Seroprevalence and Risk Factors for Hepatitis B Virus Infection in the Healthy Blood Donors at Jimma University Hospital, Southwest Ethiopia

Kahsay Huruy[1*], Afework Kassu[1]Andargachew Mulu[1], Netsanet Worku[1], Teshome Fetene[2]

[1]College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia

[2]Adamitulu PP, Research and Development Department, Ethiopia

Summary

Chronic hepatitis remains a major public health problem affecting more than 350 million people world and risk of transmission HBV infection in blood transfusion in Ethiopia is high and this study will have a significant importance in the design of effective and efficient preventive and control activities. A cross sectional study was conducted in Jimma University teaching hospital, southwest Ethiopia, between January 25 and March 23, 2004 to determine the seroprevalence and assess possible risk factors for Hepatitis B virus (HBV) infection among blood donors at Jimma University Hospital. Specimens of the blood were collected from 62 subjects. Each donor was apparently normal according to criteria set by the blood bank. The specimen was assayed for Hepatitis B surface antigen (HB_SAg) using HBs Ag latex agglutination test kit according to the recommendation of the manufacturer. The seroprevalence of HB_S Ag in blood donors were 24.2 % (15/62). The prevalence was particularly higher in subjects having multiple sexual partner (P=<0.005) than others. Variables like sex and age did not affect the rate of HB_S Ag positively. Seroprevalence of HBsAg positivity in normal blood donors was higher. Therefore, regular HBs Ag screening of blood donors should become a routine hospital function encouraged so as to prevent the occurrence of post transfusion Hepatitis B infection and subsequent development of chronic lives diseases.

Keywords: HBsAg latex, Hepatitis B surface antigen (HBsAg), Hepatitis B Virus (HBV), Sero Prevalence.

Corresponding author*

Introduction

Hepatitis B virus is a DNA virus. During infection many virus particles are released from infected liver cells, results in large amount of viral antigen entering the blood (1). Blumberg *et al* discovered the so called Australia Antigen (AuAg), which is now called HBs Ag led to major advances in viral Hepatitis research (3). The main mode of transmission HBV is percutaneous from blood and blood products, the most important being blood transfusion and also occur through parental and sexual exposure (4, 5). The life saving properties of transfused blood becomes clear during the Second World War and there after blood transfusion quickly become a routine hospital function. Because blood is used as therapy to safe the life of patients and the life saving value is achieved only if it is prepared and is free from transmissible disease (6, 7).

Acute sporadic and epidemic viral hepatitis are common world wide, mostly in developing countries including Ethiopia, and account for high morbidity and mortality (4). Hepatitis B virus infection is a serous problem in Ethiopia and the total infection rate with HBv is 79% with about 2.4 million adult carriers of HB_S Ag (13). Among top ten leading of deaths at Jimma University hospital a chronic hepatitis accounts 5.7 % (11). Therefore, the aim of this study was to evaluate the prevalence of HBV infection and associated risk factors in normal blood donors at Jimma University teaching hospital.

Methods

A total of 62 blood donors were included in the study between January 25 and March 23, 2004. All the subjects were interviewed prior to blood donation by preparing structured questionnaire. Each subject was apparently normal according to criteria set by the blood bank. After written consent obtained about 5 ml of blood sample was collected from each blood donor. Blood was dispensed into a clean test tube and labeled on code number. Serum was separated after 30 minutes and stored at 2-8$^{O}_{C}$ until analyzed for HB_S Ag. The specimen was assayed for HB_S Ag using HB_S Ag latex agglutination test kit according the recommendation of the manufacturers. The quality of the latex reagent was pre-tested before the actual analysis. Positive tests were confirmed by Enzyme Linked Immuno sorbet Assay (ELISA) and had 100% consistency. Data were analyzed using Epi –Info 6

Results

A total of 62 apparently healthy blood donors who were volunteered were included in the study between January 25 to march 23, 2004 at Jimma university hospital to determine the seroprevalence and assess assorted risk factors for HBV infections. In this study different socio-demographic characteristics such as age, sex, marital status, religion, ethnicity and occupational status were considered.

As indicated in Table 1 among the study subject 57 (91.9%) were males and the rest were females. The mean age was 31 years with the minimum age of 18 and maximum age of 64. The marital status of the study population were largely presented by married 43 (69.4 %) followed by single 16(25.8%).Occupational status also shows 21 (33.9%) farmer, 14 (22.6%) government employee 11 (17.7%) merchant, 8(12.9%) students, 5(8.1) daily laborer and 3 (4.8%) others. The dominant religion of the study population was found to be Muslim 29 (46.8%) followed by orthodox 26 (41.9%) protestant 4 (6.5%) and catholic 3 (4.8%). In this investigation the over all seroprevalence of HBsAg among apparently health blood donors was found be 15(24.2%).

Result about age the age group of 18 –32 years 42(67 .4 %) were the dominant blood donors followed by the age group of 33-47 years 14(21.2 %} and the least were age group of 48 – 62 years 2(3.2) and 63^{+} each contained 1(1.6%).

There seems a higher seroprevalence of HBsAg among age group of 48-62, but it s difficult to reach on such conclusion as the number of individuals tested in this age category is relatively small.

According to the religion the protestant had high seropostivity rate for HBS Ag 3(75%) followed by orthodox 8(30.82%) Muslim 4(13.8%) and among the study subjects single 8 (50%) where HB_S Ag positive and married of 7 (16.3%) were positive but none of them were positive in divorced population. The prevalence of serum HBS Ag was significantly higher among single population than married. The occupational status of the study populations indicates that sero prevalence of HBs Ag with in merchants were 6 (54.5%), followed by government employee 4(28.6%), daily laborer 1 (20%), farmer 3 (4.3%) students 1 (12.5%) (Table1).

