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Research Article

Seroprevalence of Hepatitis B Virus Infection among Blood Donors in a Tertiary Care Hospital Western UP

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Abstract: Hepatitis B virus infection is transmitted disease through blood.HbsAg is a specific first marker which appears first in blood after infection. Objectives of the study were to determine the trends of seroprevalence of Hepatitis B infection and to compare the seroprevalence of Hepatitis B infection positivity in Voluntary and Replacement donor. A retrospective study was conducted at the blood bank of a tertiary care hospital, Rohilkhand Medical college and Hospital Bareilly, for the period of 3 years with effect from Jan 2012 to Dec 2014 to determine the prevalence of hepatitis B infection by one step immune assay (hepa card). Total 10,994 blood donors were screened, out of that 4,733 (43.05 %) were voluntary donors and 6,261 (56.94%) were replacement donors. The prevalence rate of HBsAg seropositivity in replacement donors were found 69 (1.10%) and in voluntary donors 35(0.73%) and overall prevalence rate of HBsAg in 104(0.94%) among the total donors. Males dominant than females with a number having 10,330 and 664 respectively having male female donors ratio 15.5:1.The age of donors were in between 18 -60 yrs in average 29.7 years. Out of 10,994 donors mostly 7,271 (66.13%) were belongs to 25 -35 years group.
Keywords: Donors, HbsAg marker, Seroprevalence

INTRODUCTION

Hepatitis B virus (HBV) is one of the most common viruses in the modern world and ranked by the WHO as one of the top ten killers. The virus is responsible for approximately 1.5 million deaths worldwide in each year, two thirds of which are attributable to primary hepatocellulor carcinoma (HCC) following HBV infection [1]. About 360 million people are estimated to be chronically infected with HBV [2]. These chronically infected persons are at higher risk of death from HBV – related liver cancer or cirrhosis by approximately 25 % and over 4 million new acute clinical cases occur [3].

HBV is a well known occupational hazard of health care workers. They are considered to be at substantial risk for acquiring or transmitting the virus due to occupational contact with blood, blood products and other body [4].The occupational risk for HBV acquisition varies according to the work place in the health care setting and times of exposure to the agent [5]. The practice of modern medicine has widely contributed to increase the disease in the society. HBV infection is common due to lapse in the sterilization technique of instruments or due to improper hospital waste management as 10-20 % health case waste is regarded as hazardous and it may create variety of health risk [6]. Among the health care personal, HBV is transmitted by skin prick with infected, contaminated needles and syringes or through accidental of minute quantities of blood during surgical and dental procedures [7].

Serological testing of Hepatitis B involves the measurement of hepatitis – B virus (HBV), specific antigens and antibodies. Different serological "markers" are used for the identification of different phases of HBV infection. They are also to determine whether a patient has acute or chronic HBV infection and to see the immune status as a result of prior infection or vaccination or susceptible to infection [8]. Viral hepatitis markers and their significances are, HBsAg - (Hepatitis B surface antigen) is needed to determine the chronic or acute infection [9]. Anti- HBs – (Antibody to hepatitis B surface antigen is known as surface antibody is important to see the immune status due to natural infection or HBV vaccination. HBeAg – Hepatitis B "e" antigen detection is to study the active viral replication and increased risk of transmitting HBV. Anti – HBe – Hepatitis B "e" antibody indicates the low viral

replication level in HBsAg positive persons. Anti -HBc - Hepatitis B core antigen – test is not commercially available. Anti – HBc – Antibody to hepatitis B core antigen – core antibody is usually present in natural infection (acute, resolved, chronic) not present after immunization. Antibody to hepatitis B core - IgM detection indicates the current or recent – HBV infection (within 6 months). Presence of antibody – HBc –IgM without HBsAg denotes "window" phase, where HBsAg has dropped below detectable levels. Anti – HBc – IgG fraction is necessary to study the past or chronic infection. PCR for hepatitis B virus DNA is useful to measure the viral load; and also to monitor response to HBV anti – viral therapy [9].

