Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Transfusion Medicine

A Comparative Status of HBsAg, HCV, HIV, TPHA & MP Test Results Among General Blood Donors in a Tertiary Care Hospital in Bangladesh

Dr. Farhana Islam[1*], Dr. Fantasir Md. Shibly Al-Amin[2], Dr. Tasia Sultana Rahman[3], Dr. Zereen Mosfeqa Rahman[4], Md. WasimMollah[5], Md. Rabiul Islam[6]

[1]Associate Professor & Head, Transfusion Medicine Department, NICRH, Mohakhali, Dhaka, Bangladesh
[2]Medical Officer, Transfusion Medicine Department, NICRH, Mohakhali, Dhaka, Bangladesh
[3]Medical Officer, Transfusion Medicine Department, NICRH, Mohakhali, Dhaka, Bangladesh
[4]Associate Professor & Head, Transfusion Medicine Department, NIDCH, Mohakhali, Dhaka, Bangladesh
[5]Medical Technologist, Lab, Transfusion Medicine Department, NICRH, Mohakhali, Dhaka, Bangladesh
[6]Medical Technologist, Lab, Transfusion Medicine Department, NICRH, Mohakhali, Dhaka, Bangladesh

DOI: 10.36347/sjams.2021.v09i07.011 | **Received:** 27.05.2021 | **Accepted:** 23.06.2021 | **Published:** 16.07.2021

***Corresponding author:** Dr. Farhana Islam

Abstract **Original Research Article**

***Background*:** Today blood transfusion is most frequently used of a life-saving therapeutic procedure in treatment arena. But in some times its becomes revers like life threatening rather than lifesaving. Specially for the blood receivers may have the threat of transfusion transmitted infections (TTIs) because of transmitting virus, bacteria or parasitic, microorganisms through blood transfusion procedures. Specially hepatitis B and C virus, human immunodeficiency virus (HIV) and syphilis (Treponema pallidum) bear the risk of transmission by blood transfusion. For this reason, Hepatitis B surface antigen (HBsAg), anti- Hepatitis C Virus (HCV), anti- *human immunodeficiency virus* (HIV), syphilis antibody TPHA (Treponema pallidum haemagglutination) and MP (Malarial Parasite) are routinely controlled in all donated blood samples. ***Aim of the study*:** The aim of this study was to analyze the status of HBsAg, HCV, HIV, TPHA & MP test results among general blood donors. ***Methods*:** This was a comparative observational study which was conducted in the Department of Blood Transfusion Medicine, National Institute of Cancer Research and Hospital(NICRH), Mohakhali, Dhaka, Bangladesh during the period from January 2018 to December 2020. In total 14,625 general blood donors were enrolled as the study population. This study was approved by the ethical committee of the mentioned hospital. Proper written consents were taken from all the participants before starting data collection. A pre-designed questionnaire was used in patent data collection. All data were processed, analyzed and disseminated by MS Office and SPSS version 20 as per need. ***Result*:** In this study 70.5% blood donors were male and 29.5% were female. So male was dominating in number and the male vs female ratio was 2.39:1. The highest number of donors were from 18-30 years' age group which was 67.3%. Then 28.6% and 4.1% donors were from 31-34 years 41-50 years' age groups respectively Finally, in analyzing the positive laboratory findings among participants regarding HBsAg, HCV, HIV, TPHA & MP we found 134 positive cases among total 14,625 study people. So, the total positive cases were 0.917%. Among total blood donor, the highest positive cases were found with HBsAg which was 0.86% (n=126). Then 0.041% were with TPHA (n=6) and 0.014% were with HCV. But we found nil (0%) of HIV & MP (Malarial Parasite). ***Conclusion*:** Although, through blood transfusion there are very few possibilities of transfusion transmitted infections (For receivers) like HCV, HIV, TPHA & MP the chances of HBsAg infection is very high. So, healthcare professionals associated in blood transfusion should be more careful about confirming those tests for blood donners before receiving their blood for any receiver patient.

Keywords: HBsAg, HCV, HIV, TPHA, MP test, blood donors transfusion.

