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Prevalence and Associated Factors of Hepatitis B Virus Infection among Blood Donors in Debre Markos Blood Bank Centre, Northwest Ethiopia, 2018

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Abstract

Background: Despite the fact that Hepatitis B Virus infection has been a major problem associated with blood transfusion in developing countries like Ethiopia, data on magnitude of Hepatitis B Virus seropositivity among blood donors is scarce. This study aimed to assess the prevalence and associated factors of Hepatitis B Virus infection among blood donors at Debre Markos blood bank centre.

Methods: The study followed a facility based cross sectional study design among 403 consecutively selected volunteer blood donors. After having informed consent, from each donor, 5 ml venous blood samples were collected. Samples were tested for hepatitis B virus antigen with Enzyme Linked Immuno Sorbent Assay. The data entered in Epi-info version 7 and analyzed in SPSS Version 22. The proportions and averages of the study variables were calculated. Odds Ratios, 95% confidence intervals, and p-value of 0.05 in multiple variable logistic regressions used to identify significantly associated factors with Hepatitis B virus infection.

Results: About 403 volunteer blood donors with a mean age of 20 ± 2.35 years were included in the study. About 4.7% (n=19) were positive for hepatitis B surface antigen. The odds of hepatitis B virus infection among blood donors who had sharp materials sharing experience were 3 times higher than those who had no such experience [AOR =3; 95% CI: 1.07-8.3]. Blood donors who had history of tooth extraction were 5.2 times more likely acquire hepatitis B virus infection than those who had no such history [AOR=5.2; 95% CI: 1.54-17.47].

Conclusion: This study found that blood donors had intermediate prevalence of hepatitis B virus infections. In addition, sharing sharp materials and tooth extraction were identified the most important risk factors for hepatitis B virus infection. Before donation, volunteers must be strictly screened and health education about its modes of transmission must be given.

Keywords: Hepatitis B virus; Infection; Prevalence; Associated factors; Blood donors; Ethiopia

Background

Viral hepatitis is an inflammation of the liver a major health problem worldwide and cause acute or chronic hepatitis, which can leads to the development of extensive liver scarring (cirrhosis), liver failure, liver cancer, and death. It is the tenth leading cause of death and the leading cause of liver cancer worldwide. Chronic hepatitis B accounts for 60-80% of the world cases of primary liver cancer [1].

The World Health Organization (WHO) and the United States (U.S) Centers for Disease Control (CDC) estimate that over 500 million people are currently living with chronic viral hepatitis. Every year, nearly one million die from hepatitis. An estimated 57% of liver cirrhosis and 78% primary liver cancer cases are due to hepatitis B or C virus infections. In Africa, the burden of viral hepatitis is significantly high [2].

The world's one-third population had HBV infection, of which a 360 million people are chronic carriers and 5-7 hundred thousand people die every year. Africa with the second largest number of chronic carriers next to Asia, considered a high endemic region. In Kenya and Ethiopia more than 60% of chronic liver diseases and up to 80% of hepatocellular cancers are due to chronic HBV infections [3]. The prevalence of HBV is 8% in West Africa and 5-7% in other parts of Africa. Nearly 70–95% of the adult population in Africa had past exposure to HBV infection with seroprevalence of 6–20% [4].

Hepatitis B virus infection is a public health problem and a major cause of morbidity and mortality particularly in developing countries. The world can be divided into three areas where the prevalence of chronic HBV infection is: high (>8%), intermediate (2-8%), and low (<2%). Most countries are still considered intermediate to high endemicity for HBV infection [5].

Evidences showed that blood transfusion saved millions of lives each year. It is an important therapy during maternal bleeding, surgery and a lifesaving procedure for anemic patients. However, it has associated major problems including transfusion transmitted

infections since a number of viruses, bacteria and parasites can be transmitted through blood or its products like hepatitis B virus (HBV) [6]. Hence, a safe blood is a critical component of health care to prevent the spread of blood borne infectious diseases, despite the fact, general lack of quality systems, poor laboratory procedures, inadequate donated blood testing, inappropriate use of blood and blood components contribute for unsafe blood transfusion services [7].

