EUROPEAN ACADEMIC RESEARCH
Vol. IV, Issue 3/ June 2016

Impact Factor: 3.4546 (UIF)
DRJI Value: 5.9 (B+)

ISSN 2286-4822
www.euacademic.org

Sero-prevalence of Transfusion Transmissible Infections among Blood Donors in Khartoum Central Sudan

NMARIQ OSMAN ALI AHMED
M.Sc. Student
Faculty of Medical Laboratory Sciences
Khartoum University, Sudan
EIMAN DIRAR OMER
M.Sc. Student
Faculty of Medical Laboratory Sciences
Khartoum University, Sudan
MUSA ABDALLA ALI MOHAMMED
M.Sc. in Clinical Microbiology of Medical Laboratory Sciences
Sudan University of Sciences and Technology, Sudan

Abstract:

Background: *The high prevalence of some transfusion transmitted infections TTIs such as HIV (human immunodeficiency virus), HBV (hepatitis B virus), HCV (hepatitis C virus) and syphilis in sub-Saharan Africa affects blood transfusion safety for the recipients.*

Objective: *The aim of this study was to detect the sero-prevalence of TTIs among blood donors attended Khartoum Teaching Hospital blood bank during year of 2015.*

Methods: *we reviewed data of 2015 from registration records of blood donors at the blood bank of Khartoum Teaching Hospital in Khartoum Sudan.*

Results: *of the all 11175 donors; 636 (5.6%) tested positive for one of the TTIs thus necessitates discarding the infected blood unit. The prevalence of HIV, HBV, HCV and syphilis were 0.4%, 6.0%, 0.2%*

and 5.4% respectively 0.6% had serological evidence of multiple infections.

Conclusion: *The study showed that the sero-prevalence of HBV was high, HIV and HCV were low in the community local to Khartoum Teaching Hospital, the situation need a strict criteria for blood donors selection and the laboratory assay methods for detection of infectious agents must be improved.*

Key words: blood donors, transfusion transmissible infections, Sudan.

INTRODUCTION

Blood and its components are lifesaving but they are also associated with life threatening infections such as transfusion transmissible infections. A TTI is any infection that transmissible from person to person through parenteral administration of blood or blood products. Examples of known TTI include: hepatitis A, B, C, D and G. HIV, HTLV I and II, west Nile virus, syphilis, cytomegalovirus, and malaria [1]. Unsafe blood remains a major threat for the global spread of TTI .hepatitis B virus, hepatitis C virus, human immunodeficiency virus and syphilis are the most infections that can be transmitted during blood transfusion, complication associated with TTI include long term mortality and morbidity, hidden states and delayed viremia; these makes TTI an important issue in transfusion medicine [2]. More than 80 million units of blood are collected worldwide every year [2]. Each transfusion carries a risk of transmitting blood borne pathogens so that the WHO recommended to screen all donated blood at least for HBV, HCV, HIV and syphilis [4], in sub Saharan Africa, these infections are frequent among the general population and the blood donors [5]. Due to the high incidence of malnutrition and endimicity of infections causing

anemia, surgical obstetric emergencies associated with blood loss in developing countries so the needs of blood transfusion services are increased [6] According to the WHO safe blood is a universal right, which means that blood has been fully screened and is not contaminated by any blood borne diseases and it will not cause any harm to the recipient, The prevalence estimating of TTI antigens or antibodies among blood donors can provide important data that can be used in formulating the strategies for improving the management of a safe blood supply and reveal the problem of unnoticeable infections in healthy looking members of the general population and also it can give us a guide to the magnitude of some sexually transmitted infections in the community [3,5,6,]. Implementation of more sensitive tests that detect infection earlier decreases risks of transfusion transmitted viral infection in developing countries [7].

MATERIALS AND METHODS

This was a retrospective analysis of blood donors records covering the year of 2015 at the capital central blood bank in Khartoum Teaching Hospital. Sudan, the first step in the blood bank for the potential donors is taking past medical history and to do physical examinations by a trained doctor. Donors are required to answer panel of questions on socio-demographic data, previous illnesses, and chronic diseases, history of blood transfusion and history of jaundice. Those who are apparently healthy, their age rang between 18-60 years and their weights above 45Kg are qualified for donation. Five ml of blood were drawn from each donor, sera were separated, and tested for HIV, HBV, HCV and syphilis, using ELISA test (Fortress-diagnostics limited, manufactured in the UK). The data were entered in computer using SPSS software for multiple logistic regressions. The analysis was performed to assess the statistical significance of the sero-prevalence of TTI among the

donors over the study period. P value <0.05 was considered statistically significant. Total of all 11175 donors were males belonging to those who attended Khartoum Teaching Hospital over the year. Average age of donors was 35 years.