I. INTRODUCTION

Today blood transfusion is most frequently used of a life-saving therapeutic procedure in treatment arena. But in some times its becomes revers like life threatening rather than lifesaving. Specially for the blood receivers may have the threat of transfusion transmitted infections (TTIs) because of transmitting virus, bacteria or parasitic, microorganisms through blood transfusion procedures. Specially hepatitis B and C virus, human immunodeficiency virus (HIV) and syphilis (Treponema pallidum) bear the risk of transmission by blood transfusion. For this reason, Hepatitis B surface antigen (HBsAg), anti-HCV, abti-HIV, syphilis antibody TPHA (Treponema pallidum

haemagglutination) and MP (Malarial Parasite) are routinely controlled in all donated blood samples. Blood transfusion is the most commonly used life-saving therapeutic procedure in regular medication. However, some infectious complications may develop during blood transfusion procedure. In order to minimize this risk, it is important to be careful about donor selection criteria and conduction of screening tests against these 4 infectious agents in a donor blood [1]. The World Health Organization (WHO) recommends that all blood donations should be screened for selected infections prior to use and that screening should be mandatory for HBV, HCV, HIV and T. Pallidum [2]. As a part of national blood banking procedures, HBsAg, anti- HCV, anti-HIV½ and VDRL are analyzed in all donated blood samples [3]. Despite performance of these tests, transmission of viral infections is still hazardous in the early stage [window period] where the serological markers are negative [4]. HBsAg positivity in healthy individuals ranged between 2.4% and 9% and anti-HCV positivity ranged from 1% to 2.2% in our country depending on regions and time period [5]. The 2015 global prevalence of HBV infection in general population reported by WHO was 3.5% for about 257 million people. Global prevalence of HCV reported by WHO is 71 million people with HCV infection in the world accounting for 1% of the population [6]. It is estimated that 0.8% of adults between 15 and 45 years of age live with HIV globally. However, Sub-Saharan Africa is the most severely affected territory for HIV with almost 1 individual per 25 adults (4.2%) [7]. The global incidence of syphilis was 25.1 cases per 100.000 adults among 55 countries that were reported in the GAVDRL (Global Aids Response Progress Reports) in 2014 [8]. The main objective of this current study was to analyze the status of HBsAg, HCV and VDRL test results among general blood donors.

II. OBJECTIVES

The general objective of this study was to analyze the status of HBsAg, HCV, HIV, TPHA and MP test results among general blood donors.

III. METHODOLOGY & MATERIALS

This was a comparative observational study which was conducted in the Department of Blood Transfusion Medicine, National Institute of Cancer Research and Hospital, Mohakhali, Dhaka, Bangladesh during the period from January 2018 to December 2020. In total 14,625 general blood donors were enrolled as the study population. This study was approved by the ethical committee of the mentioned hospital. Proper written consents were taken from all the participants before starting data collection. This study included healthy male and female individuals between 18 and 50 years of age with a body weight of >50 kg. Minimum hemoglobin levels were accepted as 12.5 g/dl in females and 13.5 g/dl in males. The gender and age range of donors were analyzed. HBsAg, HCV, HIV, TPHA & MP tests were performed on serum samples obtained from donors through microparticle-enzyme immunoassay (EIA) method. TPHA tests were used for syphilis screening. Samples with positive test results were re-tested by the same method; same equipment and same serum samples were utilized for repetitive reactivity. Repetitive reagent samples were considered positive. Seropositive samples for HCV were referred to the laboratory of the mentioned hospital for validation test. A pre-designed questionnaire was used in patent data collection. All data were processed, analyzed and disseminated by MS Office and SPSS version 20 as per need.

