Original Research Article

Seroprevelence of transfusion transmissible infection at regional blood transfusion center Government General Hospital/Government Medical College, Nalgonda 2018-2020

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Abstract

Background: Blood Transfusion is the integral part of modern medicine and surgical procedures. Blood transfusion saves many people every year that would otherwise have died because of various natural diseases and disasters. But unsafe blood transfusion has the potential to transmit a diverse of infections to blood recipients. These infections could be due to viruses, bacteria, protozoans, and/or prions. Viral agents include human immunodeficiency virus (HIV), Hepatitis B virus (HBV) and Hepatitis C virus (HCV)[1,2]. HIV, HCV, HBV and VDRL are preventable diseases. A fundamental part and priority transfusion transmitted infections is to notify and counsel reactive donors. To prevent secondary transmission of infectious disease. **Method:** ELISA is highly sensitive and specificity test. All the blood units screened for ELISA which is superior compared to the rapid method detection. **Results:** 5423 units of samples were screened 61 were reactive among these HIV(8), HBSAG(50), HCV(2), VDRL(1). **Conclusion:** The decrease in prevalence and trends of TTIS among the study donors demonstrated the safety measures which were employed in the recent years were effective. ELISA is the time saving and gold standard method for screening of blood donor units.

Keywords: ELISA, HBSAg, Seroprevalence, HCV, VDRL

Introduction

Blood Transfusion is the integral part of modern medicine and surgical procedures. It is a known vice that blood transfusion is associated with transfusion reactions and transfusion associated infections. The effects of transfusion associated infections range from subclinical infections to life threatening diseases. In India the first case of HIV infection was detected in1986 among female sex worker in Chennai[3].

HIV infection resulting from blood transfusion was first reported in the United states in late 1982[4]. Laboratory testing of donated blood prior to transfusion is intended to ensure that recipients receive the safest possible blood products. Blood transfusion service is a life saving important part of modern health care system. Worldwide TTIS still remain a major public health problem in developing countries due to resource facility

The first National AIDS Control Programme (NACP) was launched in 1992 for the prevention and control of infectious diseases i.e. HIV/AIDS in India. This was followed by NACP II in 1999 and NACP III from 2007-2012. The overall goal of health and reversing the epidemic in India by Phase IV (2021-2017) Programme included in prevention care support and treatment services. Due to this program, there is increased awareness of the disease, overall declining trend as a result of national policies implemented through national and state blood transfusion council.

Transfusion transmitted infections are major problem associated with blood transfusion. Accurate estimates of risk of TTIs are essential for monitoring the safety of blood supply and evaluating the efficacy of currently employed screening procedures. The present study was carried out to assess the percentage of voluntary donors and replacement donors and to find out prevalence and changing trends of various TTIs blood donors in recent years.

During different phases of program the focus shifted from rising of HIV and AIDS awareness to behaviour change from national response to more decentralized response and increase involvement of NGOs the prevalence rate was decreased.

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Materials & Methods

It was descriptive observational study, done in Government General Hospital/Government Medical College, Nalgonda from the period of 2018-2020. 5423 units of samples were screened. From these units, 5 mL donor samples were obtained for serological testing. Samples were collected in test tubes at the time of bleeding, and blood was screened for hepatitis B surface antigen (HBS Ag), hepatitis C virus (HCV) , and human immunodeficiency virus (HIV) by ELISA based kits and by following the proper guidelines in the Transfusion Transmitted Diseases Screening Laboratory of Department Of Microbiology.

These were third generation enzyme-linked immunoadsorbent assay technique ELISA (followed by standard protocol). Syphilis was tested by RPR-Rapid Plasma reagin Kit & ELISA.

Results

A total 5423 blood units were screened over a period of 2018 to 2020 for transmissible infections 61 were reactive.

HIV, HBV, HCV and Syphilis by ELISA from January 2018 to December 2020.

Out of this 8 were reactive for HIV (0.14%), 50 reactive for HBSAG (0.92%), HCV is 2 reactive (0.036%), 1 reactive for VDRL(0.018%) respectively. The seroprevalence of HIV patients who are attending the hospital is 3% of prevalence. The seroprevelence of HBV patients attending to the hospital was 0.72% by rapid method of detection.

