

ORIGINAL RESEARCH

To Study The Seroprevalence Of Transfusion Transmitted Infections Amongst Blood Donor

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ABSTRACT

Aim: To study the seroprevalence of transfusion transmitted infections amongst blood donors.

Materials and Method: This particular research was a hospital-based cross-sectional investigation. There were a total of one thousand donors involved in the research project, including both voluntary and replacement donors. Donors who agreed to have their blood drawn were chosen for the procedure in accordance with the blood bank's regular operating procedure. A thorough history and examination of the patient were performed. Participants comprised only healthy replacement and voluntary donors who had passed the health screening. In accordance with established procedures, this serum was analysed for the presence of HIV, HBV, HCV, Syphilis, and Malaria.

Result: Replacement donors accounted for 910 (91%) of the total blood donors, while voluntary donors made up the remaining 9% of the total. Out of a total of 1000 blood units that were examined, there were 50 that tested positive for a transfusion-transmitted infection (TTI), which resulted in a prevalence rate of 5%. There were a total of 50 seropositive units, 45 of which came from replacement donors (4.94%), while the remaining 5 units (5.56%) came from volunteer donors. The seroprevalence for HIV, HBV, and HCV were respectively 0.20%, 1.50%, and 2.20%, while the seroprevalence for syphilis was 1.10%.

Conclusion: Following the implementation of required testing of blood units, a discernible trend towards a declining incidence of transfusion-transmitted infections (TTI) has been seen. Despite this, it is possible that the danger may not be eradicated since the donors may still be in the window period and have the ability to spread the virus.

Keywords: transfusion-transmitted infections, blood, HIV

INTRODUCTION

Blood is very scarce yet may be used to save lives. It is necessary to transfuse it in a small number of life-threatening situations; nevertheless, the process of transfusion itself is linked

to a number of adverse consequences that increase the risk of morbidity and death and place an economic burden on the country. If the blood that is going to be transfused is not correctly screened, there is a danger that the recipient may get an infection that is called a transfusion-transmitted infection, or TTI for short [1]. This is one of the most significant adverse consequences of receiving a blood transfusion. Because of this, it is important to have a safe and secure blood transfusion in order to reduce the risk of TTI, which is a significant obstacle in the field of transfusion medicine. The following are some of the most important measures that need to be taken in order to ensure the safety of a blood transfusion. These include the right selection of donors, the incorporation of a variety of screening tests, and the implementation of processes to inactivate pathogens [2]. Donating blood on a voluntary basis, on the other hand, is the method that poses the least risk and is the safest to utilize [3]. In India, it is required to perform tests for Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Syphilis, and Malaria in accordance with the Drugs and Cosmetics Act (Ist amendment) Rules 1992 and the guidelines of the National AIDS Control Organization (NACO). [4] These requirements can be found in the Drugs and Cosmetics Act (Ist amendment) Rules 1992.

It is possible for a person to be a healthy carrier of any infection, and if the blood or blood component of that person is transfused to anyone else, it may further add to the pool of infection already present in the population, which may in turn lead to an indirect increase in the economic burden placed on the nation [4]. Because of this, it is vital to do appropriate screening of blood products prior to any transfusion.

The current investigation was carried out with the intention of determining the seroprevalence of transfusion-transmitted illnesses among blood donors. In order to ensure that the national rules for the safe transfusion of blood may be applied in a comprehensive manner across this specific area.

MATERIALS AND METHOD

The department of Pathology was responsible for carrying out the present research. This particular research was a hospital-based cross-sectional investigation. There were a total of one thousand donors involved in the research project, including both voluntary and replacement donors. Donors who agreed to have their blood drawn were chosen for the procedure in accordance with the blood bank's regular operating procedure. A thorough history and examination of the patient were performed. Donors who did not meet the criteria established by the protocol were not considered for participation in the research. Participants comprised only healthy replacement and voluntary donors who had passed the health screening. All of the donors gave their written approval after having their questions answered.