The hepatitis B virus infection is 50–100 times more contagious than HIV. Many of the carriers do not realize that they have infected with the virus rendering it as a "silent killer" [8]. The infection can transmitted vertically at birth, horizontally through unprotected sex, sharing of injecting equipment and close contact to infants and neonates. Transmission through unscreened blood products is another route of transmission since blood remains infectious for several weeks even when dried [9]. In Sub-Saharan Africa, 12.5% of patients who receive blood transfusion are at risk of post-transfusion hepatitis [10]. The World Health Organization (WHO) estimated that transfusion of unsafe blood accounted for 8 to 16 million hepatitis B virus infections each year. In sub-Saharan Africa, more than 45,000 hepatitis B virus infections are due to contaminated transfusions annually [11]. A study conducted among migrants in Italy reported 6% prevalence of HBV infection [12]. Another study from Pakistan reported 3.17% prevalence among high risk groups [13] and 1.9% in Karachi [14]. It was 0.58% in Bahrain with blood transfusion, dental procedures and surgical operations accounted for 24.6%, 37.2% and 35.6% route sources of infection respectively [15]. Similarly, it was 0.58% in Tiruchirappalli among voluntary blood donors [16], 3.51% in Gwilar, India [17] and 0.11% among blood donors in Mexico [18]. Another study conducted in Brazil showed that male gender, schooling <4 years, no stable relationships, and previous acupuncture therapy were risk factors of HBV infection [19]. A study conducted in Delhi reported that injection was a highly significant risk factor for HBV [20].

A study from Kenya reported 3.8% prevalence of HBV infection among pregnant women and 4.3% among 20-24 years old [21]. In Libya the prevalence was 2.2% with a significantly higher rate among males (2.6%) than females (1.8%) and 44% lower risk of infection among vaccinated [22]. In Burkina Faso, it was 13.4% and 2.4% for first-time and repeat donors respectively [23]. The prevalence of HBV infection was 10.79% in voluntary blood donors and 11.59% in replacement blood donors in Ghana [24] and 4.2% in Sudan among blood donors [25]. In Kenya patients who had undergone dental surgery had 3.3 times more risk than patients who had not [26]. A study done in Morocco reported that age, male gender, Dental procedure history, use of glass syringes, history of jaundice and sexual risk behaviors were risk factors of HBV infection [27]. Another study done in Nigeria showed that Circumcision, scarification/tattooing/ and past surgeries were risk factors of hepatitis B virus infection [28].

In Ethiopia, a study from Addis Ababa reported that the prevalence of HBV infection was 5.4% among pregnant women, 40.1% of which were in 25-29 years age group and the HBV infection prevalence was higher above 20 years of age, history of abortion, Surgery and family history of hepatitis [29]. It was 3.05% in Southwest Ethiopia, Jimma [30], 6.9% among adults attending ART clinic in Hawassa University Referral Hospital. It also indicated that the prevalence was 7.5% in age group of 18-24, 8.2% in 25-34 and 4.8% for above 34 years old [31]. It was reported to be 10.9% among blood donors in Jijiga [32], 9.5% among voluntary blood donors in Wolaita Sodo [33], 4.7% among blood donors in Arba Minch blood bank [34] and 3.6% in North Gondar district blood bank indicating farmer, employed, and unemployed donors were at a higher risk of HBV infection compared to student donors [35]. A study done in Dire Dawa among blood donors showed that the most important risk factors of HBV infections were male sex and age group 33-40 [36]. Another study from Mekelle hospital among HIV positive individuals reported that male, multiple sexual partner and CD4 count <200 cells/μl were significantly associated with HBsAg positivity [37]. A study from Bahir Dar among pregnant women showed that history of blood transfusion, body tattooing, previous history of surgery and unsafe injection were risk factors for HBV infections [38]. Sharing of sharp materials was significantly associated with HBV infection [39] and tooth extraction was the other strong predictor of Hepatitis B infection [40,41]. Many researchers have investigated prevalence rates of HBV infections in various groups. However, most studies conducted in Ethiopia among blood donors are retrospective and does not include all personal factors. Therefore, this study tried to determine the prevalence and identify associated factors of HBV infection among blood donors.

