
Prevalence of Hepatitis B and C Viruses among Libyan Blood Donors in Sebha Medical Center

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Abstract:

Background: Hepatitis B virus (HBV) and Hepatitis C virus (HCV) are associated with chronic liver disease and hepatocellular carcinoma, their magnitude is varies from country to another. They are transmitted through blood and its products as well. However, in Libya, most of the available data about these viruses are coming from mainly regional studies. **Objective:** The aim of this study was to determine the prevalence of hepatitis B and C among Libyan blood donors attending the Blood Bank Unit in Sebha Medical Centre, Sebha, Libya, during the year 2006. **Materials and Methods:** A total number of two thousand and two hundred thirty nine blood donors were assessed, all were apparently healthy males, and their age was between 20 and 50 years. Their serum was screened for hepatitis B and C viruses and HIV antibodies using an Enzyme Linked Immunoassay (ELISA, Biorex diagnostics, UK). **Results:** The proportion of HBsAg positive results was 3.17% (71/2239) and the negative result was 96.83% (2168/2239) and the prevalence of anti-HCV antibody sero-positive result was 1.34% (30/2239) and the majority was 98.66% (2209/2239) sero-negative. Interestingly, we found 100% sero-negative HIV antibodies and syphilis (VDRL) among those donors. **Conclusion:** Our results may indicate that the possibility of transmitting hepatitis B and C virus from blood donors to patients is low, especially for the hepatitis C, HIV and Syphilis. Nonetheless, restricted regulation on blood transfusion is required for further minimization of the risk of the infection.

Key words: Hepatitis B virus (HBV), Hepatitis C virus (HCV), Libyan Blood Donors.

Introduction:

Transfusion transmitted diseases are of great concern for the patients' safety, their magnitude varies from country to another depending on loads in that particular population, there is a risk of 1 to 2 per 1000 recipients receiving viral, bacterial or parasitic agents contaminated blood.¹ Hepatitis B and C viruses are becoming a world-wide serious health problem. An early World Health Organization (WHO) report estimated that there are about 2 billion people infected with hepatitis B virus and about 350 million have chronic lifelong infections.² In the western countries hepatitis B is usually an adult acquired disease its prevalence ranging from 0.2% to 1% of the population.³ Furthermore, the same report estimated that about 170 million people are chronically infected with hepatitis C virus and each year between 3 to 4 million people are newly infected.⁴ The only safeguard against the epidemic of viral hepatitis is prevention by avoiding those practices which can increase their risk of infection.⁵ Hepatitis B virus (HBV) is a double strand DNA molecule surrounded by a protein

coat, it belongings to the Hepadnaviridae family and appears in serum from patients with active viral hepatitis. On its core there is an antigen termed hepatitis B core antigen (HBcAg)⁶ which has been seen only in the nuclei of hepatocytes during an acute infection with hepatitis B⁷ and on its surface protein there is an antigen termed surface antigen (HBsAg).⁶ The clinical manifestation of hepatitis B is variable that means the majority of cases may be asymptomatic or show only a mild flu-like illness, whereas, the minority of the cases may develop irregular fever, jaundice and dark urine.⁷⁻¹⁰ Libya is a developing country with poor health service, the estimated number of the carriers of chronic HBsAg in is between 120.000 and 150.000 individuals.¹¹ Previous studies reported that the sero-prevalence of HBsAg among Libyan population was about 2.2%.¹²⁻¹⁴ Hepatitis C virus (HCV), previously was known as hepatitis non-A or non-B but recently with the help of modern technology it was identified as a ribonucleic acid (RNA) molecule containing hepatitis C virus (HCV),¹⁵

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it belongs to the family of Flaviviridae. The available techniques helped in detecting the HCV antibodies and identifying the infectious carriers.¹⁶ There are different routes of its transmission¹⁷; the blood transfusion is one of them.¹⁸ In America about 3% of the blood donors are HCV positive.¹⁹