SAMPLE COLLECTION

After collecting 3.0 ml of blood from the tubing of a donor bag and placing it in a marked pilot tube, the blood was centrifuged for 5 minutes at a speed of 2500 rpm in order to get clear serum that was not hemolyzed. In accordance with established procedures, this serum was analysed for the presence of HIV, HBV, HCV, Syphilis, and Malaria. An ELISA kit, together with a semiautomated ELISA washer and reader, was used in order to carry out the HIV, HBV, and HCV testing. Sandwich ELISA is the foundation of the qualitative test known as ELISA, which stands for enzyme-linked immunosorbent assay. Rapid test strips were used in order to do the syphilis testing. The Rapid test strip is a qualitative membrane-based immunoassay that can detect antibodies (IgG and IgM) to *Treponema pallidum* in whole blood, serum, or plasma. In order to test for malaria, a Rapid Malaria Ag card was used. This test uses chromatographic immunoassay for the qualitative identification of

malarial parasite in a blood sample. The test is based on the principle of immunochromatography. The Statistical Package for the Social Sciences (SPSS) programme was used to do the analysis after the collection and insertion of the data into Microsoft Excel.

RESULT

The research included testing a total of one thousand donor blood units for the presence of HIV, HBV, HCV, Syphilis, and Malaria. The age of the donors varied from 20 to 60 years old, with the vast majority of donors (900) making up 60% and 30% of the total, respectively, in their second and third decades of life. There were a total of 1000 donors, 980 (98%) of whom were male and just 20 (2%), female. (Table 1) Replacement donors accounted for 910 (91%) of the total blood donors, while voluntary donors made up the remaining 9% of the total. (Table 2)

Out of a total of 1000 blood units that were examined, there were 50 that tested positive for a transfusion-transmitted infection (TTI), which resulted in a prevalence rate of 5%. There were a total of 50 seropositive units, 45 of which came from replacement donors (4.94%), while the remaining 5 units (5.56%) came from volunteer donors. (Table 3)

The seroprevalence for HIV, HBV, and HCV were respectively 0.20%, 1.50%, and 2.20%, while the seroprevalence for syphilis was 1.10%.

(Table 4) There was no evidence of malarial infection in any of the blood donors, hence the seroprevalence of the disease was deemed to be zero. Out of a total of one thousand blood units that were examined, there was not a single instance of co-infection discovered.

Table 1: Gender wise distribution of blood donors

Gender	Blood units screened (n)	Percentage (%)
Male	980	98
Female	20	2
Total	1000	100

Table 2: Categorization of blood donors

Donor	Blood units screened (n)	Percentage (%)
Replacement	910	91
Voluntary	90	9
Total	1000	100

Table 3: Seroprevalence of TTI in voluntary and replacement donors

Type of donors	No. of donors		No. of seropositivity	
	(n)	(%)	(n)	(%)
Replacement	910	91	45	4.94
Voluntary	90	9	5	5.56
Total	1000	100	50	5

Table 4: Seroprevalence of HIV, HBV, HCV and Syphilis in voluntary and replacement donors

Donor	No.	HIV		HbsAg		HCV		Syphilis	
		(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Voluntary	5	0	0	2	(0.20%)	2	(0.20%)	1	(0.10%)
Replacement	45	2	(0.20%)	13	(1.30%)	20	(2%)	10	(1%)
Total	50	2	(0.20%)	15	(1.50%)	22	(2.2%)	11	(1.10%)

DISCUSSION

Because of the very efficient preventative measures that have been implemented in industrialised countries over the last several decades, the incidence of transfusion-transmitted infections (TTI) has seen a significant decline in recent years. On the other hand, the situation was rather different for the emerging nations. One of the primary reasons for this is because the National Policy for Blood Transfusion Services in India didn't get off the ground until a fairly late stage [5].