IV. RESULT

In this current study in total 14,625 general blood donors were enrolled as the study population. In total 5424, 5200 and 4001 participants were enrolled in the year 2018, 2019 and 2020 respectively. This study included healthy male and female individuals between 18 and 50 years of age with a body weight of >50 kg. In analyzing the ages of the participants of this study we observed among total 14,625 participants the highest number were from 18-30 years' age group which was 64.36%. Besides this, 31.52% participants were from 31-40 years' age group and the rest 4.12% were from 41-50 years' age group. On the other hand, in analyzing the gender of the participants we observed, majority of the participants were male which was 75% (n=11013), then the rest 25% (n=3612) were female. So, in this study male blood donors were dominating in number and the male vs female ratio was 3:1. Finally, in analyzing the positive laboratory findings among participants regarding HBsAg, HCV, HIV, TPHA & MP we found 134 positive cases among total 14,625 study people. So, the total positive cases were 0.917%. Among total blood donor, the highest positive cases were found with HBsAg which was 0.86% (n=126). Then 0.041% were with TPHA (n=6) and 0.014% were with HCV. But we found HIV & MP Nil (0%) among the donors.

Table I: Age distribution of participants (N=14625)

Age	n	%
18-30 Years	9412	64.36
31-40 Years	4610	31.52
41-50 Years	603	4.12
Base	14625	100.0

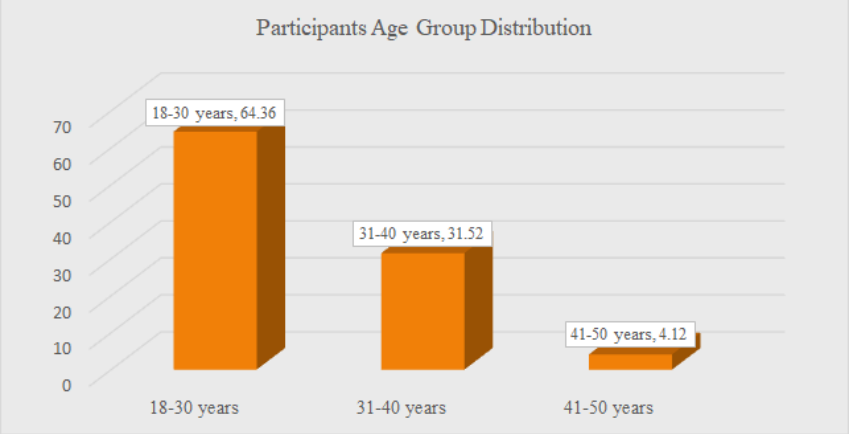

Figure I: Participants Age Group Distribution (N=14625)

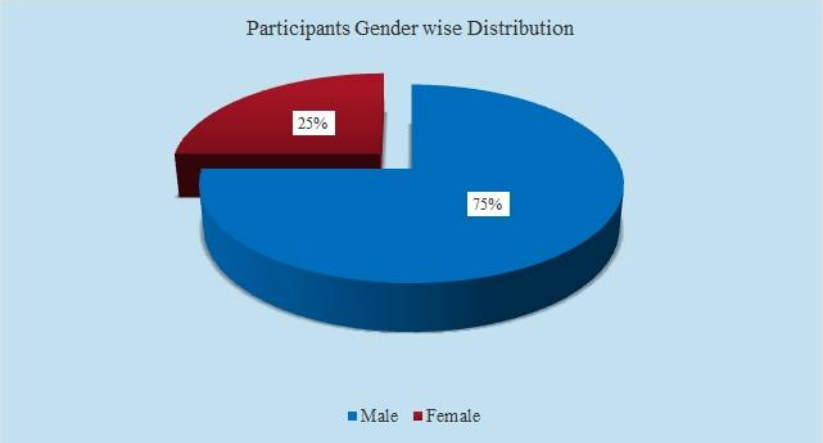

Figure II: Participants Gender Wise Distribution (N=14625)

Table II: Positive laboratory findings among participants (N=14625)

Findings	n	%
HBsAg	126	0.862
TPHA	6	0.041
HCV	2	0.014
HIV	0	0.0
MP	0	0.0
Base	14625	0.917

