



ANALYSIS OF SEROPOSITIVITY OF BLOOD DONORS IN A DEPT OF TRANSFUSION MEDICINE OF TERTIARY CARE UNIT- A RETROSPECTIVE STUDY

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ABSTRACT

Aims and Objectives: This study is to highlight importance of screening and serological testing of blood donors to prevent transfusion transmitted life threatening diseases such as HIV, HBV, HCV and syphilis etc. **Materials and Methods:** - Total number of blood bag units from donors over the period of five years were 17912. Out of these units 501 were seropositive. Average seropositivity rate over five years was 2.7%. Average positivity for HIV, HBSAG, HCV and VDRL was 0.4%, 1.8%, 0.45% and 0.01% respectively. **Conclusion:** - Extensive and thorough screening of donors is very crucial to prevent transfusion transmitted diseases (Key Words: -HIV- Human Immunodeficiency Virus, HBSAG- Hepatitis B virus surface antigen, HBV- Hepatitis B Virus, HCV- Hepatitis C virus, VDRL- Venereal Disease Research Laboratory TTI- Transfusion Transmitted Infection)

KEYWORDS :

INTRODUCTION: -

Transfusion of blood is potential source of hematogenous spread of infections such as Human Immunodeficiency Virus (HIV), Hepatitis B virus (HBV), Hepatitis C virus (HCV), Syphilis. As per WHO guidelines it is mandatory to screen donors for above diseases with screening methods which are strictly followed in blood banks and monitored by regulatory authorities.[1]

Material and Methods: - Retrospective analysis of all serology positive blood units over the period of five years i.e. from Jan 2015 to Dec 2019. Total number of blood units collected were of blood transfusions as well as history of exposure and all relevant questions which reveal high risk behavior of the individual. Donors with positive significant history were deferred. All collected units were screened for transfusion transmitted infections i.e. HIV, HBV, HCV, Syphilis and Malaria. For HIV, HBV, HCV third generation ELISA tests were performed with positive and negative controls as per test protocols. Screening for syphilis was done with VDRL test using RPR antigen and Malaria parasite with preparation of peripheral smear stained by Field's method. All seropositive units were discarded.

RESULTS:

As per Table 1, seropositivity for HIV was maximum in 2018 i.e. 28 (0.7%), for HCV was maximum in 2016 i.e. 25 (0.6%), HBV was screened with HBSAG antigen which showed positivity maximum in 2016 as 88(2.2%). Positivity for VDRL test was very much minimal with maximum 0.03% in 2019. Over all VDRL positive rate was 0.01%. We could not find any malaria parasite examined by peripheral smear examination done with Field's in any of the donors. As all seropositive blood units were discarded, seropositivity was the major cause of blood wastage maximum in 2018 as 54%. The overall five years average seropositivity for HIV, HCV, HBV and VDRL was observed as 0.42%, 0.36%, 1.72%, 0.01%

Table 1

	2015	2016	2017	2018	2019
HIV	20(0.4)	12(0.3)	7(0.3)	28(0.7)	21(0.4)
HCV	21(0.4)	25(0.6)	4(0.2)	13(0.3)	19(0.3)
HBSAG	70(1.6)	88(2.2)	35(1.7)	75(2.0)	60(1.1)
VDRL	1(0.02)	0	0	0	2(0.03)
Malaria	0	0	0	0	0
TOTAL SEROLOGY	112	125	46	116	102
TOTAL DISCARD	329	275	164	213	298

TOTAL COLLECTION	4246	3929	1968	3572	5026
% OF COLLECTION	2.6	3.1	2.3	3.2	2
% OF DISCARD	34	45.4	28	54.4	34.2

After analysis of age wise distribution amongst blood donors it was observed that maximum number of donors were between 20 -30 years of age. The similar trend has been observed in HBV, HCV, HIV and Syphilis as shown in Table no 2 respectively. Overall as well as disease specific positivity was observed maximum in second decade.

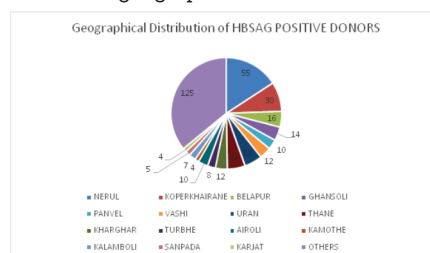
Table No 2

AGE Group	18-28	28-38	38-48	48-58
HBV	133	122	55	18
HCV	49	16	11	05
HIV	40	24	16	08
VDRL	1	1	1	0

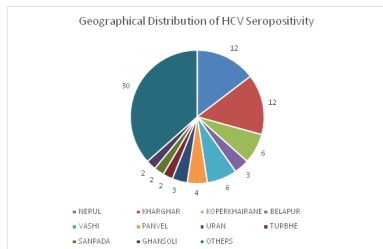
Seropositivity was more predominant in male. Out of total 501 Seropositive donors 43 were females i.e. 8.5 % Similar trend was observed in respective transfusion transmitted diseases. As shown in Table no 3

