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Magnitude and Associated Risk Factor of HBV Virus Among Pregnant Mothers Attending Antenatal Care in Debre Tabor Referral Hospital; Northwest Ethiopia

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Abstract: *Background*: Hepatitis is a contagious liver disease caused by Hepatitis B virus. When a pregnant mother infected, the Hepatitis B virus can stay in the body and Vertical transmit to baby and develop chronic liver disease. In regarding to this Neonatal immunization interrupts this vertical transmission and used to take preventive action. For that reason, this study was undertaken with the aim of determine the magnitude and predisposing factors of HBV infections among pregnant women. An institutional based cross-sectional study was conducted 333 pregnant women attending ANC from September 2020 to November 2020 at Debre Tabor Referral Hospital antenatal care clinic. Appropriate sample was collected; serum separated and tested with ELISA test for the detection of HBsAg. Fishers exact test was employed to see the association between variables as well as Logistic regression were applied to identify potential risk factors (P-value < 0.05) was considered as statistically significant. A total of 333 pregnant women within 100% response rate; were enrolled in this study and the magnitude of HBV infections found to be were (22.2%). among the potential risk factors multiple sexual behavior (AOR 3.096), 95% CI=1.469-6.525, *P-value*=0.003), shaving habit (AOR 3.375, 95% CI=1.511-7.538, *P-value*=0.003), a history of needle stick injury (AOR 4.080, 95% CI=2.041-8.156, *P-value*=0.000), history of common usage of Sharpe materials (AOR 8.229, 95% CI=3.991-16.967, *P-value*=0.000) and history of home delivery by traditional attendants were (AOR 1.557, 95% CI=0.621-3.899, *P-value*=0.000) were significantly associated with important predictors of hepatitis B infection. *For that reason* this study showed high endemicity of HBV infection among pregnant women. Multiple sexual practices, history of home delivery, needle stick injury, common usage of Sharpe materials and shaving habit were major factors for hepatitis B virus transmission. Thus, scaling up of screening pregnant women for HBV infection and provision of health education about risk factors and testing all pregnant mothers for hepatitis B virus should be a regular feature of the ANC service. Other community studies, as well as screening HBV antigen marker conducting, will play an important role in accurately determining the true spread of hepatitis B virus in the general population.

Keywords: HBV, Pregnancy, Magnitude, Risk Factor

1. Background

Hepatitis B virus (HBV) infection is an important worldwide public health problem and it is the most common cause of chronic infection can lead to liver cirrhosis and hepatocellular carcinoma [1-3]. It also known as serum hepatitis is a disease of the liver caused by hepatitis B virus group under Heapadnaviridae in which a core antigen surrounded by a shell containing hepatitis B surface antigen has numerous antigenic components which is reported to be the main etiological factor of chronic liver diseases worldwide [4-6]. The virus has 50-100 and 10 times infectious than immunodeficiency virus and hepatitis C virus respectively [7, 8].

In Italy, HBV infection is endemic; approximately 400,000 infection (700/1000) were found per year [9]. During pregnancy HBV is associated with a high risk of maternal complications, has a high rate of vertical transmission causing foetal and neonatal hepatitis and has been reported as a leading cause of maternal mortality [10]. In accordance of world health organization, the saddle of HBV infection to be approximately 2 billion, >350 million chronically infected with HBV, and 500,000–700,000 patients die annually as a result of HBV related liver disease, such as liver cirrhosis, heapatocellular carcinoma and the third most common cause of death in medical ward with 15-60% seropositivity of HBsAg [11, 12].

Hepatitis is an inflammation of the liver characterized by the presence of inflammatory cells in the tissue of the organ and associated with high risk of fetal neonatal hepatitis maternal complication, jaundice in pregnancy and mortality during pregnancy and it referred to as silent killer [13, 14]. Viral hepatitis at some stage in pregnancy is closely related to high risks of maternal complications including premature contractions, placenta Previa, and preterm delivery, premature rupture of membranes, vaginal bleeding, preterm labour and mortality with a high rate of vertical transmission and risk of transmitting infection to their newborn infants leading to fetal and neonatal hepatitis [4, 15].

