Prevalence of HBV and HCV infections among blood donors of dongola hospital, dongola, Northern state ,Sudan

Commented [DO1]: Prevalence of HBV and HCV Infections Among Blood Donors at Dongola Hospital, Dongola, Northern State, Sudan"

Abstract

Blood transfusion is a life-saving intervention and millions of lives are saved each year globally through this procedure. However, blood transfusions are associated with certain risks which can lead to adverse consequences. It may cause acute or delayed complications and carries the risk of the trans- mission of infections.There are many viruses which cause damage to liver one of them are Hepatitis viruses. Viral hepatitis: a primary infection of the liver by one of hepatotropic viruses (A, B, C, D, E). The clinical manifestations of almost all these types are similar. Hepatitis B and C viruses are also responsible for hepatocellular cancer.

Commented [DO2]: Hepatocellular carcinoma.

To determine the Prevalence of HBV and HCV infections among blood donors of Dongola Hospital, Dongola, Northern State, 2025 were involved in this study 100 patients were the age of 61 (61%) of them 18 – 30 years old, 24 (24%) aged 31 – 40 Years, while 11(11%) aged 41- 50 years old and, 4 (4%) were aged 51 years old and *older. and there are 61 (61%) of them have History of Donation, while 39 (39%) of them have no History of Blood Donation. 93 (93%) of them have Negative result of HBV Test, while 7 (7%) of them have Positive result of HBV test. 100 (100%) of the*

m have Negative result of HCV Test. involved in this study, 2 (2%) of them have History of Tatto or Islamic Higama, while 98 (98%) of them have No History of Tatto or Islamic Higama

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And thethere are 3 (3%) of them have History of Surgery, while 97 (97%) of them have No History of Surgery .were 6 (6%) of them have History of Jaundice, while 94 (94%) of them have No History of Jaundice. in this study, 1% in Hafer and Mgaser, 3% live in Baden, Shaikh Sharive and Kmnar, 5% of them live in Altety, while 6% live in Grada, Algoled , 7% live in Aldem, 12% in Alselam, and 53% in Dongola.

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In our study, we found that we need to use PCR and ELISA to make the results more accurate and to be sure of our results. Because the ICT gives a false negative Result and the false positive

Result in this way, the results and the studies that were done in the correct reading line will be more accurate.

Commented [DO6]: Unclear and awkwardly phrased.

Commented [DO7]: They are several grammatical issues, such as improper phrasing and sentence structure. Kindly recast, for clarity.

Commented [DO8]: Reduce to a maximum, of 250 words.

Introduction:

Blood transfusion is a life-saving intervention and millions of lives are saved each year globally through this procedure. However, blood transfusions are associated with certain risks which can lead to adverse consequences. It may cause acute or delayed complications and carries the risk of the trans- mission of infections. Globally, more than 81 million units of blood are donated each year [1]. Blood transfusion is a therapeutic procedure ,as there is no genuine substitution. But contaminated blood transfusion can transmit infectious diseases and can be fatal instead of saving life .[2] Evaluation of data on the prevalence of transfusion transmissible infections (TTIs) namely HIV, HBV, HCV and syphilis antibodies among blood and plasma donors permit an assessment of the occurrence of infections in the blood donor population and consequently the safety of the collected donations. It also gives an idea of the epidemiology of these diseases in the community .Transfusion associated infections continue to be a big threat3] .[

Commented [DO9]: You mention acute or delayed complications and the transmission of infections but do not explain what these complications might be. This makes the statement somewhat vague and general. Specific examples of acute complications, such as allergic reactions, fever, or hemolytic transfusion reactions, would help clarify what is meant by acute complications.

Commented [DO10]: Lack of context. Is this figure global or specific to certain regions?

Commented [DO11]: An unclear phrase. Are you implying that there are no alternatives to blood transfusion (i.e., no other procedure or substance that can replace it entirely)? This is a bit too vague.