Table 1: Showing the Positivity rate in the screened blood units

REACTIVE RATE	NO.	%
REACTIVE POSITIVE	61	1.1%
NON REACTIVE	5362	98.9%
TOTAL	5423	100.0%

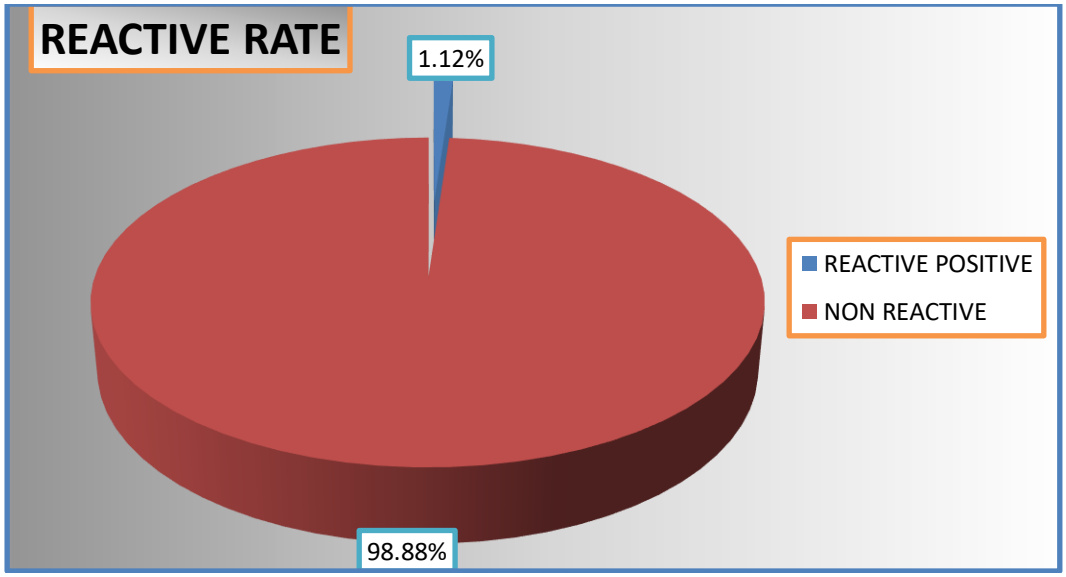

Fig. 1: showing the Positivity rate in the screened blood units

Table 2: Showing the Positivity rate attending the hospital

POSITIVE REACTIVE RATE	NO.	%
HIV	8	0.14%
HBV (HBSAg)	50	0.92%
HCV	2	0.04%
SYPHILIS (VDRL)	1	0.02%
TOTAL	61	1.11%

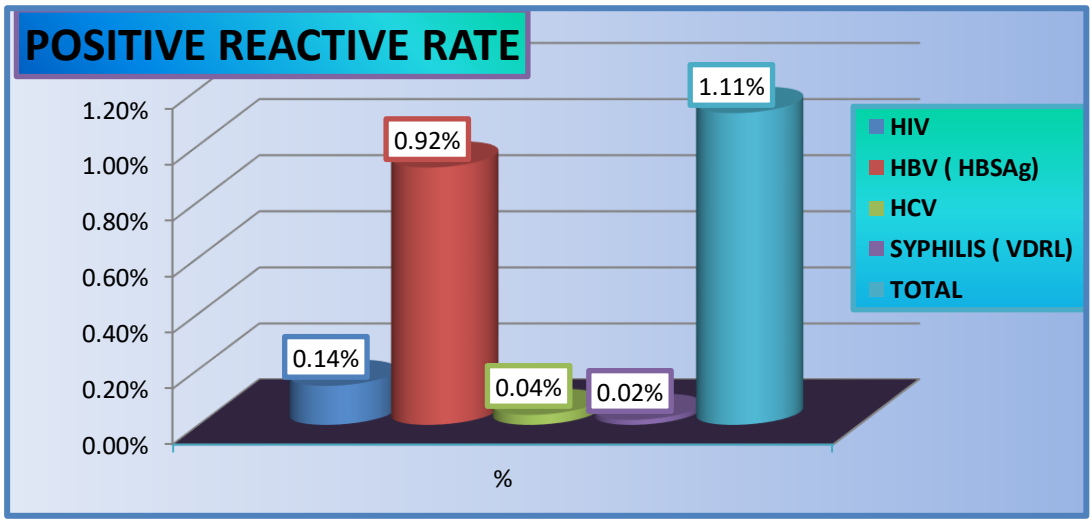

Fig. 2: Showing the Positivity rate attending the hospital

Table 3: Showing the seroprevalence for the transfusion transmitted infections in the screened blood units