RESULTS

A total of 11175 voluntary blood donors screened at Khartoum Teaching Hospital their age ranged between 18-60 years, over all sero-prevalence of HIV, HBV, HCV and syphilis was 0.4% (45/11175), 6.0% (667/11175), 0.2% (25/11175) and 5.4% (600/11175) respectively, of all the donors 0.6% (65/11175) had multiple infections. HBV-syphilis was the most common combination 5.1% followed by HBV-HIV 0.4% HIV-syphilis also 0.4%, HCV-syphilis 0.2% and HIV-HCV 0.1%.

Table (1)
Frequency of HIV

HIV	**Frequency**	**Percent**
+ve	45	0.4%
-ve	11130	99.6%
Total	11175	100.0%

Table (2)
Frequency of HBV

HBV	**Frequency**	**Percent**
+ve	667	6.0%
-ve	10508	94.0%
Total	11175	100.0%

Table (3)
Frequency of HCV

HCV	**Frequency**	**Percent**
+ve	25	0.2%
-ve	11150	99.8%
Total	11175	100.0%

Table (4)
Frequency of Syphilis

Syphilis	**Frequency**	**Percent**
+ve	600	5.4%
-ve	10575	94.6%
Total	11175	100.0%

Table (5)
HIV * HBV Correlation

HIV	**HBV**		**Total**
	+ve	-ve	
+ve	44 (0.4%)	1 (0.0%)	45 (0.4%)
-ve	623 (5.6%)	10507 (94.0%)	11130 (99.6%)
Total	667 (6.0%)	10508 (94.0%)	11175 (100.0%)
Chi-Square	678.55		
P-Value	0.000		

Table (6)
HIV * HCV Correlation

HIV	**HCV**		**Total**
	+ve	-ve	
+ve	16 (0. 1%)	29 (0.3%)	45 (0.4%)
-ve	9 (0.1%)	11121 (99.5%)	11130 (99.6%)
Total	25 (0.2%)	11150 (99.8%)	11175 (100.0%)
Chi-Square	2526.83		
P-Value	0.000		

Table (7)
HIV * Syphilis Correlation

HIV	**syphilis**		**Total**
	+ve	-ve	
+ve	43 (0.4%)	2 (0.0%)	45 (0.4%)
-ve	557 (5.0%)	10573 (94.6%)	11130 (99.6%)
Total	600 (5.4%)	10575 (94.6%)	11175 (100.0%)
Chi-Square	723.28		
P-Value	0.000		

Table (8)
HBV * HCV Correlation

HBV	HCV		Total
	+ve	-ve	
+ve	25 (0.2%)	642 (5.7%)	667 (6.0%)
-ve	0 (0.0%)	10508 (94.0%)	10508 (94.0%)
Total	25 (0.2%)	11150 (99.8%)	11175 (100.0%)
Chi-Square	394.73		
P-Value	0.000		

Table (9)
HBV * Syphilis Correlation

HBV	Syphilis		Total
	+ve	-ve	
+ve	567 (5.1%)	100 (0.9%)	667 (6.0%)
-ve	33 (0.3%)	10475 (93.7%)	10508 (94.0%)
Total	600 (5.4%)	10575 (94.6%)	11175 (100.0%)
Chi-Square	8854.44		
P-Value	0.000		

Table (10)
HCV * Syphilis Correlation

HCV	syphilis		Total
	+ve	-ve	
+ve	25 (0.2%)	0 (0.0%)	25 (0.2%)
-ve	575 (5.1%)	10575 (94.6%)	11150 (99.8%)
Total	600 (5.4%)	10575 (94.6%)	11175 (100.0%)
Chi-Square	441.61		
P-Value	0.000		

DISCUSSION

In this study the overall prevalence TTI among blood donors in Khartoum Teaching Hospital blood bank over 2015 was 636/11175 (5.6%), this was higher than finding in Kassala, eastern Sudan by Abdalla and Ali 3% [8], 3.8% found in neighboring Eritrea [9], in Brune Darussalam was 1.49% [10]. Our finding was lower when compared to a study done by Tessema et al 9.5% [11], Manzoor et al 9.9%[4], other study

done by Baye et al which was 6.2% [12] and study done in Islamabad by Waheed et al was 14.34% [13] and study in northwest Ethiopia was 43.2% [14], Nwankwo et al in Nigeria 19..3% [15]. The reason for the relatively lower rate of seroprevalence of TTI in our study when compared with the other studies may be due to the different magnitude of risk factors that contrasting transfusion transmitted infections and may be also different screening techniques used.