Hepatitis is a general term meaning inflamation of the liver and can be caused by a variety of different viruses, such as hepatitis A,B,C,D and E. Development of jaundice is a characteristic feature of liver disease and a proper diagnosis can only be made by testing sera of the patients for the presence of specific anti-viral antigens or antibodies [10-13]. Throughout the world, millions of people are affected by Hepatitis B, which is a serious and common infectious disease [10-15].The pathological consequences include chronic hepatic insufficiency, cirrhosis and hepatocellular carcinoma (HCC) [10, 12, 13, 15, 16].

The virus is transmitted through percutaneous or parenteral contact with infected blood, body fluids, and by sexual intercourse [10-12, 15, 17]. It has the ability remain on any surface and comes into contact with for about a week without losing infectivity [10, 11, 13].

HBV does not cross the skin or mucous membrane barrier [13]. It cannot cross the placenta via amniocentesis. Still transmission may occur to the babies at birth. If not vaccinated at birth, babies develop lifelong HBV infection [10, 12]. All persons positive to hepatitis B surface antigen (HBsAg) are potentially infectious [10, 13].

Blood is infective many weeks before the onset of the first symptoms and throughout the acute phase. The infectivity of chronically infected persons varies from highly infectious to often sparingly infectious [10]. Hepatitis B is the only sexually transmitted infection for which protective vaccine is available [8].

After acute infection, the risk of developing chronic infection varies inversely with the age. Chronic infection occurs among about 90% of infants infected at birth, 25-50% of children 1-5 yrs of age, 1-5 % of older children and adults. Persons with immunodeficiency are at risk for the development of chronic infection [10-13].

The world can be divided into three zone according to the prevalence of chronic HBV infection: high (78%), intermediate (2-8%) and low (2%<) [12, 18]. India belongs to intermediate zone.

HBsAg in blood donors is transfusion transmitted disease, includes improving donor selection, testing the donated blood for specific antibodies against infectious agents, using autologus blood transfusion [19, 20, 21]. But still the disease and virus is transmitted [22]. As the HBsAg is not detectable during window period, prevalence of carrier, false negative of test commonly occurs. Therefore its prevalence among blood donors is utmost essential.

Aims

- To study the HBsAg marker in different age and sex groups o f Blood donors.
- To see the year wise trend of replacement and voluntary blood donors.
- To determine the prevalence of Hepatitis B surface antigen as marker in Replacement and Voluntary donors.
- To compare the seropositivity between replacement and voluntary donors. Along with over all positivity rate.

MATERIAL AND METHODS

The study was conducted in the Blood Bank, Rohilkhand Medical College and Hospital, Bareilly, during Dec 2014. A total 10, 994 samples were collected from voluntary and replacement donor aseptically. The donors, friends, family members, relative of the patients were selected as replacement donors. The peoples who are donating blood without any interest in return and from blood donation camps were categorized as voluntary blood donors. The donors were examined physically, Hb % , and relevant questionnaires by the Blood Bank doctor in charge. After fulfilling the laid down criteria the donors were selected carefully. Meantime 5ml of blood were collected from each donor in plain vial without anticoagulant. Serum was separated after centrifugation in 10,000 rpm for 15 minutes. 70 µl serum of each specimen was placed in each Hepa-card with separate microtip and reaction was observed within 20minutes and results were recorded as HBsAg reactive or non-reactive in comparison with positive control. Doubtful or boarder line cases were confirmed by ELISA. Hepa-card commercially available, sensitive, and accurate one step immunoassay based on antigen capture and sandwich principle.

RESULTS

Out of total 10,994 blood donor, 10,330 (93.96%) were males and 664 (6.03%) were females with male to female ratio 15.5:1 (Table 1).

Among the total donors, the participation for donating blood, maximum were observed in between 20 – 40 years age groups (Table 2).

Total 10994 blood donors were screened, of which 6261(56.94%) were replacement donors and 4733(43.05%) were voluntary donors (Table 3).

The seroprevalence of HBsAg among 10994 donors were positive in 104(.94%) donors, out of that 6261 replacement donors, 69(1.10%) was positive in Hepatitis B infection and 35 were positive among 4733 voluntary donors respectively (Table 4).

Over all prevalence rate among voluntary and replacement donors were 0.94% (Table 5).