Human immunodeficiency virus (HIV) infection together with acquired immunodeficiency syndrome (AIDS) caused by HIV are important public health problems worldwide. World Health Organization (WHO) reported that there were 2.2 million people with HIV/AIDS in European countries by the end of 2005 and of these 1.6 million were living in Eastern Europe and Middle Asia countries.²⁰ Moreover, it was estimated that 45 million new HIV infections would occur by 2010 in the world and if precautions are neglected, more than 4 million of these infection cases will be caused by healthcare services as unsafe blood transfusion, injections, and other interventions).²¹ Now, it is well known that HIV is transmitted through sexual contact, sharing of HIV contaminated needles and/or syringes, transfusion of blood components, and nosocomial exposure to HIV contaminated blood or bodily fluids, and can be passed vertically from a mother to her infant.^{21,22} Another WHO report²² estimated that the HIV infection in the world, 5%-10% is transmitted by contaminated blood and its products.

Syphilis is primarily sexually transmitted disease which caused by the bacterium *Treponema pallidum*. It can also be transmitted from mother to fetus and from an infected donor to a recipient through unscreened blood or direct blood transfusion. It is transmissible by the parenteral route, and may be found in blood and other body fluids. In case of transfusion-transmitted infection the organism enters the bloodstream directly and spread throughout the body.²³ It is an endemic disease in many parts of the world and the risk of its transmission from unscreened blood donors is variable, thus, the screening test is nonetheless considered essential as most blood transfusion services provide some blood components and syphilis increases the risk of acquiring HIV infection.²³

Libya is a developing country with poor health services and with less care about the bio-safety regulations; thus, it could face a huge risk of

infectious diseases. It is important to screen the blood donors and to identify types of viruses and/or pathogenic microorganisms which could be transmitted during blood transfusion, and also to help in preventing their spread among the population. Therefore, the main objective of this study was to determine the prevalence of hepatitis B, C, HIV viruses and Syphilis (VDRL) among Libyans blood donors attending Sebha Medical Centre (Sebha, Libya) the Blood Bank Unit.

Methods:

This investigation was planned as a retrospective descriptive study based on official records. The donor forms and serological test results of all donors between January, 01, 2006 and December, 31, 2006 were assessed. A total number of two thousand two hundred and thirty nine (2239) apparently healthy voluntary blood donors or patient relatives, all were Libyans males (100%) and their age was between 20 and 50 years. The serum from each donor was screened for hepatitis B, C and HIV+1+2+0 antibodies using an Enzyme-Linked Immunobond Assay (ELISA) (Biorex diagnostics Limited, Antrim, UK) with the Sunrise Absorbance Reader (Tecan, Austria). Basically, it is an enzyme immunoassay based on a "sandwich" principle, where, polystyrene micro-well strips pre-coated with monoclonal antibodies specific to HBsAg virus or pre-coated with recombinant, highly immune-reactive antigens corresponding to the core and the non-structural regions of hepatitis C virus, or pre-coated with recombinant HIV antigens expressed in *E. coli* (recombinant HIV-type1gp41, gp120 and type-2gp-36). It is a third generation ELISA technique which was carried out as it has been instructed by the manufacturer without any modifications. On the other hand, syphilis was tested in each serum of the blood donors by VDRL test (Biorex Diagnostics limited, Antrim, UK). It is non-treponemal flocculation test for the detection and filtration of reagins, antibodies released against syphilis induced tissue damage. The procedure was also carried out as it has been instructed by the manufacturer without any modifications.

Statistical analysis: The data entry was carried out using Microsoft Office Excel worksheet and percentage and proportions for each variable was calculated.

Results:

Table I. shows the percentage of the results of the two thousand two hundred and thirty nine apparently healthy screened blood donors. As it can be seen, about 3.17% (71/2239) were sero-positive and about 96.83% (2168/2239) were sero-negative for HBsAg. On the other hand, there were about 1.34% (30/2239) sero-positive and about 98.66% (2209/2239) sero-negative for HCV antibodies. Sebha may not like other places, all blood donors are 100%

males. It is very rare when females come to donate blood. Women have lower hemoglobin levels which may be a cause of their refusal. Among these donors, we haven't seen a combination between HBV and HCV. Interestingly, there were no sero-positive HIV antibodies among these donors; all were 100% anti-HIV1+2+0 sero-negative. Thus, we report no positive results in this study. Furthermore, the VDRL results were also sero-negative in all donors; we did not detect any positive case.

