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Original Article

High prevalence of hepatitis-B virus infection and risk factors associated with it among blood donors in teaching hospital of north Karnataka.

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ABSTRACT

Screening of blood transmissible infections is one of the important surveillance methods for infectitious diseases. Hepatitis B is one of the world, most common and serious blood transmitted infectious diseases. With the fact that HBV is 100 times more infectious than HIV, screening of HBV attained highest global priority. The present cross sectional study conducted at blood bank of tertiary care facility of North Karnataka during June 1 to July 31, 2010. With the informed consent and ethical approval the study collected information of 207 blood donors regarding various risk factors for above infections. The findings were correlated with their status of sero-positivity of Hepatitis-B. The study revealed exceptionally higher prevalence of Hepatitis-B Virus infection that is 12.5% which was very high as compared with other studies. The male gender, illiteracy and driver by occupation were found to be independent risk factors for Hepatitis-B Virus infection.

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1. Introduction

Hepatitis B is one of the world's most common and serious blood transmitted infectious diseases[1]. Every year there are over 4 million acute clinical cases and 1 million deaths due to Hepatitis B Virus (HBV) infection and its consequences. It is estimated that more than one third of the world's population live in areas with high HBV infection. South East Asia is identified as endemic for chronic HBV infection where the prevalence of chronic HBV infection >8%, in this region 70 to 90% of the population becomes HBV-infected before the age of 40 and 8-20% of people are HBV carriers[2]. Transfusion of blood containing HBV is one of the important route of acquisition of HBV infection by most of the individual. This is also true in modern technological era, as 31 countries still reported collecting paid blood donations (more than 1 million donations in total in a year) and 41 countries were not able to screen all blood donations for one or more of the transfusion-transmissible infections (TTIs); with these facts screening of blood donors for TTI becomes an important operation on the part of safe blood transfusion. With the fact that HBV is 100 times more infectious

than HIV, screening of HBV attained highest global priority. In India Drug and Cosmetic Act (1945) obligates testing of each blood unit for TTI such as HIV, HBsAg, HCV, Syphilis, Malaria etc[3]. HBsAg is detectable in the high replicative phase of HBV infection and therefore detection of it is of prime importance to halt further spread [2]. The information regarding prevalence of these blood transmissible diseases among blood donors and its risk factors will be helpful to identify potential infectious subjects and will add an impetus towards HBV infection control activities. The present cross sectional study under taken to determine prevalence of Hepatitis B virus infection among blood donors and to uncover risk factors associated with this serious infection among the healthy blood donors at Raichur Institute of Medical Sciences (RIMS) Teaching Hospital, Raichur.

2. Aims and Objectives

1. To study prevalence of Hepatitis B virus infection among blood donors of RIMS teaching hospital blood bank.
2. To study risk factors for Hepatitis B Virus infection among them.

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3. Material and Methods

Study design: Cross sectional study

Study settings: Raichur Institute of Medical Sciences Teaching Hospital, Raichur blood bank.

Study period: 1st June 2010 to 31st July, 2010 as a part of ICMR Short Term Studentship programme-2010 (Ref. No. 2010-04270).

Participants: Healthy consenting blood donors of Blood bank of RIMS Teaching Hospital, Raichur.

Ethical issues: Informed written consent taken from all the blood donors. The confidentiality of the reports of their blood sample was maintained strictly and not disclosed to any one. Ethical approval was taken from institutional ethical committee of RIMS, Raichur. Informed consent of all the study subjects will was obtained using informed consent form. Actual enrollment into the study started only after approval of institutional ethical committee of RIMS.

Data collection: Data collected using pre-designed and pre-tested structured questionnaire. The blood donors were asked about the presence/absence of all possible risk factors by personal face to face interview.

HEPALISA Microwell ELISA Test for the detection of Hepatitis B Surface antigen (HBsAg) in human serum/plasma of J Mitra & Co. Pvt. Ltd used for diagnosis of Hepatitis B infection. This test had sensitivity and specificity of 100 each for diagnosis of HBsAg infection. The test was performed as per manufacturer's guidelines. All the subjects were screened with the help of same kit and there was no change of kits or procedures for diagnosis of HBV infection during the study period.

Statistical analysis: The individualized data entered into spreadsheet programme. The level of significance was assessed by the 95% confidence interval.

Statistical software Epi Info version 3.5.1 utilized for testing individual and independent association of risk factors with the presence of Hepatitis B Virus infections. Proportions and chi square tests applied wherever necessary for univariate analysis of significant difference in groups. Logistic regression model used to assess the independent association of risk factors.

4. Observations and Results:

207 blood donors evaluated for sero-prevalence of HBV infection. The mean age was 26.82 (± 6.72) years, 200 (96.62%) were males, 119 (57.5%) were married, 71.50% were illiterates, 75.20% were labourers, 160 (77.29%) were replacement donors and 29 (14%) had pervious history of blood transfusion. The overall prevalence of HBV infection was observed to be 12.08%. None of the female donor was tested positive for HBsAg. The prevalence of HBV infection was noted higher among young donors (age less than 30 years), illiterates, professional drivers, married men and replacement donors. Univariate analysis showed that age (<30 years), illiteracy, driver by occupation, married people and replacement blood donors had significantly higher risk of Hepatitis

B infection as compared to their counterparts (Table 1). Further; the multivariate analysis using logistic regression model showed that illiterates and drivers were significantly and independently at more risk of acquisition of HBV infection. Each of them observed to have five times higher risk of Hepatitis B (Table 2).