Methods

Study design

A facility based cross-sectional survey design was employed to assess the prevalence and associated factors of Hepatitis B virus infection among blood donors at Debre Markos blood bank center, Northwest Ethiopia 2018. This study design considered appropriate for the objective, as its main intention was to determine the prevalence of HBV infection and identify its associated factors simultaneously at single-point data collection period of March to April 2018 for the study.

Study setting

The study was conducted in Amhara Region, Ethiopia, at Debre Markos blood bank center. Debre Markos blood bank center, which is located in "Debre Markos city", 299 km North West of Addis Ababa. The study blood bank centre screens HIV, HBV, HCV, and syphilis. The blood bank mainly provides services for 10 hospitals found under East Gojjam Zone. The blood bank collected 4524 unit of blood from voluntary blood donors in 2017/18. The study was conducted from March- April 2018.

Population and sample

The source population was all potential donors who visited Debre Markos blood bank centre, while all blood donors who attended the blood bank during the study period and who were eligible to donate blood were the study population. Sample size was determined using single population proportion formula considering 9.5% prevalence of hepatitis B virus infection in Wolaita Sodo University Teaching Referral Hospital with a 95% level of confidence and 3% margin of error and 10% nonresponse rate as follows:

$$n = \left[\frac{\left(Z_{\alpha/2}\right)^2 * P(1-P)}{d^2}\right] = \left[\frac{(1.96)^2 * 0.095(1-0.095)}{(0.03)^2}\right] = 367$$

By adding 10% non-response rate to the larger sample size (367), the final sample size was 403.

Eligibility criteria

All individuals who fulfilled the national and regional blood bank criteria were included. Some of these criteria's include:

- Age 18-65 years
- Weight; at least 45 Kg, Pulse 60-100 per minute, Blood pressure systolic 120-129 mmHg and diastolic 80-89 mmHg, Hemoglobin 12.5 g/dl for females and 13.5 g/dl for males
- Frequency of donation: For whole blood donors 12 weeks for males and 16 weeks for females, For platelet donors four weeks and For plasma donors two weeks
- Fluid intake and food; donors should maintain their usual food and fluid intake
- Pregnancy, lactation and menstruation: Donors defer during pregnancy and up to six months after delivery
- Donor's medical history: assessed and free of Non-communicable disease and for Medical and surgical interventions.

Sampling procedure

All donors prospectively recruited in the study and samples were selected consecutively during the data collection period to take the first 403 blood donors which were eligible for donation.

Study variables

The dependent variable was HBV infection (Yes/No). The independent variables includes: Socio-demographic factors (Age, Sex, Marital status, Type of Blood group, Occupation, Educational status); Behavioral factors (Have multiple sex partners, Intravenous drug use, Tattooing practice, Alcohol use, Condom use, Sharing sharp materials, Sharing tooth brush, Smoking history) and Clinical factors (Previous transfusion, Type of donation, Previous surgery, Tooth extraction, Hospital admission).

Operational definitions

- Hepatitis B Surface Antigen (HBsAg) - is an antigen on the surface of the virus. Its presence indicates either acute or chronic infection.
- Hepatitis B surface antigen seropositivity- the detection of HBsAg in serum or plasma using a gold standard method Enzyme Linked Immuno Sorbent Assay (ELISA).

Data collection procedures

Prior to blood collection, the donors were requested to answer a questionnaire to determine whether they are eligible for donation per the criteria set by the National Red Cross Society (NRCS) and by study area blood bank. Pre-tested semi structured Standard data collection tool was prepared for both independent and dependent variables. Two trained and oriented blood bank workers collected the data.

Specimen collection and processing

After obtaining informed consent, 5 ml of venous blood was collected in plane tubes under aseptic conditions from peripheral vein by experienced laboratory personnel from all consenting blood donors consecutively. These tubes were labeled with unique identification number and processed at the time of collection. The blood samples taken from the individuals were centrifuged at 3000 revolution per minute (RPM) for at least 20 minutes at room temperature and the serum was separated and placed in nun tubes and kept frozen at -20°C until to be tested.

