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Research Article

Seroprevalence of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) among Blood Donors from Bahir Dar, Ethiopia

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Background. Hepatitis B virus (HBV), a highly contagious virus, is a circular partial double-stranded DNA virus. Hepatitis C virus (HCV) is an enveloped, single-stranded RNA virus with a major blood-borne infection worldwide. Infection of HBV and HCV among blood donors is an important public health problem. *Objective*. To assess the seroprevalence of hepatitis B and C viruses and associated factors among blood donors at Bahir Dar Blood Bank, Northwest Ethiopia. *Method*. Institutional-based cross-sectional study was conducted at Bahir Dar Blood Bank from May 18, 2020 to July 27, 2020. A systematic random sampling technique was used to select 426 participants. Variables having a p value of <0.05 with 95% CI and AOR were considered statistically significant. *Results*. From 426 proposed participants, 418 (98.1%) of them completed the face-to-face interview. The seroprevalence of HBV and HCV among study participants was 4.07% and 0.48%, respectively. Having multiple sexual partners (AOR = 10.356: 95% CI: (2.277–47.099)), having a family history of hepatitis (AOR = 8.106: 95% CI: (1.278–51.403)), and having sharp materials sharing experience (AOR = 11.313, 95% CI: (1.144–111.864)) have a significant association with HBV infection. No risk factors were found for HCV infectious markers. *Conclusion and Recommendations*. This study showed that the seroprevalence of HBV and HCV infections confirmed with positive tests among voluntary blood donors in Bahir Dar Blood Bank was 4.07% and 0.48%, respectively. HBV seroprevalence among blood donors in this study has remained stable when compared to a study done in 2013 in the same population. Strict donor selection, safe sex practice, using proper safety precautions when offering care to a family member, and immunization of people at risk could constitute an important package of a prevention program.

1. Introduction

Hepatitis is a disease of liver inflammation most commonly caused by infection with viruses. Infections with hepatitis B virus (HBV) and hepatitis C virus (HCV) account for the considerable proportion of liver diseases worldwide [1]. Viral hepatitis is a critical public health challenge in the entire continent of Africa and in about 80% of world countries. Majority of individuals who become chronic carriers of HBV live in Asia and Africa. As part of Africa, Ethiopia has significant hepatitis B transmission in both children and adults, displaying around 6–12% hepatitis B surface antigen (HBsAg) prevalence. In addition, 12% of hospital admissions and 31% of mortality on medical wards are due to acute viral hepatitis, chronic viral hepatitis, cirrhosis of the liver, and hepatocellular carcinoma [2, 3].

Hepatitis B virus, highly contagious virus, is a circular partial double-stranded DNA virus. Screening blood donors by detection of HBV using HBsAg marker is crucial to minimize the transmission risk of HBV via blood transfusion [4, 5]. Hepatitis C virus (HCV) is enveloped, single-stranded RNA virus with positive polarity. This virus is one of the most important pathogens of humans and can cause mild to severe liver diseases. Hepatitis C virus infection is a major blood-borne infection worldwide, with silent epidemiology, that it has reached pandemic proportions [6].

Both HBV and HCV are transmitted through direct contact with blood, transfusion of blood and blood products, intravenous injections, and unprotected sex [7]. HBV is highly infectious, can be transmitted in the absence of visible blood, and remains viable on the environmental surface for at least a week. Persons with chronic infection who had persistent HBsAg in the serum for at least 6 months following acute infection serve as the main reservoir for HBV transmission [8]. HCV is most commonly transmitted through injecting drug use, the sharing of injection equipment, and reuse or inadequate sterilization of medical equipment especially syringes and needles in healthcare settings [9]. The most efficient way to acquire HBV and HCV is through the injection of the virus into the bloodstream [10]. HBV can cause acute or chronic, symptomatic or asymptomatic disease whose occurrence seems to be determined by the person's immune response to the infection [11]. HCV infection has a striking tendency towards chronicity, often significant liver diseases like chronic hepatitis, cirrhosis, and hepatocellular carcinoma [12].