Hepatitis B is one of the most infectious diseases; around 2 billion were infected worldwide but it is hyper endemic in sub-Saharan Africa and Asia [9]. In our study the prevalence rate of HBV was 6%, this figure is comparable with study done in northwest Ethiopia by Anagawa et al 6% [16], but our finding is higher than studies conducted in northern and central sudan 5.1% and 5.6% respectively [17,18], also higher than neighboring Eritrea 4% [9], at Gondar University Teaching Hospital 4.7% [11], However our finding is lower when compred to southern Sudan study which was 26% [19] and 10% found by Elfaki et al in west Sudan [6], study done by Dessi et al 25% [14], Taye et al [20], and study in southwest Nigeria 18.6% [21], also in Amhara state in Ethiopia 6.2% [12].
170 million people are estimated to be infected with HCV worldwide [22]. In our study the prevalence of rate of HCV was 0.2%, this is low when compared to the eastern Sudan study which was 3.1 [8], Tessema et al 0.7% [11], Baye et al 1.7% [12], Dessi et al 13.3% [14], Wasfi and Sadek among Egyptian donors 3.5% [23], and Yohannas Zeneb et al 0.6% among pregnant women [24], Taye et al 3.6% [20]. Our finding is higher than Elfaki et al study found no cases of HCV infection at Elobied Teaching Hospital [6], also Rishi Diwan and manu Mathur found no cases of HCV infection among voluntary donors [25].
The low prevalence of HCV when compared with HBV may be due to the less infectivity of HCV and it is mainly transmitted through transfusion of blood or blood products.

The prevalence of HIV in this study is 0.4% which is lower when compared with 3% found by Tajeldin et al [8], 3.8% in Ghana [26], and 10.6% in Nigeria [27], also lower than 5.5% found in Maiduguri [28], and 1% showed by study done at Nyala Hospital in western Sudan [29].But higher than study from Egypt in which it was no cases reported [30].

Syphilis is sexually transmitted disease that represents a major public health problem, spreading worldwide specially in developing countries. The prevalence of syphilis in this study was 5.4%, this study is in agreement with values ranging between (1.1% - 12.4%) reported from different African countries [31], but it was higher than 2.7% showed by study done in eastern Sudan [8], and 3.6% found by Chikwemet et al in Nigeria [32], and 0.1% in south Nigeria [33], 0.85% found by Gupta et al [34], and lower if compared with 23% study done by Elagib and Abalmagid in south western Sudan [35], and 15% found bey Elfaki et al [6], at whit Nile state, Sudan study showed 6.8% by Elsharif at al [36], and 12.8% was a survey in blood donors Ethiopia [37], 12% by Muttee et al among Tanzanian donors [38], 7.5% by Adjetet et al [39]. The most rate of co-infection in this study is BBV and syphilis 5.1%.

CONCLUSION

The study results showed high prevalence rate of HIV, HBV, HCV and syphilis infections among blood donors thus selection of blood donors should be strict and using comprehensive screening is highly recommended to insure safety of blood to the recipients and the community, also good documentation of blood donors information is technically important specially during data collection.

Acknowledgment

We would like to thank the laboratory technicians in the blood bank at Khartoum Teaching Hospital for their help in the data collection and I really would like to thank Elham Dirar Omer for her help in the data analysis.