Commented [DO12]: Lack of acknowledgment of the rigorous safety measures in place to mitigate the risks of blood transfusions. Modern screening, blood typing, and cross-matching protocols have drastically reduced the risk of infections and adverse reactions. Not mentioning these would leave the reader with a skewed perception that transfusions are inherently dangerous.

Transfusion transmissible infections can be classified as viral ,bacterial and parasitic infections. The most commonly encountered transfusion infection is of viral origin. In many cases, post transfusion diseases have been caused by human immunodeficiency virus (HIV), hepatitis B and C virus .[4] Prevalence of HBV infection varies greatly in different parts of the world. The World Health Organization (WHO) has classified HBV prevalence into high endemicity (% 8<)intermediate (2–7 (% and low endemicity.[5] (% 2>)

1:2Viral hepatitis is inflammation of liver by viruses. There are many viruses which cause damage to liver one of them are Hepatitis viruses. Viral hepatitis: a primary infection of the liver by one of hepatotropic viruses (A ,B, C, D, E). The clinical manifestations of almost all these types are similar. Hepatitis B and C viruses are also responsible for hepatocellular cancer)..(6

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Commented [DO16R15]: Carcinoma.

1:3Hepatitis B virus (HBV), the prototypical member of the Hepadnaviridae family, is a non-cytopathic DNA virus that is transmitted by contacts with infected blood and body fluids and triggers immune-mediated liver diseases of varying

severity and duration(7). The infectious virion is an enveloped nucleocapsid that selectively enters the hepatocyte and delivers an incomplete circular DNA genome, thereby initiating a multifaceted process of viral replication (7,8). According to WHO (World Health Organization) data ,almost one-third of the world's population has been infected by HBV at some point in their lives(8–9). The vast majority of these people encountered HBV in adulthood, developed a self-limited infection (that is, acute hepatitis B (AHB)) and successfully controlled the virus(7,8) Although fewer than 5% of individuals who encountered HBV as immunocompetent adults develop a persistent infection (that is, chronic hepatitis B (CHB)), most of the infections acquired in infancy or early childhood become chronic. CHB affects more than 250million individuals worldwide and almost 1million die annually from complications of persistent infection, liver cirrhosisand hepatocellular carcinoma (HCC). CHB is highly endemic in Africa and Asia, as well as parts of Central and Eastern Europe.(8,9)

1:4Haptites C HCV is an RNA virus that belongs to the family of flaviviruses; the most closely related human viruses .(10) The natural targets of HCV are hepatocytes and, possibly, B lymphocytes.11,12) Viral replication is extremely robust, and it is estimated that more than 10 trillion virion particles are produced per day, even in the chronic phase of infection (13).Replication occurs through an RNA-dependent RNA polymerase that lacks a" proofreading" function, which results in the rapid evolution of diverse but related quasispecies within an infected person and presents a major challenge with respect to immune-mediated control of HCV.

1:5Several infectious agents can be transmitted through an infected blood and blood products. The most common diseases that are transmitted through blood are hepatitis B and hepatitis C viruses (14).Infections with hepatitis B virus (HBV) and hepatitis C virus (HCV) are a worldwide public health problem. Viral hepatitis, caused by hepatitis B virus (HBV) or hepatitis C virus (HCV), is one of the common transmissible causes of chronic livermorbidity and mortality. The main modes oftransmission include blood transfusion, unsafe sex, use ofparental drugs, and the vertical transmission from motherto child. Blood transfusions contribute to the ever widening pool of these infections, wherein even anasymptomatic person (carrier) can transmit the infection.(15) Screening and assessment of these not only alleviates the risk of transmission through infected bloodproducts, but also

gives an idea about the prevalence ratesof the infections in the community. The study was carriedout at the blood bank of Cardio-Thoracic and NeuroSciences Centre, All India Institute of Medical Sciences(New Delhi, India), India's premiere tertiary care hospital and referral center. This study was aimed to assess the prevalence of the markers of HBV and HCV in the blood donors at the blood bank over the period of 5 years an compare the yearly trends of the seropositivity ratesThe decrease in prevalence among general population is due to application of the prevention and control programs, especially safe blood transfusion and safe injections in addition to introduction of vaccination program .