World Health Organization estimates that there are 350 million people with chronic HBV infection and 170 million people with chronic HCV infection worldwide [10]. A study finding in India indicated that the prevalence of HBV and HCV among blood donors was 1.76% and 0.19%, respectively, whereas 0.51% and 0.25% of blood donors in China were positive for HBV and HCV infection, respectively [5]. Based on CDC surveillance report the prevalence of HBV in sub-Saharan African countries ranges from 0.12% in South Africa to 18.82% in Mauritania [13]. In Ethiopia, studies done in different parts of the country showed that the prevalence of HBV and HCV in blood donors varied ranging from 3.4% [14] to 10.1% [8] and 0% [15] to 8.8% [8], respectively.

Blood transfusion is a routine practice in today's healthcare systems and if used appropriately it can save lives, improve health, and enhance patient outcomes. However, this treatment is likely to be responsible for the transmission of infectious agents such as hepatitis B and C viruses and other transfusion-transmitted infections like human immunodeficiency virus (HIV) and syphilis [16]. For instance, blood transfusion accounts for 16 million new infections with hepatitis B virus and 5 million new infections with hepatitis C virus every year in the world [17]. A significant decrease in HBV and HCV prevalence rates can be achieved by implementing a predonation screening system of blood donors. Moreover, educating the donors about the mode of transmission of HBV and HCV could make them more alerted to abate the risk factors [6, 7]. Therefore, we were involved to determine the seroprevalence of HBV and HCV and associated factors among voluntary adult blood donors.

2. Methods and Materials

An institution-based cross-sectional study was conducted from May 18, 2020 to July 27, 2020 in Amhara Region, Ethiopia, at Bahir Dar Blood Bank Center. Bahir Dar town is located approximately 565 km north to northwest of the capital city, Addis Ababa. Based on the 2007 Census, this town has a total population of 221,991, of whom 108,456 are men and 113,535 women [18]. Bahir Dar Blood Bank, the only blood bank in Bahir Dar city, was established in October 2005 and screens HIV, HBV, HCV, and syphilis. According to the official body of the blood bank report, on average there are 32, 1000, and 12,000 blood donors per day, per month, and a year, respectively. It collects blood within a 100 km radius from the blood bank including sites up to Chagni, Motta, and Tilili towns and supplies safe blood to 24 health institutions that are found around Bahir Dar city.

Selected adult voluntary blood donors screened for HBV and HCV were the study population. Healthy voluntary blood donors who fulfilled the national blood donation criteria; age >18 years and <65 years, body weight greater than 45 kg, and hemoglobin level >12.5 g/dl were included in the study while donors who were not volunteer to participate in the study were excluded.

2.1. Source Population. All adult voluntary blood donors that gave blood at Bahir Dar Blood Bank centre were the source population.

2.2. Study Population. All selected adult voluntary blood donors screened for HBV and HCV were the study population.

2.3. Inclusion and Exclusion Criteria. All healthy voluntary blood donors who fulfilled the national blood donation criteria for instance age >18 years and <65 years, body weight greater than 45 kg, and hemoglobin level >12.5 g/dl were included. Blood donors who were not volunteers to participate in the study were excluded.

2.4. Sample Size Determination. The sample size was calculated for the first objective using the single population proportion formula. We leave to calculate the sample size for the second objective due to HCV that has low prevalence globally compared to HBV. Thus, we considered the following assumptions: prevalence of hepatitis B virus infection in Nigeria as 10% [19], considering a 95% level of confidence, a 3% margin of error, and a 10% nonresponse rate gave us 426.

2.5. Sample Technique and Procedures. A systematic random sampling technique was used to select study participants from voluntary blood donors who meet the national donation criteria. A sampling frame was created using the blood donor register. The number of blood donations at this center on average was 1000 per month. To reach each study participant the sampling interval was 3. The first participant was selected by the lottery method and based on the order of every 3rd interval (i.e., 2nd, $2^{nd} + 3^{rd} = 5^{th}$, $5^{th} + 3^{rd} = 8^{th}$...) blood donor in the population list was selected.

2.6. Data Collection Tools. The data were collected from participants through face-to-face interviews using semi-structured questionnaires which are adopted from the

previous literature [7]. The questionnaire was initially prepared in English and later translated to the local language, Amharic and then back to English. Sociodemographic characteristics, clinical, and behavioural factors were collected by using a face-to-face interview, whereas data related to laboratory test results (hepatitis B and C virus seropositivity) were collected from the blood bank's registration book. The blood bank screen HBV and HCV using the enzyme linked immunosorbent assay (ELISA) (HBsAg: a third generation ELISA, Hepanostika HBsAg UNi-Form II, Bio-Merieux, Boxtel, Netherlands and HCV: Human anti-HCV third generation ELISA, Human Gesellschaft for Biochemical and diagnostic MbH, Germany). One day after blood donation, each participant's laboratory test results were collected from the register based on record identification numbers given by the blood bank during donation.

