



Prevalence and Associated Factors of Hepatitis B Virus Infection Among Pregnant Women Attending Antenatal Care at Felegehiwot Hospital, Bahir Dar, Ethiopia

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Abstract: *Background:* Hepatitis B virus is one of the major infectious diseases and caused by a small enveloped DNA virus. Globally, 360 million people have a chronic HBV infection, and greater than three fourth of these live in the Western Pacific Region and Africa, considered as a region with high endemicity. Hepatitis B virus infection during pregnancy has a high risk of vertical transmission and is harmful to both the mother and the newborn. There is a lack of information regarding the prevalence of HBV infection and its contributing factors among pregnant women in Bahir Dar City. *Objectives:* To assess the prevalence and associated factors of Hepatitis B virus infection among pregnant women who had Antenatal Care services at Felegehiwot Comprehensive specialized Hospital in Bahir Dar City. *Methods:* Institution based cross sectional study design was employed at Felegehiwot Comprehensive specialized Hospital among 221 mothers. Systematic random sampling technique was used to select the study participants and data was collected using structured questionnaire by face-to-face interview and chart reviews. Data were entered into SPSS version 25 and cleaned, coded and analyzed. Bivariate and multi-variable logistic regression analysis was used. $P < 0.05$ was used to express the statistical significance of the variables. *Result:* Prevalence of HBV infection is found to be 4.5% among study participants. History of blood transfusion [AOR=13.4, 95% CI (1.79-101.36)], genital mutilation [AOR=11.2, 95% CI (1.20-104.3)] and body tattooing [AOR= 6.6, 95% CI (1.29-33.7)] were the significantly associated determinant factors for HBV infection. *Conclusion:* The prevalence of the HBV was intermediate, according to WHO classification criteria. History of blood transfusion, body tattooing and genital mutilation were the determinant factors identified

in this study. The study's recommendations involve maintaining sterility while taking blood samples for transfusion, eliminating risky cultural behaviors, and promoting community awareness regarding transmission and prevention techniques.

Keywords: Prevalence, HBV, Pregnant Women, Antenatal Care

1. Introduction

Hepatitis B virus is among the leading public health infectious disease globally. It is caused by Hepatotropic Deoxyribonucleic acid (DNA) virus. In 2015, the global prevalence of HBV infection in the general population was 3.5%. Prevalence was highest in the African (6.1%) and Western Pacific regions (6.2%). Globally, almost two billion people have been exposed to HBV at some stage of their lives, and an estimated 360 million people are infected chronically and approximately 780,000 patients die from advanced liver disease caused by chronic HBV infection each year. Assuming that women of reproductive age constitute 25.3% of the world's population, adults chronically infected may include 65 million women of childbearing age who can potentially transmit HBV to their babies [1-4]. The global prevalence of chronic HBV infection varies widely, from high (>8%), e.g., Africa, Asia, and the western Pacific to intermediate (2-7%) e.g., Southern and Eastern Europe and low (<2%), e.g., Western Europe, North America and Australia. Ethiopia is in the intermediate category [1, 5, 6].

HBV infection spreads mostly via vertical transmission during the prenatal period and sexual intercourse. Perinatal and early childhood transmissions are the main routes of HBV infection in endemic areas [1]. In underdeveloped nations with high or moderate endemicity, vertical transmission from mother to child and horizontal transmission between children, particularly siblings, and to the community are the most commonly identified routes of infection. Neonates born of chronically infected mothers have a 70–90% risk of the infection progressing to a chronic phase [1].

Ethiopia is currently examining the breadth of the problem and delivering immunization for health care workers, but there is still no access to and availability of HBV vaccine for those healthy women. As thus, the purpose of this study aimed to assess the prevalence as well as risk factors of HBVsAg among pregnant mothers attending prenatal care at Felegehiwot comprehensive specialized hospital (FHCSH). In different parts of Ethiopia, studies showed that the prevalence of HBV infection in pregnant women ranges 3.8-7.8% [7, 8].

Women is the major basis of the future community as well as they interface their sexual partner. Pregnant women should be screened for HBV before delivery, as this offers an opportunity to prevent vertical transmission of mother to child. Pregnancy-related HBV infection carries a significant risk of vertical transmission and is harmful for both the mother and the newborn. The prevalence of HBV infection and the variables that contribute to it among pregnant women in Bahir Dar City are not well addressed so far. Prevention of vertical transmission has extreme public health importance. Accordingly, the finding provides information for prevention

and control strategies and base line data for future researchers.