Laboratory testing

All the serum samples were tested for HBsAg by using a gold standard method ELISA following standard operating procedures [42]. The subjects' positive for HBsAg were referred to the attending physician for further diagnosis and treatment. The HBsAg EIA is a solid-phase simultaneous sandwich immunoassay, which employs monoclonal antibodies and polyclonal antibodies specific for HBsAg. Micro titters well were coated with monoclonal antibodies specific for HBsAg. A Serum specimen was added to the antibody coated micro titter wells together with Enzyme conjugated polyclonal antibodies. HBsAg, if present, would form an antibody-HBs Ag-antibody-enzyme complex. The plate was then washed to remove unbound material. Finally, a solution of substrate was added to the wells and incubated. A blue color was developed in proportion to the amount of HBsAg present in the specimen. The enzyme-substrate reaction was stopped and the result visualized by naked eye or read by EIA plate reader for absorbance at the wavelength of 450 nm.

Data quality control

The questionnaire was prepared in English and translated back to Amharic, translating back to English to ensure consistency of the questions. Pre-testing of 5% the questionnaire was done prior to the study. The clarity, understand ability and flow of each question and the time to fill the questionnaire were assessed and found satisfactory. Daily all the collected data were checked for completeness by the principal investigator. Quality control of serological test, Known positive and negative controls were run in parallel with test samples. All laboratory procedures were carried out following standard operating procedures (SOPs). The quality assurances of pre-analytical, analytical, and post-analytical stages were applied.

Pre-analytical stage

Blood samples were collected aseptically from blood donors and properly labeled with the patient identification number. Trained Laboratory personnel collected the specimen. The samples were centrifuged; the serum was evaluated and separated; appropriately and stored until transported to the laboratory. The transported samples were stored at the optimum temperature until they were processed.

Analytical stage

Trained laboratory personnel in Hema diagnosis laboratory performed the test with Huma reader and Washer (Human, Germany). The reagents and the test method were assessed with a known positive and negative control materials, the standard laboratory procedures were also followed, and the supervisors checked the results.

Post-analytical stage

The results were recorded with the patients' identification number, in order to avoid the errors in the results of the test, repeatedly checked before reporting.

Data processing and analysis

The collected data from the questionnaire were entered and cleaned using Epi-info version 7 and analyzed by SPSS version 22. Frequency, percentage, and mean were used for data description. Tables and figures were used to present the data. Both bivariable and multivariable binary logistic regression were used to identify possible factors associated with the outcome. Adjusted odds ratio with its 95% confidence interval and p-value less than or equal to 0.05 were used to report the statically significant explanatory variables.

Results

Socio-demographic characteristics

About 403 blood donors were screened during the study period of which 67% (n=270) were males and 33% (n=133) were females. The minimum participant's age was 18 and maximum was 42 years old with a range of 24 years. The majority (75.9%, n=306) of donors were in the age group of 18-20 years and all were voluntary donors.

Regarding the types of blood group profile of the participants, about 40.9% (n=165) had blood group O, 31.5% (n=127) A, 20.6% (n=83) B and 6.9% (n=28) had AB. With respect to the Rh factor, most (95.1%, n=383) participants were found RH positive. The majority (66.7 %, n=269) of the study participants had a Secondary level of educational status, the rest 30.8% (n=124) and 2.5% (n=10) had either a College/ above and a Primary level of educational status respectively (Table 1).

Characteristics	Frequency	Percent
Age Group		
18-20	306	75.9
21-25	88	21.8
≥ 26	9	2.2
Sex		
Male	270	67
Female	133	33
Marital status		
Single	371	92.1
Married	31	7.7
Divorced	1	0.2
Educational status		
Primary	10	2.5
Secondary	269	66.7
College and above	124	30.8
ABO (blood group)		
A	127	31.5
B	83	20.6
AB	28	6.9
O	165	40.9
RH		
Positive	383	95.1
Negative	20	4.9

Table 1: Socio demographic characteristics of study participants in Debremarkos Blood Bank Center, East Gojjam Zone, Amhara Regional State, Ethiopia 2018.

Prevalence of hepatitis B virus infection

About 4.7% (n=19) study participants were found positive for HBV infection. The males seropositivity was 3.7% (n=15) and females was 1% (n=4). About 3.2% (n=13) of positive results for HBV infection were in the age group of 18-20 years. About 3.2% (n=13) HBV seropositive was found in those participants who had primary or secondary level of education (Figure 1).