However, the continuous occurrence of new cases is due to the presence of reservoirs of chronically infected persons. Therefore, there is a continuous circulation of the infection in the community. This infection exposes the community to a higher risk of morbidity and mortality due to long-term complications of chronic carrier state, which might end with chronic active hepatitis, liver cirrhosis, and hepatocellular carcinoma HCC (16)

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Materials and Methods

This study was retrospective cross-sectional study carried out in hospital blood bank . The study was carried out in blood bank of Dongola Hospital, Dongola City, north State. It was done during the period from January to february 2025

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Commented [DO19]: Conducted in the hospital blood bank

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Samples collection

Volume of 2.5ml venous blood drawn from each participant after disinfection of the area using 70% alcohol and wait for 30 second insert the needle into vien with 30 angle the blood was with drowed and poured in plain container. Then centrifuged at 1500 round per minutes for 2 minutes serum specimens was obtained for preforming test immediately .

Commented [DO21]: A volume of 2.5 mL of venous blood was drawn from each participant after disinfecting the area with 70% alcohol.

Commented [DO22]: Waited for 30 seconds.

Commented [DO23]: vein

Commented [DO24]: was withdrawn.

Commented [DO25]: The area was then allowed to dry for 30 seconds before inserting the needle at a 30-degree angle. The blood was then withdrawn and collected in a plain container.

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Screening of blood borne pathogens

HBsAg test procedure:

The test was done by using Right Sign cassette immune chromatographic (ICT) kit according to company guidelines. Briefly, by using pastier petite, one

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drop of serum (25ul) was added into sample well. Then two drops of buffer was added. The result was read at 10 minutes. The test is considered positive only when the two lines (T and C) are visible.

Anti-HCV test procedure:

The test was done by using Right Sign cassette immune chromatographic (ICT) kit according to company guidelines. Briefly, by using pastier petite, one drop of serum (25ul) was added into sample well. Then two drops of buffer was added. The result was read at 10 minutes. The test is considered positive only when the two lines (T and C) are visible.

Data collection tools:

The data of blood donors was collected by questionnaire

Data analysis:

Statistical analysis was done by SPSS software version 21. The results present as numbers and percentages or means inform of tables. Pearson chi-squared and Fishers Exact tests were used. A p-value of less than 0.05 was considered significant.

Ethical considerations:

The study approval was obtained from Sudan International University and the permission was given by Dongola blood pank Hospital.

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Commented [DO31]: Detail the types of questions used (e.g., demographic, health history, risk behaviors) and any validation processes to ensure reliability and accuracy in the responses.

Commented [DO32]: Specify the sampling method used (random sampling, convenience sampling, etc.) to assess whether the sample is likely to represent the population of interest.

Commented [DO33]: Clarify the administration mode (self-administered, interviewer-administered, etc.) to understand how responses might be influenced by the method.

Commented [DO34]: Clarify the types of data used and which specific variables were analyzed (e.g., demographic data, clinical data, outcomes).

Commented [DO35]: Be more specific about which variables are presented as percentages (likely categorical data) and which are shown as means (likely continuous data). Ensure that this is consistent and clear.

Commented [DO36]: Clarify why a p-value of 0.05 was chosen

Commented [DO37]: Clarify whether the approval was granted by an Ethics Committee or an IRB at Sudan International University. If there was no formal ethics review process, this should be stated clearly with an explanation.

Commented [DO38]: Explicitly mention whether informed consent was obtained from all participants, ensuring that they were made aware of the study's purpose, procedures, risks, and their right to withdraw at any time without penalty.

