IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 10 Ver. 9 (October. 2018), PP 66-69
www.iosrjournals.org

Prevalence of Hepatitis B virus infection among voluntary blood donors of a blood bank in a mixed Urban – Rural setting in West Bengal , India

Dr. Debjit Chattopadhyay[1], * Dr. Barnik Choudhury[2]
[1](Assistant Professor, Department of Pathology, College of Medicine & JNM Hospital, WBUHS, Kalyani, Nadia, India)
[2](Associate Professor, Department of Pathology, College of Medicine & JNM Hospital, WBUHS, Kalyani, Nadia, India)
**Corresponding Author: Dr. Barnik Choudhury*

ABSTRACT: *With a 3.7% point prevalence and 40 million HBV carriers, India is considered to be an intermediate endemic zone as per WHO observation. Prevalence of HBV infection among voluntary blood donors indicates the prevalence of carrier state in the population.*
METHODS: *All voluntary blood donors reporting to the blood bank are screened using appropriate enzyme linked immunosorbent assay. This retrospective study was designed for duration of 8 and a half years starting from January of 2010 to june2018.Medical reports of the donors were accessed from the blood bank and were analyzed.*
RESULTS: *Total 46900 donors were screened of which 41805 were males and 5095 were females and the prevalence was estimated by HBsAg positivity which is 0.88|% which well below the Indian average.*
CONCLUSION: *Blood borne infection of HBV continues to occur which calls for superior method of screening.*
Keywords: *ELISA, Hepatitis B.Virus, Voluntary Blood Donors*

Date of Submission: 12-10-2018 Date of acceptance: 27-10-2018

I. Introduction:

The discovery of hepatitis B virus(HBV) came via indirect route by Blumberg et al in 1963.While studying sera for multiply transfused individuals to track genetic differences in human population, a new antigen was identified in an Australian aborigine and named Australia antigen [1]. Further studies revealed that the Australia antigen is associated with serum hepatitis and Blumberg was awarded Nobel Prize in 1976.

Hepatitis B virus is a double stranded DNA virus belonging to genus Orthohepadnavirus and family Hepadnaviridae. After infection it causes many hepatocytic changes encoded by protein HBx and also by generation of reactive oxygen species (ROS).This ROS and HBx are responsible for genetic and epigenetic mutation and carcinogenesis. Thus hepatitis B virus is responsible for acute as well as chronic hepatitis, hepatocellular carcinoma and pancreatic carcinomas as recently suggested. As estimated by WHO about 257 million people are chronically infected by hepatitis(2015)[2]

HBV is a double stranded DNA enveloped virus. It has an incomplete double stranded DNA genome which is 3.2 kb long.The HBV genome contains four overlapping open reading frames (ORF),which encodes the three hepatitis B surface antigen(HBsAg),encoded by the S gene,preS2/S genes,and preS1/S2/S genes. HBeAg and HBcAg (encoded by preC/C genes and viral polymerase (encoded by P genes) and a multifunctional non-structural protein called X(encoded by X genes) all contribute to this viral genome and its outcomes.The overlapping structure of the coding regions enhances the utility of the virus genome greatly. HBeAg is a clinical indicator of active viral disease. HBeAg positive individuals as well as those with high HBV DNA load is associated with hepatocellular carcinoma in asymptomatic HBV carriers, whereas HBeAg negative individuals infected with HBV carry the risk of cirrhosis as well.[3]

There is divergence of sequence more than 8% in HBVgenome. Eight strains (A-H) so far identified and two more on the way [3]Genotypes are divided into subgenotypes and these genotypes and sub genotypes has particular geographical distribution all over the world.

Reverse transcriptase of HBV lacks proof reading function and HBV shows higher degree of mutations, virulence and drug resistance. Genotype C and preS mutation are specially implicated in hepatocellular carcinoma. In developing countries hepatitis can be transmitted by perinatal transmission, bloodtransfusion, unprotected handling of medical instruments and sexual contacts as well.

Incubation period of hepatitis B is 1.5 to 6 months—3 months on an average.

II. Material And Methods:

A retrospective hospital record based study was conducted in a blood bank attached to a teaching hospital in Kalyani, Nadia, West Bengal, India. The ethics committee of the hospital approved the study. Data was collected for a period of 8.5 years starting from January 2010 to June 2018. Sera of voluntary blood donors from different localities and different age groups were screened for HbsAg. Atotal of 46,900 blood units were collected and studied. Voluntary blood donors were selected and screened as per WHO criteria of donor selection. 5 milliliter of blood was collected from each donor in a sterile plain test tube. Blood samples were centrifuged and the sera was separated and analyzed. Based on WHO recommended strategies of using two different testing methods, one being an enzyme linked immune sorbent assay (ELISA) and simple or rapid assay in the second are used. Samples were analyzed for HbsAg by 3rd generation ELISA test. Reactive serum was retested using a second assay based on different principles e.g card test .Tests were validated as per the given criteria and the results were computed.