Table 1. Prevalence of HBsAg and anti-HCV antibody among male Libyans blood donors from January, 01, 2006 to December, 31, 2006.

	Total screened	Sero-positive	Sero-negative
HBsAg	2239	3.17%	96.83%.
anti-HCV	2239	1.34%	98.66%.
HIV1+2+0	2239	Nil	100%
VDRL	2239	Nil	100%

Discussion:

Screening of blood is now mandatory for many transmitted diseases and is undertaken routinely in blood banks. In Libya, previous studies reported that transmission of HBV appears to be a mixture of prenatal and horizontal transmission, and the majority of HBV infection is acquired by horizontal transmission.^{12,13} Since 1980, screening of blood donors for HBV have become mandatory.²⁴ Nowadays, screening for HCV and HIV is also carried out nationwide and most of the published reports on blood screening for hepatitis viruses were from Benghazi²⁴ and Tripoli²⁵ Blood Banks. Such reports showed that the prevalence of HBsAg positivity in these blood donors ranged between 1.3% and 5.8%, respectively. In the present study we observed lower percentage for HBV and HCV in blood donors attended the blood Bank Unit in Sebha Medical Center. About 3.17% of these blood donors were HBsAg sero-positive and about 1.34% HCV were sero-positive, which is less than the percentage for HBV. The transmission of HCV is primarily through blood exposure and the majority of the infected person's progress to chronic infection and chance of cirrhosis and hepatocellular carcinoma is more as compared to HBV.¹ The present study, a third generation enzyme immunoassays were used and results for anti-HCV and HBsAg screening were only reported as positive or negative. However, for further diagnosis and investigation of this seropositivity, it is recommended that conformation techniques as HCV core antigen

and HCV RNA would be more informative.²⁶ Unfortunately, such techniques were not available within Sebha Medical Centre laboratories to follow up those sero-positive donors. Nevertheless, based on the outcome of these results, the possibility of transmitting hepatitis B and C viruses from the blood donors to patients is low and screening of blood donors would further minimize the risk of transmission. A previous study²⁷ reported that the endemicity in an adult population for the HBV is greater than 7%, a percentage we haven't seen in the present study, and another recent study screened a larger group of blood donors for HBV, HCV and HIV, over four years showed different percentage for the three viruses.²⁸ It is interesting, in the present study we observed 0% HIV sero-positive among this relatively small group of blood donors, most of them were young men between 20 and 50 years, an age group is usually at a high-risk for drug abuse, unprotected sex, and unsecured habits.²⁸

For syphilis, as well, the sero-prevalence is 0% which is not in line with the previous large screened groups were 0.07%,¹ 0.85%²⁹ and 1.2%³⁰ reported. The Venereal Diseases Research Laboratory (VDRL) and the rapid plasma reagin (RPR) tests identify those individuals who may have been more recently infected. They detect antibodies to cardiolipin or lipoidal antigen (reagin); the plasma levels of these antibodies rise significantly in active infection due to the cellular damage. The use

of non-specific assays is of most value in diagnostic testing where it can be used to identify recently infected individuals, but they are less sensitive and high risk of false negative results may be looming around.²³ In general, these results didn't show a relationship between the commonly sexually transmitted diseases since no view of various combinations of co-infection was noted.

Conclusion:

The present results may indicate that the possibility of transmitting hepatitis B and C viruses from the blood donors to patients in Sebha Medical Centre is low, especially for the

hepatitis C, HIV and Syphilis. Nonetheless, restricted regulation on blood transfusion and comprehensive screening of blood donors for transfusion transmitted agents using standard methods are highly recommended to minimize the risk of the infection and to ensure the safety of blood for the recipients.

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