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RESEARCH ARTICLE
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A CROSS SECTIONAL STUDY TO ESTIMATE THE MAGNITUDE OF TRANSMISSIBLE INFECTIONS AMONG THE BLOOD DONORS OF BLOOD BANK ASSOCIATED WITH A TERTIARY CARE PEDIATRIC HOSPITAL IN EASTERN INDIA.

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Abstract:
Transfusion Transmissible Infections (TTIs) such as human immune-deficiency virus (HIV-I/II), hepatitis B virus (HBV), Hepatitis C virus (HCV) may spread through contaminated blood or blood products. Therefore, a cross sectional descriptive study was done to determine the magnitude of TTIs among the blood donors of a blood bank associated with a tertiary care pediatric hospital in Eastern India and estimate the predominant viral pathogen to cause TTI amongst the included study population. The blood samples were tested for HIV 1&2, HBsAg and HCV by standard enzyme-linked immunosorbent assay (ELISA) test kits. Results show higher number of blood donation in the month of August (19%), and the number of male donors are significantly higher (83%) than the female. Number of donors is significantly contributed from the age 18 years to 40 years (64.6%). In our study, prevalence of TTI is only 0.9% and the distribution of HBV, HCV and HIV-1/2 were 37%, 38% and 25% respectively amongst the TTI cases. Public awareness, proper counseling, medical examination and testing can help to minimize TTIs.

Key words: Transfusion Transmissible Infections, HBV, HCV, HIV,Blood Donor

Background:
Although the risk of transfusion transmitted infections today is lower than ever, the supply of safe blood products remains subject to contamination with known and yet to be identified human pathogens[1]. Transfusion Transmissible Infections (TTIs) are infections that can spread from one person to another through the use of contaminated blood or blood products. The term "blood transfusion infections" refers to a range of illnesses, the most prevalent of which are hepatitis B virus (HBV), human immunodeficiency virus (HIV-1/2), hepatitis (HCV), malaria and syphilis. In India it is mandatory to test TTIs before blood transfusion includes HBV, HIV-1/2 and HCV[2]. The

three most common viruses that cause TTI worldwide are hepatitis C virus (HCV), hepatitis B virus (HBV), and HIV [3]. According to statistics, there are 71.0 million people who are HCV positive, 25.70 million people who are HBV positive, and 36.70 million people who are HIV positive worldwide. According to estimates, 2.30 million and 2.70 million patients, respectively, had co-infections with HIV/HCV and HIV/HBV as a result of the same method of transmission[4,5].
Therefore, it is of interest to determine the prevalence of TTIs among the blood donors of a blood bank associated with a tertiary care pediatric hospital in Eastern India.

Objective(s):

1. To describe the distribution TTIs among the blood donors of a blood bank associated with a tertiary care pediatric hospital in Eastern India.
2. To estimate the predominant viral pathogen to cause TTI amongst the included study population.

Materials & Methods:

This was a cross sectional descriptive study done with all 995 enrolled blood donors from 1st June, 2021 to 31st May, 2022 in a blood bank associated with a tertiary care pediatric hospital in Eastern India. All precautions were taken and infection control protocols were followed, during the procedure for collection and testing of blood samples. All volunteer and replacement blood donors who arrive at the blood bank undergo counseling and evaluation before donating blood as per standard operating procedure (SOP).
Inclusion criteria:
Blood donors, healthy and without the risk of developing TTIs was included. Donors without recent, past or present history of hepatitis, some chronic diseases, sexually transmitted diseases, surgery, asthma, high-risk activities (like random unprotected intercourse) and pregnancy were included. The study comprised blood donors who were in good physical health, were between the ages of 18 to 65 year, weight >45 kg and hemoglobin levels >12.5 gm/dl.
Exclusion criteria:
Donors not qualified for blood donation were excluded from this study.

ELISA has been used for screening of blood samples to detect HCV, HBV and HIV[6].

Results:

Figure1. : Distribution of blood doors in month wise fashion

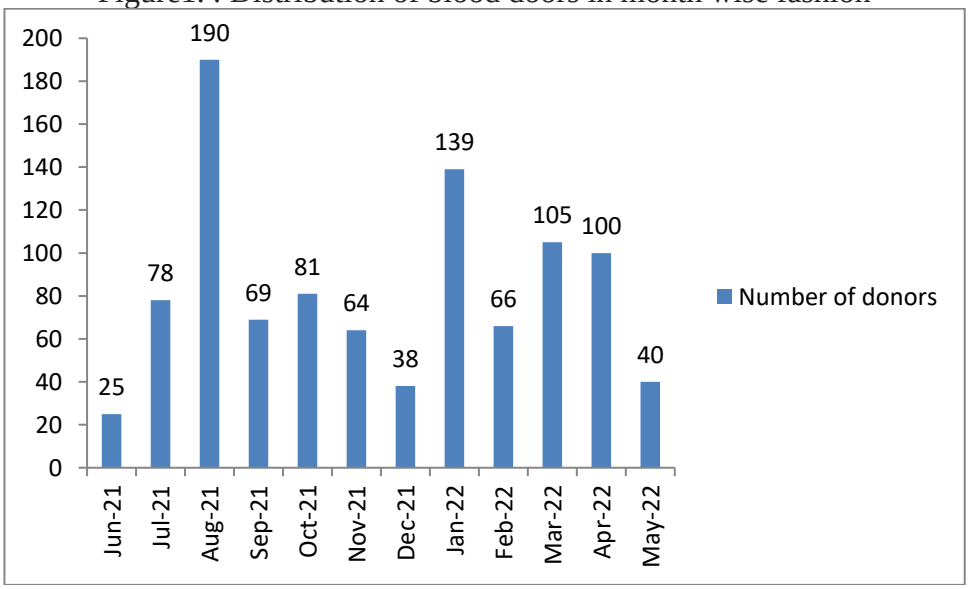


Figure 1: Column presentation shows higher number of blood donation in the month of August followed by January.

Figure-2: Gender wise distribution of blood donors.

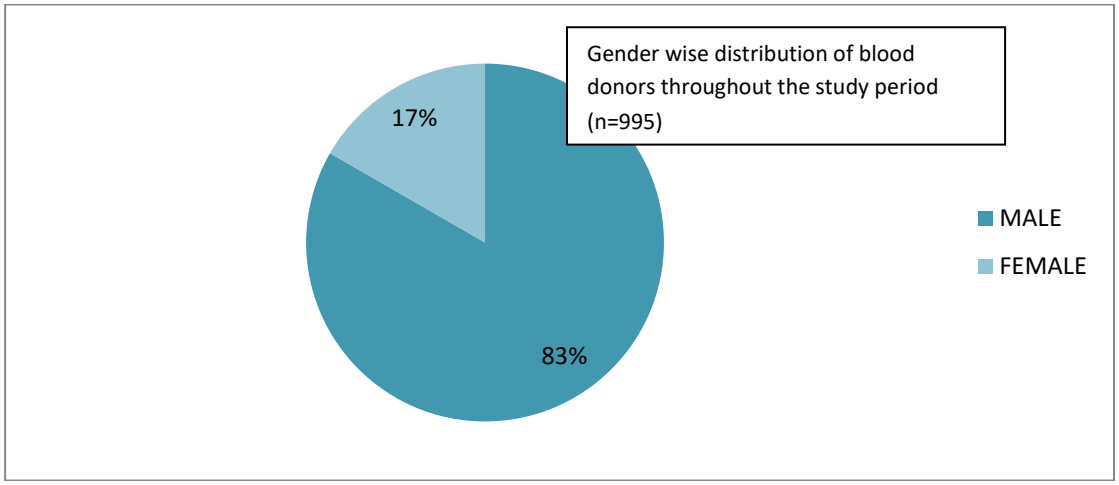


Figure 2: Pie chart depicts that number of male donors are significantly higher than the female.

The Fisher exact test statistic value is < 0.00001. The result is significant at p <0 .05