SEROPOSITIVITY	HBSAG		HCV		HIV		Syphilis	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
	299	29	74	08	78	16	2	0
M:F RATIO	10.31	9.2	7.8	2				

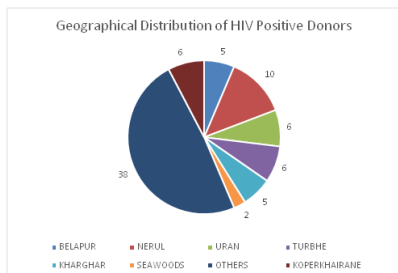
Geographical distribution of all HBSAG, HCV, HIV seropositive donors can be summarized as Pie chart 1, 2 and 3 respectively. As our institution is catering population from Navi Mumbai and most of the blood donation camps are from this area, we get majority donors from these areas only. So seropositivity is also reflected from these geographical locations.



Pie Chart 1



Pie Chart2



Pie Chart 3.

Co-infection was found in three donors, i.e. 0.01% of the total donors over five years. Out of these two donors were both HBSAG and HIV positive while one had HCV and HIV seropositivity.

All blood donors were asked for any febrile illness or malaria like symptoms in the recent past. Donors with any fever history were deferred. A peripheral smear was examined with field's stain. We could not find any parasitaemia in any donor.

DISCUSSION:-

As blood donors represent society prevalence of seropositivity for transfusion transmitted diseases reflects prevalence of the respective infection in the entire society. Although timely blood transfusion and therapeutic application of various blood components is very much crucial in-patient management, it is also a potential source of transfusion transmitted infections (TTI). According to WHO, screening for HIV, Hepatitis B, Hepatitis C and syphilis should be mandatory. As per its official website, India falls lower middle-income group with average prevalence of HIV, HBV, HCV and Syphilis as 0.14% (0.03%-0.6944%), 2.27% (0.80%-4.87%), and 0.39% (0.18%-0.95%), 0.70% (0.19%-1.27%) respectively.

As per report released as India Estimation 2017, HIV prevalence in India is estimated at 0.22% (0.16%-0.30%) with 0.25% (0.18-0.34) among males and 0.19% (0.14-0.25) among females (ii) Prevalence of HBV due to multiple transfusion in thalassemia patients, it was 35-69% in the 1990s, but it has been reduced to 2% (iii). Rate in haemophilia patient is 6-9% (iv.) and in acute leukaemia patients is 15.9 % (v). Voluntary blood donors have a rate of 0.2-4% (vi) with high prevalence of occult infection. (vii)

Globally, HCV is the predominant cause for post transfusion hepatitis. A systematic review revealed 185 million persons globally had HCV infection, out of which an estimated that 170 million may be chronically infected (viii.) Estimated prevalence of HCV infection in India is about 0.5-1.5%. Approximately 12-18 million people are thought to be infected with HCV in India. (ix)

The world health organization estimates that 10-12 million new infections of syphilis occur every year (x) Indian incidence rates ranging from 5.4 per 100 persons each year in a sexually transmitted infection clinic to prevalence of 21% in long distance truck drivers. (xi)

A study conducted by Gita Negi et al, a total of 17209 donors 14

donors (0.08%) were found to test positive for malaria parasite. (xii)

In a cross-sectional study from North India by Dara et al out of 106,238 blood donors, 62 (0.05%) donors were had co infection. (xiii) A study from North India observed that one third of deaths in HIV infection are directly or indirectly related to HCV infection. (xiv) Many factors favour coinfections as epidemiological similarity between HIV and hepatitis viruses with similar routes of transmission, risk factors and higher prevalence with other STDs such as syphilis. Testing for syphilis is used as surrogate marker for lifestyle known to be associated with a high risk of transmitting HIV and hepatitis. (xv.) In a study conducted by Sushma A et al (xvi), out of 76653 healthy donors were included out of which majority donors were male (91.79%). The overall seroprevalence of HIV, HBsAg, HCV, and syphilis were 0.26%, 1.30%, 0.25% and 0.28% respectively. There were 6 (0.007%) donors with multiple infections out of which 4 were found with HIV and HBsAg coinfection and two co-infected with HIV and Syphilis. As per Makroo et al, (xvii) the data of 180, 77 donors [173,019(95.86%) males and 7,458 (4.13%) females] the overall seroprevalence of HIV, HBsAg, HCV and syphilis were 440(0.24%); 2138(1.18%); 790(0.43%); and 421 respectively. Seroprevalence for coinfections as follows: HIV and Syphilis was seen in 13(0.007%), HIV and HCV in two (0.001%) donors respectively.

