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Research Article

Prevalence of Hepatitis Viruses, Retroviruses and bacterial infections among Blood Donors in Thi-Qar Province-Iraq

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I N F O

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A B S T R A C T

Background: Transfusion-transmitted infectious agents are considered to be a major health problem worldwide. The objective of the present study was to evaluate the prevalence of HCV, HBV, HIV-1/2, Treponema pallidum and HTLV-1/2 in Thi-Qar, Iraq.

Materials and Methods: Serum samples from donors in the blood bank centre were collected for testing using monoclonal antibodies against HCV, HBV, HIV-1/2, Treponema pallidum and HTLV-1/2 using ELISA kits.

Results: From 91 samples, the current study revealed only four positive results for HBc Ab (4.39%) and the results were negative for all other infection markers (HCV Ab, HBsAg, HBcAg, HIV-1 Ab, HIV-1 p24 Ag, HIV-2 Ab, TP IgM, TP IgG, HTLV-1/2 Ag).

Conclusion: Even though the results revealed low positivity of the study sample, it is very important to pay attention to the presence of HBc Ab positivity alone without HBsAg and anti-HBs Ab, which may refer to occult hepatitis. Although the results were negative for HTLV-1/2, it is necessary to add such viral markers to the routine screening test among blood donors in the blood bank centres.

Keywords: HBV, HCV, HIV, HTLV, Treponema pallidum, Blood Donor

Introduction

The basic screening of a donor's blood to rule out any infection is essential to ensure the safety of blood products. Enzyme-linked immunosorbent assay (ELISA) is the main method used for the investigation of microbial antibodies and antigens in blood donors. The incidence of transfusion-transmissible infections is alarming; especially in low-income countries.[1] Hepatitis C Virus (HCV) has a significant role in post-blood-transfusion hepatitis. Asymptomatic Hepatitis C viral infection is a public health problem, with the presence of undiagnosed cases the blood donor screening is a crucial control measures.[2] Adequate caution should be taken during blood transfusion as pathogens, such as Human Immunodeficiency Virus (HIV) and Human T-lymphotropic Virus (HTLV), can be transmitted easily to the recipients. Such pathogens are routinely screened for in all donors and their blood products in blood bank centres.[3,4]

The case of blood-transmitted syphilis was first recorded in 1915 when the donors suffer from primary or secondary stage of syphilis.[5] The WHO approximation about 12 million new cases each year.[5] Several studies have mentioned that HTLV has been found to be widespread in southwestern Japan, Taiwan, Sub-Saharan African states, the Caribbean basin, South America and in certain regions of the Middle East and India.[6] The present study aims to find the presence of hepatitis viruses and other pathogens (HCV, Hepatitis B Virus (HBV), HIV-1/2, Treponema pallidum and HTLV-1/2) using ELISA among blood donors visiting a blood bank centre.

Materials and Methods

Study Design

A cross-sectional study was conducted from April to June 2025 in the Thi-Qar blood bank centre. The study group comprised an accessibility sample of male blood donors of all age groups who went to the blood bank for blood donation during the study period.

Sample Collection and Processing

Five millilitres of blood was collected from each of the 91 male donors. It was kept at room temperature for around 1–2 hours or less, depending on the instructions mentioned in the kit. The samples were centrifuged at 3000 rpm for 15–20 minutes for serum separation and were then tested immediately or stored at -20 □ until further use.

Detection of Pathogen Markers

Serum samples were tested using monoclonal antibodies against HCV, HBV, HIV-1/2, Treponema pallidum and HTLV-1/2 using ELISA kits and according to the manufacturer's instructions (Table 1).

ELISA Procedure

The microplate was pre-coated with antigen (Ag) or antibody (Ab) using horseradish peroxidase (HRP) conjugates (Ag or Ab +/- HRP) according to the ELISA Kit Instructions (Table 1). The procedures were generally similar, with a few differences among the ELISA kits used in the current study. After serial sample dilution, one hundred microliters of the sample was added for each sample well. The concentration was measured using ELISA reader; concentrations were compared to the concentration of positive/ negative/ blank control wells which were loaded at the same plate. The microplate was then incubated for 30–60 minutes at 37 □. The wells were washed with the wash buffer five times. If not precoated, HRP was added to all wells except the blank well and was then incubated for 30 minutes at 37 □ and washed. Fifty microlitres of chromogen solutions A and B were added, mixed gently, and then incubated for 30 minutes at 37 □. Finally, 50 µL of stop solution was added, and the reaction was checked for a change in colour. The reaction was tested by measuring the optical density (OD) at 450 nm using a plate reader. The sample was considered negative if the OD/cut off value < 1.00 and positive if the OD/cut off value ≥ 1.00.

Ethical Approval

The research obtained ethical approval along with patients' consent from the ethical committee in the faculty of Medicine at Jabir Ibn Hayyan University.

Statistical Analysis

The age group of patients was specified in ten-year intervals starting from 18 years. The p values were calculated using SPSS version 22.0.

Results

According to the patient's demography, the distribution of blood groups varied across age groups. The mean of donors' ages was 31.72 years (range: 18–48 years). The results revealed that the most common blood type among the donors was O+ (34.06%), while AB- was the least common among the donors (1.09%) (Table 2).