2.7. Quality Control. The questionnaire was prepared in English and translated back to Amharic and again translated back to English to ensure its consistency. A pretest was done on 5% of the total sample size which is on 21 voluntary blood donors at Finote Selam donation site before the study. The clarity, understandability, flow of each question, and the time to fill the questionnaire were assessed and found satisfactory. Two data collectors, having a nursing background, who are working in the blood bank were recruited and trained. They got a day of training on the aim of the study and techniques of the interview. One supervisor had closely followed the data collection process. Overall supervision was made by the principal investigator. Daily, all the collected data were checked for completeness by the supervisor and principal investigator.

2.8. Statistical Analysis. After the completion of the data collection, the questionnaires were checked for their completeness and cleaned manually, coded, and entered into the SPSS windows version 23 for further analysis. Means and frequencies (%) were used to describe the participant's characteristics. Bivariate and multivariate logistic regression were used to determine the associated factors of HBV and HCV infection. Variables with a p value <0.2 in the bivariate logistic regression model were further entered into the multivariate logistic regression model to control confounders. The significance level and association of variables were tested by using a 95% confidence interval (CI) and the odds ratio. p values < 0.05 were taken as statistically significant.

2.9. Ethical Clearance. An ethical approval letter was obtained from Debre Tabor University College of health science one week before data collection. Then with this letter, Bahir Dar Blood Bank was contacted. Finally, verbal consent was obtained from each respondent before data collected.

3. Results

3.1. Socio-Demographic Characteristics of Respondents. From a total of 426 proposed study participants, 418 have participated in the study with a 98.1% response rate. Among the participants 336 (80.4%) were males and 266 (63.6%) were in the age group of ≥26 years with the mean age of 30.98 years (±9.094 SD). Regarding the educational status of the respondents about 168 (40.2%) were completed their college and above schooling, 134 (32.1%) were completed their secondary school and 99 (23.7%) were completed their primary school and the rest 17 (4.1%) of them had no formal education. Of the total study participants 348 (83.3%) have resided in the urban area, and about 219 (52.4%) of them were single (Table 1).

3.2. Clinical and Behavioural Characteristics of Study Participants. Of the total participants, 11 (2.6%) had body tattoos and 13 (3.1%) had a history of multiple sexual partners. But, only 11 (2.6%) of them took HBV vaccine doses (Table 2).

3.3. Seroprevalence of HBV and HCV. The overall seroprevalence of viral infections among blood donors was 4.55% (Table 3).

3.4. Bivariate Analysis for HBV Risk-Factors. The possible association of HBV with a variety of factors was assessed. Different variables were entered into the bivariate model. Needle-stick injury, communal use of sharp materials, having a body tattoo, having multiple sexual partners, history of previous surgery, and having a family history of hepatitis were significantly associated with HBV infection at a p value < 0.2 (Tables 4 and 5).

3.5. Multivariate Analysis for HBV Risk-Factors. Six variables that showed significant association in bivariate analysis were then entered into a multivariate logistic regression model. In the multivariate analysis common use of sharp materials, having multiple sexual partners and having a family history of hepatitis had a significant association with the positivity of HBV at a p value of <0.05.

Sharing sharp materials were found as an important factor in the positivity of HBV. The odds of hepatitis B virus infection among blood donors who had sharp materials sharing experience were 11.3 times higher than those who had no such experience (AOR = 11.313, 95% CI: (1.144, 111.864)). Having multiple sexual partners has a significant association with HBV infection. Donors who has multiple sexual partners were 10.4 times more likely (AOR = 10.356, 95% CI: (2.277, 47.099)) to be positive for HBV when compared to their counterparts. It is also found that having a family history of hepatitis was significantly associated with HBV seropositivity (AOR = 8.106, 95% CI: (1.278, 51.403)). Voluntary blood donors who had a family history of hepatitis were 8.1 times more likely to be positive for HBV when compared to those who had no family history of hepatitis (Table 6).