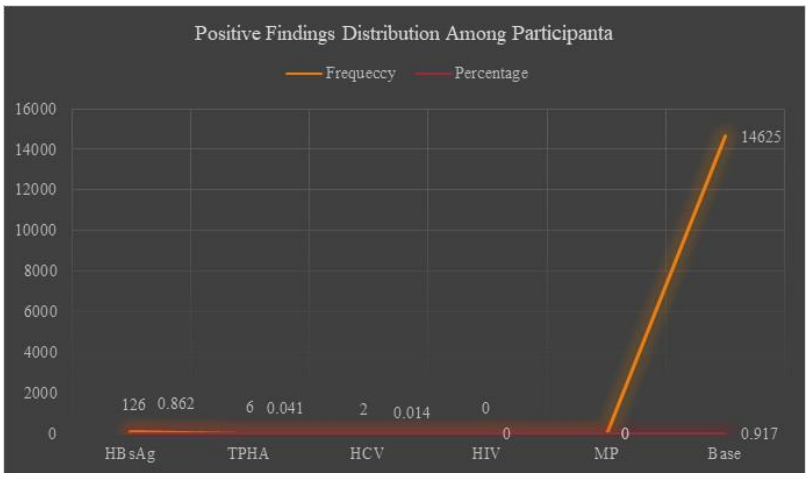

Figure III: Positive Findings Distribution among Participants (N=14625)

V. DISCUSSION

This comparative observational was conduct on 14,625 general blood donors during the period from 2018 to 2020. The aim of this study was to analyze the status of HBsAg, HCV, HIV, TPHA & MP test results among general blood donors. In analyzing the gender of the participants of our study we observed, majority of the participants were male which was 75% (n=11013), then the rest 25% (n=3612) were female. So, in this study male blood donors were dominating in number and the male-female ratio was 3:1. These findings are comparable with other studies of different countries and our country. In general, number of male donors is much more than females in Africa, Asian and Middle East countries [9]. In analyzing the ages of the participants of this study we observed among total 14,625 participants the highest number were from 18-30 years' age group which was 64.36%. Besides this, 31.52% participants were from 31-40 years' age group and the rest 4.12% were from 41-50 years' age group. We divided donor candidates into three different age groups. Such age groups were 18-30, 31-40 and 41-50 years. HBsAg positivity was the least in 18-30 years' age group. The positivity rate at that age range was significantly lower than other age groups. Turan *et al*., from Turkey detected no difference in HBsAg detection probability between the age groups [10]; however, Noubiap *et al*., from Cameron found that HBsAg detection probability was higher in younger age groups [9]. In the study of Kader *et al*., from Turkey, the average for HBsAg positivity was 31.3 [3]. Niazi *et al*., from Pakistan found positivity rate in the 18-30 age group similar to our study [11]. In our study, in analyzing the positive laboratory findings among participants regarding HBsAg, HCV, HIV, TPHA & MP we found 134 positive cases among total 14,625 study people. So, the total positive cases were 0.917%. Among total blood donor, the highest positive cases were found with HBsAg which was 0.86% (n=126). Then 0.041% were with TPHA (n=6) and 0.014% were with HCV. Rate of HBV infection is 0.3-1.7% in post transfusion hepatitis [12]. HBsAg positivity rates in blood donors are found 0.06% in USA [13], 0.7-2.2% in India [14], and 0.2% in Mexico. The 2015 global prevalence of HCV reported by WHO was 71 million people with HCV infection in the world, accounting for 1% of the population [6]. Positivity rate in different regions of India vary between 0.23% and 1.02% [14]; the positivity rate in China [15] and European region [6] were 1.43% and 1.5%, respectively. There are different rates of positive VDRL test ranging among blood donors in our country. The variation in the rates appears due to geographical differences, methodological differences, differences of kits, and confirmations by TPHA in some studies. The incidence of syphilis is more in Sub-Saharan regions than that of other regions of the world. However, different prevalence results are reported in aforementioned region. This is connected with methodological differences [16].

VI. LIMITATIONS OF THE STUDY

This was a single centered study with a small sized sample. So, the findings of this study may not reflect the exact scenario of the whole country.

VII. CONCLUSION AND RECOMMENDATIONS

Although, through blood transfusion there are very few possibilities of transfusion transmitted infections (For receivers) like HCV, HIV, TPHA & MP the chances of HBsAg infection is very high. So, healthcare professionals associated in blood transfusion should be more careful about confirming those tests for blood donners before receiving their blood for any receiver patient. For getting more reliable information we would like to recommend for conducting more studies in several places with larger sized samples.

