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Transfusion Transmitted Infection Among the Blood Donors in Central India : - A Tertiary Care Hospital Based Study

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ABSTRACT

Introduction and Aims – transfusion transmitted infection specially hepatitis B, hepatitis C and HIV still remains a major challenge for safe blood supply particularly in developing country, therefore we aimed to estimate the prevalence of HBV, HCV and HIV among blood donors in central India.

Material and Methods – This is a retrospective observational study carried out at department of pathology, blood bank at S.S. Medical College Rewa (M.P.) over the period of 5 years from January 2010 to December 2014. Monthly report from blood bank which were send to Madhya Pradesh state AIDS control society was collected and analyse. All donor blood sample ware screened for HBV, HCV and HIV by national AIDS control organization (NACO) supplied Elisa kit.

Result - A total of 29, 540 unit of blood were screened. Out of which 28,117 (95.18%) were male and 1423 (4.82%) were female donors. Among all donor majority are (56.98%) in age group of 18-30 years. The overall seroprevalence of HBV, HCV and HIV was fount to be 1.18%, 0.33% and 0.80% respectively.

Conclusion - Our study shows poor women participation in blood donation, the transfusion transmitted infection are more among young male donors and there is gradual increased trend in HCV and HIV seen over the years in blood donors.

KEYWORDS Transfusion transmitted infection, blood donors, seroprevalence.

INTRODUCTION

The demand for safe blood or blood products in life saving interventions is critical to avoiding non-curable infectious diseases. The transmission of virus by blood has been of public health concern, particularly in developing countries where the issue of unsafe blood still remains a major challenge [1]. Several infectious agents can be transmitted through an infected blood or blood products, the most common are hepatitis B, hepatitis C and HIV viruses [2] With every unit of blood, there is a 1% risk of transfusion associated complications including transfusion associated disease [3] and an increase in transfusion related infection has been reported in India [4]

Hepatitis B is the most common disease transmitted by blood and has infected 43 million people in India, chronic infection with HBV have a high risk of developing liver cirrhosis and hepatocellular carcinoma [5]. Hepatitis C virus infection is another common blood borne infection with an estimated 15 million person infected in India and have high rate of development of liver cirrhosis. In India there is around 5.7 million HIV infected people .

Although direct percutaneus inoculation is the most common mode of transmission of HBV, HCV and HIV, several studies have demonstrated that sexual, household occupational and vertical transmission may also be of importance. [6,7].

Since transfusion transmitted infection (TTi) is among the common viral agents of public health importance worldwide, only continuous improvement and implementation of donor selection, sensitive screening test and effective inactivation procedure can ensure the reduction of the risk of acquiring these TTi.

Thus we aimed to estimate the sero-prevalence of HBV, HCV and HIV among blood donors over a period of 5 year from January 2010 to December 2014 in tertiary care hospital. It would also help in determining the safety of blood products and identify the trend in epidemiology of these diseases.

MATERIAL AND METHOD

This is a retrospective cross sectional observational study carried out at blood bank of tertiary care hospital Rewa (M.P.) from January 2010 to December 2014. Monthly report from blood bank are collected and analyse, which were send to Madhya Pradesh state AIDS control society (MPSACS) . These report also registered and kept monthly in blood bank. All donors were included in the study. A detailed predonation questionnaire was used, to collect their socio demographic characteristics including age, gender, occupation and predonation status . A written informed consent was taken form each donor and all donated blood were routinely screened for HBV, HCV and HIV by 3rd generation ELISA Kits (SD biostandard diagnostics pvt. LTD). The statistical evaluation of the data was made using soft ware Instate graph pad. The year wise statics have also calculated. Chi-square test and t- test used for comparison between groups where p value < 0.05 were considered significant.

RESULTS AND OBSERVATION

Table No. – 1 : Year, Donor category and gender wise distribution of blood donors.

