diagnostics, Inc., Korea for the HIV

test; Virucheck HBsAg, Orchid Biomedical Systems, India for the HBsAg test; and SD Bioline HCV, Standard Diagnostics, Inc., Korea for the HCV test). The anti-*Treponema pallidum* test was confirmed with the same available ELISA test kit. All the test results were recorded in Microsoft Access 2007 suitable for further analysis using available tools. Statistical analysis was done using WinPepi Ver 3.8. Chi Square Test was used wherever applicable.

Results

The seroprevalence of HIV, HBV, HCV and syphilis were determined to be 0.12%, 0.46%, 0.64% and 0.48% respectively. Though the prevalence of infections was higher among the male blood donors, only HCV prevalence among males (0.69%) was statistically significant compared to HCV prevalence among females (0.33%) [Table 1]. HIV prevalence was highest but statistically insignificant among blood donors of the age group 31 to 40 years of age. HBV, HCV and syphilis prevalence was highest and statistically significant among blood donors in the age groups of 41 to 50 years, 21 to 30 years, and 51 to 60 years respectively compared to other age groups taken as a whole [Table 2]. HIV and HBV prevalence was relatively higher among first-time donors, whereas HCV and syphilis was relatively higher among the repeat donors but the differences in prevalence among both types of blood donors were insignificant [Table 3].

Discussion

Determined seroprevalence of HIV, HBV, HCV and syphilis was lower than the infections reported in other countries: Ethiopia (HIV-4.5%, HBV-8.2%,

Table 2. Age-wise seroprevalence of TTIs among blood donors.

Age Groups	Total no.	No. of HIV	No. of HBV	No. of HCV	No. of Syphilis
≤ 20	3,310	2 (0.06%)	7 (0.21%)	7 (0.21%)	10 (0.30%)
21-30	9,818	12 (0.12%)	45 (0.45%)	75 (0.76%)**	19 (0.19%)
31-40	5,763	10 (0.17%)	29 (0.50%)	42 (0.72%)	37 (0.64%)
41-50	2,433	3 (0.12%)	19 (0.78%)*	13 (0.53%)	24 (0.98%)
51-60	392	0 (0.00%)	2 (0.51%)	2 (0.51%)	16 (4.08%***)

* Significantly higher HBV prevalence in the age group ($P < 0.05$).** Significantly higher HCV prevalence in the age group ($P < 0.05$).*** Significantly higher syphilis prevalence in the age group ($P < 0.05$).**Table 3.** TTIs seroprevalence among first-time and repeat blood donors.

Donation Times	Total no.	No. of HIV	No. of HBV	No. of HCV	No. of Syphilis
First Time Donors	9,993	14 (0.14%)	51(0.51%)	58 (0.58%)	42 (0.42%)
Repeat Donors	11,723	13 (0.11%)	51 (0.43%)	81 (0.69%)	64 (0.54%)

None of the above differences among first-time and repeat blood donors were significant ($P > 0.05$).

HCV-5.8%) [1]; Tanzania (HIV-8.7%, HBV-11%, HCV-8%, syphilis-12.7%) [22]; Thailand (HIV-0.69%, HBV-4.61%, HCV-2.90%) [23]; Pakistan (HBV-2.45%, HCV-2.52%) [24]. Lower prevalence of TTIs during this study may be attributed to lower infection rates in Nepal as compared to the other countries/studies under review. Seroprevalence of TTIs was higher among male donors compared to female donors. TTIs considered for the study can be all transmitted by sexual transmission. The findings could indicate some risk behaviours of males, such as outside socialization, multiple sex relationships, etc. and may also be due to fewer females donating blood; hence fewer females are screened compared to males. HIV, HBV, HCV and syphilis seroprevalence was highest in different age groups indicating the different risk behaviours in the age groups. HCV and syphilis seroprevalence was higher among the repeat donors. This is an alarming situation requiring immediate action in appropriate counselling of donors before and after the testing. It further shows the need to communicate the test results to the donors. These precautions not only inform donors of their health status, but also prevent them from donating again with infected blood. Furthermore, unnecessary expenditures from the superfluous testing and proper disposal of the infected blood product are also eliminated, thereby lowering costs for the NRCS, CBTS. Differences in HIV, HBV,

HCV and Syphilis seroprevalence in Nepal compared to studies conducted in Ethiopia [1], Tanzania [22], Thailand [23] and Pakistan [24] must have been due to variations in geographical distribution as well as population differences in terms of lifestyle, awareness, sensitivity and specificity of tests, donor selection criteria, etc. The prevalence of HIV, HCV, and HBV also seems to be decreasing when compared to similar previous studies focussed on any of these infections conducted in Kathmandu, Nepal [5,14-18].

Though the seroprevalence of TTIs in Nepal is lower and decreasing, there is need for immediate action to 1) strengthen donor counselling before donation, and 2) report the results of the tests after donation with follow-up counselling to prevent further transmission of the infection. Mandatory screening of all the TTIs concerned should be continued following standard algorithms developed by the WHO and government. Encouraging younger members of the population who have not had blood transfusions to donate blood may also decrease the chances of transmission of TTIs. Similar studies in other blood transfusion centres of Nepal need to be conducted to monitor the overall sero status of the concerned infections.