In addition, the virus transmitted horizontally by means of sexual intercourse, exchange or transfer of body fluids like blood or saliva, needle sharing with drug addicts, tattooing, contact with persons with jaundice, dental procedures and blood transfusions [16].

However, the prevalence of HBV infection varies widely in different parts of the world [17]. According to this we can classify the prevalence as high (more than 8%), medium (between 2% and 8%), and low epidemic (less than 2%) [1, 18]. For instance, the research conducted in different country in the world showed that there were high prevalence of HBV among pregnant mothers (in Paraná State, Brazil and Gambia (18.5% and 9.2%) [2, 19].

When we see about the prevalence in different parts of Ethiopia, Italy, Mbarara Regional Referral Hospital and Maranhão state Brazil indicated that there were moderate prevalence of HBV among pregnant mothers (Dessie town 4.9% [3], Bahir Dar city 3.8% [20], Arba Minch 4.3% [21], and 5.4% in public hospitals in Ethiopia [22], 2.4% [9], 3.12% [23] and 7.4% [1] respectively. In some parts of the world like Nepal (0.25%) [24] and Espírito Santo State, Brazil (1.1%) have lower prevalence of HBV infection among pregnant women [18].

In Ethiopia Various studies showed that blood transfusion, body tattooing, history of surgery and unsafe injection, history of abortion, most sexual partners', harmful practices associated with culture, such as ear pricing and also perinatal, horizontal, and sexual transmission is an important source of HBV transmission [25, 26]. In Ethiopia the surveillance conducted from July to September, 2014 Hepatitis B virus infection and risk factors among pregnant women at public hospital showed that Pregnant women with hepatitis B virus infection are reservoir for the virus and do have high potential to transmit it to their fetuses (newborns) and the risk of HBV transmission to newborn infants accounts 70-90% during the simultaneous positivity of mothers with HBsAg seromarkers and 10–40% of risk of HBV transmission observed if mothers test positive for only HBV [22]. Viral hepatitis is blood borne pathogens can cause a life-threatening liver disease has important public health issue in developing countries including Ethiopia have intermediate endemicity (4.4%) of HBV infection in pregnant women and contagious relatively easy to be transmitted from one infected individual to another by blood to blood contact, during birth, unprotected sex, and by sharing needles [15, 27] in regarding to this WHO recommended that hepatitis B vaccine be incorporated into routine infant and childhood immunization program for all countries by 1997such data are fundamental for health planers and care givers for evidence-based intervention [26].

Now a day's burden of hepatitis B in pregnant mother is one of the main problem for maternal health especially in Ethiopia [28]. Although many studies have been done on liver disease in different parts of Ethiopia, studies have shown that the spread of liver disease in people with lung cancer, HIV, heart disease, and diabetes. These are just a few of the studies that have been done on pregnant women.

So conducting this study has its own input for maternal health as well as for health program managers and for future study.

In addition, determining the prevalence of HBV, the associated factors also, important to establish a strategy to prevent or reduce exposures, to devise a protocol for management of such exposures including post exposure management, Vaccination and draw the attention of stake holders to focus on such preventable but life threatening virus.

2. Methods

2.1. Study Design and Setting

A cross-sectional study was conducted from September 2020 to November 2020 at Debre Tabor Referral Hospital antenatal care clinic. The Hospital provides health service to three million inhabitants and residents found in Debre Tabor City, South Gondar administration zone, Amhara National Regional state, 666 km North of Addis Ababa.

2.2. Study Subjects and Sampling

All pregnant women who were visited ANC service in Debre Tabor General Hospital during study period are the study subject and Systematic random sampling method was used to select the study participants among ANC attendants.

On average, 20 pregnant women per day visited the ANC clinic at Debre Tabor Referral Hospital and there are 22 working days in a month excluding the National calendar days. Considering 3 months study period, 1320 pregnant women were expected to visit the ANC clinic during the study period. Hence, K is equal to four (4), one woman was randomly selected among ANC attendants by lottery method, and then every four (4) woman was selected to participate in the study.

