DOI:10.5958/j.2319-5886.2.4.130

International Journal of Medical Research & Health Sciences

www.ijmrhs.com Volume 2 Issue 4 Oct-Dec Coden: IJMRHS Copyright @2013 ISSN: 2319-5886

Received: 13th Aug 2013 Revised: 5th Sep 2013 Accepted: 15th Sep 2013

Research article

SEROPREVALENCEOF HBV, HCV AND HIV INFECTIVITY AMONG BLOOD DONORS IN IBN SINA TEACHING HOSPITAL IN SIRT REGION OF LIBYA

Ismail Mahmud Ali[1], *Amirthalingam R[2]

[1]Hospital Director, Head, Assistant Professor, Department of Surgery, [2]Specialist, Department of Molecular biology, Ibn Sina Teaching Hospital, Sirt University, Libya. P.O.Box 705.

*Corresponding author email:amrith2002@rediffmail.com

ABSTRACT

Background &Aim: Numerous infectious diseases are spread by blood transfusion, particularly viral infections. The hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) and other pathogenic organisms are transmitted through inappropriate screening of blood product. These infected blood products are causing fatal, persistent and life frightening disorders. The predominance of these viruses differs by ethnic group and geography. Scheme of the current study was to statistical estimation of the incidence of HBV, HCV and HIV along with blood donors. **Materials & Methods:** The existing review was approved in Ibn Sina Teaching Hospital, Sirt Region of Libya. A total of 16,929donors were analyzed by enzyme immune assay (EIA) kits from TaytecInc, Canada, for the predominance of human immunodeficiency virus, hepatitis B and C virus, over a period of 17 months from January2012 to May 2013.**Results:** Among the blood donors, 81.40% were unpaid donors and 18.60% were alternative donors. The total incidence in blood donors was 3.18%. The seroprevalence of hepatitis B was uppermost (1.98%) followed by hepatitis C (1.20%) and seroprevalence of HIV was nil among unpaid and surrogate donors. **Conclusion:** Present study was emphasized the prevalence rates of HBV and HCV between charitable and alternative blood donors and the HIVwas not detected in the current study.The prevalence rate was more in male among the blood donors.

Keywords: Human immunodeficiency virus, Hepatitis B&C virus, Seroprevalence, Blood donors

INTRODUCTION

Blood transfusion is the transfer of blood and its components such as red blood cells, platelets, and plasma from donor to recipient. Donation of the blood saves the life of millions of people universally, and it is essential to the helpfulness of the health system by supporting current medicine as its key role in patient contribution [1-2].Today, the medical and surgical procedure like organ transplantations, heart surgery, trauma, cancer and hematologic condition such as severe anemia, leukemia, sickle cell disease, and others health emergency depends extremely on blood

transfusions worldwide. Hence, in developing countries, blood transfusion-transmitted infections (TTIs) frequently terrorize the defense of patients demanding blood transfusion, and healthcare facility supplier faces serious challenges with blood availability and protection because of an improper facility. It is estimated about 45% of 80 million blood donations through the world are collected every year in rising nation that included almost 80% of the world's population[3-4.]

In universal healthcare service provider, the blood safety studies have integrated procedure for clinical laboratory screening of HIV1&2; human T-lymphotropic virus 1&2(HTLV); hepatitis B&C virus; West Nile virus, cytomegalovirus; human herpes virus 8, parvovirus B19, malaria; Creutzfeldt-Jakob disease, influenza, chikungunya; dengue, trypanosomacruzi and other viruses. Furthermore, the very important subject that making difficulties of transfusion because of bacterial contamination of platelets in blood products[5].This screening protocol might be differing from country to country and depend on epidemiological condition. In addition to infectious diseases threat, clinicians should also supervise other risk, such as post blood transfusion reactions. These include transfusion-related lung injury (TRALI); transfusion associated circulatory overload (TACO), and transfusion-related immune modulation (TRIM), post transfusion iron overload and graft versus host diseases (GVHD) [6].

The blood transfusion department contains clinical methods and guidelines for screening of blood before transfusion. If the screening procedure and other regulation are not followed well there is possibility to carry the risk of spreading blood transfusion contagious pathogens like HIV, HBV, HCV, Bacteria (syphilis) and others[7]. Also, there is a 1% of chance of transfusion related infection in each unit of blood even if the procedure followed well[8].Therefore, the risk of blood transfusion-transmitted infection today is minimized than constantly, the delivery of safe blood products stays behind inquiry to infection with accepted and until now to be predictable human pathogens[9].