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ETUDE DE LA PREVALENCE DE L' ANTIGENE HBs CHEZ LA FEMME ENCEINTE A ANTSIRABE (MADAGASCAR)

Antoine Contamin

MADAGASCAR



Antsirabe

MADAGASCAR – INDICATEURS*

Population totale	19 625 000
Espérance de vie	60,8 ans
Taux population <15 ans	45%
Taux de fécondité	4,62 enfant/femme
Taux de mortalité avant 5 ans	57,7‰
Taux d'accroissement annuel	3,03%
Taux Population urbaine	26,5%

* Données Banque Mondiale 2009

MADAGASCAR – HEPATITE B(1)

Année	1979	1982	1992	2003-2009
Effectif	4000	172	1629	47597
AgHBs+	5,4%	2,3%	4,7%	3,84%
Remarques	18-60 ans	ELISA 18-65ans	ELISA 18-60 ans	TDR ♂4,54% ♀1,80% (p<0,05)

Étude de prévalence de l'antigène HBs chez les donneurs de sang à Antananarivo

MADAGASCAR-HEPATITE B(2)

ANNEE	1992	1993	1994			1999	2008
Lieu	Morarano	Belagera	Provinces de Tamatave et Tananarive			Majunga	Rural Nord
Population	Rurale	Rurale	Rur/urbaine	Rurale	Urbaine	Urbaine	Rurale
Effectif	197	456	921	678	243	654	563
Age	≥ 1 an	≥ 1 an	≥ 1 an	≥ 1 an	≥ 1 an	≥ 2 ans	15-55 ans
AgHBs+	30,5%	18,9%	20,5%	26,0%	5,3%	14,2%	8,5%
1-4 ans	36,5%	25%	28,4%	30,6%	11,1%	20,8%	
5-14 ans	42,6%	18,8%	22,4%	29,1%	4,1%	13,1%	
15-34 ans	27,9%	17,3%	18,1%	23,6%	3,4%	14%	
≥ 35 ans	13,3%	20,7%	19,2%	23,8%	8,2%	14,8%	
Hommes		23,7%	24,6%	30,4%	7,6%	15%	
Femmes		13,5%	17,1%	22,2%	3,3%	13,7%	
AgHBe+AgHBs+	37,9%	48,2%	33,3%	33%	38,5%	9,7%	41,6%
AgHBs+F15-49ans	17,6%	12,9%	13,6%	18,4%	2,5%	15,3%	6,7%
AgHBe+/FHBs>>15	33%	46,7%	20%	21,2%	0%	5,6%	27,4%

Étude de prévalence de l'antigène HBs à Madagascar

MADAGADASCAR-HEPATITE B (3)

En 2000 :

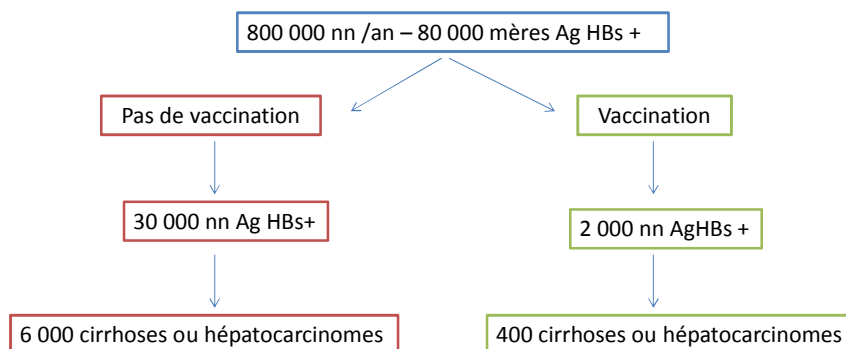
- 23% de la population serait AgHBs+
- 60% de la population a été en contact avec le VHB
- Disparité importante entre zones rurales [26% AgHBs+] et zones urbaines [5,6% AgHBs+]
- Transmission forte du VHB à la naissance et lors des premières années surtout en zone rurale

MADAGASCAR-HEPATITE B (4)

- Vaccination systématique des nourrissons depuis 2002 (S6-S10-S14)
- En 2008 : 82% des nourrissons vaccinés
- Support GAVI

TRANSMISSION MATERNO-FŒTALE

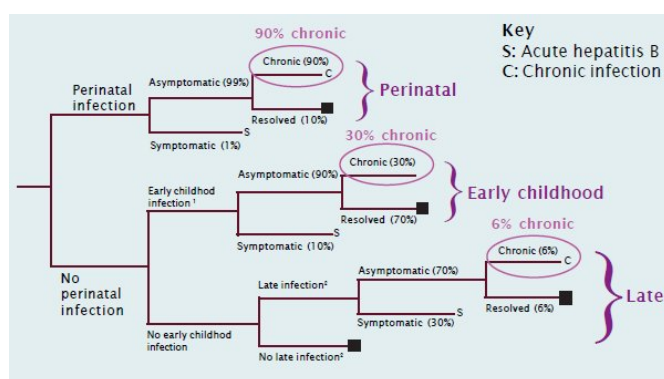
(Projection Hypothétique à Madagascar)