Result

Figure (1): Distribution of the Volunteer Blood Donors according to age groups.

Total of 100 Volunteer Blood Donors were involved in this study, the age of 61 (61%) of them 18 – 30 years old, 24 (24%) aged 31 – 40 Years, while 11(11%) aged 41- 50 years old and, 4 (4%) were aged 51 years old and older .

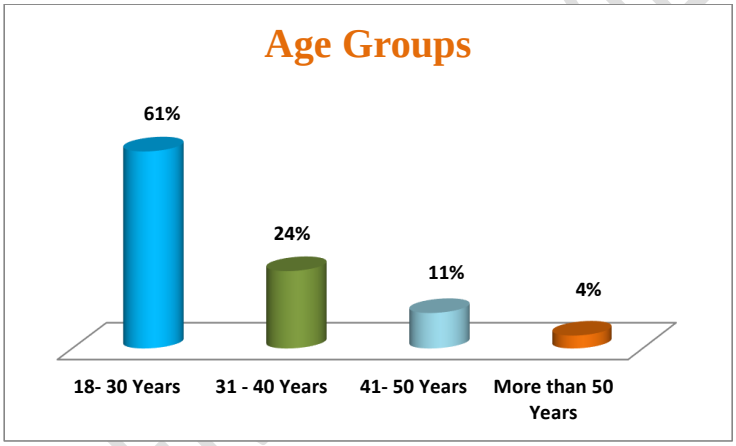

Figure (2): Distribution of the studied Volunteer Blood Donors according to Place of residence.

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Commented [DO40]: Explicitly state the boundaries of age groups. For example: Aged 18–30 years.

Commented [DO41]: Revise the phrasing for clarity.

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Commented [DO43]: Rephrase to Distribution of Volunteer Blood Donors According to Place of Residence or Distribution of Volunteer Blood Donors by Place of Residence.

Total of 100 Volunteer Blood Donors were involved in this study, 1% in Hafer and Mgaser, 3% live in Baden, Shaikh Sharive and Kmnar, 5% of them live in Altety, while 6% live in Grada, Algoled , 7% live in Aldem, 12% in Alselam, and 53% in Dongola.

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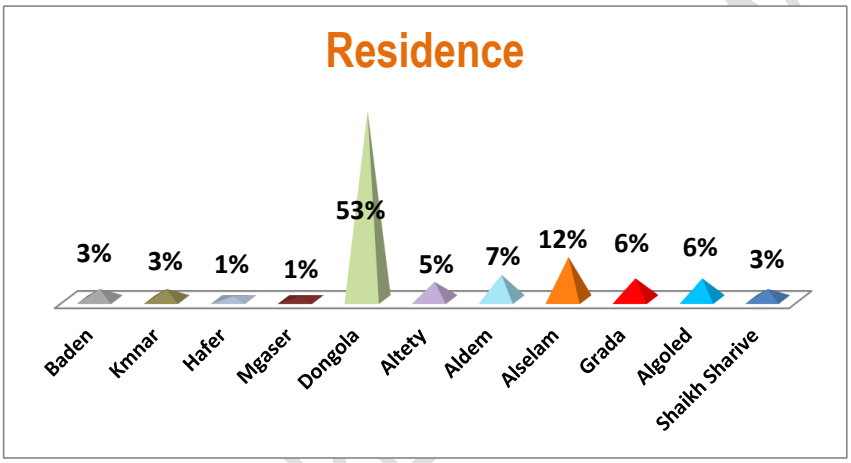

Figure (3): Distribution of the studied Volunteer Blood Donors according to History of Blood Donation.

Total of 100 Volunteer Blood Donors were involved in this study, 61 (61%) of them have History of Donation, while 39 (39%) of them have no History of Blood Donation.