Year	Male	Female	Total	Voluntary	Replacement	Total
2010	4289 (95.00%)	226 (5.00%)	4515	3174 (70.30%)	1341 (29.70%)	4515
2011	5762 (96.55%)	206 (3.45%)	5968	4755 (79.67%)	1213 (20.23%)	5968
2012	6001 (95.42%)	288 (4.58%)	6289	5729 (91.09%)	560 (8.91%)	6289
2013	6145 (95.14%)	314 (4.86%)	6459	6128 (94.87%)	331 (5.13)%	6459
2014	5920 (93.83%)	389 (6.17%)	6309	6112 (96.88%)	197 (3.12%)	6309
Total	28117 (95.18%)	1423 (4.82%)	29540	25898 (87.67%)	3642 (12.33%)	29540

Table No. – 2 : Prevalence of TTi among Donor population.

Donor category	Total No. screened	HBV +ve	HCV +ve	HIV +ve
Voluntary	25898	1.09% (284)	0.32% (82)	0.79% (204)
Replace-ment	3642	1.78% (65)	0.47% (17)	0.85% (31)

Table No. – 3 : Age wise distribution of TTi among blood donors

Age(Years)	Total No. Screened	HBV + ve	HCV +	HIV +
18 – 30	16834 (56.98%)	1.79% (199)	0.37% (62)	0.84% (141)
31 – 45	9085 (30.75%)	1.71% (155)	0.30% (28)	0.78% (70)
46 - 60	3618 (12.25%)	0.97% (35)	0.24% (9)	0.66% (24)

A total of 29540 unit of blood were collected and screened during the period of 5 years from January 2010 to December 2014. out of 29540 unit, 28117 (95.18%) were from male donors and 1423 (4.82%) from female donors (Table No. - 1). Among all donors, 25898 (87.67%) were voluntary blood donors and 3642 (12.33%) were replacement blood donors. The sero- prevalence of HBV, HCV, HIV was found to be 1.09%, 0.32% and 0.79% respectively in voluntary blood donors as against the figures of 1.78% , 0.47% and 0.85% being in the replacement blood donors (Table No. - 2)

All donors ware subdivided in three age group between 18-30 years, 30-45 years and 45-60 years, majority of the donors belong to the age group of 18-30 years. Donor in age group less than 30 years had the highest prevalence of 1.79%, 0.37% and 0.84%respectively for HBV, HCV and HIV. The sero-prevalence of TTi among the donors declined with advancement in age (Table No. -3)

The overall average sero-prevalence of HBV, HCV and HIV was found to be 1.18%, 0.33% and 0.80% respectively(p-value<0.000%). There was no difference in the prevalence rate in HBV seen in 5 years duration, while HCV and HIV showing increasing trend of infection between 5 years duration (Table No. - 5)

Table No. – 4 : Year wise trends in sero-prevalence of TTi.

Year	HBV				HCV				HIV			
	Male	Female	Voluntary	Replacement	Male	Female	Voluntary	Re-placement	Male	Female	Voluntary	Replace-ment
2010	1.26% (54)	0.88% (2)	1.07% (34)	1.64% (22)	0.28% (12)	00% (00)	0.22% (7)	0.37% (5)	0.33% (14)	0.88% (2)	0.25% (8)	0.61% (8)
2011	1.20% (69)	1.46% (3)	1.03% (49)	1.89% (23)	0.24% (14)	00% (00)	0.19% (9)	0.41% (5)	0.73% (42)	0.97% (2)	0.72% (34)	0.82% (10)
2012	1.18% (71)	1.04% (3)	1.13% (65)	1.61% (9)	0.28% (17)	0.35% (1)	0.26% (15)	0.54% (3)	0.85% (51)	1.04% (3)	0.84% (48)	1.07% (6)
2013	1.04% (64)	0.32% (1)	0.95% (58)	2.11% (7)	0.44% (27)	0.0% (00)	0.4% (25)	0.60% (2)	0.83% (51)	0.32% (1)	0.78% (48)	1.21% (4)
2014	1.32% (78)	1.03% (4)	1.28% (78)	2.03% (4)	0.46% (27)	0.26% (1)	0.43% (26)	1.02% (2)	1.11% (66)	0.77% (3)	1.08% (66)	1.52% (3)
Total	1.20% (336)	0.91% (13)	1.09% (284)	1.78% (65)	0.34% (97)	0.14% (2)	0.32% (82)	0.47% (17)	0.80% (224)	0.77% (11)	0.79% (204)	0.85% (31)