III. Results:

In the present study, total number of voluntary blood donors 46900. Out of them, 41805 were males (89.13%) and 5095 were females (10.87%) which clearly shows absolute prevalence of males over females in voluntary blood donors.(Table-1)

Table-1: Distribution of voluntary blood donors in total population under study

Year	Total voluntary blood donors	Male	Female
2010	4531	4174	357
2011	4584	4267	317
2012	4970	4564	406
2013	4320	4002	318
2014	3530	3194	336
2015	4978	4469	509
2016	5269	4564	705
2017	9584	8209	1375
Up to Jun 2018	5134	4362	772
Total	46900	41805	5095

Table-2: Number and Percentage of HbsAg positive cases in Males and Female voluntary donors

YEAR	Total number of voluntary donors	Reactive for HBSAg (HBVinfection)	
		Number	Percentage
2010	4531	39	0.86
2011	4584	33	0.71
2012	4970	42	0.85
2013	4320	34	0.79
2014	3530	27	0.76
2015	4978	48	0.96
2016	5269	53	1.01
2017	9584	101	1.05
Upto Jun of 2018	5134	35	0.68
Total	46900	412	0.88

The prevalence of Hepatitis B among voluntary blood donors are shown in Table-2, which shows 0.88% in total. The highest prevalence is noted in the age group 31-40 which shows 31.8% of the positive cases (Table-3) The sex distribution as evident from the Table-4 is 88.89% in male and 11.11% in female. But when we compare with the actual amount of donor we can see 366 cases are positive among 41805 of male donors i.e. 0.88% whereas 46 out of 5095 female donors i.e. 0.90% .The difference in data among different sexes is insignificant.($p>0.05$)

Table-3: Distribution of HBsAg positive cases according to age among the voluntary blood donors

Age groups(years)	Number	Percentage
18-30	89	22
31-40	131	31.8
41-50	120	29
51-60	72	17.2
Total	412	100

Table-4: Distribution of HBsAg positive cases according to sex among the voluntary blood donors

Sex	Number	Percentage
Male (41805)	366	88.89
Female (5095)	46	11.11
	412	100

IV. Discussion:

Hepatitis B virus is one of the main causes of post transfusion hepatitis all over the world. WHO estimates that in 2015, 257 million persons or 3.5% of the population were living with chronic hepatitis infection in the world.68% of the infected individuals live in Africaand western pacific area. The burden in India is 2-7% (4%) average as per Roy [4]. WHO report says that global prevalence of HBV infection in HIV – infected patients is 7.4%[2]

As per Naik et.al, HBV infection is more prevalent among male patients in a hospital setting and prevalent mostly in age group21-40 years [5] which corroborates with our study and another study of prevalence of hepatitis B in voluntary blood donors show 2.54% in a medical college of Andhra by S Gulia et al [6].

As per WHO observation of global prevalence of hepatitis B among children under 5 years is 1.3 to 2.2 % in year 2015 and 0.7 to1.6% in south east Asia in which area India belongs. [2] .This under-5 prevalence is a strong indicator of the disease prevalence among general population.

Overall prevalence is 2 to 4% in south East Asia [2]. As observed by Baviskar et al [7], prevalence of HBV infection is more than 12% among blood donors in a teaching hospital of north Karnataka. Of course some professional donors are included in the study, but it is not the whole story: low socioeconomic groups, illiteracy, poor concept of hygiene as well as poor delivery of health care, all contribute to the saga and further study is to be contemplated there. In a rural hospital in south India, Das et al observed the pre valence of hepatitis B about 0.93%[8] Basavraj et al observed seroprevalence of 2.12% in central Karnataka[9] ; Malik et al observed 0.51% in Jammu[10]. Ghosh et al observed 0.77% prevalence of HBV infection in voluntary and replacement donors of Gauhati, Assam [11] which is near our observation. In the study of Naskar et al in the blood bank of National Medical College , Kolkata it is 1.75% ,bit higher than us [12]. As observed by Rawat et al, the seroprevalence rate is almost approaching our observation in a tertiary care hospital in north India among voluntary blood donors only [13]

So we can aptly say that variation in prevalence of hepatitis B virus infection among voluntary blood donors depends upon culture, religion, consciousness levels and socioeconomic conditions..Moreover superior scientific methods of detection of hepatitis B Virus can efficiently detect the infection which is not perceived by ELISA OF 3rd generation. This is more evident from the lower rate of positivity of our study than many other studies from India.

