

Original Research Article

Seroprevalence of Transfusion Transmissible Infections among Blood Donors in Nizamabad District of Telangana State - A six years study

Ather Fatima¹, Farida Begum², Kandukuri Mahesh Kumar^{3*}

¹Associate Professor, Department of Pathology, Government Medical College, Nizamabad, Telangana State, India

²Assistant Professor, Department of Pathology, Government Medical College, Nizamabad, Telangana State, India

³Assistant Professor, Malla Reddy Institute of Medical Sciences (MRIMS), Hyderabad, Telangana State, India

*Corresponding author email: doctormaheshgoud@gmail.com

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Abstract

Background: Blood transfusion is a life-saving therapeutic intervention and millions of lives are saved each year globally through this procedure. However, blood transfusions are associated with certain risks which can lead to adverse consequences. It may cause acute or delayed complications and carries the risk of the transmission of blood borne infectious agents.

Materials and methods: This study was done in Government general hospital blood bank, Nizamabad district, Telangana state, India. Study duration was six years, from June 2010 to May 2016. Blood was collected from apparently healthy donors after following the questionnaire put forth by National AIDS Control Organization (NACO) through blood camps organized by voluntary organizations, voluntary and replacement donors in the government blood bank and motivated student bodies.

Results: In our study, total screening positives were 532 out of the total 55291 units accounting to 0.96%. Among the positives, most of the positives belonged to Hepatitis B virus, HBsAg positives were 384 cases (0.69%), Human Immunodeficiency Virus (HIV) were 117 cases (0.20%), Venereal

Disease Research Laboratory test (VDRL) positives were 22 cases (0.03%) and minimal positives were noted in Hepatitis C virus (HCV) those were 09 cases (0.01%).

Conclusion: Transfusion of blood and blood products is an established mode of treatment in many conditions. However unnecessary transfusions and unsafe transfusion practices expose patients to the risk of serious adverse transfusion reactions and transfusion-transmitted infections. This risk can be minimized by encouraging voluntary non-remunerative donation and screening of blood for TTI before transfusion with better screening methods like Enzyme Linked Immuno-sorbent Assay (ELISA), Nucleic Acid Amplification technique (NAT).

Key words

Blood Donors, Seroprevalence, Transfusion Transmitted Infections, Enzyme Linked Immuno-sorbent Assay (ELISA), Nucleic Acid Amplification technique (NAT).

Introduction

Blood transfusion is a life-saving therapeutic intervention and millions of lives are saved each year globally through this procedure. However, blood transfusions are associated with certain risks which can lead to adverse consequences. It may cause acute or delayed complications and carries the risk of the transmission of blood borne infectious agents. A transfusion transmissible infection (TTI) is any infection that is transmissible from person to- person through parenteral administration of blood or blood products. The magnitude of transfusion-transmitted infections (TTI) varies from region to region depending on TTI's load in that particular given population. Transfusion transmissible infections can be classified as viral, bacterial and parasitic infections. The most commonly encountered transfusion infection is of viral origin. In many cases, post transfusion diseases have been caused by human immunodeficiency virus (HIV), hepatitis B and C virus [1]. The median prevalence rates of transfusion-transmissible infections in blood donations in high-income countries are considerably lower than in middle- and low-income countries. A well-organized blood transfusion service is an important component of the health care delivery system of any country. An integrated strategy for blood safety is required for elimination of transfusion transmissible infections (TTI) and for provision of safe and adequate blood transfusion service to the people. The main component of an integrated strategy include collection of blood

only from voluntary, non-remunerated blood donors, meticulous and stringent pre-donor questionnaire, proper screening for all TTIs and reduction of unnecessary transfusions . Meticulous pre-transfusion testing and screening particularly for transfusion transmissible infections (TTI) is the need of the hour [2]. 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 [3].

Aim

To study the seroprevalence of transfusion transmitted infections (TTIs) amongst voluntary as well as replacement blood donors.