To supply of safety blood product for transfusion, it's compulsory to introduce an advanced technology like a nucleic acid test (NAT) because of an excellent clinical sensitivity and good specificity to detect infected blood components as it identified pathogens prior in the 'window period' than enzymes immune assay[10]. Even though, it has some margin in blood components with lesser range of viremia, which can even free quantifiable by NAT[11]. Even with this margin, the grouping of both enzymes immune assay and NAT has notably condensed the hazard of pathogen spread during transfusion [12-13].Also many scientific research data showed that the comparison between p24 antigen detection or conventional serological testing, it is estimated that the use of NAT reduces the detection time from 22 to 11 days for HIV; from 70 to 10 days for HCV and from 60 to 30 days for HBV infection. Final outcome of this, the prevalence risk for HIV is between 0.14-1.1 and for HCV between 0.10-2.33 per million units' transfused[13-14.]The greater risk of HBV spread through blood transfusion differ between the countries. The HBV infection through blood transfusion differs among 0.75 per million blood donations in Australia, 3.6-8.5 in the USA and Canada.0.91-8.7, also from North region 7.5-13.9 in the Southern region of Europe; up to 200 per million blood contributions in Hong Kong, mostly reflecting the universal epidemiology[15].

The objective of this study is to statistical estimations of those pathogenic viruses such as HBV, HCV and HIV in well blood contributor. Hence, it needs to authenticate how well we are responsibility in clinical laboratory and proficiently in work with medical ethics. This statistic may possibly assist in creating the state health plan to advance improve the background and method to instruct the public concerning the

subject matter of these burdens therefore to reduce the incidence of illness and death formed by these viral pathogens through blood transfusion.

MATERIALS AND METHODS

Study Population: In the present study were incorporated 16,929 blood donors (99% of male). All the donors have been screened with medical consultant before donation, who attended as voluntary and replacement in blood transfusion department at Ibn Sina Teaching Hospital, a tertiary care hospital Sirt region of Libya during the period of January 2012 to May 2013.The ethics committee and an internal appraisal panel of the organization approved the procedure. Informed consent obtained from individual patients.

Sample Collection: Five milliliters (5ml) of venous blood was collected from each patient using plain vacationer tubes after taking history and clinical examination. All samples were allowed to clot and centrifuged at 3000 rpm for 10 minutes. All serum samples were separated into sterile 2ml cryovial containers and stored at -20°C until ready for use.

Serology: All donors samples were screened by enzyme immune assay (EIA) kits from TaytecInc, Canada, for HIV-1 antigen and HIV-2 antigen; HBsAg and Anti-HCV antibodies. The EIA was authenticated by the approval standard instructed by the manufacturer for the optimal density of reagent blank and optimal density mean value of positive and negative controls given with the test protocol. The least value (cut off) was considered as per company guideline for reporting positive and negative outcomes. Confirmed positive and negative samples were used subjectively as an outside run in each screening for our laboratory intention. The donated blood was discarded if the serum sample was found positive for any infectivity. The statistical analysis was done using Microsoft ware office excel 2007.

RESULTS

A total 16,929 donors were integrated in the study. Of these, 3152 (18.60%) were replacement and 13777 (81.40%) were voluntary donors.All of the samples were collected within transfusion department not from any other branch of requirement of blood donation. Males blood donors'more than female with16, 862(99.6%) donations while only 67(0.4%) donors were females. Among these, most of the donors aged from 18 to 40 years. Out of the 16,929 blood donors, 535 were tested positive for donated healthy blood samples (3.18%).Out of these, 61 were alternative donors. In general, the predominance of HIV, HBsAg,HCV and total positivity in blood screening was 0%, 1.98%, 1.2% and 3.18%,in assenting order (fig-1).The prevalence of HBsAg in total donors was 1.98% (333 cases). Substitute donors (44 cases) had a high incidence with low frequency of patients as compared to the voluntary donors (289 cases). The seropositivity of HCV in total donors was 1.20% (202 cases). Replacement donors (17 cases) had a low incidence with low frequency of patients as compared to the voluntary donors (185 cases). Zero prevalence of HIVwas zero among all blood donors. The infectivity rate of male blood is higher than female blood donors. The agreeing rates for seropositivity were peak for HBsAg infection followed by HCV infection in descending order. The co-infection of transfusion transmitted infectious diseases has not been studied among blood donors.