3.6. Bivariate and Multivariate Analysis for HCV Risk-Factors. To identify factors associated with HCV infection some variables were entered into the bivariate model. Communal

Table 1: Sociodemographic characteristics of voluntary blood donors at Bahir Dar Blood Bank, Northwest Ethiopia, 2020 ($n = 418$).

Characteristics	Number (n)	Percent (%)
Age in years		
18–20	31	7.4
21–25	121	28.9
≥26	266	63.6
Sex		
Male	336	80.4
Female	82	19.6
Educational status		
Unable to read and write	17	4.1
Primary school complete	99	23.7
Secondary school complete	134	32.1
College and above	168	40.2
Marital status		
Single	219	52.4
Married	199	47.6

Table 2: Determinant factors for HBV and HCV infection among blood donors at Bahir Dar Blood Bank, Northwest Ethiopia, 2020 ($n = 418$).

No	Characteristics	Category	Frequency	Percentage
1.	History of blood transfusion	Yes	7	1.7
		No	411	98.3
2.	Taking an HBV vaccine	Yes	11	2.6
		No	407	97.4
3.	Having alcohol drink habit	Yes	11	2.6
		No	407	97.4
4.	Needle-stick injury	Yes	3	0.7
		No	415	99.3
5.	Previous history of blood testing for hepatitis B and C	Yes	8	1.9
		No	410	98.1
6.	Communal use of sharp materials	Yes	5	1.2
		No	413	98.8
7.	Having a body tattoo	Yes	11	2.6
		No	407	97.4
8.	Sharing of toothbrush	Yes	7	1.7
		No	411	98.3
9.	Having multiple sexual partners	Yes	13	3.1
		No	405	96.9
10.	Being an intravenous drug user	Yes	0	—
		No	418	100
11.	History of previous surgery	Yes	5	1.2
		No	413	98.8
12.	Having a family history of hepatitis	Yes	9	2.2
		No	409	97.8
13.	Having underline disease	Yes	0	—
		No	418	100%

Table 3: Seroprevalence of HBV and HCV among voluntary blood donors at Bahir Dar Blood Bank centre, Northwest Ethiopia, 2020 ($n = 418$).

Variables	Status	Number (%)
HBsAg	Positive	17 (4.07)
	Negative	401 (95.93)
Anti-HCV antibody	Positive	2 (0.48)
	Negative	416 (99.52)
Coinfected	Positive	0
	Negative	418 (100)
Total	Positive	19 (4.55)
	Negative	399 (95.45)

Table 4: Bivariate analysis of HBV with sociodemographic characteristics of blood donors at Bahir Dar Blood Bank centre, Northwest Ethiopia, 2020 ($n = 418$).

Variables	Categories	HBV status		COR (95% CI)	p value
		Reactive	Nonreactive		
Age (in years)	18–20	1	30	1	0.832
	21–25	4	117	1.026 (0.111, 9.517)	
	≥26	12	254	1.417 (0.178, 11.286)	
Sex	Male	13	323	1	0.679
	Female	4	78	1.274 (0.404, 4.014)	
Educational status	Unable to read & write	1	16	1.437 (0.166, 12.432)	0.925
	Primary complete	3	96	0.719(0.182, 2.845)	
	Secondary complete	6	128	1.078 (0.354, 3.287)	
	College and above	7	161	1	
Marital status	Single	10	209	1.312 (0.490, 3.516)	0.589
	Ever-married	7	192	1	
Residency	Rural	1	69	1	0.248
	Urban	16	332	3.325 (0.434, 25.493)	
Occupational status	Govt employee	8	124	3.129 (0.650, 15.072)	0.559
	Merchant	3	75	1.940 (0.316, 11.907)	
	Housewife	1	11	4.409 (0.369, 52.657)	
	Private employee	3	94	1.548 (0.253, 9.473)	
	Others	2	97	1	
No. of donation	New	14	292	2.021(0.259, 15.765)	0.682
	2-3 times	2	67	1.254(0.110, 14.259)	
	>3 (regular type)	1	42	1	

use of sharp materials and having body tattoos were significantly associated with HCV infection at a p value <0.2. Then, these two variables were further entered into the multivariate logistic regression model but were not found statistically significant (Table 7).