SEROPREVALENCE	%
HIV patients	3%
HBV patients	0.72%

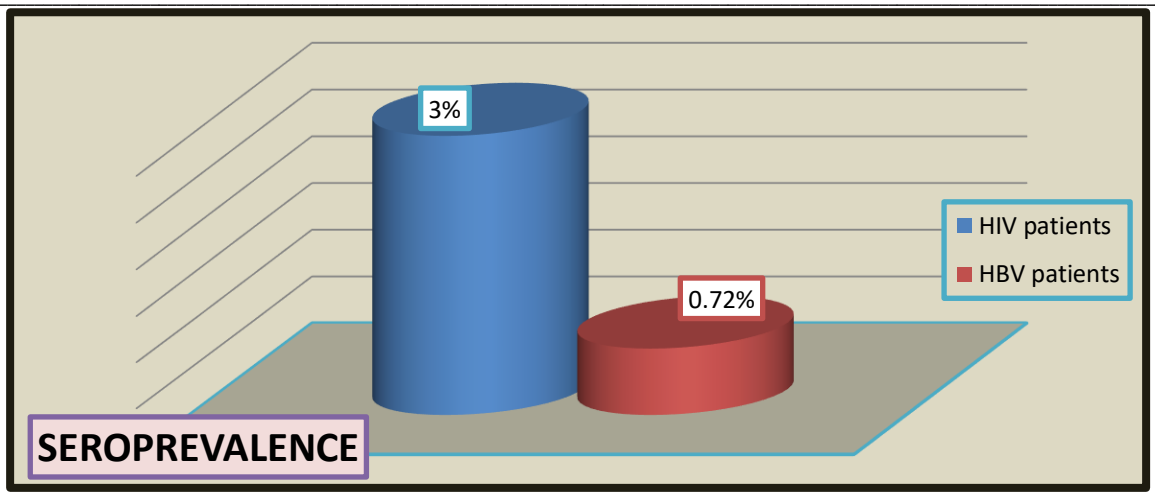

Fig.3: showing the seroprevalence for the transfusion transmitted infections in the screened blood units

Discussion

According to Gharehbaghian, the prevalence of TTIS among the blood donors in well structured health care system with a well organized blood establishment can be used as a reliable tool for statistical estimation of those infection agents in the general population[5].

A total 5423 blood units were screened over a period of 2018 to 2020 for transmissible infections 61 were reactive. HIV, HBV, HCV and Syphyllis by ELISA from January 2018 to December 2020. Out of this 8 were reactive for HIV(0.14%), 50 reactive for HBSAG(0.92%), HCV is 2 reactive(0.036%), 1 reactive for VDRL(0.018%) respectively. The seroprevelence of HIV patients who are attending the hospital is 3% of prevalence.The seroprevelence of HBV patients attending to the hospital was 0.72% by rapid method of detection. In a study by Bharti et al, (2018), the rate of HIV infected donors was 1.10% to 1.04%in 2005 to 2008; 0.62% to 0.35% in 2009 to 2012; 0.21% to 0.08% in 2013 to 2017[6].

The marked reduction in HIV seropositivity could be a result of successful implementation of National AIDS Control Programme (NACP) phase III and Phase IV, leading to increased awareness about the disease, its route of transmission, changes in risky sexual behavior of the general population and their treatment, increased number of voluntary blood donations as a result of national policy implemented through national and state blood transfusion council[7].

Fulzele Parag Prabhakar,Yasmin Khatib et al[8] reported a HIV seropositivity of 0.6%. Patel P J.er al,[9] reported a HIV incidence of 0.14% Mohan M Raut, Umesh S Joge et al[10] in a retrospective review of blood donors record over a period of seven years 2005 to 2011 reported HIV in 0.53% donors. P Pallavi,CK Ganesh et al[11] in retrospective review of donor record between 2004 to 2008 reported a HIV 0.44%.

Arora D et al[12] in his data collected for 3.5 years from Oct 2002 to APRIL 2006 reported an infection of HIV 0.3%, Sastry Jayagowri M et al[13] reported HIV 0.28%, Karmarkar PR et al[14] in his retrospective analysis during 2009 to dec 2011 and found TTI to be 2.9%, HIV. Dr. Amrapali L. Gaikwad et al[15] reported a seroprevalence of 0.45% HBsAg 1.27%, HCV 0.32%,VDRL 0.01%, Malaria 0.02%, noted increasing trend for all serological markers was observed.

In a study by Chandra T et al(2014)[16], on screening of 180,371 replacement units, seropositivity of transfusion transmitted disease in replacement donors was 0.15% in HIV, 1.67% in hepatitis B surface antigen, 0.49% in hepatitis C virus, 0.01% in VDRL, and 0.009% in malaria. Of 11,977 voluntary units, seropositivity of transfusion transmitted disease in voluntary donors was 0.08% in HIV, 0.24% in hepatitis B surface antigen, 0.001% in hepatitis C virus, 0.008% in VDRL (sexually transmitted disease), and 0.01% in malaria.

