Hepatitis B virus infection among pregnant women in Bahir Dar, Ethiopia, 2018: An institution based cross sectional study

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Abstract

Objective: This study aimed to determine the magnitude of serum HBsAg and the risk factors for Hepatitis B virus infection among pregnant women in Bahir Dar. An institution based cross sectional study was implemented from February 1 to May 1, 2018 among 338 pregnant women attending antenatal care clinic at Felegehiwot referral hospital, Bahir Dar, 2018. Systematic sampling technique was implemented. Blood sample was taken from 338 study participants and serum was tested for Hepatitis B surface antigen (HBsAg) using Enzyme Linked Immuno Sorbent Assay. Results: The overall magnitude of hepatitis B virus infection among pregnant women were 16(4.7%) (95% CI= 2.7, 7.7).Having a history of blood transfusion (AOR=5.2; 95% CI=1.2-22.3), having a history of multiple sexual partners (AOR=4.6; 95% CI=1.1-19.6) and having a history traditional tonsillectomy (AOR=3.4; 95% CI=1.1-10.1) were the major predictor factors for Hepatitis B virus infection. Keywords: Pregnant women, Bahirdar, Ethiopia, Hepatitis B virus

Introduction

Hepatitis B virus (HBV) is a common cause of acute and chronic viral hepatitis worldwide. According to phylogenetic analyses, HBV can be classified into eight genotypes (A to H) based upon an inter-group divergence. Among these, genotypes B and C are most common among those with chronic HBV, while genotype A is most common among those with acute HBV. HBV is the most crucial type of virus because of their insidiousness at nearly stage of infection and the eventual detection of the disease at a very late stage(1). Hepatitis B virus (HBV) is DNA virus causing hepatitis in humans which is classified as chronic hepatitis B and acute Hepatitis B virus infection. Chronic hepatitis B virus is the single most important risk factor in the development of liver cancer, with 60-80% of the world cases of primary liver cancer (Hepatocellular carcinoma/HCC/) is attributed to chronic
hepatitis B. Acute hepatitis B in pregnancy is not associated with increased abortion rate, stillbirth, or congenital malformation but higher incidence of low birth weight was reported (3,4).

Hepatitis B virus (HBV) is transmitted by: vertical transmission, between family members within households by contact of non-intact skin or mucous membrane with secreting or saliva containing, unsafe sexual intercourse, transfusion of HBV infected blood and blood products, perinatal transmission, horizontal transmission, nosocomial infection (commonly transmitted blood-borne virus in the healthcare setting), and percutaneous inoculation (contaminated medical equipment and sharing of contaminated syringes and needles among injecting drug users) (1,5).

Administration of Hepatitis B Immunoglobulin (HBIG) in combination with hepatitis B vaccines as post exposure prophylaxis is very important since vertical transmission rate is nearly 100% (6,8). Ethiopia is now identifying the magnitude of the problem and implementing the vaccination for health workers but still there is no accessibility and availability of vaccination of hepatitis B virus for those healthy mothers. Hence, this study aimed to determine the magnitude and associated factors of hepatitis B surface antigen virus among pregnant women attending antenatal care at Felegehiwot referral hospital, 2018.

Methods And Materials

Study setting

Bahir Dar town is located in Amhara region, 565km north-west of Addis Ababa. According to 2007 Ethiopian central statistical agency report, the total populations of Bahir Dar town administration is 221,991. Of them 108,456 are males and 113,535 females. The hospital has different departments that provide specialized services in outpatient, inpatient and
operation theatre departments. It provides services for approximately for more than 7 million people from the surrounding area. It has more than 415 beds and gives services for the western part of Amhara region as a referral hospital. There are more than 600 members of staff employed by the hospital and a further 200 employed by Bahir Dar university. Felegehiwot referral hospital provides care for the pregnant mothers widely in ANC, Intrapartum and Postpartum period.

**Source population**

All pregnant women who had antenatal care follow up at Felegehiwot referral hospital.