2. Methods and Materials

2.1. Study Area and Populations

This study was conducted at FHCSH in Bahir Dar city from July 11- August 10/2022 G.C. Bahir Dar is the regional city of Amhara nation, 495 km Northwest of Addis Ababa. Based on the 2021/2022-year Health indicators report by Bahir Dar city administration health office, it has 3 governmental Hospitals and 8 Health Centers (HCs). The Hospital provides services for approximately ten million residents from the communities that surround it in the western area of the Amhara region. It has 1416 staffs, 12 wards and more than 500 beds. Mother and child health is one of the major departments. It provides care for the pregnant mothers widely in ANC, maternity, intrapartum and postpartum period, with a staff of 61 midwives, 27 General Practitioners and 5 senior obstetricians.

The ANC follow up sub-department has three rooms and gives service for 1340 pregnant women in the 6month report prior to data collection time. The source population was all pregnant mothers who had ANC follow up at FHCSH. All Pregnant mothers who were attending the ANC follow up at FHCSH during the study period were the study population.

2.2. Study Design and Period

Facility based cross sectional study design was conducted from July 11 -August 10, 2022G.C.

2.3. Study Variables

Dependent variable: HBV Test result of pregnant women (positive or negative).

Independent variables: Age, Occupation, Gravidity, Parity, History of abortion, History of surgical procedure, working history at health facility, History of blood transfusion, History of multiple sexual partners, Genital mutilation, Alcohol consumption, Body Tattooing.

2.4. Sample Size Determination

Sample size was calculated from previous study in Adigrat General Hospital in 2019, the Prevalence rate was (9.2%) [9]. Desired precision of 4%, a 95% confidence level and 10% for non-response rate. The sample size was determined based on a single-population proportion formula and found to be 221.

$$n = \frac{\left(\frac{z_{\alpha}}{2}\right)^2 p(1-p)}{d^2}$$

2.5. Sampling Procedures

First sampling frames were listed from antenatal care registration log book. Then by using systematic random sampling technique, study units were selected. ANC registration log book was used for the sources of data. We took a 3 months' registration data from the log book, which was 625. The first pregnant woman was chosen at random, and study participants were picked at three intervals until the sample size was reached.

2.6. Data Collection Procedure and Tools

After we received permission letter from GAMBY Medical and Business College and FHCSH Quality unit, the data was gathered using a pre-tested questionnaire by face-to-face interview with pregnant women and chart reviews. Socio-demographic data, clinical factors, behavioral and health-related factors were included on the interview. Data collection tools were prepared by reviewing related literatures and ANC follow up worksheet.

An English version tool was developed by looking at different literatures and then translated into the local language (Amharic). The questionnaire was reinterpreted in English by language experts to check any inconsistency. To verify the quality of the data, the questionnaire was pretested among the 5% of pregnant women of the study participants and the necessary modifications were carried out. The data collection process was overseen and the data collected were examined and verified. Successive data collection was verified to ensure reliability and accuracy.

2.7. Data Processing and Analysis

After checking for completeness and consistency of the data, the data was entered into SPSS version 25. Bivariate logistic regression analysis was done and those variables with p value less than 0.2 in bivariate analysis was processed to multi-variable logistic regression analysis. P value of <0.05 was used to express the statistical significance of the variables.

2.8. Ethical Consideration

Ethical clearance was obtained from Institutional Review Board of GAMBY Medical and Business College. Written consent from the study participants was found after informing the objective and significance of the study for each participant. To keep participant information confidential, codes were used to indicate that the participant's name and any participant identifiers stayed not on the questionnaire. Participants were interviewed individually to keep confidentiality. Voluntary Participation clearly stated that they can choose to participate or not; and they can receive all the services they usually do if they choose not to participate.

3. Results

3.1. Socio-Demographic Characteristics of the Study Participants

A total of 221 pregnant women were participating with a

mean age of the women was 29.12 years (range from 18-44 years) with a SD of +5.11 years. The majority (66.1%) of women's age were in the age group of (18-30). Based on place of residence, 195 (88.2%) of them were from urban area, 33 (14.9%) were illiterate and only 63 (28.5%) had college or university degree. Regarding occupation of the study participants, 100 (45.2%) are housewife and 47 (21.3%) were governmental employee (Table 1).