2.3. Sample Size Determination

Sample size was determined using a previous study done

in Gondar Health Center, northwest Ethiopian on Prevalence of hepatitis B virus in pregnant women was 7.3% [29]. The minimum sample size was calculated using a single population formula, taking into account the 7.3% prevalence of HBV in Gondar Health center sero-positive of pregnant women with 3% margin error and 95% confidence interval (CI), the sample size was determined to be 333.

$$n = \frac{z^2\alpha/2(P(1-P))}{d^2}$$

n=the minimum sample size

z=the standard normal deviate=1.96

p=the proportion in the target population estimated to have a particular characteristic in which previous prevalence 7.3% [29]

q=1.0-p=1 - 0.073=0.927

d=Degree of accuracy desired which is 3% (0.03) consequently by applying the

Formula as follows

$$n = \frac{(1.96)2x\ 0.073x\ (1-0.073)}{0.03^2} = \frac{3.8416\ x\ 0.073x0.927}{0.0009} = 289$$

Considering the 15% non-response (attrition) on 289 is 29 then the minimum sample size for this study is 289+29=318. But I have used a minimum sample size of 333 is chosen for this study.

2.4. Sample Collection and Laboratory Analysis

After obtaining written consent from the study subjects the trained nurses working at ANC clinic were assigned to collecte appropriate data, Essential information for this study was collected from the study participants orally and in writing questionnaires. After verification of test kits to determine the accuracy of known positive and negative samples, serum of this known sample was analyzed for HBsAg were confirmed by ELISA technique.

Then, venous blood was collected and serum was separated by centrifugation according to SOPS by trained medical laboratory specialist and tested for HBsAg using ELISA Hepanostica HBsAg Uniform II (Bio-Merieux, Boxtel, and Netherland) was screened.

2.5. Quality Control and Data Analysis

The principal investigator and supervisors was assigned to guide the data collection and check the data completeness, consistency of the questionnaire and based on test manufacture instruction the procedure was done by the following manner.

We strictly followed the standard operating procedures to insure the quality of laboratory results were followed during sample collection and laboratory investigation. Known positive and Negative sample for HBV sample were used and analyzed as internal quality control before the actual investigation. Besides this all laboratory analysis was performed according to manufacturer instruction.

Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 20 tactical software. Fishier exact test, logistic regression and 95% confidence interval were employed to determine association between possible variables. Also with P-value of <0.05 was regarded as significant.

3. Result

3.1. Demographic Characteristics

From September 2020 to November 2020, 333 pregnant women were selected for a study conducted on pregnant mothers attending antenatal care at Debre Tabor Referral Hospital the ANC Clinic.

The majority of the study participant lived in urban 210 (63.1%) and of 240 (72.1%) were orthodox, 133 (39.9%) were the age range of 18-27 years old, 157 (47.1%) were employed and 256 (85.9%) were secondary and above education level. The magnitude of HBV infection in socio-demographic states show that there were high prevalence in urban 48 (14.4%), orthodox 42 (12.6%), employed 30 (9%) and with age range of 18-27 had 26 (7.8%) in related to which had low prevalence in other socio-demographic characteristics like the age of >48 years 6 (1.8%) and day labors 11 (3.3%) (Table 1).

Table 1. *Socio-demogaphic and HBV states of pregnant women at Debre Tabor referral hospital, south Gondar, northwest, Ethiopia, 2020. (N=333).*

Variables		Frequency N (%)	HBV status	
			Positive N (%)	Negative N (%)
Age s	18-27	133 (39.9)	26 (7.8)	107 (32.1)
	28-37	93 (27.9)	22 (6.6)	71 (21.3)
	38-47	87 (26.1)	20 (6)	67 (20.1)
	>48	20 (6)	6 (1.8)	14 (4.2)
Resident	Urban	210 (63.1)	48 (14.4)	162 (48.6)
	Rural	123 (36.9)	26 (7.8)	97 (29.1)
Occupation	Employed	157 (47.1)	30 (9)	127 (38.1)
	Day labor	30 (9)	11 (3.3)	14 (4.2)
	House wife	25 (7.5)	20 (6)	10 (3)
	Student	121 (36.3)	13 (3.9)	108 (32.4)
Religion	Orthodox	240 (72.1)	42 (12.6)	198 (59.5)
	Muslim	44 (13.2)	14 (4.2)	30 (9)
	Catholic	27 (8.1)	12 (3.6)	15 (4.5)
	Others	22 (6.6)	6 (1.8)	16 (4.8)
Education status	non formal education	16 (4.8)	7 (2.1)	9 (2.7)
	Primary school	31 (9.3)	15 (4.5)	16 (4.8)
	Secondary and above	256 (85.9)	52 (15.6)	234 (70.3)