4. Discussion

The seroprevalence of HBV in this study was 4.07%. The finding is comparable with the study done in Bahir Dar 4.11% [20], South Gondar 5.8% [15], Debre Markos 4.7% [21], Mekele 3.79% [22], Hawassa 3.4% [14], Arba Minch 4.7% [23], Dire Dawa 3.73% [24], Democratic Republic of Congo 4.76% [25], Yemen 5.1% [26], and Saudi Arabia 3.24% [27].

This finding is lower when compared to studies conducted in Ethiopia [28], Wolita [8], Jigjiga [29], two studies of Cameron [30, 31], Mali [32], and Ghana [33] in which the seroprevalence of HBV was 7.4%, 10.1%, 9.48%, 11.2%, 6.4%, 14.78%, and 7.5%, respectively. However, this finding is higher than the study done in Lybia [34], Burundi [35], Eastern Mediterranean and Middle Eastern Countries [36], Iraq [7], Iran [37], three studies in India [38–40], Nepal [41], and Mexico [42] which were 0.21%, 1.04%, 2.03%, 0.78%, 0.137%, 2.12%, 2.2%, 0.58%, 0.49%, and 0.11%, respectively. The possible explanation for the relatively higher or lower seropositivity in this study could be the differences in the epidemiology of HBV between different geographic areas, improvement in diagnostic technologies over the years with greater sensitivity and specificity, and the economic status of the country which leads to varying levels of hepatitis illness vulnerability [30].

The seroprevalence of HCV was 0.48% (95% CI: 0, 1.2). This finding was similar with previous studies done in Bahir Dar [20], Hawassa [14], Arba Minch [23], Jigjiga [29], Burundi [35], India [38], Iran [37], Iraq [7], and Mexico [42] blood bank centers which were 0.63%, 0.7%, 0%, 0.73%, 1.12%, 0.1%, 0.087%, 0.78%, and 0.72%, respectively. But, the result was lower than that found by Negash in South Gondar [15], Degefa in Mekele [22], Demissie in Wolita [8], Qowaider in Mali [32], David in Congo [25], and Khader in Yemen [26] which stated that the seroprevalence of HCV was 4.2%, 1.33%, 8.80%, 2.32%, 1.86%, and 1.3%, respectively. The possible explanation for this difference could be due to the difference in the study setup, the difference in the research period covered by the studies used for the estimation, and the cultural and behavioural characteristics of the study participants relating to prevention of viral hepatitis [21].

This study showed that having multiple sexual partners had a significant association with the positivity of HBV. Donors who had multiple sexual partners were 10.4 times more likely to be positive for HBV when compared to their counterparts. This finding is consistent with studies conducted in Ethiopia [43], Kenya [44], and Ghana [45]. The reason for this finding might be because that the crucial means of acquiring transfusion transmissible infections among voluntary blood donors in Africa is sexual activity, multiple partners being one of the main risk factors [46, 47].

Table 5: Bivariate analysis of clinical factors with HBV among blood donors at Bahir Dar Blood Bank centre, Northwest Ethiopia, 2020 ($n = 418$).

Variables	HBV status		COR (95% CI)	p value
	Reactive	Nonreactive		
Have you ever donated blood?				
Yes	3	109	1	0.390
No	14	292	1.742 (0.491, 6.180)	
History of blood transfusion				
Yes	1	6	4.115 (0.467, 36.225)	0.202
No	16	395	1	
Taking an HBV vaccine				
Yes	1	10	1	0.408
No	16	391	0.409 (0.409, 3.394)	
Alcohol drinking habit				
Yes	1	10	2.444 (0.295, 20.269)	0.408
No	16	391	1	
Needle-stick injury				
Yes	1	2	12.469 (1.074, 144.77)	0.044
No	16	399	1	
Previous history of blood testing for hepatitis B and C				
Yes	1	7	1	0.252
No	16	394	0.284 (0.033.2.450)	
Communal use of sharp materials				
Yes	1	4	6.203 (0.655, 58.711)	0.111
No	16	397	1	
Having a body tattoo				
Yes	3	8	10.527 (2.519, 43.987)	0.001
No	14	393	1	
Sharing of toothbrush				
Yes	1	6	4.115 (0.467, 36.225)	0.202
No	16	395	1	
Having multiple sexual partners				
Yes	4	9	13.402 (3.330, 43.464)	0.001
No	13	392	1	
History of previous surgery				
Yes	1	4	6.203 (0.655, 58.711)	0.111
No	16	397	1	
Having a family history of hepatitis				
Yes	3	6	14.107 (3.196, 62.275)	0.001
No	14	395	1	

Table 6: Multivariate analysis for factors associated with HBV among blood donors at Bahir Dar Blood Bank centre, Northwest Ethiopia, 2020 ($n = 418$).