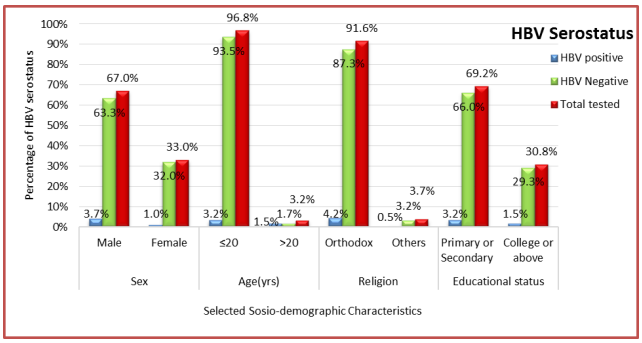

Figure 1: Percentage Distribution of HBV serostatus by selected socio-demographic factors, Debremarkos Blood Bank Center, East Gojjam Zone, Amhara Regional State, Northwest Ethiopia, 2018.

Factors associated with Hepatitis B virus infection

About 2.7% (n=11) of the study participants had history of contact with Jaundice patient, none of them however, were positive for hepatitis B virus infection. About 9.43% (n=38) of the study participants had the experience of cigarette smoking, of which 0.74%) (n=3) were positive for HBV and the rest 3.97% (n=16) of the blood donors who were seropositive for HBV infection had no such experience. About 5.96% (n=24) blood donors had history of tooth extraction, of which 1% (n=4) were seropositive for HBV infection.

About 14.89% (n=60) had history of sharing sharp materials, of which 1.49% (n=6) were HBV positive. Around 14.64% (n=59) of the study participants had a history of unsafe injection, of which 1.49% (n=6) were positive for hepatitis B virus infection. Similarly, 23.6% (n=95) of the study participants had awareness on HBV transmission, prevention and treatment, of which 1.24% (n=5) were positive for HBV infection and the rest 3.47% (n=14) who were seropositive had no the awareness on HBV transmission, prevention and treatment (Figure 2 and Table 2).

Risk factors of HBV infection		HBV positive		HBV Negative		Total tested	
		n	%	n	%	n	%
Vaccination	Yes	0	0	13	3.23	13	3.23
	No	19	4.71	371	92.06	390	96.77
Contact with Jaundice patient	Yes	0	0	11	2.73	11	2.73
	No	19	4.71	373	92.56	392	97.27
Unsafe injection	Yes	6	1.49	53	13.15	59	14.64
	No	13	3.23	331	82.13	344	85.36
Body tattoo	Yes	7	1.74	65	16.13	72	17.87
	No	12	2.98	319	79.16	331	82.13
More than one sexual partner	Yes	0	0	11	2.73	11	2.73
	No	19	4.71	373	92.56	392	97.27
Smoking	Yes	3	0.74	35	8.68	38	9.43
	No	16	3.97	349	86.6	365	90.57
Know about disease transmission & prevention	Yes	5	1.24	90	22.33	95	23.57
	No	14	3.47	294	72.95	308	76.43

Table 2: Distribution of factors associated with Hepatitis B virus infection among study participants, Debre Markos Blood Bank Center, East Gojjam Zone, Amhara, March-April 2018.

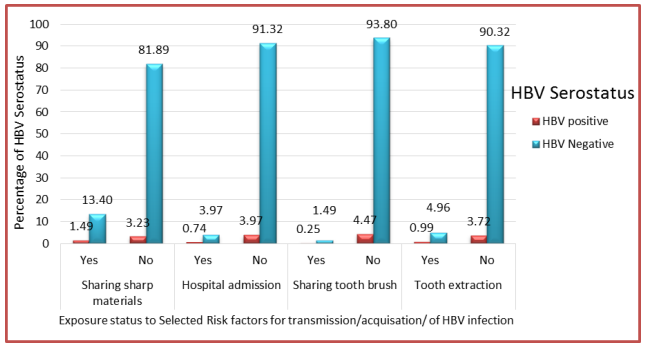

Figure 2: Percentage distributions of HBV Serostatus by exposure status to Selected Risk factors of HBV infection transmission, Debremarkos Blood Bank Center, East Gojjam Zone, Amhara Regional Sate, Northwest Ethiopia, 2018.