3.2. Exposure to Potential Risk Factors of Explanatory Variables for Hepatitis B Virus Infection

Concerning to the exposure of potential risk factor of HBV infection, one hundred four (21.2%) women's had a history of multiple sexual behavior, of them 35 (10.5%) were HBV positive, 95 (28.5%) were had a history of tattooing among this twenty five (7.5%) were HBV positive, fifty one (15.3%) had a history of abortion and 43 (12.9%) of them were HBV positive, and 70 (21%) pregnant women's had shaving habit among them 25 (7.5%) were HBV positive, 119 (35.5%) had need stick injury and 45 (13.5%) were HBV positive. When we see other reasonable factors 70 (21%) women who had a history of common sharing of tooth brush 16 (4.8%) were HBV positive, one hundred sixty three (83.4%) had been ear pricing of them 46 (13.8%) were HBV positive, and 67 (20.1%) had a history of surgery of them 22 (6.6%) were HBV positive. On the other hand 105 (31.5%) pregnant women delivered in their home among this 46 (13.8%) were HBV positive, and 48 (14.4%) had received blood transfusion of them 17 (5.1%) were positive. In this study 169 (50.7%) women were singled and 26 (7.8%) of the were HBV positive because of this women who were single they had multiple sexual behavior and this is the main risk for women to exposed to hepatitis B infection (table 2).

Table 2. *Explanatory variables and hepatitis B virus infection among pregnant women attending at Debre Tabor Referral Hospital, South Gondar, Northwest, and Ethiopia 2020. (N=333).*

Variables		Total (N)	Anti HBV status	
			Positive N (%)	Negative N (%)
Multiple sexual behaviour	Yes	104 (21.2)	35 (10.5)	69 (20.7)
	No	229 (68.8)	(39 (11.7)	190 (57.1)
History of tattooing	Yes	95 (28.5)	25 (7.5)	70 (21)
	No	238 (71.5)	49 (14.7)	189 (56.8)
History of abortion	Yes	51 (15.3)	43 (12.9)	8 (2.4)
	No	282 (84.7)	31 (9.3)	251 (75.4)
shaving habit	Yes	70 (21)	25 (7.5)	45 (13.5)
	No	263 (79)	49 (14.7)	214 (64.3)
Needle stick injury	Yes	119 (35.7)	45 (13.5)	74 (22.2)
	No	214 (64.3)	29 (8.7)	185 (55.6)
Communal usage of sharp materials	Yes	104 (31.2)	49 (14.7)	55 (16.5)
	No	229 (68.8)	25 (7.5)	204 (61.3)
Sharing of toothbrush	Yes	70 (21)	16 (4.8)	54 (16.2)
	No	263 (79)	58 (17.4)	205 (61.6)
Ear pricing	Yes	163 (83.4)	46 (13.8)	117 (35.1)
	No	170 (60)	28 (8.4)	142 (42.6)
History of surgery	Yes	67 (20.1)	22 (6.6)	45 (13.5)
	No	266 (79.9)	52 (15.6)	214 (64.3)
History of hone delivery	Yes	105 (31.5)	46 (13.8)	59 (17.7)
	No	228 (68.5)	28 (8.4)	200 (60.1)
History of blood transfusion	Yes	48 (14.4)	17 (5.1)	31 (9.3)
	No	285 (85.6)	57 (17.1)	228 (68.5)
Marital status	Single	169 (50.7)	26 (7.8)	143 (42.9)
	Married	106 (31.8)	21 (6.3)	85 (25.5)
	Divorced	35 (10.5)	16 (4.8)	19 (5.7)
	Widowed	23 (6.9)	11 (3.3)	12 (3.6)

3.3. Association of HBV Infection and Explanatory Variables Among Study Subjects in Bi-variate Logistic Analysis

The association between HBV infection and risk factors were analyzed by using logistic regression and multivariate logistic regression analysis was used for scheming confounding factors and evaluate the strength association of variables with HBV infection among study group.