As indicated table 2 seoprevalence of HBs Ag were compared with some possible risk factors. Most of study subjects 40 (64.5%) had history of frequent medical injection of which 10 (25%)

were positive for HB_S Ag. Donors with multiple sexual partners had high seroprevalence of HB_S Ag and it was found to be highly significantly associated with HB_S Ag ($P<0.005$).

Table 1: Frequency of Seropevalence of HBsAg by Sex, Age, Religion, Marital status and Occupation among blood donors at Jimma University hospital, January. 25 – March 23, 2004, Jimma, Ethiopia

		Status of HBsAg (%)		
		+ve	**-ve**	**Total**
Sex		14(24.6)	43(75.4)	57(100)
		1(20.0)	4(80)	5(100)
		15(24.2)	47(75.8)	62(100)
Age	18-32	10 (16.1)	32 (51.6)	42 (67.74)
	33-47	3(4.83)	11 (17.74)	14 (22.6)
	48-62	2(3.22)	3 (4.83)	5 (8.1)
	$\geq$ 63	-	1 (1.6)	1 (1.6)
Religion	Orthodox	8(30.8)	18(69.2)	26(100)
	Muslim	4(13.8)	25(86.2)	29(100)
	Protestant	3(75)	1(25.0)	4(100)
	Others		3(100)	3(100)
	Total	15(24.2)	47(75.8)	62(100)
Marital Status	Single	8(50)	8(50)	16(100)
	Married	7(16.3)	36(83.7)	43(100)
	Divorced	-	3(100.00)	3(100)
	Total	15(24.2)	47(75.8)	62(100)
Occupation	Gov't employee	4(28.6)	10(71.4)	14(100)
	Merchant	6(54.5)	5(45.5)	11(100)
	Former	3(14.3)	18(85.7)	21(100)
	Student	1(12.5)	7(87.5)	8(100)
	Daily Laborer	1(20.0)	4(80.0)	5(100)
	Others	-	3(100)	3(100)
	Total	15(24.2)	47(75.8)	62(100)

Table 2: Distribution of the sero prevalence of HBsAg with various risk factors among blood donors at Jimma University hospital, January 5 – March 23, 2004, Jimma, Ethiopia

Risk factors	No of tested (%)	No of positive (%)	X^2
Had history of blood transfusion	4(6.5)	1(25)	
Had multiple sexual partner	14(22.6)	8(57)	10.5
Had history of dental therapy	11(17.7)	3(27.3)	
Had history of frequent Medical injection	40(64.5)	10(25)	

Discussion

Sixty two healthy blood donors who volunteered for the study and completed questionnaire had provided blood sample and were examined for the detection of HB_S Ag. Prevalence of HB_S Ag was 24.2%. This finding was in line with reports from Logos Nigeria reported by Belo (5), which was 25.7%. However, this result was higher from reports from countries like Europe and Australia <1%, Israel 1.8, Somalia 12% (22). A similar study was undertaken in Addis Ababa blood donors to determine seroprevalence of HB_S Ag and were positive 8 %(3).

This difference may be due to geographical variation genetic difference; immunity, other socioeconomic characteristics and sample size variation also may contribute for this difference.

In respect to risk factors, having multiple sexual partners was found to be important risk factor for HBV infection. 8(53.3%). This finding was similar with the finding in Tanzania by Jacobsetal in 1995 (26).

Marital status has been associated with seropostivity of HB_S Ag. In this study the prevalence was law among married than single this might be explained as; those who are single have experienced multiple sexual partners than who are married. The merchants had high seroprevalence for HB_S Ag in this particular study in contrast to other occupational status; therefore occupation could be one of the risk factors for the acquisition of HBV infection. In this study the seroprevalence of HB_S Ag among the apparently healthy blood donors at Jimma University hospital were high, this might indicate that there is high prevalence of HB_S Ag circulating in this population. However, there is no previous study regarding the rate of HB_S Ag

in apparently healthy blood donors at Jimma University hospital, so compression with this study was not possible.

In conclusion, the increasing rate of HBV in blood donors from various risk groups should seek re-emphasize. It is important to strength re-arrange and set the mechanism of prevention strategies by regular HB_S Ag screening of blood donors, so as to prevent the occurrence of post transfusion hepatitis B and subsequent development of chronic liver disease.

References

1. Cheesbrough M (2000) District laboratory practice in tropical countries, UK. Cambrige University press.
2. GebreSelassie L (1983) Hepatitis B surface antigen and its antibody in Ethiopian blood donors. Eth. Med. J 21 205-8.
3. Tsega E (2000) Epidemiology, prevention and treatment of viral hepatitis. Eth Med J 38 13-15.
4. Belo A.C.(2000) prevalence of HBV markers in surgeons in logos, Nigeria. East Afrmed J.77 283-5.
5. WHO (1990) Guidelines for the organization of blood transfusion services. WHO Geneva.
6. WHO (1990) Guidelines for the organization of blood transfusion services. WHO, Geneva.
7. Gibbs W.N, Britten A.F.H (1992) Guide lines for the organization of a blood transfusion service. WHO, Geneva.
8. Sisay Y (1995) Hepatitis B, C,D and E markers in Rural Gabon. Am J Trop Med Hyg 53 338-44.
9. Abdool Karim S (1988). The prevalence and transfusion of Hepatitis B virus infection in urban, rural and institutionalized Black children of South Africa. International J of Epidemiology 17 168-73.
10. Jacobs B, Mayaud P, Changalucha J, et al (1997) sexual transmission of hepatitis in Mwanza, Tranzania. East Afr. Med. J. 24 121-4
11. Jimma University Hospital Annual report. 2001-2002.