REFERENCES

1. World Health Organization. Global Health Observatory HIV/AIDS. http://www.who.int/gho/hiv/en. Accessed 20 May 2016.
2. World Health Organization. Blood safety and availability. http://www.who.int/mediacentre/factssheets/fs279/en. Accessed 20 May 2016.
3. Kader, C., Erbay, A., Biringel, S., & Gurbu, Z. M. (2010). Seroprevalance of hepatitis B virus, hepatitis C virus, human immunodeficiency virus infections and syphilis in blood donors. *Klimik J*, 23(3), 95–99.
4. Uzun, B., Güngör, S., & Demirci, M. (2013). Seroprevalence of transfusion transmissible infections among blood donors in western part of Turkey: a six-year study. *Transfusion and Apheresis Science*, *49*(3), 511-515.
5. Akcam, F. Z., Uskun, E., Avsar, K., & Songur, Y. (2009). Hepatitis B virus and hepatitis C virus seroprevalence in rural areas of the southwestern region of Turkey. *International Journal of Infectious Diseases*, *13*(2), 274-284.
6. World Health Organization (WHO). Global hepatitis report 2017 Geneva: World Health Organization. P.2017.
7. World Health Organization (WHO). Global Health Observatory (GHO) data HIV/AIDS. Available at http://www.who.int/gho/en./Accessed 11 April 2018.
8. World Health Organization (WHO). Report on global sexually transmitted infection surveillance 2015. Geneva: World Health Orginization. P. 2015.
9. Nansseu, J. R., Mbogning, D. M., Monamele, G. C., Tamoh, S. F., Gonsu, H. K., Kouanfack, C., ... & Sando, Z. (2017). Sero-epidemiology of human immunodeficiency virus, hepatitis B virus and hepatitis C virus: a cross-sectional survey in a rural

setting of the West region of Cameroon. *The Pan African Medical Journal*, *28*.

10. Turan, H., Serefhanoglu, K., Kanat-Unler, G., & Arslan, H. (2011). Seroprevalance of HBsAg and Anti-HCV and Their Correlation to Age and Gender in Blood Donors in the Province of Konya. *Klimik Dergisi/Klimik J*, *24*(1), 36-9.
11. Niazi, S. U. K., Mahmood, A., Alam, M., & Ghani, E. (2016). Transfusion transmissible infections in blood donors from northern Pakistan: Three years' experience (2010–2012). XIIth Annual conference of Asian association of transfusion medicine [AATM], 2–6 April 2016, Antalya/Turkey. Abstract book p368-369.
12. Temiz, H., & Gul, K. (2008). The evaluation of HBsAg, anti-HCV, anti-HIV and VDRL test results in blood donors. *Turkish J Infect*, *22*(2), 79-82.
13. Sheikh, M. Y., Atla, P. R., Ameer, A., Sadiq, H., & Sadler, P. C. (2013). Seroprevalence of hepatitis B and C infections among healthy volunteer blood donors in the central California valley. *Gut and Liver*, *7*(1), 66-73.
14. Chandekar, S. A., Amonkar, G. P., Desai, H. M., Valvi, N., & Puranik, G. V. (2017). Seroprevalence of transfusion transmitted infections in healthy blood donors: A 5-year Tertiary Care Hospital experience. *Journal of laboratory physicians*, *9*(4), 283.
15. Cao, W. W., Zhou, R. R., Ou, X., Shi, L. X., Xiao, C. Q., Chen, T. Y., ... & Li, N. (2018). Prevalence of hepatitis B virus, hepatitis C virus, human immunodeficiency virus and Treponema pallidum infections in hospitalized patients before transfusion in Xiangya hospital Central South University, China from 2011 to 2016. *BMC infectious diseases*, *18*(1), 1-7.
16. Okoroiwu, H. U., Okafor, I. M., Asemota, E. A., & Okpokam, D. C. (2018). Seroprevalence of transfusion-transmissible infections (HBV, HCV, syphilis and HIV) among prospective blood donors in a tertiary health care facility in Calabar, Nigeria; an eleven years evaluation. *BMC public health*, *18*(1), 1-8.