In Bi-variate logistic regression; variables (multiple sexual behavior, history of abortion, shaving habit, needle stick injury, common sharing of sharp materials, ear pricing, history of surgery, history of blood transfusion and home delivery) were associated to HBV infection (P value < 0.05) in bi-variate analysis and they were entered to multivariate logistic regression (table 3).

Table 3. Bi-variate logistic regression observation on risk factor association with HBV infection among pregnant women at Debre Tabor Referral Hospital, South Gondar, Northwest, Ethiopia 2020 (N=333).

Variables		Total (N)	Anti HBV status		COR (95% CI)	P-value
			Positive N (%)	Negative N (%)		
Multiple sexual behaviour	Yes	104 (21.2)	35 (10.5)	69 (20.7)	2.471 (1.450-4.211)	0.001
	No	229 (68.8)	39 (11.7)	190 (57.1)	1	
History of tattooing	Yes	95 (28.5)	25 (7.5)	70 (21)	1.378 (0.791-2.398)	0.257
	No	238 (71.5)	49 (14.7)	189 (56.8)	1	
History of abortion	Yes	19 (5.7)	12 (3.6)	7 (2.1)	6.968 (2.634-18.430)	0.000
	No	314 (94.3)	62 (18.6)	252 (75.4)	1	
shaving habit	Yes	70 (21)	25 (7.5)	45 (13.5)	2.426 (1.360-4.330)	0.003
	No	263 (79)	49 (14.7)	214 (64.3)	1	
Needle stick injury	Yes	119 (35.7)	45 (13.5)	74 (22.2)	3.879 (2.263-6.650)	0.000
	No	214 (64.3)	29 (8.7)	185 (55.6)	1	
Communal usage of sharp materials	Yes	104 (31.2)	49 (14.7)	55 (16.5)	7.270 (4.126-12.808)	0.000
	No	229 (68.8)	25 (7.5)	204 (61.3)	1	
Sharing of toothbrush	Yes	70 (21)	16 (4.8)	54 (16.2)	1.047 (0.558-1.965)	0.886
	No	263 (79)	58 (17.4)	205 (61.6)	1	
Ear pricing	Yes	163 (83.4)	46 (13.8)	117 (35.1)	1.994 (1.174-3.387)	0.011
	No	170 (60)	28 (8.4)	142 (42.6)	1	
History of surgery	Yes	67 (20.1)	22 (6.6)	45 (13.5)	2.012 (1.112-3.641)	0.021
	No	266 (79.9)	52 (15.6)	214 (64.3)	1	
History of home delivery	Yes	105 (31.5)	46 (13.8)	59 (17.7)	5.569 (3.206-9.675)	0.000
	No	228 (68.5)	28 (8.4)	200 (60.1)	1	
History of blood transfusion	Yes	48 (14.4)	17 (5.1)	31 (9.3)	2.194 (1.135-4.239)	0.019
	No	285 (85.6)	57 (17.1)	228 (68.5)	1	
Marital status	Single	169 (50.7)	26 (7.8)	143 (42.9)	1	
	Married	106 (31.8)	21 (6.3)	85 (25.5)	1.359 (0.720-2.563)	0.344
	Divorced	35 (10.5)	16 (4.8)	19 (5.7)	4.632 (2.112-10.159)	0.000
	Widowed	23 (6.9)	11 (3.3)	12 (3.6)	5.042 (2.012-12.634)	0.001

3.4. Association of HBV Infection and Potential Risk Factors Among Study Subjects in Multivariate Logistic Analysis

In bivariate logistic regression; (multiple sexual behavior, history of abortion, shaving habit, needle stick injury, common sharing of sharp materials, ear pricing, history of surgery, history of blood transfusion and home delivery) were associated to HBV infection (P value < 0.05) in bivariate analysis and they were entered to multivariate logistic regression (table 3). In final model of multivariate logistic regression the same five variables were found to significant predictor of HBV infection (P- value <0.05).