Figure 3: Column presentation of age wise distribution of blood donors

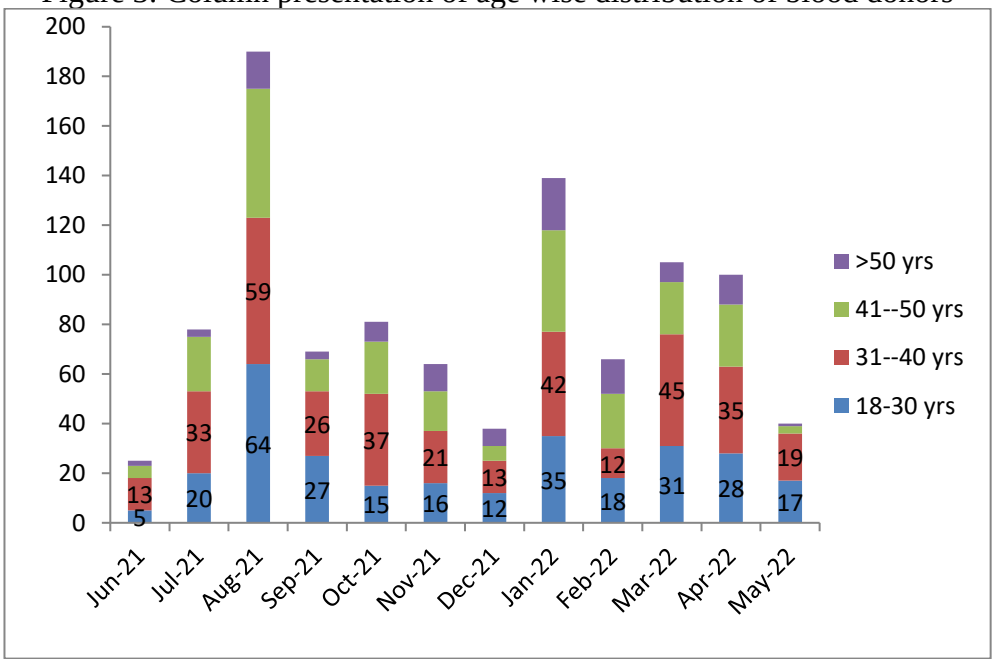
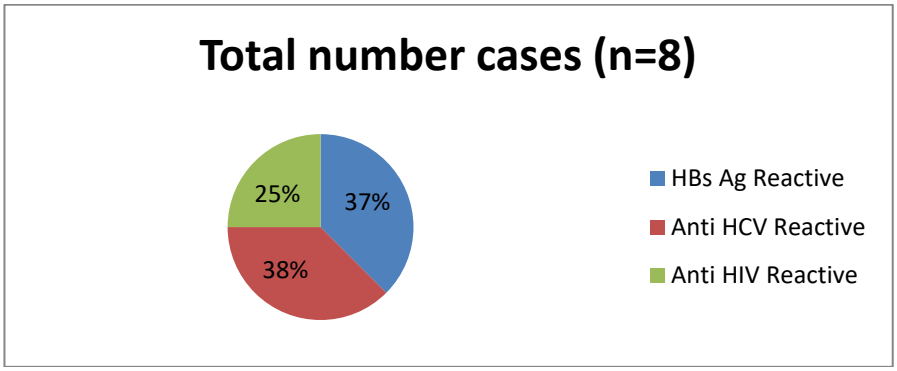


Figure 3: Column presentation depicts that number of donors are significantly contributed from the age 18 years to 40 years.
The Fisher exact test statistic value is < 0.00001. The result is significant at p <0 .05

Figure 4: Pie chart showing the distribution of donors reactive to viral parameters.



Discussion:

This descriptive cross sectional study dealt with a total of 995 donor evaluation from 1ST June 2021 to 31ST May 2022. In some other study on blood donor demography, in West Bengal, 1,528 donors tested in the study averaged 33.01 years old with a standard deviation of ± 9.06 years. A quarter of the donors were 26 years or younger (25% percentile), half of the donors 32 years or younger (mean, 50% percentile) and three quarters of the donors 39 years or younger (75% percentile). Female donors represented 11% of all donors[7]. Similarly, in this present study, number of donors are significantly contributed from the age 18 years to 40 years (64.6%, ref to figure-3) and in figure 2, Pie chart depicts that number of male donors (83%)are significantly higher than the female. In both the issues, The Fisher exact test statistic value is < 0.00001. The result is significant at p <0 .05. Seasonal variation has been noted to cause fluctuations in blood collections. The voluntary blood donation is less during extremes of weather conditions like summer or winter months and also affected by examination periods and vacations of educational institutions[8]. In accordance to this observation by Marwaha et al, in this present study, it has been found higher number of blood donation in the month of August followed by January (Figure-1 shows enlistment of 190 donors out of total 995 blood donors, i.e, 19% contribution).

In an epidemiological study performed by Thakur et al, it has been recorded that prevalence of HBV, HCV, HIV-I/II, syphilis and MP were 188(1.111%), 73(0.431%), 34(0.201%), 49(0.29%) and 1(0.006%) respectively. Their results show a trend of decrease in prevalence of TTIs; 2.267%, 2.111% and 1.614% between the year 2020, 2021 and 2022 respectively[9]. In our study, prevalence TTI in our study is only 0.9% which is a bit lower than that is documented in other reports [10]. Similar to the findings mentioned by Dong et al, in our study also, the three most common viruses causing TTI are hepatitis C virus (HCV), hepatitis B virus (HBV), and HIV[11]. The prevalence of HBV, HCV and HIV-1/2 were 37%, 38% and 25% respectively amongst the TTI cases (Figure-4); that is quite lower than that found in the study performed by Thakur et al [9]. A low prevalence of TTIs positivity was seen among blood donors in this cross sectional study. Public awareness, proper counseling, medical examination and testing can help to minimize TTIs[9].

Limitation of the study: Larger number of sample size and correlation of TTI s with donor's blood group are objected in the next phase of this study.

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There is no conflict of interest and violation of good ethical practices.

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