From 91 samples, the current study revealed only four positive results for HBc Ab (4.39%) and the results were negative for all other infection markers (HCV Ab, HBsAg, HBcAg, HIV-1 Ab, HIV-1 p24 Ag, HIV-2 Ab, TP IgM, TP IgG, HTLV-1/2 Ag) (Table 3).

Based on the blood group, the positive results of HBc Ab (4.39%) appeared as two cases for O+ (50%), one case for A+ (25%) and one case for B+ (25%) (Table 4).

Table 1.Types of Kit for Each Pathogen Marker

S. No.	Markers	Types of Kit
1	HCV Ab, HBc Ab, HBsAg, HBcAg, HIV-1/2 Ab, HIV-1 p24 Ag	InTec Products, Inc.
2	Treponema IgM/ IgG ELISA	KHB, China
3	HTLV-1/2 Ag ELISA	Sunlong Biotech Co. Ltd

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Table 2.Distribution of Donors According to Age and Blood Group

Age Group (Years)	A+	A-	B+	B-	AB+	AB-	O+	O-	Total N (%)
18–28	8	0	11	0	2	1	14	0	36 (39.56)
29–38	8	1	9	0	3	0	10	1	32 (35.16)
39–48	5	1	4	2	1	0	7	3	23 (25.27)
Total N (%)	21 (23.07)	2 (2.19)	24 (26.37)	2 (2.19)	6 (6.59)	1 (1.09)	31 (34.06)	4 (4.39)	91 (100.00)

p value = 0.28 (non-significant)

Table 3.Positive Results Obtained as per the Age Groups

Age Group (Years)	HBc Ab (4 (4.39%))	Other Infection Markers*
18–28	0	0
29–38	1	0
39–48	3	0
*HCV Ab, HBsAg, HBcAg, HIV-1 Ab, HIV-1 p24 Ag, HIV-2 Ab, TP IgM, TP IgG, HTLV-1/2 Ag		

Table 4.Positive Results among the Pathogen Markers and ABO

Blood Group	HBc Ab (4 (4.39%) n (%)	Other Infection Markers*
A+	1 (25.0)	0
B+	1 (25.0)	0
AB+	0 (0.0)	0
O+	2 (50.0)	0
*HCV Ab, HBsAg, HBcAg, HIV-1 Ab, HIV-1 p24 Ag, HIV-2 Ab, TP IgM, TP IgG, HTLV-1/2 Ag		

Discussion

All participants in the study were male, belonging to the age range of 18–48 years. The participants' demographics were similar to several studies, such as that of Luz et al., where the study participants were also male and were around 25–44 years of age.[7] ABO blood groups have shown some association with various diseases. The current results found that the positive results of HBc Ab were 25% with A+, 25% with B+, 50% with O+, and showed no positivity with AB. Our results agreed with those of Aljooani and Almaiman.[8,9] They revealed that the seroprevalence of HBsAg and HCV Ab was found to be higher in donors who had blood group O and lowest in donors who had blood group AB.

Several studies have revealed that the distribution of the viruses that are transmitted through blood products, like hepatitis B and C viruses has been increasing at an alarming rate worldwide, such as in Iraq. Recently, about 350 million and 200 million subjects were found to have chronic HBV and HCV infections, respectively.[10]

It is worth noting that the incidence of hepatitis infection in Iraq is not recorded due to certain situations in the past years. On the other hand, the hepatitis serology is one of

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the important laboratory methods employed for checking blood donors and preventing hepatitis. Even though the current results revealed low positive cases for anti-HBc Ab (4.39%), it is important to know that a positive HBc Ab test may also indicate a past HBV infection. Past infection cases will have HBs Ab positivity in addition to HBc Ab positivity. The screening of HBc Ab is essential to avoid HBV infection.[11]

Our results agreed with those of Mobarki et al., who concluded that the incidence of HBsAg is lower while anti-HCV positivity is higher among people in Samtah, Jazan.[12] Several studies found that the blood samples with positive HBc Ab appeared negative for anti-HBs Ab and HbsAg; it may refer to the occult HBV infection.[13, 14]Other researchers have shown that the HBc Ab is considered to be an exceptional sign of HBV infection, especially in the window period. As such, the presence of HBc Ab has a crucial role in decreasing transfusion HBV infection.[15] It is worth noting that since the 1970s, blood bank centres in Iraq have used HBc Ab checking for the donors.[16] The current study revealed negative results for T. pallidum, HCV, HIV and HTLV (Table 3). This was in agreement with certain studies that showed that T. pallidum is moderately sensitive to cold; therefore, the risk of transmission through blood kept below 20 °C for 72 hours or more is very low.[5] Besides this, the current study did not detect any retroviral infection among the donors. This was in agreement with studies in which none or a very few donors had a confirmed positive result for retroviral infections.[17-19] However; this was in disagreement with the results of Kengne et al., who found a high prevalence of syphilis and HTLV-1/2 among the blood donors.[20]

Conclusion

The presence of HBc Ab positivity alone with negative of HBsAg and anti-HBs Ab is considered to be a risk factor for occult hepatitis infection. Even though the current study revealed negative results for HTLV-1 & 2, it is very important to add such viral markers to the routine screening test for blood donors in blood banks.

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