INTERET DE LA VACCINATION DU NOUVEAU-NE

- Réduction du taux d'hépatite transmise de la mère à l'enfant de 80 à 95%
- Réponse immunitaire > 95%
- Tolérance excellente
- Evite les formes chroniques graves pour l'enfant mais aussi potentiellement contaminantes pour l'entourage
- Protection de longue durée

Evolution de l'hépatite B selon l'âge



¹ Based on prevalence of HBV infection at 5 years old

² Based on prevalence of HBV infection at ≥30 years old

RECOMMANDATIONS OMS

- 1992 : Vaccination universelle recommandée
- 1999 : Utilisation préférentielle puis exclusive à partir de 2003 des seringues autobloquantes
- 2004 : Vaccination à débiter avant 24^{ème} h dans les pays de haute incidence
- 2006 : Vaccination des nouveau-nés dans le monde entier
- 2007 : 65% des enfants ont reçu 3 doses
27% ont été vacciné à la naissance

CALENDRIER VACCINAL MADAGASCAR

VACCIN	NAISSANCE	6 semaines	10 semaines	14 semaines	9 mois
BCG	X				
VPO	(X)	X	X	X	
DTC		X	X	X	
Hib		X	X	X	
HepB schema1		X	X	X	
HepB schema2	X	X		X	
HepB schema3	X	X	X	X	
Rougeole					X

ETUDE EFFECTUEE A ANTSIRABE (1)

Buts de l'étude :

- Evaluer la séropositivité des femmes enceintes
- Proposer une vaccination dans les 24 premières heures des enfants nés de mère AgHBs+
- Contrôler à 9 mois statut AgHBs des enfants vaccinés

ETUDE EFFECTUEE A ANTSIRABE (2)

- Lieu de l'étude :
 - Clinique de l'Ave Maria - Médecin chef : Dr Robin
- Durée de l'étude : 9 mois (janvier-septembre 2011)

ETUDE EFFECTUEE A ANTSIRABE (3)

- Formation du personnel soignant à l'intérêt de la vaccination néo-natale
- Elaboration d'une fiche pour la mère et son futur bébé
- Fourniture des tests de diagnostic rapide Viruccheck (sensibilité 95,6% spécificité 98,2%)
- Vaccination du personnel soignant
- Information soigneuse à toute mère Ag HBs+ et vaccination gratuite du nouveau-né

TDR VIRUCHECK HBsAg (1)

- Test immunochromatographique
- Vérifier la date de péremption
- Conservation 4°C-30°C
- Sur sérum ou plasma (centrifugation 3000trs/5mn)
- Ouvrir la poche juste avant emploi
- Submerger jusqu'à la bande rouge
- Attendre 15mn (30 mn max)
- Test valide uniquement si bandelette témoin+

TDR VIRUCHEK HBsAg (2)

NEGATIVE: Only one pink-purple colored band appears on the dipstick.



POSITIVE: Two distinct pink-purple colored bands appear on the dipstick.



VACCIN EUVAX B

- Vaccin à virus inactivé
- 10µg d'antigène HBs dans 0,5 ml de solution
- A conserver entre + 2°C et + 8°C
- Ne pas congeler
- Agiter avant usage
- 3 ou 4 injections
- Si prématurité avec pds de naissance < 2000g le schéma à 4 injections est indispensable

MODALITES VACCINALES CHEZ LE NOUVEAU-NE

- Dans les 24 premières heures suivant l'accouchement
- En intramusculaire
- Face antéro-latérale de la cuisse
- Site d'injection ≠ site BCG
- Pas de contre-indication (sauf enfant très fébrile ou maladie très grave à la naissance)
- Effets secondaires assez rares : fièvre et douleurs disparaissant dans les 48h

RESULTATS (1)

- 582 femmes ont été testées
- 21 (3,6%) étaient AgHBs+
- 6 enfants sont nés durant l'étude et ont tous été vaccinés

RESULTATS (2)

Femmes enceintes	Ville et zone périurbaine	Ville	Zone périurbaine
AgHBs+	3,61% (21/583)	2,6% (10/384)	5,53% (11/199)

Taux d'antigène HBs selon l'habitat

Age	<25ans	25-34 ans	≥ 35 ans
AgHBs-	94,25% (246/261)	98,5% (257/261)	96,7% (59/61)
AgHBs+	5,75% (15/261)	1,5% (4/261)	3,3% (2/61)

Taux d'antigène HBs selon l'âge

LIMITES DE L' ETUDE

- Milieu « favorisé »
- CPN et accouchement à la clinique
- Test utilisé non « gold standard »
- Statut Ag Hbe inconnu
- Etude ...en cours

INTERET

- Bonne réception de la formation auprès du personnel et des futures mères
- Vaccination du personnel
- Enfants de mère AgHBs+ vaccinés à la naissance
- « Ouverture » pour d'autres études devant conduire, dans l'idéal, à la vaccination des nouveau-nés

For further information contact :



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