REFERENCES

1. BC Center for disease Control, Communicable Disease Control Transfusion Transmissible Infection July 2004 Page 1 .
2. Saghir SAM, Al–Hassan FM,Alsalahi OSA,Alhariry AEA,BaqirHS. Frequencies of HBV, HCV, HIV, and Syphilis Markers among Blood Donors: A Hospital-Based Study in Hodeidah, Yemen. Trop J Pharm Res.2012; 11 (1): 132_136.
3. World Health Organization. Universal access to safe blood transfusion.Geneva:World Health Organization;2008.
4. Manzoor I, Hashmi N, Ajmal SD, Fatima H, Rasheed Z,Syed S. Seroprevalence ofTransfusion Transmissible Infections (TTIS) in Blood Donors.Biomedica. 2009; 25(10):154 –158.
5. Ymele FF, Keugoung B,Fouedjio JF,Kouam N, Mendibi S,and Mabou JD.High Rates of Hepatitis B and C and HIV Infections among Blood Donors in Cameroon: A Proposed Blood Screening Algorithm for Blood Donors in Resource-Limited Settings. Journal of Blood Transfusion. 2012: 1-7
6. Elfaki AMH, Eldour AAA, and Elsheikh NMH. Sero-prevalence of immunodeficiency virus, hepatitis B and C and syphilis amongblood donors at ElObeid Teaching Hospital, West Sudan. Sudan JMS.2008; 3(4):333-338.
7. Glynn SA, kleinman SH, Schreiber GBet al. Trend in incidence and prevalence of transfusion-associated viral infection in US blood donors 1991 to 1996. JAMA 2000; 229-235.

8. Abdallah TM, Ali AAA. Sero-prevalence of transfusion-transmissible infectious diseases among blood donors in Kassala, eastern Sudan. J Med Med Sci. 2012;3(4):260–262.
9. Fessehaye N, Naik D, Fessehaye T. Transfusion transmitted infections—a retrospective analysis from the National Blood Transfusion Service in Eritrea. Pan Afr Med J. 2011;9:40–46.
10. Teo KS, Saparudin MS, Zain Z, Morshidi MA, Metassan N, Jaberudin R, Teo BC, Yakup S, Lim A, Ashikin NW. Transfusion transmissible infections in Brunei Darussalam: a blood donor study. Brunei Int Med J. 2011;7(6):321–327.
11. Tessema B, Yismaw G, Kassu A, Amsalu A, Andargachew M, Emmrich F. Seroprevalence of HIV, HBV, HCV and syphilis infections among blood donors at Gondar University Teaching Hospital, Northwest Ethiopia: declining trends over a period of 5 years. BMC Infect Dis. 2010;10:1
12. Gelaw B, Mengistu Y. The prevalence of HBV, HCV and malaria parasites among blood donors in Amhara and Tigray regional states. Ethiop J Health Dev. 2007;22(1):3–7.
13. Waheed U, Khan H, Satti HS, Ansari MA, Malik MA, Zaheer HA. Prevalence of transfusion transmitted infections among blood donors of a teaching hospital in Islamabad. Ann Pak Inst Med Sci. 2012;8(4):236–239.
14. Dessie A, Abera B, Wale F. Seroprevalence of major blood-borne infections among blood donors at Felege Hiwot referral hospital, Northwest Ethiopia. Ethiop J Health Dev. 2007;21(1):68–69.
15. Nwankwo E, Mamodu I, Umar I, Musa B, Adeleke S. Seroprevalence of major blood-borne infections among blood donors in Kano, Nigeria. Turk J Med Sci. 2012;42(2):337–341.
16. Anagaw B, Shiferaw Y, Anagaw B, Belyhun Y, Erku W, Biadgelegn F, et al. Seroprevalence of hepatitis B and C viruses among medical waste handlers at Gondar town Health institutions, Northwest Ethiopia. BMC Res Notes. 2012;5:55.

17. Nagi AM, Altyeb HA, Ahmed AM:Seroprevalence of Hepatitis B and C Viral Infections among blood donors in Shendi, River Nile State, Sudan.Research Journal of Medicine and Medical Sciences2007,2(2):122-126.
18. Elsheikh RM, Daak AA, Elsheikh MA, Karsany MS, Adam I:Hepatitis B virus and hepatitis C virus in pregnant Sudanese women.Virology Journal2007,4:104.
19. McCarthy MC, El- Tigani A, Khalid IO, Hyams KC:Hepatitis B and C in Juba, southern Sudan: results of a serosurvey.Transactions of Royal Society of Tropical Medicine and Hygiene1994,88:534 536.
20. Taye S, Abdulkerim A, Hussen M. Prevalence of hepatitis B and C virus infections among patients with chronic hepatitis at Bereka Medical Center, Southeast Ethiopia: a retrospective study. BMC Res Notes. 2014;7:272.
21. Buser FI, Muhibi MA, Jeremiah ZA. Sero-epidemiology of transfusion-transmissible infectious diseases among blood donors in Osogbo, south-west Nigeria. Blood Transfus. 2009;7:293–299.
22. Lauer GM, W alker BD (2001). Hepatitis C virus infection. N Engl. J. Med. 345: 41-52.
23. Wasfi OASSN. Prevalence of hepatitis B surface antigen and hepatitis C virus antibodies among blood donors in Alexandria, Egypt. East Mediterr Health J. 2011;17(3):238–242.
24. Zenebe Y, Mulu W, Yimer M, Abera B. Sero-prevalence and risk factors of hepatitis C virus infection among pregnant women in Bahir Dar city, Northwest Ethiopia: cross sectional study. Pan Afr Med J. 2015;21:158.
25. Diwan R, Mathur M. Incidence and pattern of transfusion transmitted infection in voluntary donors in a teaching hospital "a four year retrospective study" J Pharm Biomed Sci. 2012;22:01.

