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Original Research Article

Profile of donors' blood wastage in Bagalkot blood bank: a record based case series study

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ABSTRACT

Background: Medical science has progressed tremendously over the years but, as yet there is no substitute for blood and thus, blood transfusion is essential part of modern-day health care. The implementation of quality system and continuous evaluation of all activities of the Blood Transfusion Services (BTS) can help to achieve the maximum quantity and quality of safe blood. Optimizing blood collection and processing would reduce the rate of discard and improve the efficiency of the Blood Transfusion Services.
Methods: A case series descriptive study was conducted at Bagalkot Blood Bank, Bagalkot. The study included all 4045 records of blood donors entered in the blood bank register in one year during 2012 in Bagalkot Blood Bank and the same were analysed.
Results: In the present study out of the 4045 blood donors, 26.48% were of the age group 20-29years, 95.64% being male and 50.43% were from urban areas. 85.19% were replacement donations. Most of the blood donors were of B blood group (31.32%). Of the 4045 units of blood collected, 231(5.71%) were discarded for various reasons. Main reasons for discarding blood were HBsAg (64.5%) positivity, followed by HIV (16.45%), HCV (11.26%), Syphilis (0.87%), Sterility (6.49%) and Expired (0.43%). Seroprevalence of HBsAg, HIV, HCV and Syphilis were 3.68%, 0.94%, 0.64% and 0.05% respectively.
Conclusions: The present study revealed more male donors of the age group 20-29 years, 85.19% being replacement donors and mostly (31.32%) being B Blood group. Sero-positivity for HBsAg (3.68%) was found to be higher among all the blood donations.

Keywords: Blood donors, Donor blood wastage, Seroprevalence

INTRODUCTION

Medical science has progressed tremendously over the years but, as yet there is no substitute for blood and thus, blood transfusion is essential part of modern-day health care. While 17% of the global population in developed countries benefit from approximately 60% of the 75 million units of blood donated each year in the world, the remaining 83% of the global population, living in the developing countries, have access to only 40% of the blood supply.[1]

The date of 1901 represents the most important achievement in the history of blood transfusions through the discovery of the ABO blood groups by Karl Landsteiner.[2] Forty years later both Landsteiner & Weiner discovered Rh (D) antigen. The genes of ABO

and Rh (D) are located on Chromosome nine and one respectively. The antibodies against red blood cell antigens are called agglutinins and individuals are divided into four major blood groups A, B AB & O, according the presence of these antigens & agglutinins.[3] The membranes of important and best known of these are the A and B antigens. Type B has the B antigen, type AB has both, and type- O has neither.[4] These antigens are found in many tissues in addition to blood; these include salivary glands, saliva, pancreas, kidney, liver, lungs, testis and amniotic fluid.[5]

There are differences in the distribution of ABO, and Rh (D) blood groups amongst different populations. The study of blood groups plays an important role in various genetic studies, in clinical studies for reliable geographical information and in blood transfusion practice, which will help in reducing morbidity and mortality rate. Knowledge of distribution of ABO and Rhesus (Rh) blood group is also essential for effective management of blood bank inventory.[6,7]

Amongst the undesirable complications arising out of transfusion of blood and blood products, transmission of certain infections like HIV, Hepatitis B and C and syphilis are most significant for the long term detrimental side effects. Meticulous pre-transfusion testing and screening particularly for transfusion transmissible infections (TTIs) is the need of the hour.[8] Only continuous improvement and implementation of donor selection, sensitive screening tests and effective inactivation procedures can ensure the elimination, or at least reduction of the risk of acquiring TTIs.[9]

Total blood units collected in Karnataka in 2006 is 357494 in that voluntary blood units collected are 187604 (52.47%) and about 3803 units of blood are discarded because of positives (HIV, HbsAg, Hepatitis C, Malaria & VDRL).[10]

The implementation of quality system and continuous evaluation of all activities of the Blood Transfusion Services (BTS) can help to achieve the maximum quantity and quality of safe blood. Optimizing blood collection and processing would reduce the rate of discard and improve the efficiency of the blood transfusion services.[11]

This study was conducted to know the profile of Donors donating blood at Bagalkot blood bank and the reasons for donor blood wastage & how to prevent the donor blood wastage as the blood is very important in saving lives & there is huge shortage of blood in India.

