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Blood donation in a tertiary care hospital: How safe is the blood collected?

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Abstract

Introduction: Blood transfusion has been used since early nineteenth century for various indications in different medical and surgical procedures. Blood Transfusion is also associated with some trivial as well as potentially life threatening complications, demanding thorough pretransfusion screening and testing, mainly for transfusion transmissible infections (TTI).

Objective: Assessment of the prevalence of TTI among blood donors.

Materials and Method: Donor record was reviewed retrospectively from January 2007 to December 2015 at Bapuji Blood bank, JJM Medical College and Hospital, Davangere. All collected samples were screened for Hepatitis B, HIV, Hepatitis C and Syphilis.

Results: Total of 81,824 voluntary and replacement donor's blood sample were analyzed, of which 2.12% transfusion had transmitted infections. The prevalence of Hepatitis B, HIV, Hepatitis C, Syphilis was 1.71%(1403), 0.26%(213), 0.12 %(96), 0.3 %(28) respectively.

Conclusion: Even with the stringent strategies adopted in screening donors, TTI is present in the blood collected. Although test is done to detect TTI, risk of TTI persists because of window period. Detection of these TTI in window period is although possible, cannot be employed in developing countries because of increased cost. Hence emphasis should be made on voluntary blood donation and increasing awareness of TTI among the general population.

Keywords: Transfusion Transmitted Infections, Hepatitis B, Seroprevalance, HIV, Hepatitis C.

Introduction

Blood transfusion service (BTS) is a vital and obligatory part of the healthcare system. The main concern of BTS is to ensure safety, adequacy, accessibility & efficiency of blood supply at all levels.(1) Till early 1970s, blood bank personnel were only concentrating on a few blood borne infections like syphilis and serum hepatitis by "Australia antigens". However, the scientific community was well aware that there would be multiple agents. Among them, significant transfusion-transmitted infections are human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), syphilis infection by spirochetes and transfusion associated malaria infection.(2)

Blood banks along with screening for transfusion transmitted infections (TTI) they also give an idea about the prevalence of these infections in healthy populations.(3) TTI is still a major concern to patients, physicians and policy makers who wish to see a risk free blood supply.(4) The integral components of blood transfusion are collection of blood only from non-enumerated blood donors, screening for TTI in blood collected and to reduce needless transfusion.(5) This study was done to know the safety of the blood collected and epidemiology of the TTI.

Objective

To assess the prevalence of TTI among blood donors.

Materials and Method

It is a hospital based retrospective and descriptive study. The data was collected from 1st January 2007 to 31st December 2015 in the Bapuji Blood Bank J.J.M Medical College & Hospital Davangere, a tertiary health care centre, Karnataka. All healthy donors were included based on the guidelines on assessing donor suitability for blood donation by WHO and donors not suitable for blood donation according to the same were excluded.

Laboratory test: Blood sample collected from donors was tested for HBs Ag, anti- HCV, anti-HIV were detected using ELISA (COBASE-411), according to manufacturer's instructions and Venereal Disease Research Laboratory Test (VDRL) was done for Syphilis. All seropositive tests were confirmed by repeating tests with the same serological test kit.

Statistical analysis: Percentage was worked out for each variable of TTI. Epi info package was used for the data entries and statistical analysis.

Results

Table 1 shows statistics for TTI in blood donors during the entire study period. A total of 81,824 donors were enlisted in the study. Of these 45,194 (55.23%) were voluntary donors (VD) and 36630 (44.76%) replacement donors (RD). Donors were predominantly male 80618 (98.53%) and female were only 1206 (1.47%)). TTI was positive in 2.12% (1740/81824) of donors out of which HBs Ag was positive in 1.71% (1403), Anti-HCV in 0.12% (96), Anti HIV in 0.26% (213), VDRL in 0.03% (28) blood donors (Table 2).