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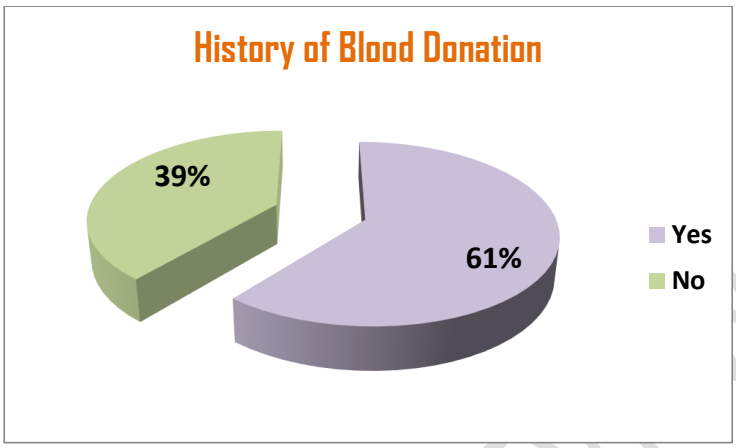

Figure (4): Distribution of the studied Volunteer Blood Donors according to History of Tatto or Islamic Higama.

Total of 100 Volunteer Blood Donors were involved in this study, 2 (2%) of them have History of Tatto or Islamic Higama, while 98 (98%) of them have No History of Tatto or Islamic Higama.

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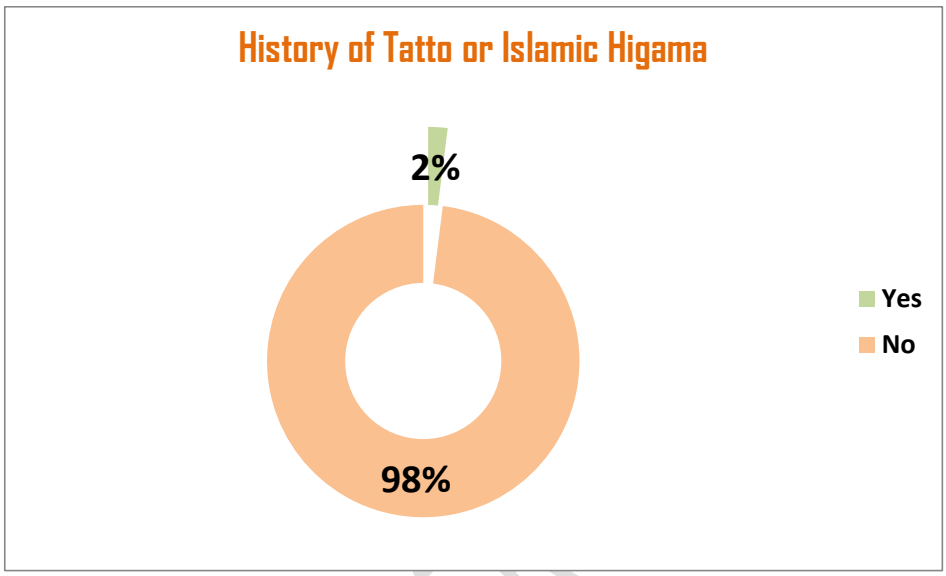

Figure (5): Distribution of the studied Volunteer Blood Donors according to History of Surgery.

Total of 100 Volunteer Blood Donors were involved in this study, 3 (3%) of them have History of Surgery, while 97 (97%) of them have No History of Surgery.