METHODS

A case series descriptive study conducted at Bagalkot blood bank, Bagalkot where the blood donors donated blood over a period of 1 year after taking approval from the Institution's Ethical Committee was taken. All the 4045 blood donors registered during the year 2012 were included for the study purpose. The Study was conducted for a period of 6 months from July to December 2013. The blood donors were selected after taking a detailed history and a complete examination regarding their eligibility criteria for blood donation. Donor's name, age, sex, occupation, caste, complete postal address and contact number was taken. Donors were deferred or accepted according to their medical history regarding chronic or acute diseases. Findings were further confirmed by physical examination of the patient. Blood was taken from a donor only after fulfilling all the eligibility criteria of a healthy donor. Blood was taken for donors who were between 18-60 years of age, more than 50 kg weight with haemoglobin more than 12.5 gm%.

Information regarding history of surgery, hospitalization, blood transfusion, occupation, high – risk behaviour and tattoo marks etc. were collected. Consent for infectious marker testing was obtained from all donors at the time of pre-do-nation counselling. Blood grouping and Rh typing was done by forward grouping and reverse grouping method (Span Diagnostics, Surat, India). All samples were screened for HIV (Elisa and Rapid test), Hepatitis B surface antigen (Elisa, Hepalisa – J. Mitra and co. and Rapid test), Hepatitis C virus (Elisa Microlisa – J. Mitra and co. and Rapid Test), Reagin antibody by a commercial Non-Treponemal Rapid Plasma Reagin (RPR) card test (Span Diagnostics, Surat, India).[12-15]

Data was entered in Microsoft Excel 2013 and analysed using SPSS version 20 (trial version). Categorical data were presented as frequencies and analysed using Pearson's Chi square test. $P<0.05$ was considered statistically significant.

RESULTS

In the present study out of the 4045 blood donors, 26.48% were of the age group 20-29years. Most of the donors (95.64%) being male and 50.43% were from Urban areas. 85.19% were replacement donations. Most of the blood donors were of B blood group (31.32%) followed by O (28.43%), A (25.34%) and AB (9.54%) respectively. Of the 4045 units of blood collected 231 (5.71%) were discarded for various reasons. Main reasons for discarding blood were HBsAg (64.5%) positivity, followed by HIV positive status (16.45%), HCV (11.26%), Syphilis (0.87%), Sterility (6.49%) and Expired (0.43%). In the present study seroprevalence of HBsAg, HIV, HCV and syphilis were 3.68%, 0.94%, 0.64% and 0.05% respectively.

In the present study HIV Seroprevalence was positive in 38(0.94%) blood donors. 0.83% and 0.96% blood donors were HIV positive among replacement and voluntary donors respectively. A total of 149(3.68%) blood donors were positive for HBsAg. The seropositivity for HBsAg was 2.84% and 3.83% among replacement and voluntary donors respectively. HCV was positive in 26(0.64%)

donors. Among replacement and voluntary donors, 0.17% and 0.73% were positive for HCV respectively. Only 2 (0.05%) were positive for syphilis serology (RPR) and both were voluntary donors. However, chi square test showed no relation between any of the Seroprevalence among voluntary and replacement donors (p>0.05).

Table 1: Seroprevalence among blood donors.

Serology	Replacement (n=599)		Voluntary (n=3446)		Total (n=4045)	
	Number	%	Number	%	Number	%
HIV	5	0.83	33	0.96	38	0.94
HBsAg	17	2.84	132	3.83	149	3.68
HCV	1	0.17	25	0.73	26	0.64
VDRL	0	0	2	0.06	2	0.05

Chi Square =1.837, df =3, p=0.6069.

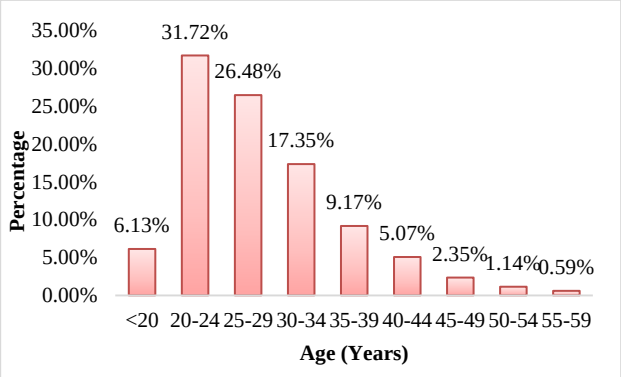

Figure 1: Age wise distribution of blood donors.