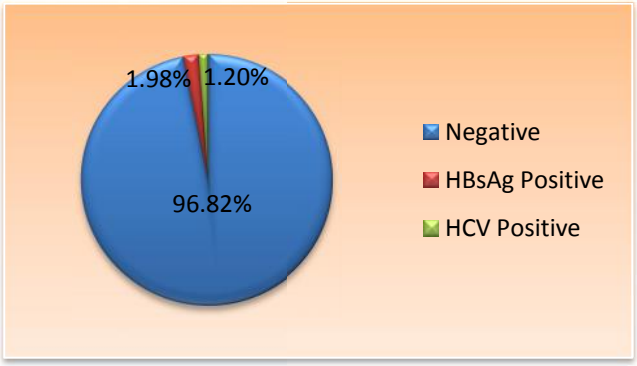

Fig.1: Distribution of seroprevalence

DISCUSSION

Blood transfusion is a branch of medicine in the healthcare sector. An incorporated strategy for blood safety is required for elimination of transfusion transmitted infections and for provision of safe and adequate blood. The infectious agents such as HIV, HBV and HCV are important blood born and transfusion transmitted infections throughout the world including Libya. The previous research statistical data has been established that prevalence rate of HBsAg, anti-HCV and anti-HIV among blood donors or the general population varied from country to country[16].

In the present study, the prevalence of HBsAg and anti-HCV antibodies was 1.98% and 1.20% respectively. These prevalence rates can be compared with other provincial studies from Central Hospital (Tripoli), and from Libyan National Center for Infectious diseases were 2.2%, 1.2%[17] and others studies 22.7% was reported with HCV infection through blood transfusion[18].Also, these rates can be compared with other studies from Egypt, from the Eastern Mediterranean region and elsewhere, the anti-HCV in Egyptian blood donor's studies found 13.6% were anti HCV antibodies detected as infection[18].In Saudi Arabia the prevalence of anti-HCV and HBsAg infection in blood donors was 0.4% and 4%[19].

In current study none of the donors had a confirmed positive result for HIV infections. The comparisons of the prevalence of transfusion viruses among different sex blood donors may not be valid because of high percentage of male donors; this is due to low hemoglobulin in females and the fact that women are less willing to donate blood. The most of the donors (99%) were male, which is similar to the preceding report[20, 21.]The differences in the incidence between current and past studies may be credited to differences in the sensitivities of the assay used, and the criteria of positivity in the degree to which individuals with risk factors for blood-born viral infections may have been excluded.

In general, the prevalence rates of hepatitis B and C were lower among young donors than older donors. This confirms the results reported earlier by other investigators[22].In contrast, most of the blood donors in Libya are young men (18-40years of age). It is recognized that this age group is generally arrogant group example of misusing of drug, insecure sex, and other misbehavior habits for the transmission of the virus. This may be explained on the essential of increased exposure with age and on the fact that a high awareness of blood born viral infections has developed and a comprehensive vaccination program against hepatitis B has been implemented in Libya. It should be noted that the carrier rate of HBV was higher than the carrier rate of HCV in this study and in other studies[23]. These data suggested that the mode of transmission and the efficiency of transmission of HBV may be different from that of HCV.

The predominance of HBV and HCV between blood donors was lower than it is in other countries. The prevalence of hepatitis B among blood donors was 3.8% in Syria[23], 9.8% in Yemen[24], 2.1% in Egypt[25], >5.0% in Sudan[26], 10.7%in Cameroon[27], 8.8% in Tanzania[28]and (Africa 5-15%). Similarly, the prevalence of HCV was 2% in Yemen[24], 4.8% in Cameron[27], 1.5% in Tanzania[28], and high in Egypt 13.6%[25]. This was probably due to the compulsory screening of all emigrants prior to granting residency in Libya. The other infectious agent of blood transfusion is HIV causes major health problem in sub Saharan Africa where the prevalence of HIV among blood donors ranges between 2-20% in Kenya[29], and 5.9% in Ethiopia[30].However, our results showed no confirmed HIV in the analyzed blood donors. Hence, the previous blood donors study in Libya reported the prevalence rates of HIV was 0.4 %[31].The frequency of HBsAg is more compared to the anti-HCV.There is no way to ignore that blood donation which is collected in the

"window" period of infectious might be transmittable even though a negative antibody test. Therefore, the introduction of screening procedures for hepatitis B core antigen and performance of NAT are advised in the blood transfusion division in this locality.