Materials and methods

This study was done in Government General Hospital blood bank, Nizamabad district, Telangana state, India. Study duration was six years, from June 2010 to May 2016. Blood was collected from apparently healthy donors after following the questionnaire put forth by National AIDS Control Organization (NACO) through blood camps organized by voluntary organizations, voluntary and replacement donors in the government blood bank and motivated student bodies. Name of the donor, age (18-55 years), Sex, date of birth, address and contact numbers were recorded for each donor, while giving them a unique identification number. Donors with history of any febrile illness in the

recent past, weight loss, uncontrolled diarrhea, recent jaundice, liver disease, cardiovascular disease, pulmonary disease, malignancy, epilepsy, malaria, unusual or excessive bleeding, recent donation of blood, receipt of blood, and taking contraindicated drugs were excluded. Detailed history of immunization was taken. Weight, pulse, blood pressure and temperature were recorded for each patient. Screening for anemia was done clinically along with laboratory methods. Inspection was made for any marks of drug abuse or any skin lesions/ infections at the venepuncture site. A written informed consent was taken from each patient before the blood donation. Proper sterilization and other precautions were taken during the blood collection and blood units were collected along with the sample for TTIs testing and blood grouping. Collected blood was stored at appropriate temperature and methods. After collection all samples were screened for Human Immunodeficiency Virus I and II: By micowell ELISA to detect antibodies against HIV I & II in plasma. Hepatitis B Virus: By micowell ELISA, Hepatitis C Virus: By micowell ELISA and Treponema Pallidum: Detection of Treponemal Antibodies (Reagin) by Rapid Plasma Reagin Test, Malaria by Malaria antigen card method.

Results

In our study, total of 55291 donors were included in the study period of six years, from June 2010 to may 2016. Most of the donors in this study are replacement donors constituting around 90% of the total donors. Year wise collection of the blood was as per **Table - 1**.

In our study, total screening positives were 532 out of the total 55291 units accounting to 0.96%. Among the positives, most of the positives belong to Hepatitis B virus, HBsAg positives were 384 cases (0.69%), Human Immunodeficiency Virus (HIV) were 117 cases (0.20%), Venereal Disease Research Laboratory test (VDRL) positives were 22 cases (0.03%) and minimal positives were noted in Hepatitis C virus

(HCV) those were 09 cases (0.01%). (**Table - 2** and **Figure - 1**)

Table - 1: Year Wise Blood Collections.

Year	Collection
2010	2880
2011	7810
2012	9424
2013	9107
2014	10200
2015	10582
2016	5288
Total	55291

Discussion

Transfusion of blood and blood products is a life saving measure and helps innumerable people worldwide. At the same time, blood transfusion is an important mode of transmission of infection to the recipients. In developing countries the prevalence of TTI is much higher and quite far from attaining a zero risk level at the present moment. With every unit of blood, there is 1% chance of transfusion associated problems including TTI. The risk of TTI has declined dramatically in high income nations over the past two decades, but the same may not hold good for the developing countries. The national policy for blood transfusion services in our country is of recent origin and the transfusion services are hospital based and fragmented. Voluntary donors (VD) are motivated blood donors who donate blood at regular intervals and replacement donors (RD) are usually one time blood donors who donate blood only when a relative or a friend is in need of blood [2]. In our study, total of 55291 donors were included in the study period of six years, from June 2010 to may 2016. Most of the donors in this study are replacement donors constituting around 90 % of the total donors. Total screening positives were 532 out of the total 55291 units accounting to 0.96%. Among the positives, most of the positives belong to Hepatitis B virus, HBsAg positives were 384 cases (0.69%), Human Immunodeficiency Virus (HIV) were 117 cases (0.20%), Venereal Disease

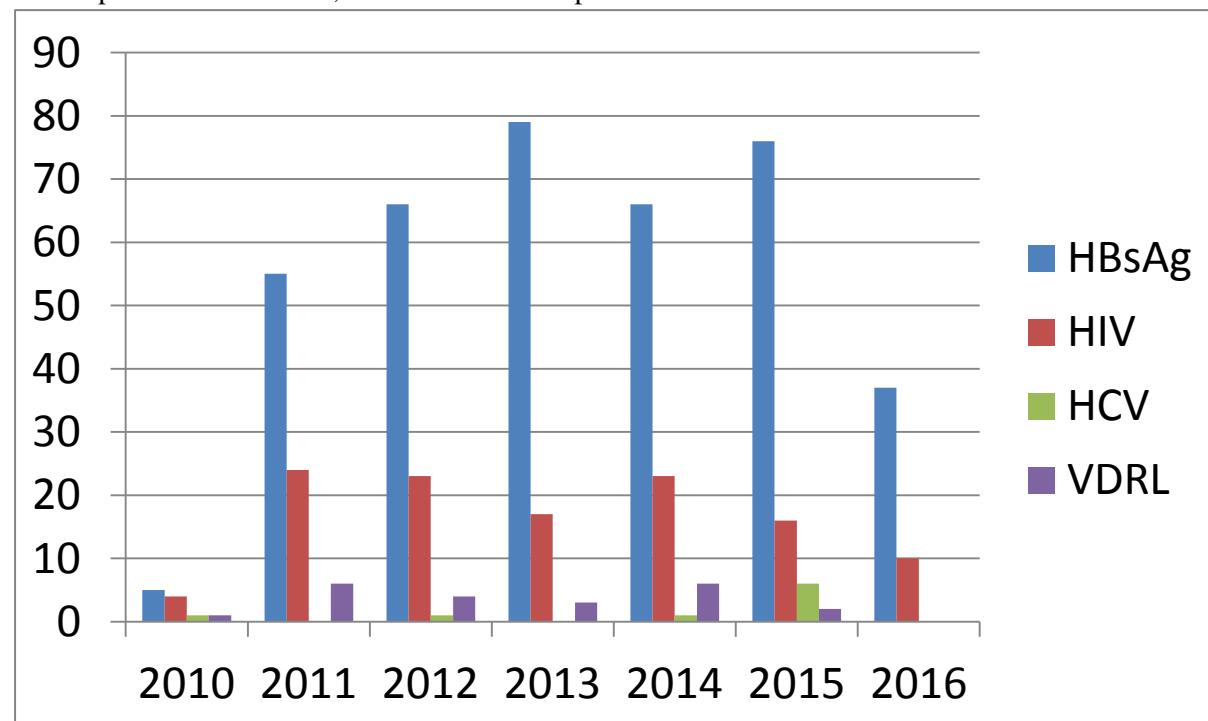
Research Laboratory test (VDRL) positives were 22 cases (0.03%) and minimal positives were noted in Hepatitis C virus (HCV) those were 09 cases (0.01%).

