

Prevalence of HBV Infection among the Blood Donors of Southern Nepal: A Three Year Retrospective Study

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ABSTRACT

Background: Blood is needed to be transfused in some life threatening situation. Safe blood transfusion is required to avoid transmission of transfusion transmitted infections (TTI_s) like AIDS, Hepatitis, syphilis and Malaria etc. Our present study was designed to determine the seroprevalence of HBsAg in blood donors in our health institution.

Methods: Data from Blood Bank of the National medical College, Birgunj, Nepal, from 2014 to September 2017 were used in this study. The method of study was descriptive and comparative in retrospective aspect. All the HBsAg positive samples were tested by using ELISA for conformation. Finally all data were analyzed statistically by Chi-square test.

Results: Among 5798 blood donors, 89.8% donors were male and remaining 10.2% were females. There were 93.7% replacement donors and 6.3% were volunteer donor. Most of the blood donors (81.9%) were coming from rural area. We have found overall 29 (0.49%) HBsAg positive individuals. Out of them higher frequency represented by females and the urban blood donor as compare to Male and rural area, respectively.

Conclusions: In conclusion, the overall prevalence of HbsAg positive individuals among blood donors of Southern Nepal are little bit decreases with increasing distribution in female and urban area.

Key Words: HBV, HBsAg, Blood Donors, southern Nepal, Prevalence.

INTRODUCTION

Hepatitis B virus (HBV), common infectious diseases of the world, has been known to infect two billion people including an estimated 400 million chronically infected cases. [1] In 1967 two group of scientist first discover a virus of the Hepadnaviridae family in human blood which is strictly hepatotropic called them HBV. [2,3] It is one of the first viruses known

to be transmitted by blood and blood components, [4] and is a major topic of interest for those involved in blood safety. [5] HBV infection from blood transfusions became rare after the introduction of the HBsAg test in early 1970, however, in countries with high and intermediate prevalence of HBV is still reflect most common serious complications of transfusion like serious mortality, morbidity

and financial burden. [6] The genotype of HBV, HAV and HDV predominantly distributed in Europe, Middle East, Central Asia, Siberia and America. Genotypic distribution of HBV and HCV are predominant in East Asia while HEV is more predominant in Africa whereas HFV genotype has been reported in Central America. Also, genotype G has been reported in the United States and France. [7-10] The median overall risks of becoming infected with HBV from a blood transfusion in sub-Saharan Africa will be 4.3 infections per 1000 units; [11] while in the developed countries, the estimate is 1/1 700 000 for HBV. [12] Among Nepalese blood donors, HBsAg seroprevalence has been reported highest in the Banke (1.2%) followed by Biratnagar (0.87%) and Kaski (0.35%). [13] The prevalence of HBsAg among blood donors of Central Nepal is 1.43%, higher in males as compared to females; [14-17] and increased in rural females than urban females. The aim of our study was to assess the prevalence of HBV infection in prospective blood donors visiting the blood bank of National Medical College, Birgunj, Nepal, to implement the better blood donor recruitment policies in Nepal.

MATERIALS AND METHODS

Study population:

Our study selected all blood donors who donated their blood from August 2014 to September 2017 at the Blood Bank of the National Medical College, Birgunj, Nepal. The selected donors were healthy according to their clinical histories, and physical examinations, and they fulfilled the optimum criteria for donation having the age ranged from 18 to 60 years.

The study includes total 5798 donors in different category by gender, willingness and area of living. From each and every donor, donor consent was collected and stored it confidentially. Permission was also taken from our institutional research committee to use the data for research purposes only.

Collection of Sample:

Blood sample were collected separately from donor blood bag and placed it into a pilot tube for further examination and screening purposes.

Analysis of Sample:

The methods of study were descriptive and comparative in retrospective aspect. Blood samples were tested anonymously and confidentiality was maintained as described by Nepal Red Cross Society, Blood Transfusion Service. All samples were examined by "Hepacard" manufactured by J. Mitra & Co. Pvt. Ltd. (India) with sensitivity 0.5ng/ml. and reactive sera were reconfirmed by testing repeatedly then positive samples were tested by using ELISA test. [18]

Statistical Analysis:

Final data were analyzed statistically by Chi-square test using SPSS computer software (SPSS 16, 2008; SPSS Inc., Chicago, IL, USA)

RESULTS

From our retrospective study of last three years assessment of prevalence of HBsAg positivity, among the blood donor at blood bank, national medical college, we found total 5798 blood donors. Majority of them (93.7%) were replacement blood donor (RBD) and remaining (6.3%) were volunteer blood donor (VBD). The proportion of replacement blood donor in the year 2014-15 were 94.2% which is slightly increased to 95.2% in 2015-16 but again decreased to 91.5% in the next year. On the other hand the amount of volunteer blood donor were decreased in 2015-2016 then sharply increased in 2016-2017.