In feature direction, the implementation of new technology like MALTI-TOF[32]MS(Matrix-Assisted Laser desorption/Ionization, Time of Flight Mass Spectrometry) for the genomic detection of the 101 blood groups antigen;DNA microarray[33] for complete blood groups typing; and integrated microchip arrays or nanotechnology[34] are being developed to enhance rapid screening of donated blood for any numbers of infectious diseases to get paramount donors for blood transfusion and get free from all kinds of risk including viruses, bacteria and blood typing. Further, taming public, generating notice, consoling unpaid blood donation, high-quality blood bank practice and employing a meticulous donor range condition according to blood transfusion by National Infectious Diseases control Organization is an important factor.

CONCLUSION

In 17 months period, 16929 units of blood werecollected. A total positivity of blood; HBsAg, anti-HCV and anti HIV were 3.18%, 1.98%, 1.20 % and 0% respectively. The seroprevalence rate was tall in unpaid donors as compared to surrogate donors because of most of them charitable donors.The major limitation of this study is the fact that there is no previous study and or data available in this region for comparison.

ACKNOWLEDGEMENT

We acknowledge the support provided by technical staff from Blood Bank and Serology division of Ibn Sina Teaching Hospital, Sirt Region of Libya.

REFERENCES

1. Eyles J, Heddle N, Webert K, Arnold E, McCurdy B. Do expert assessments converge? An exploratory case study of evaluating and managing a blood supply risk.BMC Public Health.2011; 11:666.
2. Gharehbaghian A, Abolghasemi H, Namini MT. Status of blood transfusion services in Iran. Asia J Transfus Sci.2008; 2(1):13-7.
3. Reynolds L, McKee M. Matching supply and demand for blood in Guizhou province, China: an unresolved challenge. Public Health (Oxf).2010; 32(1):103-9.
4. World Health Organization. Blood transfusion safety (updated 2012 June 14); Available from: http://www.who.int/blood safety/en.
5. Klein man S, King MR, Busch MP, Murphy EL,GlynnSA. National Heart Lung Blood Institute Retrovirus Epidemiology Donor Study; Retrovirus Epidemiology Donor Study-II.Twenty years of research to advance blood product safety and availability.Transfuse. 2012 Oct; 26(4):281-04.
6. Naomi LC, Luban. Children's National Medical Center, Washington, DC; Advances in Transfusion Medicine.2008; 4:421–445.
7. Jain C, Mogra NC, Mehta J, Diwan R, Dalela G. Comparison of seropositivity of HIV, HBV, HCV and Syphilis and Malaria in replacement and voluntary blood donors in Western India. IJCRR. 2013;5:43-46.
8. Widman FK (eds.), Technicalmanual. American Association of Blood Banks, Arlington, 1985, pp. 325-344.
9. Florian Bihl,DamianoCastelli, Francesco Marin cola, Roger Y Dodd and Christian Brander.Transfusion-transmitted infection. Journal of Translational Medicine. 2007; 5-25.
10. Stramer SL, Glynn SA, Kleinman SH, Strong DM, Caglioti S, and Wright DJ et al.Detection of HIV-1 and HCV infections