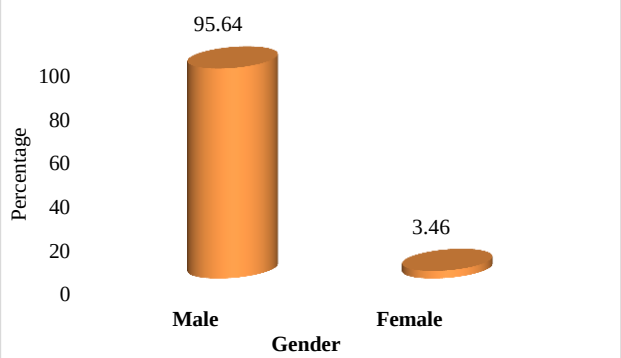

Figure 2: Gender wise distribution of blood donors.

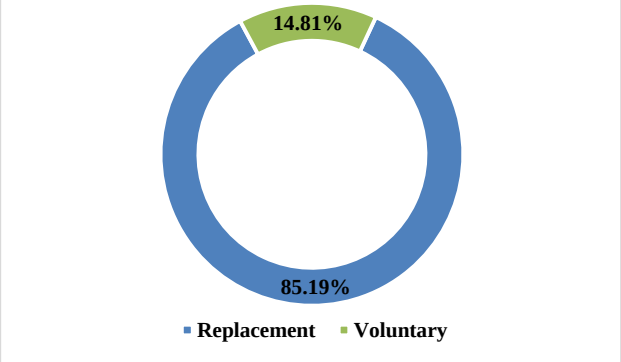

Figure 3: Distribution on the basis of type of blood donation.

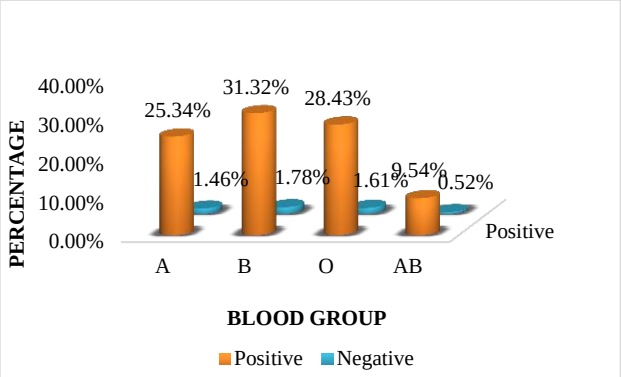

Figure 4: Distribution of donors according to their blood group.

DISCUSSION

In the present study about 33% of donors were in the age group of 20-30 years. Arora D et al., reported that out of 5849 blood donors, 3914 (66.9%) were of 18-31 years age and 1935 (33.1%) were of 32-44 years age.[16] Ahmed et al, reported that out of 14520 blood donors 48 (69.8%) were from the age group 18-30 years and 60 (28.3%) were from 31-45 years.[17]

Only 3.46% of donors were females and 95.64% being male in the present study. Similar study done by Arora D et al., reported that 5629 (96.2%) were males and 220(3.8%) were females.[16] Makroo et al, reported that out of 2,06,022 blood donors, 1,93,661 (94%) were males and 12,361 (6%) were females.[18] This is because of fact that in developing country like India, because of social taboo, cultural habit, lack of motivation and fear of blood donation female donors are very less. In addition large numbers of females are anaemic with low weight so declared unfit for blood donation.

In the present study only 14.81% of blood donors were voluntary donors. Kora et al, reported that the total blood units collected by voluntary blood donation were 3.99% which is lower compared to present study.[19] Whereas according to study done by Arora et al, 31.4% were voluntary donors.[16]