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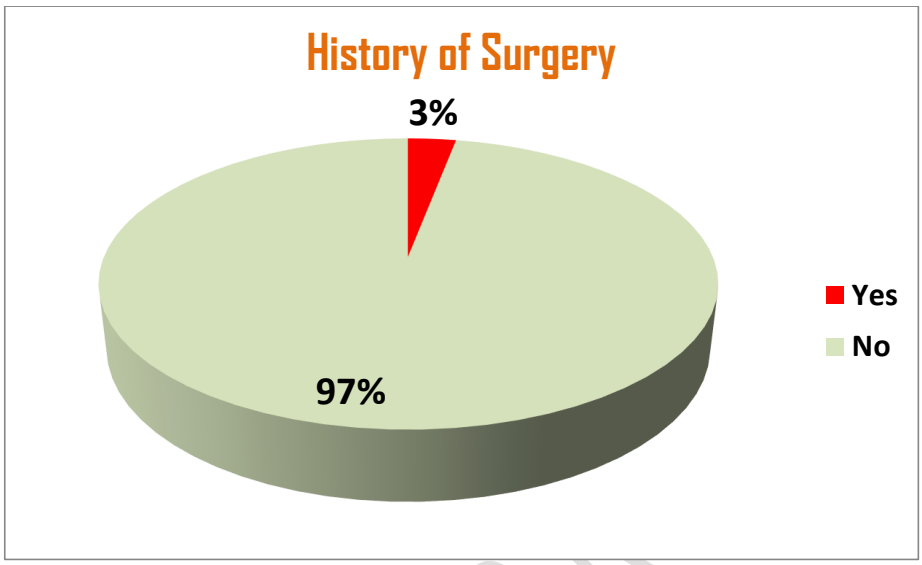

Figure (6): Distribution of the studied Volunteer Blood Donors according to History of Jaundice.

Total of 100 Volunteer Blood Donors were involved in this study, 6 (6%) of them have History of Jaundice, while 94 (94%) of them have No History of Jaundice.

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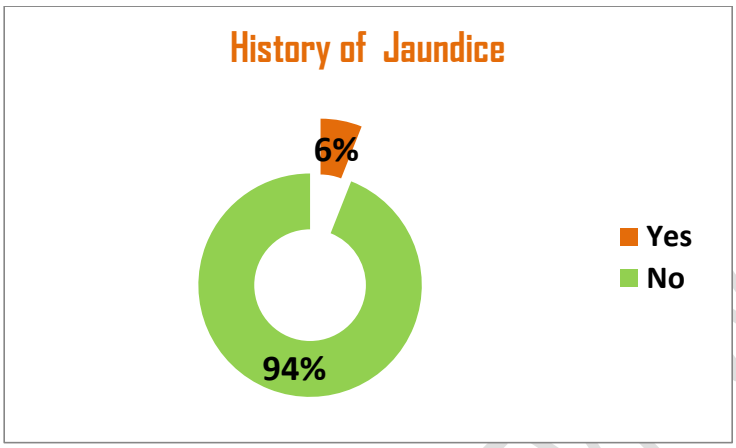

Figure (7): Distribution of the Studied Volunteer Blood Donors according to Result HBV Test.

Total of 100 Volunteer Blood Donors were involved in this study, 93 (93%) of them have Negative result of HBV Test, while 7 (7%) of them have Positive result of HBV test.

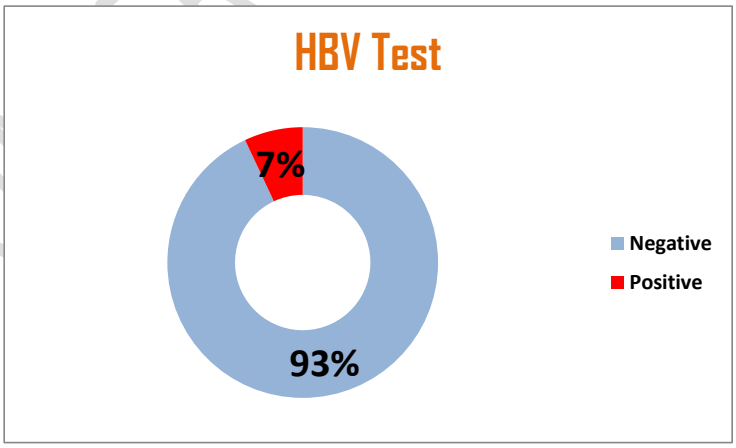

Figure (8): Distribution of the Studied Volunteer Blood Donors according to Result HCV Test.