Table 1: Total blood collection and sex distribution of donors

Year	Total donors	Voluntary donors	Replacement donors	Male	Female
2007	8343	4476	3867	8220	123
2008	9118	5117	4001	8998	120
2009	7627	3314	4313	7571	56
2010	9509	5903	3606	9296	213
2011	9735	5483	4252	9626	109
2012	9470	5349	4121	9237	233
2013	9388	4841	4547	9309	79
2014	9628	5415	4213	9491	137
2015	9006	5296	3710	8870	136
Total	81824	45194	36630	80618	1206

Table 2: Prevalence of HBsAG, HIV, HCV, Syphilis (line chart)

Year	Total donors	TTI	HBsAg	HIV	HCV	Syphilis
2007	8343	198	151	24	07	16
2008	9118	217	176	28	06	07
2009	7627	176	146	17	08	05
2010	9509	160	137	16	07	0
2011	9735	232	188	32	12	0
2012	9470	234	178	41	15	0
2013	9388	233	178	33	22	0
2014	9628	154	132	08	14	0
2015	9006	136	117	14	05	0
Total	81824	1740(2.12)	1403 (1.71)	213(0.26)	96(0.12)	28(0.03)

Discussion

The donors included in our study were predominantly males (98.53%). Likewise, male predominance of above 95% was seen in other studies in different parts of India.[3,4,5,6] Voluntary donors are blood donors who are motivated to donate blood at regular intervals and replacement donors are usually one-time blood donors who donate blood to a friend or relative when in need of blood.[7] In our study, of the total blood donors proportion of VD was 55.23%, while that of RD was 44.76%. This predominance of VD is in concordance with other studies by Piyush A et al, H. Fernandes et al, Pallavi P et al.[3,4,6] In contrast, a predominance of RD which was reported by Singh et al (84.43), and Arora et al (68.6%) reflects the variation of awareness for blood donation different parts of the India.[8,9] Our study has a statistical limitation because of which the prevalence of TTI as per age group and the difference between VD and RD couldn't be calculated.

In our study we found overall seroprevalence of TTI was 2.12% among healthy blood donors which was high compared to seroprevalence of 0.53% in Ahmedabad, 0.6% in Mangalore and 1.63% found in Gangtok.[3,4,10]

The prevalence of TTIs in Indian blood donors is reported as follows: HBV – 0.66% to 12%, HCV – 0.5% to 1.5%, HIV– 0.084% to 3.87%, and syphilis – 0.85% to 3% respectively.[11] In this study we found that prevalence of Hepatitis B (1.71%) was predominant followed by HIV (0.26%), Hepatitis C (0.12%), and Syphilis (0.03%).

HBV: The key route of HBV transmission is parenteral and it is the most infective amongst all blood-borne viruses and chronic carrier state is associated with cirrhosis, chronic liver disease and hepatocellular carcinoma. In the present study the seroprevalence of HBV was 1.71% among the donors, some of the other similar studies have shown the following findings: Chadra et al 1.96 %, Bhawani et al 1.41% and Jasani et al 1.35 %.[12,13,14]

HIV: In India blood donors constitute the third main source of HIV. The seroprevalence of HIV infection in the general population is 0.3%.[5] The prevalence of HIV in varies in different parts of India with higher rates in western and southern parts.[8] Current study showed a HIV prevalence of 0.26%. Other studies by Singh et al, Srikrishna et al and Pahuja et al have noted 0.44%, 0.56% and 0.54% respectively.[8,15,16]

HCV: HCV infection is a progressing public health problem globally. Most common viral hepatitis next to Hepatitis B is Hepatitis C.[5] HCV prevalence in our study was 0.12% prevalence by Chattoraj A et al was 0.79%, Kaur et al was 0.78%, Giri et al was 0.74%, Bagga PK et al was 0.88%.[11,17,18,19]

Syphillis: VDRL positivity in our study was 0.03% which was comparatively lower than other studies Leena MS et al, Pallavi P et al, Singh et al and Sri Krishna et al was 0.10% 0.28%, 2.6% and 1.6%, respectively.[5,6,8, 5]

Conclusion

Based on the results from our study and comparison with other studies it is evident that majority of donors are male. Hence female donation should be promoted so that, the number of donations can be increased. TTI in the window period are still transfused and carries risk of transmission of the disease. Detection of TTI in window period although possible, cannot be employed in developing countries because of increased cost. In order to prevent the transmission of in developing country is to increase the awareness of TTI among the general population and more stringent screening measures should be included which excludes donation from subjects who have received blood previously or has been hospitalized for long term in hospitals including population with high risk behaviour which is already included in the screening criteria. Studies should be conducted which includes the above criteria to see its effectiveness. TTI screening should be done mandatory for all recipients of blood in order to early diagnosis and treatment of dreaded infections like HIV.

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