Variables	Category	HBV status		AOR (95% CI)	p value
		Reactive	Nonreactive		
Needle-stick injury	Yes	1	2	11.437 (0.72, 181.307)	0.084
	No	16	399	1	
Communal use of sharp materials	Yes	1	4	11.31 (1.144, 111.864)	**0.038**
	No	16	397	1	
Having a body tattoo	Yes	3	8	5.848 (0.941, 36.354)	0.058
	No	14	393	1	
Having multiple sexual partners	Yes	4	9	10.356 (2.27, 47.099)	**0.002**
	No	13	392	1	
History of previous surgery	Yes	1	4	6.125 (0.483, 77.610)	0.162
	No	16	397	1	
Having a family history of hepatitis	Yes	3	6	8.106 (1.278, 51.403)	**0.026**
	No	14	395	1	

Table 7: Bivariate and multivariate analysis for factors associated with HCV among blood donors at Bahir Dar Blood Bank centre, Northwest Ethiopia, 2020 ($n = 418$).

Variables	HCV status		COR (95% CI)	p value	AOR (95% CI)	p value
	Reactive	Nonreactive				
Sex of the respondent						
Male	2	334				
Female	0	82				
Marital status						
Single	1	218	0.908 (0.056, 14.618)	0.946		
Ever-married	1	198	1			
Communal use of sharp materials						
Yes	1	4	103.0 (5.437, 1951.318)	**0.002**	403868699.6	0.992
No	1	412	1		1	
Having a body tattoo						
Yes	1	10	40.60 (2.368, 696.238)	**0.011**	161547479.8 (0.0)	0.992
No	1	406	1		1	

It was found that having a family history of hepatitis was significantly associated with HBV infection. Voluntary blood donors who had a family history of hepatitis were 8.1 times more likely to be positive for HBV when compared to those who had no family history of hepatitis. This is supported by the study conducted in Ethiopia and India [43, 48]. This could be due to the fact that hepatitis B virus is mainly transmitted through direct contact of nonintact skin or oral mucosa with secretions containing HBV from an HBV-infected person. As such, donors may acquire this infection when caring for their families [49].

This study revealed that sharing sharp materials was found as an important factor in the positivity of HBV. The odds of hepatitis B virus infection among blood donors who had sharp materials sharing experience were 11.3 times higher than those who had no such experience. This finding is in line with the study from Ethiopia where a history of having sharp material experience was identified as a significant predictor of HBsAg positivity [21]. This could be due to the fact that study participants may have a lack of awareness of transmission methods of the hepatitis virus including sharing sharp material. In Ethiopia, there is a belief that hepatitis disease is not transmitted from person to person rather it is Bat's disease or "Yewef Beshita" in the Amharic language [50].

5. Conclusion

This study showed that the seroprevalence of HBV and HCV infections confirmed with positive tests among voluntary blood donors in Bahir Dar Blood Bank was 4.07% and 0.48, respectively. The findings suggest that though HBV seroprevalence among blood donors has remained stable when compared to a study done in 2013 in the same population, it still remains within an intermediate level of prevalence. Having multiple sexual partners, a family history of hepatitis and having sharp materials sharing experience were significantly associated with HBV infection. No risk factors were found for HCV infectious markers. Strict donor selection, safe sex practice, using proper safety precautions when offering care to a family member, and immunization of people at risk could constitute an important package of a prevention program.

5.1. Limitations. This study utilized a cross-sectional design which made the finding impossible to establish a causal relationship between the outcome and exposure variables. The study was done only on blood donors and therefore these findings may not be generalizable to the general population. The study did not observe the seroprevalence of transfusion-transmitted infection (TTIs) other than HBV and HCV like HIV, syphilis, and other infections.

Abbreviations

AOR: Adjusted odds ratio
CI: Confidence interval
COR: Crude odds ratio
DNA: Deoxyribonucleic acid
HBsAg: Hepatitis B surface antigen
HBV: Hepatitis B virus
HCV: Hepatitis C virus
RNA: Ribose nucleic acid.

Data Availability

All data generated or analyzed during this study are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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