Among whole volunteer blood donor we got the percentage of male volunteer was gradually increases from 2014 to 2017, which is just opposite in female volunteer blood donor. The replacement male blood donor is more or less same in between first 2 years (2014-15 and 2015-16) but it slightly increased in last year 2016-2017. Meanwhile the number of female replacement blood donor is quietly increased in 2015-2016, as compare to

2014-2015 but sudden decline its value to 7.1% in 2016-2017(Table-1).

Table-1: Distribution of VBD and RBD among Male and female blood donor from 2014 to 2017.

Year	Total blood donor	Total		Female		VBD		RBD	
		VBD	RBD	VBD	RBD	VBD	RBD	VBD	RBD
2014-2015	1683	97(5.8%)	1586(94.2%)	76(78.4%)	1408(88.8%)	21(21.6%)	178(11.2%)		
2015-2016	2152	103(4.8%)	2049(95.2%)	84(81.5%)	1808(88.2%)	19(18.4%)	241(11.8%)		
2016-2017	1963	167(8.5%)	1796(91.5%)	161(96.4%)	1669(92.9%)	06(3.6%)	127(7.1%)		

From that data it has also been clearly shown that, most of the male and female VBD were from urban Area but in

RBD most of them were from rural area of Southern Nepal (Table-2).

Table-2: Prevalence of Urban & Rural VBD and Urban & Rural RBD within 2014-2017(Figure2).

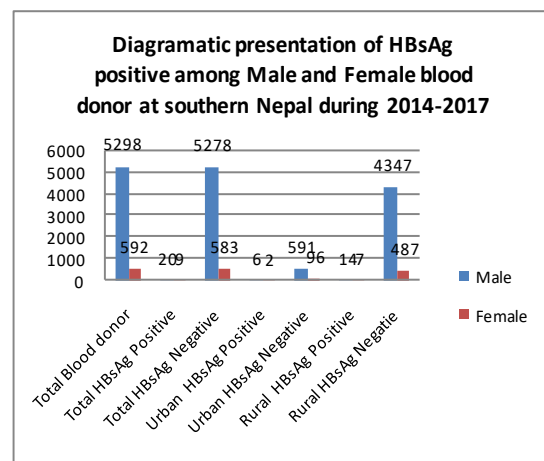
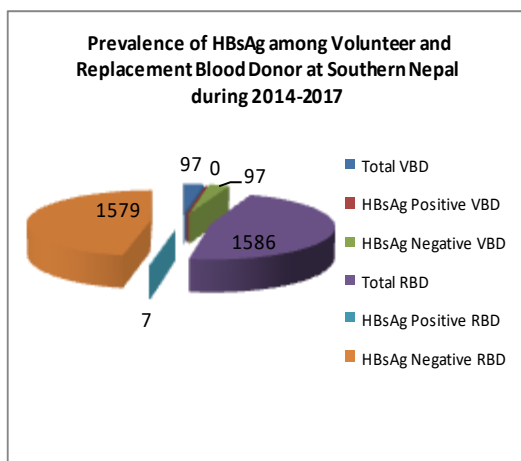
Year	Total				Male				Female			
	VBD		RBD		VBD		RBD		VBD		RBD	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
2014-2015	83 (85.6%)	14 (14.4%)	277 (17.5%)	1309 (82.5%)	72 (86.7%)	04 (28.6%)	256 (88%)	1152 (93.3%)	11 (13.3%)	10 (71.4%)	21 (7.6%)	157 (11.9%)
2015-2016	91 (88.3%)	12 (11.7%)	247 (12.1%)	1802 (87.9%)	77 (84.6%)	07 (58.3%)	219 (88.6%)	1681 (93.3%)	14 (15.4%)	05 (41.7%)	28 (11.3%)	213 (11.8%)
2016-2017	158 (94.6%)	09 (5.4%)	193 (10.7%)	1603 (89.3%)	153 (96.8%)	08 (88.9%)	174 (90.2%)	1495 (93.2%)	05 (3.2%)	01 (11.1%)	19 (9.8%)	108 (6.7%)

Out of 5798 blood donors, only 29 people were suffering from Hepatitis B viral infection; with highest 0.74% HbsAg positive in the year of 2015-2016. The proportion of HBV positivity in VBD is about double (0.82%) in respect to RBD though the total percentage of VBD is very

low in compare to RBD. On the other hand Female and urban blood donor shows 1.5% and 0.76% respectively. We did not found any significant association between HBV infections with Gender (Male/Female), willingness (VBD/RBD) and area (Rural/Urban) of living (Table-3).

Table: 3- Statistical analysis for the association between HBV infection with gender, willingness and area of living of blood donors (Analyzing Chi-Squire Test).