Most of the blood donors were of B blood group (31.32%) followed by O (28.43%) and A (25.34%) respectively in present study. Sindhu et al, reported in her study most frequently occurring blood group is B (37.56%), followed by O (31.21%), A (21.91%) and AB (9.30%). Raja et al, reported that most common blood group among donors was B (34.43%) followed by O (32.26%), A (24.35%), while the least prevalent blood group was AB (8.94%). Gupta et al, reported that the frequency of ABO and Rh blood group observed was B>O>A>AB.[20-22] The present study is comparable with studies done at various parts of Northern India like Amritsar, Lucknow and parts of western and central India.[23-27] However contradictory to our study in Southern part of India studies done by Periyavan et al, at Bangalore, Das et al, at Vellore, and at Davanagere by Mallikarjuna et al, and at Shimoga- Malnad study done by Girish et al., found that the commonest blood group was O followed by B, A and AB also study done in eastern part of India, Durgapur by Nag et al, showed O group to be the commonest group which is different from our study.[28-32]

The prevalence of HIV infection among blood donors varies from one geographical location to another and can provide a reasonable 'proxy' for HIV infection levels in a larger adult population (WHO/UNAIDS, 2000).[33]

The present study reported seroprevalence of HBsAg, HIV, HCV and Syphilis of 3.68%, 0.94%, 0.64% and 0.05% respectively. Bagalkot district is in 7th position among all Indian districts with very high seropositivity (2.9%) & high prevalence of HBsAg. As for HIV concerned Bagalkot is in highest prevalence area because of devdasi belt in Jamkhandi (Savadatti) & as per NACO10 Bagalkot is category A district (ANC>1%) & second in Karnataka to have highest patients on ART.[19] Arora et al, reported that seroprevalence of HBsAg, HIV, HCV and syphilis was 1.7%, 0.3%, 1.0%, 0.9% respectively.[16] Panda et al, reported the infection status of the donors; 1.13% was found to be positive for hepatitis B, 1.98% for hepatitis C and 0.35% for HIV.[34] Mythreyee et al, reported in his study that the seroprevalence of HBsAg, HIV, HCV and syphilis was 0.98%, 0.19%, 0.22% and 0.05% respectively.[33] Chetna et al, reported seropositivity for HIV was 0.034%, HBV was 1.57%, HCV was 0.04%, Rapid Plasma Reagin method (RPR) for syphilis was 0.019% and malaria was 0.017% respectively.[35] Shah et al, reported the seroprevalence of HIV, HBV, HCV and syphilis was found to be 0.162%, 0.977%, 0.108% and 0.234% respectively.[36]

Seroprevalence rates of HBsAg in other parts of country, such as 1.7% from Haryana, 1.66% in eastern India and as high as 3.44% in western India.[16,37,38] Furthermore, previous reports from the northern, eastern, and western states of India and Pakistan revealed the HCV seroprevalence to be 1.5%, 0.35%, 0.29%, and 3% respectively.[16,37-39] The seropositivity for HIV was 0.94% in our study which is low as compared to studies from other parts of India.[16,37,38] The seropositivity for syphilis was 0.05%, which again is relatively low as compared to that reported from the other parts of the country, as well as that of other countries.[16,37,38,40] This lower seropositivity is believed to be attributed to improve counselling of blood donors, adherence to standard donor selection criteria, and rationale use of blood.

CONCLUSION

In this study of 4045 blood donors, Most of the donors (26.48%) were from the 25-29yr Age group. This may be due to better acceptance among youth to donate blood. Only 3.46% of donors were females, may be due to ignorance, fear of pain, many women being underweight and anemic. Blood donation among voluntary blood donors (14.81%) is very less. Voluntary blood donors require increased motivation. Majority of the blood donors were of B blood group (31.32%) followed by O (28.43%) and A (25.34%) respectively. The present study reported seroprevalence of HBsAg, HIV, HCV and syphilis of 3.68%, 0.94%, 0.64% and 0.05% respectively. Following measures like blood donation awareness programmes for general public, screening of HBsAg & HIV by rapid slide tests before bleeding, not to bleed rare blood groups until required, need to be taken into consideration. To follow blood grouping and Rh typing & screening protocol.

Recommendations

1. Extensive awareness programme by blood banking services for donor motivation, so as to ensure adequate availability of safe blood to be launched.
2. The replacement donors who are “Forced Voluntary” donors, if tracked and motivated to donate blood voluntarily and regularly, most of the blood requirement can be met with.
3. Arrange near to expiry blood units in front shelves of freezer in blood banks.
4. Each hospital should have a hospital transfusion committee which should include transfusion specialist, pathologist, blood bank officer, clinician, surgeon, public relation officer and hospital administrator. Regular audit by hospital transfusion committee.

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