Table 1. Socio demographics characteristics among pregnant women attending ANC at FHCSH, 2022 G.C.

Variables	Category	Frequency	%
Age	18-30	146	66.1
	31-40	70	31.3
Residence	Rural	21	9.5
	Urban	195	88.2
Occupation	House wife	100	45.2
	Governmental Employee	47	21.3
	Farmer	12	5.4
	Merchant	33	14.9
	Student	8	3.6
	Daily labourer	16	7.2
	Illiterate	33	14.9
Educational status	Read and write	37	16.7
	Primary school	30	13.6
	Secondary school	53	23.9
	College/university	63	28.5

3.2. Prevalence of HBV Infection

About 4.5% of the study participants were positive for HBVsAg. A total of 7 (10%) respondents was observed in the age group of 31-40 years and 5 (50%) were reported in house wife group. 9 (90%) of the HBsAg Positive mothers were multi-gravida, and 2 (6%) was illiterate in their educational status (Figure 1).

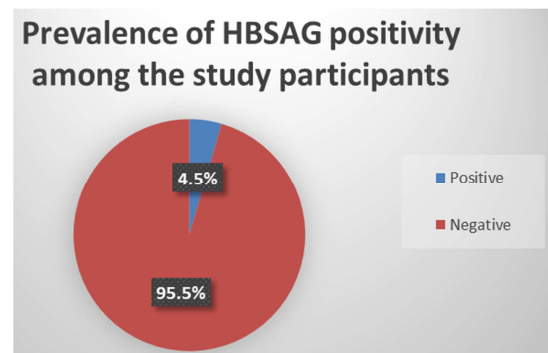


Figure 1. Prevalence of HBV among the study participants.

3.3. Behavioral and Health Related Factors for HBV

More than two thirds 152 (68.7%) of the study participants had no any previous surgical history and 97 (43.9%) of pregnant women was in their 3rd trimester of pregnancy. Around one-fifth 46 (20.8%) of the study participant had alcohol consumption history and only 3 (1.4%) of the pregnant women had multiple sexual partners. A 54 (24.4%) of the respondents' husband screened among which only one man found to be HBsAg positive. Approximately one-tenth 17 (7.7%) of the study participants worked at health facility (Table 2).

Table 2. Behavioral and health related factors for HBV among pregnant women attending ANC at FHCSH, 2022G.C.

Variables	Category	Frequency	Percent
Gestational Age	1st trimester	47	21.3
	2nd trimester	72	32.6
	3rd trimester	97	43.9
Previous surgical history	Yes	64	29
	No	152	68.7
History of Alcohol consuming	Yes	46	20.8
	No	170	76.9
History of multiple sexual partner	Yes	3	1.4
	No	213	96.3
History of working at Health Facilities	Yes	17	7.7
	No	198	89.6
Husband screened	Yes	54	24.4
	No	162	73.3

3.4. Clinical Factors Associated with Hepatitis B Virus Infection

In bivariate analysis gravidity, previous history of abortion, history of blood transfusion, chronic medical illness, contact

history with liver disease person, history of genital mutilation, and history of body tattooing had $p < 0.2$ and then included to multivariable logistic regression. In multivariable logistic regression analysis, three predictor variables were significantly associated with HBV infections, these are: - history of blood transfusion, history of genital mutilation and body tattooing.

The odds of HBV infection is 12.4 times [AOR=13.4, 95% CI (1.79-101.36)], higher among Pregnant women who had history of blood transfusion as compared to their counterparts. The odds of HBV infection is 10.2 times [AOR=11.2, 95% CI (1.20-104.3)], higher among Pregnant women who had history of genital mutilation as compared to their counterparts. The odds of HBV infection among Pregnant women who had history of body tattooing is 5.6 times [AOR= 6.6, 95% CI (1.29-33.7)] higher as compared to mothers without history of body tattooing (Table 3).

Table 3. Bivariate and Multivariate logistic regression of predictive factors associated with HBsAg Positivity among pregnant women attending ANC at FHCSH, 2022G.C.