In relation to multiple sexual behavior, 21.2% of the study subjects were had multiple sexual behavior, of which 10.5% were found to be positive for HBsAg. Statistical significant association was observed between multiple sexual behavior and HBV infection (*P-value*=0.003). Those who had multiple sexual behavior were 2.5 times more likely infected than their counterparts (AOR 3.096), 95% CI=1.469-6.525).

Pregnant women who had shaving habit were 21%, of which 7.5% were found to be positive of HBsAg. Statistical significant association was detected between women had shaving habit and HBV infection (*P-value*=0.003). Those who had shaving habit were 3.4 times more likely infected

than women who had no shaving habit (AOR 3.375, 95% CI=1.511-7.538).

The proportion of pregnant women who had needle stick injury was 35.5%, of which 13.5% were positive of HBsAg. Statistical significant association was obtained between women had needle stick injury and HBV infection (*P-value*=0.000). Who had needle stick injury were 4.1 times high risk to be infected by HBV infection than women who had no a history of needle stick injury (AOR 4.080, 95% CI=2.041-8.156).

Among 333 pregnant women, 104 women were had Communal usage of sharp materials, of these 16.5% were positive for HBV infection. Statistical significant association was perceived between these two variables (*P-value*=0.000). Those women with history of common usage of Sharpe materials were 8.229 times more likely had HBV infection (AOR 8.229, 95% CI=3.991-16.967).

Women who had a history of home delivery by traditional attendants were 105 (31.5%), of which 46 (13.8%) were HBsAg positive. Statistical significant association was sensed between women who delivered at home and HBV infection (*P-value*=0.000). Those women with history of home delivery by traditional attendants were 2 times more likely infected with HBV infection (AOR 1.557, 95% CI=0.621-3.899) (table 4).

Table 4. *Multiple logistic regression observation on risk factor association with HBV infection among pregnant women at Debre Tabor Referral Hospital, South Gondar, Northwest, Ethiopia 2020. (N=333).*

Variables		Total (N)	Anti HBV status		COR (95% CI)	P-value	AOR (95% CI)	P-value
			Positive N (%)	Negative N (%)				
Multiple sexual behavior	Yes	104 (21.2)	35 (10.5)	69 (20.7)	2.471 (1.450-4.211)	0.001	3.1 (1.469-6.525)	0.003*
	No	229 (68.8)	39 (11.7)	190 (57.1)	1		1	
History of abortion	Yes	19 (5.7)	12 (3.6)	7 (2.1)	6.968 (2.634-18.430)	0.000	1.9 (0.549-6.637)	0.309
	No	314 (94.3)	62 (18.6)	252 (75.4)	1		1	
shaving habit	Yes	70 (21)	25 (7.5)	45 (13.5)	2.426 (1.360-4.330)	0.003	3.4 (1.511-7.538)	0.003*
	No	263 (79)	49 (14.7)	214 (64.3)	1		1	
Needle stick injury	Yes	119 (35.7)	45 (13.5)	74 (22.2)	3.879 (2.263-6.650)	0.000	4.1 (2.041-8.156)	0.000*
	No	214 (64.3)	29 (8.7)	185 (55.6)	1		1	
Communal usage of sharp materials	Yes	104 (31.2)	49 (14.7)	55 (16.5)	7.270 (4.126-12.808)	0.000	8.2 (3.991-16.967)	0.000*
	No	229 (68.8)	25 (7.5)	204 (61.3)	1		1	
Ear pricing	Yes	163 (83.4)	46 (13.8)	117 (35.1)	1.994 (1.174-3.387)	0.011	1.6 (0.809-3.144)	0.178
	No	170 (60)	28 (8.4)	142 (42.6)	1		1	
History of surgery	Yes	67 (20.1)	22 (6.6)	45 (13.5)	2.012 (1.112-3.641)	0.021	1.5 (0.646-3.361)	0.357
	No	266 (79.9)	52 (15.6)	214 (64.3)	1		1	
History of home delivery	Yes	105 (31.5)	46 (13.8)	59 (17.7)	5.569 (3.206-9.675)	0.000	6.8 (3.332-13.820)	0.000*
	No	228 (68.5)	28 (8.4)	200 (60.1)	1		1	
History of blood transfusion	Yes	48 (14.4)	17 (5.1)	31 (9.3)	2.194 (1.135-4.239)	0.019	1.6 (0.621-3.899)	0.345
	No	285 (85.6)	57 (17.1)	228 (68.5)	1		1	