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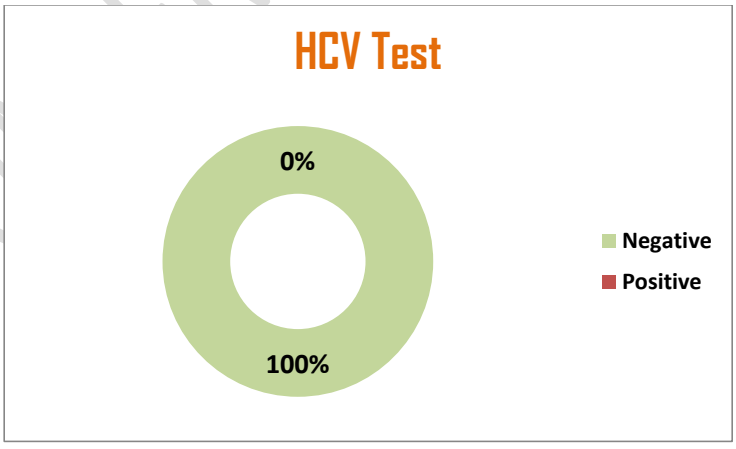
Total of 100 Volunteer Blood Donors were involved in this study, 100 (100%) of them have Negative result of HCV Test.



The trend of HBV infection Considering age, the age groups 18 –30 had the highest contribution and the age group, 31-40, 41 – 50, and Above 50 the lowest contribution of HBV infection, There is a insignificant statistical difference in the prevalence HBV with P value > 0.05.

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Table (1): Prevalence of HBV among age group at Dongla Blood Bank:

Age Variable	Total Donator	HBV Positive		P value
		N	Prevalence %	
18 – 30	61	6	6	0.536
31 – 40	24	1	1	
41 – 50	11	0	0	
Above 50	4	0	0	
Total	100	7	7	

The trend of HBV infection Considering Residences, the donors lived in Dongola had the highest contribution and the residences , Baden , Grada, Kmnar, Hafer, Mgaser, Altety, Aldem, Alselam, Algoled and, Shaikh Sharive the lowest contribution of HBV infection, There is a insignificant statistical difference in the prevalence HBV with P value > 0.05.

Table (2): Prevalence of HBV among Residences at Blood Bank:

Age Variable	Total Donator	HBV Positive		P value
		N	Prevalence %	
Baden	3	0	0	

Kmnar	3	0	0	0.858
Hafer	1	0	0	
Mgaser	1	0	0	
Dongola	53	6	6	
Altety	5	0	0	
Aldem	7	0	0	
Alselam	12	0	0	
Grada	6	0	0	
Algoled	6	1	0	
Shaikh Sharive	3	0	0	
Total	100	7	7	

Discussion:

were involved in this study 100 patients were the age of 61 (61%) of them 18 – 30 years old, 24 (24%) aged 31 – 40 Years, while 11(11%) aged 41- 50 years old and, 4 (4%) were aged 51 years old and older. and there are 61 (61%) of them have History of Donation, while 39 (39%) of them have no History of Blood Donation. 93 (93%) of them have Negative result of HBV Test, while 7 (7%) of them have Positive result of HBV test. 100 (100%) of them have Negative result of HCV Test. involved in this study, 2 (2%) of them have Higama, while 98 (98%) of them have No History of History of Tatto or Islamic Tatto or Islamic Higama

And ththere are 3 (3%) of them have History of Surgery, while 97 (97%) of them have No History of Surgery .were 6 (6%) of them have History of Jaundice, while 94 (94%) of them have No History of Jaundice. in this study, 1% in Hafer and Mgaser, 3% live in Baden, Shaikh Sharive and Kmnar, 5% of them live in Altety, while 6% live in Grada, Algoled , 7% live in Aldem, 12% in Alselam, and 53% in Dongola.

