A RESEARCH ANALYSIS OF INEVITABLE BLOOD WASTAGE IN THE DISTRICT SOLAPUR, INDIA: A CROSS-SECTIONAL RETROSPECTIVE STUDY OF 12 YEARS

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ABSTRACT

BACKGROUND

Fundamental part of preventing transfusion transmitted infections (TTI) is to notify and counsel reactive donors. Policy advocates notification to all reactive blood donors, blood banks are now required to obtain written consent from donors at the time of donation for screening blood for TTI whether they wish to be informed about their abnormal test results. If any tests are abnormal test results before notification to the donors, the tests are repeated either using 2 assays of different principles or in duplicate with same assay.

METHODS

This is a retrospective study of the 12 years from the year 2003 to 2014 of district Solapur of India, so this data is being analysed in respect to 'Transfusion Transmitted Infections'. The study is aimed to determine the prevalence of TTI among the blood donors of district Solapur and to determine the trend of TTI and also to know the preventive measures of TTI. Statistical analysis by comparing the blood collection (manufacturing) of 12 years and discard due to TTI in the form of percentage. Area graph of TTI discard percentage and line graph of manufacturing of blood is prepared.

RESULTS

TTI discard% is declined from 5.68% to 3.10% while blood collection is climbed up by 62.55% in 12 years, average TTI discard units% of 12 years was 3.98%.

CONCLUSION

Seroprevalence for TTI further can be reduced by strict adherence to WHO selection and deferral criteria of donors. Properly conducting donor interviews, notification of permanently deferred donors will help in discarding less number of blood bags from collected units.

KEYWORDS

Inevitable Blood Wastage, TTI Reactivity, TTI Seropositivity, TTI Seroprevalence, Blood Donor's Infection, Permanent Deferral, TTD Reactivity, TTD Seropositivity, TTD Seroprevalence.

MeSHTerms

Blood Safety, Donor Selection, Donor Exclusion.

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INTRODUCTION: Blood is a vital health care resource used in broad range of hospital procedures. It is also a potential vector for harmful and sometimes fatal infectious diseases such as HIV, Hepatitis B and C. As per global data base, in 178 countries, it is not screened for transfusion transmitted infections (TTI). Licensing and monitoring of blood banks and blood donors in India is the responsibility of Drug Controller of India. NBTC has a major advisory role in the formation of policy on safe blood transfusion services in India. NACO is responsible for collection of safe blood while providing financial assistance. (1) The steps in donor selection and laboratory testing described have resulted in nation's blood supply being safer than ever.

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Screening of donor's identity against donor deferral registries detects individuals who were previously deferred as blood donors. These changes resulted in improved blood safety. The risk of acquiring TTI ranges from 1/150000 Units of blood for Hepatitis B & 1/135000 Units of blood for HIV. (2)

Fundamental part of preventing TTI is to notify and counsel reactive donors. NAT is being increasingly used in many centres in addition to ELISA improves blood safety although it is not mandated by national authorities. In 2002, GOI adopted the national blood policy to ensure safe blood supply.

Policy advocates notification to all reactive blood donors, blood banks are now required to obtain written consent from donors at the time of donation for screening blood for TTI whether they wish to be informed about their abnormal test results. If any tests are abnormal test results before notification to the donors, the tests are repeated either using 2 assays of different principles or in duplicate with same assay.

Donors who report back to transfusion facility are retested and if found repeat reactive are referred to ICTC for HIV and Gastroenterology Clinic & STD Clinic for HBV/HCV & syphilis respectively for counselling, confirmatory testing and management. Some of the donors even use blood donation as a mean for free testing because of high risk behaviour. [3] Each unit of blood is precious and utilised judiciously with minimal wasting because there is no substitute for human blood. Many modern surgical procedures could not be carried out without use of blood. [4]

AIMS AND OBJECTIVES: To determine the prevalence of TTI (Transfusion Transmitted Infections) among the blood donors of district Solapur, India.

1. To compare results with other studies.
2. To determine the trend of TTI.
3. To determine the preventive measures of TTI.

METHODS: This research analysis is a retrospective study of 12 years from the year 2003 to 2014 of district Solapur, India. The data of which is maintained and reported by this nodal centre of district, Solapur. This blood bank is owned by the state Government of Maharashtra. The regulatory authorities like FDA, NBTC, SBTC (A state branch of NBTC and its headquarters is at Mumbai), NACO, MSACS (A state branch of NACO and its head quarter is also at Mumbai), and the national headquarters of NBTC and NACO are situated at New Delhi. This nodal blood bank collects reports from all blood banks of the Solapur district and submits after compilation of the data to these regulatory authorities. So this data is being analysed in respect to 'Transfusion Transmitted Infections' for 12 years since year 2003.

RESULTS: It is mandatory to discard TTI (Transfusion Transmitted Infections including HIV 1&2, HCV, HBsAg, VDRL & Malaria Screening) reactive units. This loss is inevitable; however, the TTI discard % is declined from 5.68% to 3.10% in last 12 years. (Fig 1). While blood collection has climbed up by 62.55% from year 2003. (Fig 2), (Table 1).