Conclusion: -1. A survey of blood transfusion practices in India showed that screening for transfusion -transmitted infections is unsatisfactory and poorly regulated.

2. A strict audit of blood banking practices is required to prevent transmission of the disease. Use of nucleic acid testing (NAT) has been proposed for preventing transmission of HBV in Indian blood donors but this would increase the cost of screening and is not routinely recommended.

3. There is also need to map out areas of high endemicity levels in greater detail, especially for tribal areas, which are known to have very high prevalence and are areas that should be the focus of intensive screening and protective measures

4. A registry voluntary donors should be prepared and they should be encouraged for blood donation at frequent interval.

5. Participation from social organizations should be sought upon to get more safe volunteer donors at frequent interval.

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REFERENCES:-

1. WHO, Blood Donor Selection, Guidelines on assessing donor suitability for blood donation for screening of donors.
2. Puri P. Tackling the hepatitis B disease burden in India J Clin Exp Hepatol ;2014;4:312-319. doi: 10.1016/j.jceh.2014.12.004
3. Amarapurkar DN, Kumar A, Vaidya S, Murti P, Bichile SK, Kairi RH, et al. Frequency of hepatitis B, C and D and human immunodeficiency virus infections in multi transfused thalassaemics. Indian J of Gastroenterol 1992; 11:80-81.
4. De M, Banerjee D, Chandra S, Bhattacharya DK, HBV & HIV seropositivity in multitransfused Haemophiliacs & Thalassaemics in Eastern India M De et al Indian J Med Res Jan 1990
5. Biswas A, Panigrahi R, Chandra PK, Banerjee A, Datta S, Pal M, et al. Characterization of the occult hepatitis B variants circulating among the blood donors from eastern India, Scientific World Journal 2013; 2013:212704. Doi:10.1155/2013/212704.
6. Ray G. Current scenario of hepatitis B and its treatment in India. J Clin Transl Hepatol 2017; 5(3): 277-296. doi: 10.14218/JCTH.2017.00024
7. Gower E, Estes C, Blach S, Razavi Shearer K, Razavi H. Global epidemiology and genotypic distribution of the hepatitis C virus infection. J Hepatol. 2014m;61(1 suppl):S45-S57
8. viii) Mohd Hanafiah K, Groeger J, Flaxman AD, Weirsmas ST. Global epidemiology of hepatitis C virus infection: new estimates of age-specific antibody to HCV prevalence. Hepatology. 2013;57(4):1333-1342.
9. Dhiman RK. Future of therapy for hepatitis C in India: a matter of accessibility and affordability? J Clin Exp Hepatol. 2014; 4(2): 85/86.
10. x) World Health Organization Department of HIV/AIDS Global Prevalence and incidence of selected curable sexually transmitted diseases: overview

- and estimates. Geneva: World Health Organization:2001
11. Gawande AV, Vasudeo ND, Zolpey SP, Khandait DW Sexually transmitted infections in long distance truck drivers. *J Commun Dis* 2000;32(3): 212-215
 12. Gita Negi, Vibha Gupta, Vikas Srivastava, and Dushyant S Gaur Malaria Positivity among blood donors :-an important index to assess blood safety *J Parasit Dis*. 2014 Mar, 38(1): 1:3
 13. Dara RC, Tiwari AK, Arora D, et al- Coinfection of blood donors: A cross sectional study from North India. *Transfus Apher Sci*. 2017; 56 (3):367-370
 14. Kumaraswamy N, Vallabhneni S, Flanigan TP, Mayer KH, Solomon S. Clinical profile of HIV in India. *Indian J Med Res* 2005; 121:377-94
 15. Dogra M, Dogra A, Sidhu M, Kotwal U. Seroprevalence of coinfections among blood donors in tertiary health care centre of Jammu region. *Indian J Med Microbiol* 2015; 33:181-2
 16. Sushma A. Chandekar, Gayatri P. Amonkar, Heena M. Desai, Nitin Valvi and Gururaj V Puranik, Seroprevalence of Transfusion transmitted infections in healthy blood donors : A 5 year Tertiary Care Hospital experience. *J Lab Physicians*. 2017 Oct-Dec; 9 (4) : 283-287 doi:10.4103/0974-2727.214246
 17. R. N. Makroo, Vikas Hegde, Mohit Chowdhry, Akanksha Bhatia, and N.L. Rosamma, Seroprevalence of infectious markers and their trends in blood donors in a hospital based blood bank in North India, *Indian J Med Res* . Res 2015 Sep; 142 (3):317-322. Doi: 10.4103/0971-5916.166598