26. Ampofo W , Nii-Trebi N, Ansah J, Abe K, Naito H, Aidoo S, Nuvor V, Brandful J, Yamamoto N, Ofori-Adjei D, Ishikawa K (2002). Prevalence of Blood borne infectious Diseases in blood donors in Ghana. J. Clin. Microbiol. (40):35235.
27. Amadi AN, Mba LE (2001). Distribution of HIV infection in Abia State, Nigeria. Niger. J. Med. Invest. Pract. (2): 38-40.
28. Baba MM, Hassan AW , Gashau W (2000). Prevalence of hepatitis B antigenaemia and human immunodeficiency virus in blood donors in Maiduguri, Nigeria. Niger. J. Med.(9):10-12.
29. Abu M, Eltahir Y, Ali A (2009). Seroprevalence of Hepatitis B virus and Hepatitis C virus among blood donors in Nyala, South Darfur, sudan. Virol. J. (6):146.
30. Nada HA, Atwa M. Seroprevalence of HBV, HCV, HIV and syphilis markers among blood donors at Suez Canal University Hospital Blood Bank. Blood Disord Transfus. 2013;5:177.
31. Buser FI, Muhibi MA, Jeremiah ZA. Sero-epidemiology of transfusion-transmissible infectious diseases among blood donors in Osogbo, south-west Nigeria. Blood Transfus. 2009;7:293–299.
32. Chikwem,J.O., Mohammed, I., Okara, G.C., Ukwandu, N.C.,Ola, T.O. 1997. Prevalence of transmissible blood infections among blood donors at the University of Maiduguri TeachingHospital, Maiduguri, Nigeria. East Afr. Med. J.,74(4):213–216.
33. Ejele,O.A., Erhabor, O., Nwauche, C.A. 2005. The risk of transfusion-transmissible viral infections in the Niger-Delta area of Nigeria. Sahel Med. J.,8(1):16–19.
34. Gupta, N., Kumar, V., Kaur, A. 2004. Seroprevalence of HIV, HBV, HCV, and syphilis in voluntary blood donors. Indian J. Med. Sci., 58(6): 255–256.
35. Elagib A. Atif, Abdelmagid A. Magzoub, (2010): Seroprevalence of Syphilis among Blood Donors in South Western Sudan, Nigerian journal of surgical research, 7(3&4) 290-292.

36. Elsharif et al (2015),Sero-Prevalence of HIV and Syphilis Infections among Blood Donors at Kosti Teaching Hospital-White Nile State-Sudan, International Journal of Current Microbiology and Applied Sciences ISSN: 2319-7706 Volume 4 Number 11 (2015) pp. 832-837.

37. Rahlenbeck, SI, Yohhanes, G., Molla, K., Reifen, R.and Assefa, A. (1997): Infection with HIV, syphilis and HBV in Ethiopia: a survey in blood donors. Int. J. STD / AIDS, from 8.261 to 246.

38. Matee, M.I., Lyamuya, E.F., Mbena, E.C., Magessa, P.M., Sufi, J., Marwa, G.J., et al. 1999. Prevalence of transfusion-associated viral infections and syphilis among blood donors in Muhimbili Medical Centre, Dar es Salaam, Tanzania. East Afr. Med. J., 76(3): 167–71.

39. Adjei, A.A., Kudzi, W., Armah, H., Adiku, T. 2003. Prevalence of antibodies to syphilis among blood donors in Accra, Ghana. Jpn. J. Infect. Dis., 56: 165–167.