[1] Table 1. Risk factors for Hepatitis B among blood donors

Risk factor	HBV Status			Level of significance
	Positive (%)	Negative (%)	Total (%)	
Age (Years)				
<30	14 (56.00)	147 (80.77)	161 (77.78)	$X^2_{(v)} = 6.44$
>30	11 (44.00)	35 (19.23)	46 (22.22)	d.f.=1
Total	25 (12.08)	182 (87.92)	207 (100.0)	p=0.011
Sex				
Male	25 (100.0)	175 (96.15)	200 (96.62)	Not applicable
Female	(0.00)	7 (03.85)	7 (03.38)	
Education				
Illiterate	23 (92.00)	125 (68.68)	148 (71.50)	$X^2_{(v)} = 4.78$
Literate	2 (8.00)	57 (31.32)	59 (28.50)	d.f.=1p=0.02
Occupation				
Labourer	17 (68.00)	139 (76.37)	156 (75.36)	Fisher Test
Clerk	01 (04.00)	16 (08.79)	17 (08.21)	p=0.0016
Businessman	01 (04.00)	20 (10.99)	21 (10.15)	Drivers compared
Drivers	06 (24.00)	07 (03.85)	13 (06.28)	with others
Marital status				
Married	20 (80.00)	99 (54.40)	119 (57.49)	$X^2(Y) = 4.90$
Unmarried	5 (20.00)	83 (45.60)	88 (42.51)	d.f.=1p=0.026
Type of donor				
Voluntary	1 (04.00)	46 (25.27)	47 (22.71)	$X^2(Y) = 4.52$
Replacement	24 (96.00)	136 (74.73)	160 (77.29)	d.f.=1p=0.033
Per capita income (Rs. per month)				
Unemployed	01 (04.00)	51 (28.02)	52 (25.12)	$X^2(Y) = 7.97$
<5000	12 (48.00)	60 (32.97)	72 (34.78)	d.f.=4
5000-10000	08 (32.00)	41 (22.53)	49 (23.67)	p=0.092
10000-15000	03 (12.00)	16 (08.79)	19 (09.18)	
>15000	01 (04.00)	14 (07.69)	15 (07.25)	
Previous H/o blood donation				
Yes	05 (80.00)	24 (13.19)	9 (14.00)	$X^2(Y) = 0.38$
No	20 (20.00)	158 (86.81)	178 (86.00)	d.f.=1p=0.539
Addictions				
Yes	15 (60.00)	88 (48.35)	103 (49.76)	$X^2(Y) = 0.77$
No	10 (40.00)	94 (51.65)	104 (50.24)	d.f.=1
Total	25 (12.08)	182 (87.92)	207 (100.0)	p=0.379

(Y): Values with Yate's correction

Table 2. Comparison of risk factors in logistic regression model

Variable	S.E.	Adjusted OR	95% CI	p value
Age (<30 yrs Vs >30 yrs)	0.6000	2.5830	0.80-8.37	0.1137
Literacy status	0.7719	5.36	1.18-24.34	0.0296
Occupation (Driver Vs Others)	0.4949	5.1550	1.95-13.60	0.0009
Marital status	0.7000	0.8929	0.23-3.52	0.8715
Type of donor	0.4595	1.0013	0.06-3.27	0.4374
Income	0.2176	0.8229	0.54-1.26	0.3702
H/o blood donation	0.6954	1.3381	0.34-5.23	0.6753
Addictions	0.3615	0.8174	0.40-1.66	0.5770

5. Discussion

According to WHO the world can be divided into three areas where the prevalence of chronic HBV infection is high (>8%), intermediate (2-8%) and low (<2%). India is placed in the intermediate prevalence zone (prevalence 2-8%)[2]. We observed 12.08% prevalence of HBV infection among the blood donors. Studies from India indicate much diverse prevalence of this deadly infection which range from 0.62% in coastal Karnataka[4] to 23.3% in Andaman and Nicobar islands [5]. This high prevalence may be reflection of WHO statement that is in this region HBV positivity increases rapidly from infancy to childhood and among adults which needs further research in this aspect[2].

In the logistic regression model illiterates and driver by occupation were observed to stand out as significant and independent risk factors for HBV infection. Lower educational status is the risk factor for HBV as reported by Vahid T (2005)[1], while Laura G (2001)[6]. noted that driving professionals are at higher risk of acquisition of HBV infection and stressed on educating these individuals for prevention of this deadly virus.

Young age, married individuals and replacement donors were found to have higher prevalence and significantly associated with HBV infection; but these factors did not sustain to be independently associated with it in the multiple logistic regression model. Higher prevalence of HBV infection in young individuals is also noted by Jutavijittum P. et al [7], Awadalla et al[8] & Singh et al[4]. The higher risk of HBV among married individuals is reported by Luksamijarulkul et al [9] and Vahid T[1] & colleagues. Singh K (2009)[4]. Noted that replacement donors are more at risk of acquisition of HBV infection as compared with their counter parts.

While 25% of the study participants were unemployed, 34.78% were poor and about half of the study subjects had at least one addition; these socio-economic indicators were not significantly associated with HBV infection.

6. Conclusions

The prevalence of Hepatitis B virus infection among blood donors was observed to be invariably high (12.5%) as compared with other studies in India and world and needs to be further investigated. Male gender, illiteracy and driver by occupation were independently associated with higher risk of HBV infection.

Strengths of the study: Most of the studies among blood donors are record based and therefore lack in socio-personal characteristics of the donors, also lack in control (comparison) group which might be among important risk factor for HBV infection (as observed in present study viz. illiteracy and occupation).

Limitations of the study: Though the HBV infection does not follow seasonal trend there is need to of study at wider perspectives with respect to duration, region and number of study subjects.

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