Bivariate and multivariate analysis of HBV infection determinant factors

Socio demographic and other determinants in relation to hepatitis B virus infection of the blood donors were evaluate by bivariate and multivariate binary logistic regression analysis model. In the bivariate models, almost no socio-demographic variables and majority of the assumed risk factors were significantly associated with hepatitis B virus infection. In this model unsafe injection, sharing of sharp materials, history of tooth extraction, body tattooing and hospital admission were determinants, which were found significantly associated with hepatitis B virus infection. The factors were then transferred to the final models to see the effect of each factor on the dependent variable. Those blood donors who had an experience of sharing sharp materials were about 3 times (AOR=3; 95% CI: 1.07-8.3) at higher risk of hepatitis B seropositive compared to blood donors who had no such experience. Further blood donors who had history of tooth extractions were also about 5.2 times (AOR=5.2; 95% CI: 1.54-17.47) more risk compared to those who had no such experience (Table 3).

Variables	HVB Serostatus		Total N (%)	COR (95%CI)	AOR (95%CI)	P-Value
	Positive n (%)	Negative n (%)				
Sex						
Male	15(78.95)	255(66.41)	270 (67)	1	-	-
Female	4(21.05)	129(33.59)	133 (33)	0.52(0.17-1.6)		

Unsafe injection						
Yes	6(31.58)	53(13.80)	59(14.6)	2.8(1.05-7.9)	2.1(0.74-6.50)	0.15
No	13(68.42)	331(86.20)	344(85.4)	1		
Body tattoo						
Yes	7(36.84)	65(16.93)	72(17.9)	2.86(1.08-7.54)	2.4(0.84-7.08)	0.09
No	12(63.16)	319(83.07)	331(82.1)	1		
Smoking						
Yes	3(15.79)	35(9.11)	38(9.4)	1.87(0.51-6.73)	-	-
No	16(84.21)	349(90.89)	365(90.6)	1		
Sharing sharp materials						
Yes	6(31.58)	54(14.06)	60(14.9)	2.82(1.02-7.73)	3(1.07-8.3)	0.03
No	13(68.42)	330(85.94)	343(85.1)	1		
Hospital admission						
Yes	3(15.79)	16(4.17)	19(4.7)	4.3(1.14-16.3)	3.9(0.86-17.83)	0.07
No	16(84.21)	368(95.83)	384(95.3)	1		
Sharing tooth brush						
Yes	1(5.26)	6(1.56)	7(1.7)	3.5(0.4-30.6)	-	-
No	18(94.74)	378(98.44)	396(98.3)	1		
Tooth extraction						
Yes	4(21.05)	20(5.21)	24(6)	4.8(1.47-15.97)	5.2(1.54-17.47)	0.009
No	15(78.95)	364(94.79)	379(94)	1		

Table 3: Bivariate and multivariate analysis results of associated factors of Hepatitis B virus infection at Debre Markos Blood Bank Center, East Gojjam Zone, Amhara, March-April 2018.

Discussion

Prevalence of hepatitis B virus infection

In this Facility based cross-sectional study, the prevalence of HBV among voluntary blood donors was determined. In this study, the overall prevalence of hepatitis B virus was found to be 4.7%. It was discussed that the world could be divided into three areas where the prevalence of chronic HBV infection is: high (>8%), intermediate (2-8%), and low (<2%). Most countries in the world are still considered intermediate to high endemicity for HBV infection [5]. This finding ensures that in the study setting epidemiology of HBV infection was intermediate level.

This, 4.7% prevalence of hepatitis B virus infection, finding was similar with a study done in Arba Minch blood bank centre (4.7%) [34]. However, it was lower than a study done in Jijiga blood bank centre (10.9%) [32] and Wolaita Sodo University Teaching Referral Hospital (9.5%) [33]. It was also lower than other countries' reported prevalence; 10.79% in Ghana [24], 13.4% in Burkina Faso [23], 6% in Italy [12] and 5.6% in Kenya [21]. The inconsistencies might be due to the difference in the socio-demographic characteristics related to geographic area, study population considered, blood banks strategy focusing on voluntary blood donors and time when these studies were conducted.