4. Discussion

WHO classification of HBV infection classified as high (>8), medium (2-7) and low (<2) and it remains a public health problem in the world that causes chronic infection affecting pregnant women ranging from sever to mothers and chronic infection to new borne [27]. In present study, sera collected from pregnant women were screened for HBsAg shows acute HBV infection. The prevalence of HBV among the present study participant 22.2%.

The 22.2% prevalence of HBV infection obtained in the present study area appears to be high endemic according to WHO criteria of global HBV epidemiology.
The magnitude of Hepatitis B surface antigen in this study relatively higher than the study carried out in Iran (0.7%) [30], Egypt (1.75%) [31]. However, higher prevalence of Hepatitis B surface antigen were reported in Cameroon 7.7% [8], Mali 8.0% [32], Nigeria 9.3% [33]. Other studies conducted in university of Ilorin teaching hospital in Nigeria on the similar study population showed that prevalence of hepatitis B virus infection was found to 41 (5.6%) out 728 pregnant women at Omdurman Maternity Hospital in Sudan [14]. Globally, the incidence of liver disease varies from continent to continent, with more than 8% in Africa, Asia and the Western Pacific and the results from this study are in agreement with high (>8%) in Southern and Eastern Europe and lowest (<2%) in Western Europe, North America and Australia [6]. The magnitude of HBV infection (22.2%) inline (high endemic in accordance of WHO criteria) with findings of similar studies conducted on pregnant women who attended antenatal clinics of the hospitals on other parts of the world revealed 10% in Hong Kong [18], 12% in Taiwan [34], 14.3% and 17.3% Nouna or Ouagadougou state in Burkina Faso [35] respectively.

In contrast to previous study conducted in different parts of Ethiopia, the present study (22.2%) is also relatively high than studies carried out among pregnant women in Jimma and Bahir Dar city 3.7% and 3.8% [20, 26] and Gondar town 7.3% [29] respectively.

In multivariate logistic regression, history of multiple sexual behavior, shaving habit, needle stick injury, common sharing of sharp materials, and home delivery were significant factors of Hepatitis B virus infection among pregnant women (P - value > 0.05) and supported by similar findings research done in Kano state of Nigeria [16].
On the other hand, mothers who undergo surgery and donated blood did not have a association with Hepatitis B virus, but compared to the finding in Kano State of Nigeria [16] and Egypt [31], those who undergo surgery and blood donations had significant association with HBV infection. The history of blood donation among pregnant mothers included in this study and the number of mothers who have undergone surgery have not been directly associated with HBV infection. Infectious diseases like HBV infection (liver disease) among the greatest threats to blood safety for transfusion recipients and pose a serious public health problem [36].

In this study, among the total study participants 21.2% of the study subjects were had multiple sexual behavior, of which 10.5% were found to be positive for HBsAg. Statistical significant association was observed between multiple sexual behavior and HBV infection (AOR 3.096), 95% CI=1.469-6.525, *P-value*=0.003). Those who had multiple sexual behavior were 3 times more likely infected than their counterparts.

Pregnant women who had shaving habit were 21%, of which 7.5% were found to be positive of HBsAg. Statistical

significant association was detected between women had shaving habit and HBV infection (*P-value*=0.003). Those who had shaving habit were 3.4 times more likely infected than women who had no shaving habit (AOR 3.375, 95% CI=1.511-7.538).