Table - 2: Year wise and Total Sero-positives in the study.

YEAR	HBsAg	HIV	HCV	VDRL
2010	5	4	01	01
2011	55	24	-	06
2012	66	23	01	04
2013	79	17	-	03
2014	66	23	01	06
2015	76	16	06	02
2016	37	10	-	-
Total (532)	384	117	09	22

Figure - 1: Seroprevalence of the TTIs .

Year represented on X-axis, Number of cases represented on Y axis.



Our study is in correlation with the study conducted by Ray Karmakar, et al. [4] and Gupta, et al. [2] where the incidence of TTIs is more with HBV and least with HCV.

Testing the blood serum for various antibodies and more conservative guidelines for blood transfusion have been effective and have successfully brought down the transmission rate. Inability of the serological tests to detect the diseases in their window period and virus

immunological variants is a major drawback in making the preventive approaches more effective. Earlier studies have shown that even HBsAg negative bloods may be anti-HBcIg/ HBV DNA positive and may retain the capacity to transmit infection [5]. Presence of occult HBV infection has also been reported from various parts of India [6, 7, 8]. As a result TTI still remains a concern for both the patient and the treating physician.

Previous studies have reported that prevalence of an infection among the donors reflects the disease burden in the society [9]. The prevalence rate obtained from this study found to be a bit higher from various previous reports [7, 10, 11]. This may be due to variation in the population or may reflect an increased burden of infection in the community. Increased prevalence of HBV among the donors underscores the concern about growing infection of this disease in the community. In India, transfusion associated HBV is estimated to be approximately 50% or more in multiple transfused patients and approximately 1.5% in post surgical recipients. Thus the absence of HBsAg in the blood of apparently healthy individuals may not be sufficient to ensure lack of circulating HBV. More appropriate methods need to be applied to find out the exact scenario.

The risk of TTI has declined in developed countries with the use of 3rd and 4th generation ELISA kits and advent of NAT (Nucleic acid Amplification Testing) [12]. It is used to detect very low levels of DNA or RNA that may be present in donated blood. NAT test reduces window period by direct detection of viral nucleic acid sequences and it reduces the time for effective detection from 22 days of serological identification to 11 days for HIV, 70 to <10 days for HCV, 56 days to <21 days for HBV. By the practice of donor self-exclusion helps in the deferral of high risk donors. Due to low socioeconomic status and lack of awareness of risk factors, the implementation of donor self-exclusion is difficult in India. Replacement donors constitute the largest group of blood donors in India [12], which reflects the lack of awareness among the general population. The strict selection of donor, screening with standard methods and promoting more of voluntary blood donation would reduce the prevalence of Transfusion Transmitted Infections (TTIs).

Conclusion

Transfusion of blood and blood products is an established mode of treatment in many

conditions. However unnecessary transfusions and unsafe transfusion practices expose patients to the risk of serious adverse transfusion reactions and transfusion-transmitted infections. This risk can be minimized by encouraging voluntary non-remunerative donation and screening of blood for TTI before transfusion with better screening methods like Enzyme Linked Immuno-sorbant Assay (ELISA), Nucleic Acid Amplification technique (NAT).

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