



PATTERN OF BLOOD DONATION AND THE PREVALENCE OF TTIS IN A BLOOD BANK AT A DISTRICT HOSPITAL IN NORTH INDIA—A 6 YEAR EXPERIENCE.

Pathology

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ABSTRACT

Background: Provision of adequate supply of safe blood is the aim of all the blood banks. Apparently healthy donors may be a source of transfusion transmitted infections associated diseases to the recipients.

Aim: The objective of the present study was to find out the pattern of blood donation and the seroprevalence of transfusion-transmitted infections (TTIs) among healthy blood donors in a blood bank at a district hospital in the hill state, Himachal Pradesh, India.

Materials and Methods: A retrospective cross-sectional study was conducted at district hospital Solan over a period of six years from 2014 to 2019 and included all the donors (voluntary and replacement) from the hospital and blood donation camps. Screening for Human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) and treponema pallidum (Syphilis) screening was done using ELISA as per the guidelines laid by the NACO. Rapid card test was done to detect malarial parasite.

Results: Of the total 8782 donors, most of them were in the age group of 18 years to 25 years (43.5%) and were males (90.4%). Voluntary donation (94.0%) was more common than replacement donation. In the present study, the overall seroprevalence was 0.8% and seroprevalence of HBV, HCV, syphilis and malaria was 0.38%, 0.17%, 0.11% and 0.14% respectively. No sero positive case of HIV was detected among the donors.

Conclusion: We observed that apparently healthy looking donors are also not free of TTIs. Hence blood donors should be selected carefully after mandatory screening for TTIs so as to ensure safe blood supply.

KEYWORDS

TTIs, Seroprevalence, Blood donors.

INTRODUCTION

Blood is life and human beings are the only source of blood. In order to save life blood transfusion is an important medical mode of treatment in certain disorders. At the same time transfusion of blood or blood products is implicated in transmitting infections to the recipient.¹ Hence the provision of adequate and safe blood becomes an essential function of the blood bank. To ensure this, blood donation from non remunerative voluntary individuals is encouraged and pre transfusion screening for all TTIs is mandatory. There is 1% chance of a transfusion related problem including TTIs when one unit of blood is transfused.² This risk increases to 12.5% in individuals receiving multiple transfusions.³ The prevalence of TTI in the developed countries is less due to high level of blood transfusion safety measures.⁴ These, may be in the form of good and thorough verification of the donor using a questionnaire, history, clinical examination, proper screening tests for TTIs and other stringent laws.

In order to decrease the transmission of TTI, the Government of India, through "The Drug and Cosmetic Act, 1954" and its various amendments from time to time, made it compulsory for all the blood banks to screen and test all the blood donations for five major infections: HIV I & II, HBV, HCV, syphilis, and malaria.⁵ Recently, NACO advised the use of third and fourth generation ELISA (HIV 1 and HIV 2) test kits for better results. In the developing countries, prevalence rate of TTIs in blood donations is more than high income countries.⁶ Variation in the seroprevalence has been observed in different studies across the country. This study was done in the blood bank of a district hospital at Solan in Himachal Pradesh to find out the pattern of blood donation, the frequency and changing trends of various TTIs in the blood donors of the state.

MATERIALS AND METHODS

A six year retrospective study was conducted at the blood bank of District hospital Solan in the state of Himachal Pradesh, India from 2014 to 2019. Prior consent of the blood bank medical officer was taken. Written consent of blood donors was taken at the time of blood donation. The blood was collected through the voluntary donors at outdoor blood donation camps and in-house blood bank. The replacement donors at blood bank were also included. Donors were physically examined, questionnaires were filled by them and then were carefully screened by trained personnel or doctors. At the time of bleeding five ml of blood was taken from the donor and screened for human immunodeficiency virus (HIV-1 & HIV-2) antibodies, hepatitis B surface antigen (HBsAg) and hepatitis C virus (HCV) antibodies.

ELISA test for Syphilis and rapid card test was done to detect malarial parasite. The data obtained was documented and analyzed.

RESULTS

During the 6 year period, we received 8782 blood units of which 8260 (94.0%) units were voluntary donations and 522 (6.0%) were replacement donations. Year wise distribution of voluntary and replacement donations is depicted in Table 1.