The proportion of pregnant women who had needle stick injury was 35.5%, of which 13.5% were positive of HBsAg. Statistical significant association was obtained between women had needle stick injury and HBV infection (*P-value*=0.000). Women who had needle stick injury were 4.1 times high risk to be infected by HBV infection than women who had no a history of needle stick injury (AOR 4.080, 95% CI=2.041-8.156).

Among 333 pregnant women, 104 women were had Communal usage of sharp materials, of these 16.5% were positive for HBV infection. Statistical significant association was perceived between these two variables (*P-value*=0.000). Those women with history of common usage of Sharpe materials were 8.229 times more likely had HBV infection (AOR 8.229, 95% CI=3.991-16.967).

Women who had a history of home delivery by traditional attendants were 105 (31.5%), of which 46 (13.8%) were HBsAg positive. Statistical significant association was sensed between women who delivered at home and HBV infection (*P-value*=0.000). Those women with history of home delivery by traditional attendants were 2 times more likely infected with HBV infection (AOR 1.557, 95% CI=0.621-3.899).

5. Conclusions

This study showed high endemicity of HBV infection among pregnant women. Multiple sexual practices, history of home delivery, needle stick injury, common usage of Sharpe materials and shaving habit were found to be significant predictors of HBV infection. Thus, scaling up of screening pregnant women for HBV infection and provision of health education about risk factors, mode of transmission should be recommended and testing all pregnant mothers for hepatitis B virus should be a regular feature of the ANC service. In addition, other community-based studies and screening HBV antigen marker conducting, may be used to identify potential transmission routes of hepatitis B virus and to take preventive action. Other community studies, will play an important role in accurately determining the true spread.

6. Recommendation

Protective measures for pregnant women must be one part of every program; HBV vaccination programs for pregnant women are needed; large scale prospective study is also recommended to measure the extent of risks of HBV infection among pregnant women.

In order to reduce the spread of the virus, it is important to make public education available to the community as well as to pregnant women. In addition, other community-based studies may be used to identify potential transmission routes and to take preventive action.

7. Limitation of the Study

Our study used only HBsAg Sero- marker for the detection of HBV infection. Other Sero -markers other than HBsAg were not possible to use in this study. Only using HBsAg might be the reason for the under estimated prevalence of HBV infection among pregnant women which could have been obtained. Besides this the study period and participants are too small that makes generalization based on the observed result too much difficult.

Abbreviation and Acronyms

ANC - Antenatal care, HBV -Hepatitis B Virus, HBsAg- hepatitis B virus surface antigen HCC - heapatocellular carcinoma, MLT -medical laboratory technologist, OR-odds ratio, OPD –Out patient department, PEP – personal protective equipment, SPSS -statistical package for social science, WHO-World Health Organization

Availability of Data and Material

All materials are within the manuscript, any additional data will be shared upon request to the corresponding author.

Author Contribution

MA initiate the study concept and designed the study, KA carried out data collection, ED carried out laboratory analysis, MA &KA supervised the data collection and laboratory analysis, MA and KA analyzed the data, MA and ED prepared the first manuscript draft, all authors read, reviewed and approved the data draft final manuscript.

Ethics Approval and Consents of Participant

This study was ethically cleared by the ethics committee of the Debre Tabor Health Science College and Debre Tabor Referral hospital. Participation was voluntary and informed verbally consent was taken from all participants before inclusion to the study. At the outset participant were briefly explained about the objective of the study, and they informed that participation is on voluntary basis and they can stop or leave from the participation at any time the study using their local language. Written consent were not acquired because all participant in Debre Tabor ANC clinic were first visitors for ANC follow up become recorded immediately on ANC registration. Therefore, considering this only verbal agreement was acquired to be included in the study. Voluntary participants who were diagnosis positive for HBV were immediately attach to ANC clinic of Debre Tabor Referral Hospital for appropriate treatment and follow up.

Consents of Publication

Not applicable.

Competing Interest

The authors declared that they have no competing interest.

Acknowledgements

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