		HBsAg		Total	Chi-squire Value	P-value
		Positive	Negative			
Type of Donor	RBD	26(0.48)	5405	5431	0.792447	>0.05
	VBD	3(0.82)	364	367		
Gender	Male	20(0.38)	5186	5206	13.78597	<0.05
	Female	9(1.5)	583	592		
Area Of Origin	Urban	8(0.76)	1041	1049	1.880548	>0.05
	Rural	21(0.43)	4820	4841		
Year	2014-2015	7(0.41)	1676	1683	4.292606	>0.05
	2015-2016	16(0.74)	2136	2152		
	2016-2017	6(0.31)	1957	1963		



DISCUSSION

Liver is the metabolic factory of our body [19] that performs most of the metabolic and synthetic functions including neutralization and removal of xenobiotic compound [20-22] and drugs. [23-25] If this vital organ will damage by any cause it can leads to development of different reflecting syndrome of major diseases. [26] One of the leading causes of damage this organ is HBV infection that can develop diseases like liver cirrhosis, Hepatocellular Carcinoma and antiviral therapy can only reduces the risk of this disease. [27,28]

Our study found average prevalence of HBsAg is 0.49%, which is similar to the study [29] conducted at Nepal by Karki et. al. 2008, but deviate from the study [30] at Dharan, Nepal. Though the prevalence of HBV infections throughout the country is not uniformly distributed. [29] But according to WHO, [31,32] throughout Nepal the prevalence of HBV is 0.8 to 1.5% during the year 2000 to 2010.

We also observed a significant gender inequality among the male and female blood donors with male: female ratio=8.8:1, it indicates more males donated their blood than females in our Blood bank. An interestingly we found proportion of HBsAg prevalence in male was 0.38% whereas female was 1.5%, with male:female ratio =1:3.9, which is just reverse to the study [33,34] conducted in France and even in neighboring country India .

We also observed that urban area having lower number with higher proportion [8(0.76%)] of HBsAg positive individual in compare to Rural blood donor [21(0.43%)] which is similar with the study conducted by a Narayanasamy et al., they represent that the urban area having more susceptibility to get infected with HBV. [35] Moreover we did not found any statistically significant association between HBV infection with male-female, Rural-Urban and VBD-RBD.

These results could be due to higher susceptibility of diseases among women as compared to their male counter-parts. [36,37]

We have got higher proportion of Urban and volunteer seropositive individuals that seem to be the only cause of lower amount of blood donor from Urban, VBD and Female side. These could also be due to lack of proper public health awareness (education) on the essence of blood donation in our regional blood banks.

CONCLUSIONS

The prevalence of HbsAg among blood donors of Southern Nepal is 0.49%, higher in females, VBD and Urban as compared to males, RBD and Rural respectively.

As shown by our findings, important issues that need to be implemented to motivate educated population especially female and the population (within age 18-60 years) who habited in urban area voluntarily donate their blood minimum 3-4 times a year. To reduce the prevalence of HbsAg among blood donors are through proper donor selection and education activities, uniform implementation of laboratory screening tests and adequate supply of blood through voluntary blood donations along with restriction of repeat donation within short interval is needed.

Similarly, increases the usefulness of HBsAg detection screenings to improve the safety of the blood supply in Nepalese population. However poverty, lack of education, ignorance, false belief, lack of uniform policy may lead to spread this Hepatitis like transmitted diseases.

ACKNOWLEDGEMENT

The authors would like to acknowledge Archita Diagnostic Center, Birta Chowk, Birgunj, Nepal (Regd No. 4939/066/067). E.mail-adc.niranjan@gmail.com.

Ethical approval and consent to participant:

Prior to collect blood from blood donor we had taken the consent form donors.

Consent to publish:

We have taken the consent from IRC to publish these data only for research purposes to improve the knowledge of these pathogenic distribution

Availability or Data and Materials

All data are available in the Data record book of Blood Bank at National Medical College, Birgunj, Nepal.

Conflict of Interest: There is nothing to disclose

Funding information: There was no funding for this research.

Authors Contributions:

AKP and DJ Design the study of the experiment. Recruitment of blood donors and counseling was carried out by AKP. Blood sample testing for HBsAg was carried out by AKP, DJ and NS, supervised by AKC and NS. AKP, DJ, NJ, RKV analyze the data. The first draft of the paper was written by DJ and AKP and then RKG, SBP, RKV and NJ contributed to revising and reviewing the paper. All authors read and approved of the final draft before submission.

Limitations of the Study:

This study was constrained by small amount of Volunteer blood donor and female and urban blood donor sample size. There is need to boost up the population to get subsequent amount of respected blood donor. The documentation and screening processes, data analysis, and demography of prospective blood donors must be improved in future similar studies.

List of Abbreviations:

HBV = hepatitis B virus, HBsAg = hepatitis B surface antigen, VBD = volunteer blood donor, RBD = Replacement blood donor, ELISA = Enzyme linked Immunosorbent assay, AIDS = Acquired immunodeficiency syndrome.

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How to cite this article: Patel AK, Jana D, Jana N et.al. Prevalence of HBV infection among the blood donors of southern Nepal: a three year retrospective study. *Int J Health Sci Res.*2018; 8(8):46-51.