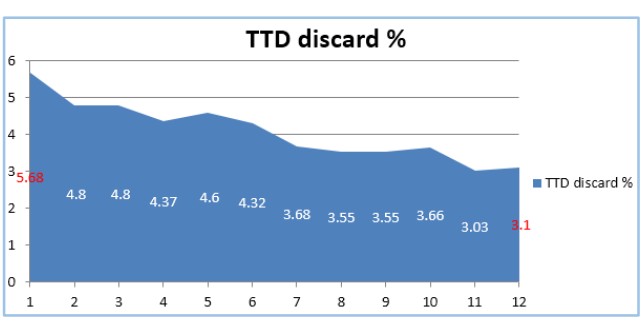

Fig. 1: Area Graph Showing TTI (TTD) Discard % of Blood for 12 Years from Year 2003 to 2014.

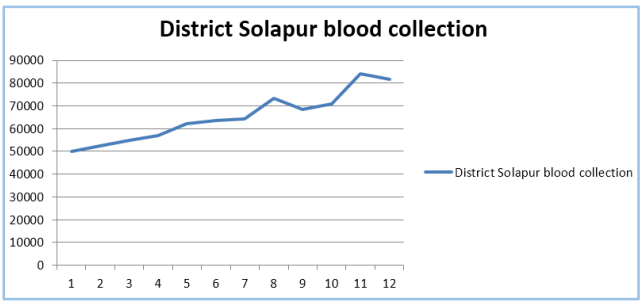

Fig. 2: Line Graph Showing District Solapur Blood Collection for 12 Years from Year 2003 to 2014

Serial Number	Year	District Solapur Blood Collection	TTI Discard	TTI Discard %
1	2003	50133	2850	5.68
2	2004	52312	2515	4.80
3	2005	54853	2634	4.80
4	2006	56900	2486	4.37
5	2007	62015	2850	4.60
6	2008	63564	2743	4.32
7	2009	64314	2367	3.68
8	2010	73350	2602	3.55
9	2011	68427	2430	3.55
10	2012	70843	2593	3.66
11	2013	84244	2553	3.03
12	2014	81490	2527	3.10
Total 12 Years		**782445**	**31150**	**3.98**

Table 1: A Comparison of District Solapur Blood Collection and TTI/TTD Discard %

Table 1: Shows average TTI discard units % of 12 years were 3.98 %. The decline in TTI discard units % is less than average of 12 years, which was started from the year 2009 and this decline was continued for 6 years so, initially for 6 years it was higher than average of 12 years.

DISCUSSION: Prevalence of TTI units% in India is 1.8 to 4%. Transfusion safety begins with healthy donor. Notifying and counselling the TTI reactive donors are the pillars of preventing TTI which protects the health of donor and prevent secondary transmission of infectious diseases to sexual partners, who reduces the risk of vertical transmission and provide feedback about the effectiveness of donor selection procedure such as pre-donation education and medical history.[3]

Present study shows TTI % is about 4% which is at par with upper prevalent range of country of India, this is the highest level when it is compared with all six studies.[2],[3] [4],[5],[6],[7] & (Table 2) all these studies show the level of TTI % in the range of 1.21% to 2.59%. Solapur district is one of the high prevalent viral TTI positivity among VBD donors amongst seventeen districts of Maharashtra state. The high level of TTI reactivity may be due to sometimes donor donates blood without revealing his/her history under peer pressure or that may be due to compromised testing quality.[7]

Comparison of studies TTI units % data worker wise	Singhal et al[2]	Rahul chaurasia[3]	Kumar et al[4]	Nikita Sharma. [5]	Vedita Bobde[6]	A.Sonawane Patil[7]	Present Study
Type of Study	**Retro.**	**Prosp.**	**Prosp.**	**Retro.**	**Retro.**	**Retro.**	**Retro.**
Period Year & Months	2 years	3 years	1 year 5 months	2 years 7 months	3 years	8 years	12 years
Total Units	6115	113014	10582	10072	31143	5152854	782445
Total TTI reactive units	84	2838	257	261	377	121048	31150
TTI reactive % units	**1.37**	**2.51**	**2.42**	**2.59**	**1.21**	**2.34**	**3.98**

Table 2: Worker wise Comparison of TTI Reactive/Positive/Prevalent Units %

CONCLUSION: Seroprevalence for TTI is further reduced by 100% voluntary blood donation and strict adherence to WHO selection and deferral criteria of donors. A properly conducted donor interviews, notification of permanently deferred donors will help in discarding less number of blood bags from collected units. Properly implemented blood transfusion policies will also help in discarding less number of blood bags. [4], [5], [6]

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ABBREVIATIONS:

1. FDA: Food and Drugs Administration.
2. GOI: Government of India.
3. HBsAg: Hepatitis B Surface Antigen.
4. HCV: Hepatitis C Virus.
5. MSACS: Maharashtra State Aids Control Society.
6. NACO: National Aids Control Organization.
7. NGO: Non-Government Organization.
8. NBTC: National Blood Transfusion Council.
9. SBTC: State Blood Transfusion Council.
10. TTD: Transfusion Transmitted Diseases.
11. TTI: Transfusion Transmitted Infections.

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