Table No. – 5 : Prevalence of TTi among blood donors in the year 2010 to 2014

Years	Total No. Screened	No. of Reactive Sample		
		HBV	HCV	HIV
2010	4515	1.24% (56)	0.26% (12)	0.35% (16)
2011	5968	1.21% (72)	0.23% (14)	0.74% (44)
2012	6289	1.18% (74)	0.29% (18)	0.86% (54)
2013	6459	1.00% (65)	0.42% (27)	0.80% (52)
2014	6309	1.30% (82)	0.44% (28)	1.09% (69)
Total	29540	1.18% (349)	0.33% (99)	0.80 (235)

DISCUSSION

One of the major problem with the transfusion medicine is the safety of blood products, since screening of blood for detection of viral marker does not role out the risk of transmission of transfusion transmitted diseases totally. There is a "window period" during the host serological response to infection in which these viral marker can not be detected in the blood, although infections is present , therefore a definite hazard of transmission of transfusion transmitted disease to recipients of such units of donated blood exists.

In our study 29540 blood donors screened and it was noted that maximum number of donors came from younger age group (18-30 years) it may reflect awareness among the youths about blood donation. The percentage of female donors have been low (4.82%) compared the male (95.18%) in our study, similar trends has been reported in other studies [16,17] the reason might be due to socio-cultural influences and believes, so efforts should be done to encourage more female to donate blood.

Table No. – 6 : Comparison of TTi prevalence rate in different part of India.

Place	HBV	HCV	HIV	Reference
Lucknow	1.96%	0.85%	0.23%	8
Bangalore	1.86%	1.02%	0.44%	9
Ludhiana	0.66%	1.09%	0.84%	10
Kerala	1.30%	1.4%	0.20%	11
Southern Haryana	1.7%	1.0%	0.3%	12
Rajasthan	3.4%	1.28%	0.44%	13

Delhi	2.23%	0.85%	0.23%	14
West Bengal	1.46%	0.31%	0.28%	15
Present Study	1.18%	0.33%	0.80%	

The present study revealed that HBV, HCV and HIV infection was more prevalent among replacement donors than voluntary donors (1.09%, 0.32% and 0.79% versus 1.78%, 0.47% and 0.55% respectively) as noted in the other studies [18,19] so educating people and creating awareness about voluntary blood donation is an important factor to reduces the risk of these TTi.

Age wise distribution shows that there is a significant increase in sero prevalence of HBV and HIV was observed in the age group 18-30 years, compared to the age group greater than 30 years, this is similar with previous report [20,21] in which higher prevalence of HBV was observed among youth. This observation is worrisome because the fact that these age groups are frequently involved in blood donation and hence their number may influence the prevalence and their constant-exposure to the society can not be overlooked.

In our study overall sero prevalence of HBV is 1.18% which is in accordance to other Indian study [9, 11, 12, 15] and shows a stable trend over the period of five years, however seroprevalence of HIV is 0.80% which is slightly higher than other studies [11, 14, 15] and an increasing trend in seroprevalence of HCV and HIV was noticed over 5 years duration specially among younger age group, this may be due to variation in the population or may reflect an increased burden of HCV and HIV infection in the community.

Hence Predonation counseling, education people and creating awareness about voluntary blood donation, encouraging more female to donate blood and strict donor selection criteria will be effective in decreasing the rates of transfusion transmitted infection.

CONCLUSION

Our study shows poor women participation in blood donation activity, the overall seroprevalence of HBV, HCV and HIV was fount to be 1.18%, 0.33% and 0.80% respectively among blood donors over 4 year duration. These transfusion transmitted infections were more common among replacement blood donors compared to voluntary donors. There is a gradual increase of HCV and HIV infection in blood donors over the years. Study also reveals that prevalence of these TTi are more among young male donors, therefore results of this study could be utilized to reduce the risk of transfusion transmitted infection in India.

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