So adequate counseling of the positive cases is required as well as universal HBV vaccination starting from birth as recommended by WHO for the purpose of creating future safe donors.

V. Conclusion:

In conclusion we can say that prevalence of hepatitis B infection in voluntary blood donors is haphazardly done all over India. Nationwide organized studies are necessary. In our study the prevalence of hepatitis among voluntary blood donors fall in low endemic zone which is not the case according to WHO observation and other related studies. So superior screening method like 4th generation ELISA and NAT (Nucleic Acid Test)[17] should be implemented for screening. Last but not the least detected positive cases should be counseled and treated properly and birth dose and coverage of three doses as a WHO recommended preventive measure should be done with utmost care.

References:

[1]. Gerlich W.H. Medical Virology of Hepatitis B: how it began and where we are now .Virology Journal .2013;10:239 . Published online 2013 Jul20. Doi:10.1186/1743-422x-10-239 PMID:23870415
[2]. World Health Organization ,Global Hepatitis Report, 2017
[3]. Zhang Q, Cao G . Genotypes, mutations and viral load of hepatitis B virus and the risk of hepatocellular carcinoma .Hepat Mon 2011;11(2):86-91

[4]. Roy G. Current Scenario of Hepatitis B and its Treatment in India . Journal of Clinical and Translational Hepatology 2017 Sep 28;5(3):277-296 Published online 2017 Jul 8.doi:10.14218/JCTH.2017.00024
[5]. Naik TB ,,. Sathish J.V. and .Wadekar M.D..Seroprevalence of Hepatitris B Surface Antigen Among Patients Attending a Tertiary Care Hospital at Chamrajanagar, Karnataka, India .International Journal of Current Microbiology and Applied Sciences(2018) 7(1):1279-1284 . https://doi.org/10.20546/ijcmas.2018.701.156
[6]. GuliaS, PandaS, Sitaraman E, ReddyK. . Seroprevalence Of Hepatitis B Virus Infection Among Blood Donors In Local Population. The Internet Journal of Pathology.2010; VOLUME 12 Number 1
[7]. Baviskar .S.R High prevalence of hepatitis-B virus infection and risk factors associated with it among blood donors in teaching hospital of north Karnataka.International Journal of Biological & Medical Research .2012;3(4):2355-2357
[8]. Das S, HarendraKumar M.L .Viral Hepatitides among the Blood Donors in a Rural Based Hospital: A Five Year Study ..Journal of Clinical and Diagnostic Research ;Year :2012, Month: May,Volume:6 ,Issue: 4 ,Page:619-622
[9]. BommanahalliBP ,Javali R ,MallikarjunaSwamyC M , Gouda KU ,Siddartha K, Shashikala KP. Seroprevalence of hepatitisB and hepatitisCc viral infections among blood donors of central Karnataka, India. ; International Journal of Medical Science and Public Health;2014;3:272-275
[10]. Malik S. Sharma,P.R., Verma U. K.. , Khajuria A. , WaniM.A.,Sharma B.B. Seroprevalence of Hepatitis B in healthy blood donors at a teaching hospital of Jammu region .JK –Practitioner Vol 16,,No(1-2) January-June2011:17-19
[11]. GhoshR,, Hazarika N .K. .Seroprevalence of HBV and HCV among Healthy Blood Donors in aTertiary Care Hospital of Northeast India:a 5-year Retrospective Study. International Journal of Current Microbiology and Applied Sciences(2018)7(7):531-536 . https://doi.org/10.20546/ijcmas..2018.707.065
[12]. Dr. Naskar S , DrNandy S, Prof Basu K .,DrBasu R . Study ofSeroprevalence of HIV, Hepatitis B and C and Syphilis Among Blood Donors In A Tertiary Care Hospital, Kolkata. IOSR Journal of Dental and Medical Sciences e-ISSN:2279-0853,p-ISSN2279-0861.Volume11,Issue 3(Nov-Dec 2013), pp-63-66
[13]. Rawat A, DiwakerP,GogoiP,Sing B. Seroprevalence& changing trends of transfusion-transmitted infections amongst blood donors in a Regional Blood Transfusion Centre in north India. Indian Journal of Medical Research 2017;vol 146 issue5 pp642-645
[14]. Hans R. ,Marwaha N, .Nucleic acid testing-benefits and constraints. Asian Journal of Transfusion Science, Vol 8 No 1 January-June,2014, pp 2–3.

Dr. Barnik Choudhury. "Prevalence of Hepatitis B virus infection among voluntary blood donors of a blood bank in a mixed Urban – Rural setting in West Bengal , India" IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 10, 2018, pp 66-69