On the other hand, our report is higher than the results of studies conducted in different parts of Ethiopia; 3.6% in Gondar blood bank [35], 3.73% in Dire Dawa blood bank [36] and 3.05% in Jimma blood bank [30]. Our data also indicate the higher prevalence of hepatitis B infection compared to the results from counties like Libya 2.2% [22], Sudan 4.2% [25], India 3.51% [17], Mexico 0.11% [18], Pakistan 1.9% [14] and Bahrain 0.58% [15]. These variations could also be due to actual changes in population risks or effectiveness of donor screening measures.

In this study, majority of the participants 67% (n=270) were males. This is always the case as far as blood donation is concerned and in similar studies earlier, males were majority of the donors [23,33]. This is again because women generally have low hemoglobin levels hence are mostly disqualified as blood donors. The prevalence of HBV based on sex was 5.6% in males and 3% in females. This difference might be due to Males dominated as blood donors compared to females in the study area. This finding of gender variation in prevalence was in line to the study conducted in Libya with a significantly higher rate of HBV infection among males (2.6%) than females (1.8%) [22].

In this study majority of the participants 75.9% (n=306) were in the age group of 18-20 years and 21.8% (n=88) were in the age group of 21-25 years old. The prevalence was lowest in the age group of 21-25 years, (1.5%). This finding was lower than a study done in Kenya 4.3% [21] and in Addis Ababa, Bishoftu General Hospital 5.6% [29]. This difference might be due to changes in population risks, as in this study majority of volunteer donors were high school and university students. Even though it is possible to find HBsAg test positivity in all age groups, this finding strongly supports the role of sexual transmission of HBV infection since high prevalence were at sexually active (fire stage) age group of 18-20 (3.2%).

From the bivariable and multivariable analysis, none of the socio-demographic variable was significantly associated with HBV infection. Sharing of sharp materials was significantly associated with HBV infection. Those having shared any sharp material were three times more likely to be infected with HBV infection than those who never share sharp materials. Consistent result was reported from Woldiya prison [41]. This may be related the fact that in our study since majority of the study participants 395 (98%) were students, where sharing of sharp materials with family members might be common.

Tooth extraction was the other strong predictor of Hepatitis B infection where blood donors who had history of tooth extraction were at increased risk of hepatitis infection [AOR=5.2, 95%CI: 1.54-17.47]. This is supported by bulk of literatures as indicated review by Mahboobi, et al. [42] and current report by Suliman M. Al Humayed [43]. As it had already mentioned on these study the increased risk of infection in individual who had the experience of tooth extraction might related to the fact that dental procedures often result in bleeding and exposure to infected body fluids that are known vehicles of infectious disease transmission.

Conclusion and Recommendations

This study showed that the prevalence of HBV infections among volunteer blood donors in Debre Markos Blood Bank center was 4.7%. History of tooth extraction and sharing of sharp materials were found to increase the risk of hepatitis B virus infection. We recommend that all volunteer blood donors must be strictly screened before donation. Since High schools and universities were a large pool of volunteer donors, health education about the disease and its modes of transmission must be given in these sites. In addition, health education must be specifically given to seropositive individuals to halt the transmission. Efforts are also required for introducing free vaccination against HBV to high-risk groups. Further, there is a need for community based HBV infection study for further investigate the risk factors, which are crucial to implement effective prevention program of HBV infection.

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from ethical review committee of Bahir Dar University, College of Medicine and Health Sciences, School of Public Health and Department of Biostatistics and Epidemiology. During data collection, brief explanation was given about the objective and significance of the study to each participant in order to obtain verbal consent. Respondents were not identified by their name and the participant had the right to discontinue the participation at any time. Official letter was given for concerned bodies and Permission letter was taken from Debre Markos blood bank center administration office. Confidentiality of the information was assured from all the data collectors and principal investigators side. Participants having positive result were referred to nearby health facilities for further diagnosis and treatment.

Consent for publication

Consent for publication is not applicable- this study did not take individual person's detail such as name, images, or videos.

Availability of data and material

All the data generated or analyzed during this study are included in this published article.

Competing interests

The authors declare that we have no competing interests.

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Authors' contributions

Yeneanchalem Bialfew wrote the proposal, participated in data collection, and analyzed the data. Getachew Hailu and Tsion Samuel approved the proposal with some revisions, and participated in data analysis. Getachew Hailu wrote the manuscript. We revised drafts of the paper. All authors read and approved the final manuscript.

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