In this particular study, the proportion of replacement donors was 91%, but the proportion of volunteer donors was just 9%. This is consistent with the findings of the research that was carried out by Srikrishna et al (98.5%), Kakkar et al (94.7%), and Dr. Anand Kumar Gurupadappa et al (91.6%)[1,3,6]. It has been noticed that the number of replacement donors is much higher than that of voluntary donors; this may be due to the misunderstandings and anxiety that are associated with the act of donating blood. This demonstrates that the health care industry in this area need more education and awareness initiatives related to health issues. According to the findings of this research, the seroprevalence of HIV, HBV, HCV, and syphilis are, respectively, 0.20%, 1.50%, 2.20%, and 1.10%. There was not a single positive Malaria test result among the blood units. The global health industry is now facing the most significant obstacle in the form of HIV. The current study found that the HIV seroprevalence was 0.20%. (2 cases). It was determined that each of the instances included replacement donors. Nobody who gave their time voluntarily was harmed in any way. However, there was no statistically significant difference in the levels of seroprevalence between replacement donors and voluntary donors. This was in agreement with the findings of the previous studies that had been carried out by Kakkar et al, Dr. Anand Kumar Gurupadappa et al, and Sundaramoorthy et al [3, 6, 7]. During the course of this research, not a single volunteer blood unit was found to have HIV antibodies. It seems that improved implementation methods are required in order to reach a contribution rate of one hundred percent voluntary giving. At this time, approach 1 developed by the WHO is used to test potential HIV carriers among blood donors in India. If the test for HIV antibodies comes back negative, the blood unit in question is thought to be free of the virus. On the other hand, if the test comes back positive, the blood unit in question is discarded, and the donors are referred to a voluntary counselling and testing centre (VCTC) for counselling. We abided by the same principles as everyone else.

In this particular research, there were a total of 15 blood units that tested positive for HBV, with 13 of them being replacement units (1.30%) and the other two being volunteer units (0.20%). This conclusion was comparable to that of the research that was carried out by Srikrishna et al, Singh et al, Gupta et al, and Arora et al, which indicated that the HBV seroprevalence was 1.86%, 1.80%, 1.86%, and 1.70% correspondingly [1,8-10]. Donors who tested positive for HbsAg were provided with post-test counselling. They were also counselled on the vaccination and examination of other members of their families.

In the current investigation, the seroprevalence of HCV was found to be 2.20%, with 22 positive blood samples out of a total of 1000 blood samples analysed. Although there was a difference in HCV seroprevalence between replacement and voluntary donors of 2.0% and 0.20%, respectively, the difference did not reach the level of statistical significance. In the studies conducted by Srikrishna et al. and Arora et al., the seroprevalence of HCV was found to be 1% and 1% respectively; however, results comparable to those found in this research were found in the studies conducted by Manchanda GS et al. and Kumar M et al. [1,10,11,12]. owing to the high rate of HCV seroprevalence among blood donors in this part of the country. This shows that there is a significant demand for health education that is rooted in the community.

In India, the prevalence rate of syphilis has been shown to be steadily falling over the last several decades. The research that was carried out in Chandigarh revealed that the rate of syphilis has significantly dropped from 10.4% in 1977-1985 to 2.5% in 1995-1996 [13]. Syphilis seroprevalence was found to be 1.10% in this work, which was comparable to the research that was carried out by Mandal R, Mondal K, and Sonawane et al, which indicated 0.65% and 0.87% Syphilis seroprevalence correspondingly [14,15].

There is a very low incidence of malaria among blood donors. During the course of this research, the blood donors were examined, and not one of them tested positive for Malaria. In the research carried out by Srikrishna and colleagues, there was not even a single instance of malaria found to be present in any of the 8617 blood samples [1]. The similar conclusion was reached by Dr. Anand Kumar Gurupadappa as well as Sonawane and colleagues [6,15]. Malaria screening is essential in regions where the disease is prevalent in order to prevent occurrences of post-transfusion malaria, which may be particularly dangerous for pregnant women and immunocompromised patients. According to the recommendations, chemoprophylaxis is required to be administered to all of the recipients in these regions.

CONCLUSION

Following the implementation of required testing of blood units, a discernible trend towards a declining incidence of transfusion-transmitted infections (TTI) has been seen. Despite this, it is possible that the danger may not be eradicated since the donors may still be in the window period and have the ability to spread the virus. Therefore, in order to reduce the risk of TTI, it is necessary to apply the donor selection recommendations in a stringent manner and to use screening procedures that are very sensitive.

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