Among the donors, male preponderance (90.4%) was observed with the male to female ratio of 9:1. The age of the donors ranged from 18 years to 60 years with the majority of them in the age group of 18 years to 25 years (43.5%) as shown in

Table 3: Year wise sero positivity of TTIs

YEAR	HIV	HBV	HCV	STS	MALARIA
2014	0	4	1	3	0
2015	0	5	2	0	0
2016	0	6	15	3	10
2017	0	6	3	0	0
2018	0	7	0	3	0
2019	0	6	2	1	3
TOTAL	0	34	15	10	13

DISCUSSION

Blood transfusions are the mainstay of the treatment in certain medical and surgical conditions but are always associated with a risk of TTIs.⁷ It is important to assess the trends in the rate of TTIs as this helps to monitor the supply of safe blood and effectiveness of donor screening. Thorough physical examination and proper selection criteria should be strictly followed for the selection of the donor. It is also crucial to do pre transfusion testing and screening for TTIs to prevent these life threatening infections.⁸ Diseases commonly transmitted through blood transfusion include syphilis, malaria, HBV, HCV HIV and HTLV while CMV, EBV, Parvo virus B and brucellosis can also be transmitted rarely. Other infectious agents such as Hepatitis G Virus (HGV), West Nile Virus, Sen Virus and Transfusion Transmitted Virus (TTV) are the emerging infectious agents discovered recently which hamper safe blood transfusion.⁹

For safe blood transfusion integrated strategy suggested by the WHO includes collection of blood from voluntary non–renumerated donors, avoiding unnecessary transfusion of blood products and screening for all TTIs using sensitive techniques.¹⁰

Seventy six percent of the donors in our study were in the age group of 18 years to 35 years similar to the findings of Gagan S et al (60%) and Arora D et al (66.9%).^{11,2}

Most of the donors were males (90.4%) and only 9.6% were females. Male preponderance was also observed by Arora D et al², Makroo et al¹², Geethalakshami et al⁹, Gopi et al⁷ and Patil M et al¹ who found 96.2%, 94.0%, 97.3%, 97.1% and 88% male donors respectively. Less number of blood donations by females is due to the fact that females are invariably anemic and under weight, fear, ignorance and temporary rejection due to lactation and menstruation also contribute.¹¹

Voluntary donors are those who donate blood on their own volition at regular intervals without any financial benefit and those who donate on the request of friends or relatives are called replacement donors.¹⁰ In our study, 94.0% were voluntary donations and about 6.0% were replacement donors. This is in concordance with Dhar G et al¹³, Geethalakshami et al⁹ and K Padma Malini et al¹⁰ who found 83.4%, 86% and 83.7% voluntary donations in their study. This is in contrast to the observations made by Gagan S et al¹¹, Arora D et al² and Singh et al¹⁴ who found preponderance of replacement donation to the tune of 94.1%, 68.6% and 82.4% respectively. This could be due to the lack of public awareness towards voluntary donation.

The sero positivity rate of the various TTIs in our study was 0.8% which was in concurrence with the studies by Leena M S et al¹⁵ and Aggarwal N et al¹⁶ (1.35% and 0.87% respectively). Mittal N et al¹⁷, Kotwal U et al¹⁸, Khandekar et al⁶ and Kumar R et al¹⁹ had found higher rates of 2.3%, 3.02%, 3.25% and 4.57% respectively. The low rates of the seropositivity could be due to the fact that majority of the donations in the present study were voluntary and donors were properly screened.

Among all TTIs, HBV was the most common infection prevalent in about 0.38% which is similar to the findings of Leena MS et al¹⁵ (0.71%) and Tiwari et al (0.62%)²⁰. It is much lower than the observations made in other studies of Pallavi et al²¹, Srikrishna A et al²², Chaurasia et al²³ and Patil A et al²⁴. (1.2%, 2.9%, 44% and 1.53% respectively).

The sero reactivity for HCV was 0.11% which was quite less than the prevalence rate in the local population as per the National Centre for Disease Control, which stated the prevalence of HCV infection was 1%. Our observation with regards to the prevalence of HCV, was concordant with Leena MS et al¹⁵ and Amrutha Kumari et al²⁵ who had found HCV seroprevalence in 0.14% and 0.13% cases respectively.

Higher seroprevalence was observed by Kumar et al¹⁹ (1.53%), Panda et al²⁶ (1.98%) and Srikrishna et al²² (1.02%) respectively.

Syphilis screening is believed to indicate the lifestyle of the individual and the society as a whole, since these people may be exposed to other sexually transmitted diseases. Hence this is a test to detect the donors with high risk behavior. In our study, we had STS positivity in 0.11% cases which is concurrent with Leena MS et al¹⁵ (0.1%), Dobariya G et al⁷ (0.16%), Pailoor K et al²⁷ (0.12%) and K Padma Malini et al¹⁰ (0.12%). Kumar et al¹⁹ and Srikrishna et al²² had observed that prevalence of STS was 1.74% and 1.6% respectively which was very high as compared to our study.

Malarial parasite was also tested in all the donated blood units and it was observed that the positivity was 0.14% very similar to the observation of Leena et al (0.12%)

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