Variables	HBVsAg sero status		COR (95% CI)	AOR (95% CI)	P Value
	Positive	Negative			
Gravidity					
Primigravida	1	60	0.27 (0.31-2.01)	0.61 (0.59-6.31)	0.67
Multigravida	9	146			
Abortion History					
Yes	5	48	3.98 (0.83-10.7)	1.47 (0.29-7.40)	0.63
No	5	158			
History of Blood Transfusion					
Yes	3	11	7.79 (1.76-34.31)	13.4 (1.79-101.36)	0.013*
No	7	195			
Chronic Medical Illness					
Yes	4	45	2.38 (0.66-9.09)	1.9 (0.36-9.6)	0.44
No	6	161			
History of Genital mutilation					
Yes	9	73	16.39 (1.90-123.4)	11.2 (1.20-104.3)	0.028*
No	1	133			
History of body tattooing					
Yes	7	49	7.48 (1.69-27.1)	6.6 (1.29-33.7)	0.028*
No	3	157			
Contact history with liver diseased person					
Yes	1	2	11.33 (0.96-140.2)	4.11 (0.19-85.5)	0.36
No	9	204			

4. Discussion

Hepatitis B virus infection is a public health problem and a major cause of morbidity and mortality, particularly in developing countries. Regarding the endemicity of the disease and based on the prevalence of hepatitis B virus infection, the world has been classified into three sub-regions; high for $>8\%$, intermediate for $2-7\%$ and low for $<2\%$ [1]. In this study, the magnitude of HBsAg positivity among study participants is 4.5% , classified as an intermediate category. This finding is in line with different studies done in Jimma [10] and Dilla University Hospital [11]. But lower in

prevalence when compared to studies done in Adigrat general hospital [9], Dire Dawa [12], Ghana [13] and Nigeria [3, 14]. This discrepancy might be related to the sampling technique, geographical variation, sociocultural and cultural variations regarding possible risk factors for HBV infection, and a lower sample size. Whereas, lower prevalence was reported in Brazil [15]. This variation may be due to Health seeking behaviors of the pregnant mother and the presence of relatively strong regular screening and vaccination for HBV during perinatal period, which isn't the real case in Ethiopia.

Considering Blood transfusion, pregnant mothers who had previous history blood transfusion are more likely to be infected with HBV than their counterparts. The finding of

this study is similar with the studies done in Dire Dawa [12], Jimma [10], Dilla [11] and Ghana [13]. The possible justification could be cross contamination, inability to follow aseptic procedure during transfusion at health facility level, transfusion of HBV infected blood due to poor screening of the donated blood at testing sites. This is described as a result of transmission of HBV through any fluid/mucosal/blood contact with infected patients [16, 17].

HBV infection among pregnant mothers who had a history of genital mutilation are more likely to occur than mothers without a history of genital mutilation. This finding is in line with a study done in Dire Dawa [12]. But this finding contradicts a study done at Ghana [13] and Nigeria [14]. This might be due to the variation in traditional or cultural practice and geographical difference.

The odds of having HBV infection among pregnant mothers who had a history of body tattooing was higher as compared to their counterparts. This finding is in line with a study conducted at Adigrat general hospital [9]. This similarity may be due to the tattooing procedure may be done by unskilled or traditional personnel, use unclean materials and Unsterilized needles for the procedure. The HBV may survive and spread on non-sterile surfaces for up to a week. the exchange of non-sterile materials during body tattooing may contribute to the transmission of HBV.

Limitations of the Study

The small sample size and the information obtained from mothers subjected to recall bias are limitations of this study.

5. Conclusion and Recommendation

The overall prevalence of Hepatitis B virus was intermediate in the study area according to the WHO classification criteria. The sero-prevalence of hepatitis B virus was significantly associated among pregnant mothers who had history of blood transfusion, body tattoo and history of genital mutilation. Avoiding harmful cultural customs, offering sterility and safety initiatives, raising community understanding about HBV transmission, preventive measures can all contribute to minimize the incidence of HBV.

Acronyms

ANC, Antenatal Care, DNA, Deoxyribonucleic Acid, FHCSH, Felegehiwot Comprehensive Specialized Hospital, HBsAg, Hepatitis B Surface Antigen, HBV, Hepatitis B Virus.

Data Sharing Statement

All data relevant to this study are available on the manuscript.

Author Contributions

All authors made a significant contribution to the work reported, whether that was in the conception, study design,

execution, acquisition of data, analysis and interpretation or in all of these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; agreed on the journal to which the article was submitted; and agree to be accountable for all aspects of the work.

Conflict of Interest Statement

The authors declare that they have no competing interests in this work.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request (Abyot Terefe Teshome: abi.rass@gmail.com).

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