among antibody-negative blood donors by nucleic acid amplification testing. N Engl J Med.2004; 351(8):760-68.
11. Schuttler CG, Caspari G, Jursch CA, Willems WR, GerlichWH,and Schaefer S, et al.Hepatitis C virus transmission by a blood donation negative in nucleic acid amplification tests for viral RNA. Lancet.2000;355(9197):41-42.
12. Allain JP, Bianco C, Blajchman MA, Brecher ME, Busch M, Leiby D,et al. Protecting the blood supply from emerging pathogens: the role of pathogen inactivation. Transfus Med Rev.2005;19(2):110-26.
13. Dodd RY, Notari EP, Stramer SL: Current prevalence and incidence of infectious disease markers and estimated windowperiod risk in the American Red Cross blood donor population. Transfusion.2002;42(8):975-79.
14. Alvarez do Barrio M, Gonzalez Diez R, Hernandez Sanchez JM, Oyonarte Gomez S: Residual risk of transfusion-transmitted viral infections in Spain, 1997-2002, and impact of nucleic acid testing. Euro Surveill.2005;10(2):20-22.
15. Coste J, Reesink HW, Engelfriet CP, Laperche S, Brown S.Implementation of donor screening for infectious agents transmitted by blood by nucleic acid technology: update to 2003. Vox Sang.2005; 88(4):289-303.
16. Luksamijarulkul P,Thammata N,Tiloklurs M.Seroprevalence of hepatitis B,hepatitis C and human immunodeficiency virus among blood donors,Phitsanulok Regional Blood Centre,Thailand. Southeast Asian J Trop Med Public Health.2002;33:272-9.
17. NilimaSawke, Sawke GK, Chawala.Seroprevalence of common transfusion-Transmitted infections among blood donors. People's journal of scientific research.2013;3(1):5-7.
18. Abudher A,Esmeo MN,Sammud M,Elzouki A,Tashani O,El-Gadi S.Prevalence of hepatitis B,C and HIV infections in Libya: how big are the problem? Submitted to XVII International AIDS Conference in Mexico City, 3-8 August 2008.
19. Gurol E. Trends in hepatitis B and hepatitis C virus among 12. Blood donors over 16 years in Turkey. European Journal of Epidemiology. 2006; 21:299–305.
20. Saeed AA, Fairclough D, Al-Admawi AM, Bacchus R, Osoba A, Al-Rasheed A, et al. Hepatitis C virus in Saudi Arabia — a preliminary survey. Saudi Med J. 1990; 11: 331-332.
21. Arora D, Arora B, Khetarpal A, Seroprevalence of HIV, HBV, HCV and Syphilis in blood donors in Southern Haryana. Indian J Pathol Microbial. 2010; 53(2):308-09.
22. Rao P, Annapurna K, HIV status of blood donors and patients admitted in KEM Hospital Pune.Indian J Hemat Blood Transf. 1994; 12:174-76.
23. Sarkodie F, Adarkwa M, Adu-Sarkodie Y, Candotti D, AcheampongJW,Allain JP. Screening for viral markers in volunteer and replacement blood donors in West Africa. Vox Sang. 2001; 80: 142-147.
24. Haidar NA. Prevalence of hepatitis B and hepatitis C in blood donors and high risk groups in Hajjah, Yemen Republic. Saudi Med. J 2002; 23:1090-94.
25. Darwish MA, Raouf TA, Rushdy P, Constantine NT, Rao MR, Edelman R.Risk factors associated with a high seroprevalence of hepatitis C virus infection in Egyptian blood donors. Am J Trop Med Hyg. 1993; 49: 440-447.
26. Mahgoub.Hepatitis B virus infection and recombination between HBV Genotypes DandE in Asymptomatic Blood Donors fromkhartoum,Sudan.JClin Microbiol.2011;49(1):298-306
27. Mbanya DN, Takam D and Ndumbe PM.Serological findings amongst first time blood donors in Yaounde Cameroon are safe

donation a reality or myth? Transfusion Medicine.2003; 13(5):267-73.
28. Mecky IN Matee, Pius M Magesa and Eligius F Lyamuya.Seroprevalence of human immunodeficiency virus hepatitis B and C viruses and syphilis infections among blood donors at the Muhimbili National Hospital in Dar Es Salaam. Tanzania BMC Public Health.2006; 6:21.
29. Moore A, Herrera G, Nyamongo J, Lackritz E, Granade T, Nahlen B, et al. Estimated risk of HIV transmission by blood transfusion in Kenya.Lancet. 2001; 358: 657-60.
30. Sentjens R, Sisay Y, Vrielink H, Kebede D, Ader HJ, Leckie G, et al. Prevalence of and risk factors for HIV infection in blood donors and various population subgroups in Ethiopia. Epidemiol Infect. 2002; 128:221-228.
31. Zaid A, Elneihonum A, Elzouki A. Routine screening for anti-HIV antibodies, hepatitis Bsurface antigen and anti-hepatitis C antibodies among general hospital in patients.JMJ.2010; 8-12.
32. ChristophGassner,Stefan Meyer**,** Beat M. Frey,CarenVollmert; Matrix-Assisted Laser Desorption/Ionization, Time-of-Flight Mass Spectrometry–Based Blood Group Genotyping—The Alternative Approach. Transfusion Med. 2013;27: 2–9.
33. Hashmi G, Sharif T, Seul M.A flexible array format for large-scale, rapid group DNA typing. Transfusion 2005; 45:680-88.
34. Clewley JP. A role for arrays in clinical virology: fact or fiction? J ClinVirol 2004; 29:2-12.