The trend of HBV infection Considering age, the age groups 18 –30 had the highest contribution and the age group, 31-40, 41 – 50, and Above 50 the lowest contribution of HBV infection, That shows us that donors lived in Dongola had

the highest contribution and the residences , Baden , Grada, Kmnar, Hafer, Mgaser, Altety, Aldem, Alselam, Algoled and, Shaikh Sharive the lowest contribution of HBV infection, There is a insignificant statistical difference in the prevalence HBV with P value > 0.05.

The result disagree with previous studies was conducted on the prevalence of HBV and HCV serological markers among blood donors in Saudi Arabia by (Altamimi et al., 1998; Al-Faleh et al., 1999;Zekri et al., 2002), the rate for HBsAg (2.34%), anti-HBc (13.53%), and anti-HCV (0.98%) reported here appears to be different from those reported elsewhere.reported may be the result of inclusion of donors from countries endemic with HBV and HCV.

The result disagree withsurvey enrolling in the large screening program for hepatitis B and C conducted by the Pasteur Institute of Morocco and carried out in eleven major Moroccan regions between December 2005 and June 2011. The target subjects in this study were the apparently healthy Moroccan individuals which were selected to be as representative of the demographic characteristics as possible in regarding areas of Morocco.To construct the national probability sample, a stratified, random cluster sampling method was used to select the study population.

the result disagree with study was conducted among all blood donors who attended the national blood bank service in Aden in Yemen between June and October 2007 by A.A. Al-Waleedi1 and Y.S. Khader2. Blood donation operates on an exchange basis in which relatives and friends of patients are requested to donate blood for their clinical management.A total of 495 male blood donors who attended the national blood bank service of Yemen (Aden) between June and October, 2007 were approached and invited to participate in this study. Of those, 469 (94.7%) agreed to participate in this study. Of the 469 participants, 27 (5.8%) were interviewed face to face because there were illiterate.

The result disagree with observational study of blood donors from the years 2006 to 2009. Monthly reports from the NBTC during that year were collected. This study took place at Communicable Disease Control Center (CDC), Baghdad, Iraq in January 2010. All reports from the NBTC in Baghdad including donors' age, gender, and residence for the last 4 years from 2006-2009) were used in this study. All donors were included in this study and no reports were excluded, and all donated bloods were routinely screened for HBsAg and anti-HCV using enzyme linked immune assay (ELISA) anti-HBsAb, anti-HBc Ab, and HBeAg were not part of the screening. New plans and arrangements were taken by the NBTC to introduce the recent architectural technique for screening of donors, which is more accurate. The total number of blood donors from 2006-2009 was 495,648)481,470 men and 14,178 women. The average prevalence of positive HBsAg was 0.6% in all donors, being higher in men

(0.76%)than in women (0.5%)with no statistical significance (p=0.07). There was no difference in the prevalence between the 4 years,

Commented [DO53]: The entire discussion contains multiple run-on sentences, missing punctuation, and awkward phrasing, making it difficult to follow the logical flow of ideas. Break up long sentences into shorter, clearer ones, and use proper punctuation. Additionally, reword certain awkward phrases for better readability.

Conclusions:

In our study, we found that we need to use PCR and ELISA to make the results more accurate and to be sure of our results. Because the ICT gives a false negative Result and the false positive Result in this way, the results and the studies that were done in the correct reading line will be more accurate.

Commented [DO54]: Add a brief explanation of the limitations of ICT, such as issues with sensitivity and specificity, and explain why PCR and ELISA provide more reliable results.

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Reverences

1. Manzoor I, Hashm NI, Daud S, Ajmal S, Fatima H, Rasheed Z, et al. Seroprevalence of transfusion transmissible infections (TTIS) in blood donors. Biomedica. 2009;25(10):154–8.

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