The prevalence for HBV in Indian population is in a range of 3-4.2% disease burden, more than 40 million people are in a carrier state and are responsible for unknowingly spreading the disease[17].

Total global prevalence of HCV is estimated to be at an average of 1.6% (1.3-2.1%). prevalence of Hepatitis C Virus (HCV) infection in the Indian population is estimated to be around 0.5%–1.5%. However, the prevalence of HCV is variable in different high risk populations according to various studies and there is still a paucity of data from large multicentre studies. Studies on voluntary or mixed donors have reported a prevalence of hepatitis C below 2%. There continues to be variations in reporting the HCV prevalence, depending upon the geographical region population sub-groups included in these studies.

HCV infection is acquired through exposure to small amounts of blood and blood products, the routes of transmission being similar to the HBV and include injection drug use, blood transfusion, unsafe injection and unprotected sex practices etc. About 10 to 15 million people in India are chronic carriers of HCV infection[18].

Though the prevalence is lesser than HBV, HCV infection is dreaded because of progression to chronicity and hepatocellular carcinoma in more number of patients. In their study by Bharti et al,[6] HCV infection was reported to be 0.14% in 2005 which very gradually reduced to 0.03%in 2012 and remained constant thereafter. The seropositive rate here was lower than the regional rate of 0.55% and 0.33%observed by Amrapali et al[15] and Sastry et al [13]respectively. Karmarkar et al[14] and Patel et al[9] reported similar rates of 0.02% and 0.06%. P.Pallavi et al[11] reported a higher seroconversion of 0.23%.

Sexually transmitted diseases (STD) are widespread in developing countries and pose a problem with ignorance, low socioeconomic status, inability to come out openly for the treatment of the diseases. Syphilis is a classic example of STD that can possibly be controlled easily as well as treated effectively and economically, by implementing efficacious public health measures.

VDRL reactivity in their study of Bharti et al,[6] showed a rising trend from 0.34% in 2008 through 2011 which was highest with0.57% then to decline again 0.03% in 2013 with fairly constant rate thereafter. Other studies showed a lower percentage upto 2013 but thereafter correlated well. Patel et al[9] reported a rising trend, Amrapali et al[15] and Mohan rout et al[10] showed a rate of 0.03%.

From our results it has been concluded that prevalence of transfusion transmitted infection (HIV, HBV, HCV, VDRL, and malaria) was more in replacement donors in comparison to voluntary donors. Extensive donor selection and screening procedures will help in improving the blood safety. Extensive donor selection and screening procedures will help in improving the blood safety. In all the markers tested there was increased prevalence of TTI among the replacement donors as compared to voluntary donors.

The prevalence of HIV has been decreasing in the Indian population supporting the growing awareness of this life threatening diseases. HBs Ag infection still continues to be a menace to the society because, in spite of decreasing trend, incidence of the disease is still very high in general population. There has been a significant reduction in the prevalence of HCV, probably due to the availability of diagnostic kits as well as increased awareness among the blood donors.

Malaria and VDRL appear to be sporadic findings and detection is mainly based on sensitive kits available. The other transfusion associated infections also showed a declining trend but to a lesser extent. The possible reason could be the increase in voluntary blood donations, increased awareness about health and related factors, possible behavioural changes.

The HBV infection accounts for the maximum number of seropositive cases and focuses on the need to start a national program to control the disease with its lifelong carrier status and life threatening diseased state. Intensive screening and vaccination in high risk groups and areas with high endemicity could curb the disease. Also mass public awareness campaigns about the horizontal route of transmission, unsafe behaviour, carrier states leading to spread of the virus and the fact that no treatment is available for the infection can probably lead to reduce the prevalence of the disease. Though HCV seropositivity was less and maintained so, public awareness about routes of transmission and progression to hepatocellular carcinoma and cirrhosis warrant a special attention.

Conclusion

Decreasing seroprevalence rate is the result of effective safety measures taken both in the general population as well as in the field of transfusion medicine. However, important initiatives are yet to be taken and should be standardized worldwide for taking blood safety to a higher level. These should include increase in the activity of voluntary counselling and testing centres, improving counselling programmes for those engaged in high-risk activities, increasing regular voluntary and non-remunerated donations as well as using effective test kits. A small percentage of sexually transmitted diseases can be easily controlled with proper counselling and treatment of both partners.

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