Table 1: Sex wise Distribution of Total Blood Donors (Voluntary and Replacement)

Male	Percentage (%)	Female	Percentage (%)	Total
10,330	93.96%	664	6.03%	10994

Table 2: Age wise participation of total 10994, voluntary and replacement donors (both sexes)

Age in Years	Number	Percentage (%)
18 - 29	3000	27.28
30 - 39	4271	38.84
40 - 49	2721	24.74
50 - 60	1002	9.11

Table 3: Shows trends in voluntary and replacement blood donors from year 2012 -2014

Year	Total No. of donors voluntary & replacement	No. of Replacement donors	%	No. of voluntary donors	%
2012	4266	2828	66.29	1438	33.70
2013	3421	1787	52.23	1634	47.70
2014	3307	1646	49.77	1661	50.22
Total	10994	6261	56.94	4733	43.05

Table 4: Showing year wise HBsAg positivity among voluntary and replacement blood donors from 2012-2014

Year	R.D (No.)	HBsAg +ve (No.)	%	V.D (No.)	HBsAg +ve (No.)	%	Total HbsAg +ve (No.) in RD+VD	%
2012	2828	15	0.53	1438	9	0.62	24	0.56
2013	1787	23	1.28	1634	12	0.73	35	1.02
2014	1646	31	1.88	1661	14	0.84	45	1.36
Total	6261	69	1.10	4733	35	0 .73	104	0 .94

*R.D =Replacement donor, *V.D = Voluntary donor

Table 5: Total HBsAg sero-positivity among the Replacement and Voluntary blood donors

Type of Donors	Total No.	No of HBsAg positive	%
Replacement	6261	69	1.10
Voluntary	4733	35	0.73
Total	10994	104	0.94

DISCUSSION

As per Government of India Drugs and Cosmotics Act (1945) each blood unit has to be tested for hepatitis B infection, which is mandatory [23]. Replacement donors were majority of blood donors 6261(56.94%) compare to voluntary donors 4733(43.05%) among total 10994 blood donors. These findings are similar with other national and International studies [24-27]. Male donors were more 10,330 (93.96%) than females in our study. The similar findings were reported by Karandeep Singh *et al*. [28]. Batham *et al*. [29] also established in his review and meta analysis that 85% of total samples of blood donor belongs to male. This is close with our study.

Our study also documented similar results with Kochher *et al*. [30] in their study that 96.34% were males and 3.66% females. This is because of the fact that in developing country like India, cultural habits, nutritional deficiency of , lack of motivation and fear for donating blood , the number of females were lee in participation. More over large number of female candidates were rejected due to underweight, anemia (menstrual loss). 20-40 years of age groups were maximum donor in this study, this is due to their willingness, healthy, motivated and lack of chronic diseases in contrast older groups are usually suffer from diabeties, hypertension , ischemic heart disease, whom

donation of blood were not considered. Similar results were observed from national and international work done by Despande *et al*. [31] and M.A. Ahad *et al*. [32]. In our study, out of 10,994 blood donors the overall seroprevalence of Hepatitis B surface antigen was observed 0.94%. In accordance with WHO classification, western UP takes its position as low prevalence area (less than 2%). Ours study results are similar with other studies [28, 33] (Table 6). HBsAg reactivity among replacement donor was 1.10% and voluntary donor was 0.73% in this study which is comparatively less than other studies [42, 43] (Table 6). The overall positivity of this study is not alarming due to active participation of youths in awareness and vaccination programme. The year wise participation of blood donors especially replacement donors were less in year wise which is alarming in near future. Comparative prevalence data of blood donors, other parts of India has been placed in Table 6.

Table 6: Comparison of HBSAg prevalence rate in different parts of India

Place	Prevalence	Reference
New Delhi	< 2.5%, 2.23%, 2.76%	[34], [35], [36]
Kerala	3.1%	[37]
Rural India Ambajogai- Voluntary – Replacement-	 2.78% 2.96	[38]
Tamilnadu- Voluntary Replacement	 1.37% 2.96%	[39]
Dehradun	0.99%	[33]
West Bengal	1.66%	[40]
Kanpur	2.25%	[41]
Bangalore	1.86%	[42]
Costal Karnataka	0.62%	[28]
Western. UP Replacement Voluntary	0.94%(overall) 1.10% 0.73%	Present study

CONCLUSION

Prevention by means of awareness about transmission and vaccination and about disease is utmost needed along with proper selection of donator. Screening of blood is most important. Screening of donors by HBsAg is to be accounted before transfusion so that reduce in near future.

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