**Study population**

All pregnant women who were visited the antenatal care clinic during the first visit at Felegehiwot referral hospital

**Inclusion criteria**

Women who had first antenatal care follow up at Felegehiwot hospital during the study period

**Exclusion criteria**

Women whose antenatal care follow up were in another health institutions

Women who referred from other health institutions

Vaccinated HBV

**Study design and Sample size determination**

We designed an institutional based cross-sectional with serological supplemented study to estimate magnitude of hepatitis B virus infection. The sample size was estimated using Epi Info 7 software using sample size determination for cross sectional studies. The parameters that were used to estimate the sample size were: confidence level of 95%, 5% margin of error and prevalence of outcome was 7.8%. It was estimated based on one study in Ethiopia prevalence of hepatitis B in Hawassa hospital. Adding a 10% loss rate, the final
sample size required for the study were a total of 338 women.

**Sampling techniques and Procedures**

Systematic random sampling technique was applied to select the study participants. We took 3 months’ average sampled population from registration book which was done at ANC clinic which is 626. So as to get kth interval = (source population) N/sample size (n0) =626/338 2. Then the first pregnant mother was randomly selected by lottery method. Then study participants were interviewed every two interval until the sample size was completed through systematic random sampling technique.

**Data collection tools and procedures**

Data collection was implemented both face to face interview through pretested structured questionnaire and chart review. A pre-tested structured questionnaire was consisting of socio-demographic and socioeconomic characteristics, risky socio cultural and behavioral factors, institution related factors and blood sample test was designed to collect patient serum hepatitis B surface antigen virus status by requesting laboratory investigation. One-day training was given for the supervisor and data collectors about data collection and sampling technique. There were two trained diploma midwives for data collection and one BSc midwife supervisor. Pre testing of questionnaire on 17 (5%) pregnant women was done to assess the questionnaire content and face validity. The investigator and supervisor made spot checking and reviewing the completed questionnaires on daily basis to ensure completeness and consistency of the information collected. Privacy of the participants was kept.

**Laboratory Methods**

Blood sample was obtained from 338 pregnant women. A standard procedure was used to collect blood and process them for testing. All sera were screened for hepatitis B surface
antigen (HBsAg) using Enzyme Linked Immunosorbent Assay (ELISA) (Hepanostika test kit; Biomerieux, Boxtel, Netherlands) in central laboratory which is found in Felegehiwot specialized Hospital compound

**Operational definition**

**Traditional tonsillectomy:** Any traditional malpractice which was attempted to remove the tonsil by the community and cultural malpractice workers especially in the school age group without attending and evaluating in health institutions.

**Risky socio cultural and behavior:** Is behaviors which are endangers the life of the mother, children, family and the community consisting of unsafe sexual intercourse, multiple sexual partner, tattooing, unsafe injection of drugs without health professionals permission, traditional tonsillectomy, different types of piercing either in the ear or eye any factors which increases healthy mothers prone by acquiring of through different procedures in the health facility as well as in the community.

**Data processing and analysis**

After declaring for completeness and consistency of the data, the data were entered into Epi Info version-7 and exported in to SPSS version 23 statistical software for data cleaning, coded and analysis respectively. Bivariate logistic regression analysis was done after dichotomizing the dependent variables. After checking associations of the variables, those with $p<0.2$ in bivariate analysis was processed to multi-variable logistic regression analysis to control confounding factors. P-value of $< 0.05$ was used to express the statistical significance of the variables.

**Results**

**Socio-demographic and socio economic characteristics**

A total of 338 pregnant women were participating with a response rate of 100%. The mean age of the women was 26.84 years (ranged from 22 to 40 years) with a SD of $\pm$ 4.8 years.
Two hundred sixty (76.9%) respondents were urban in residence. *(Table S1)*

**Risky socio cultural, behavioral and institution related factors**

A total of 20 (5.9%) participants had been history of blood transfusion, while 92 (27.2%) had been hospitalized at some time during their lives. Among respondents 22 (6.5%) had a history of unprotected multiple sexual partners and 97 (28.7%) had a history of traditional tonsillectomy. No one was HIV positive among the study HBV positive participants. *(Table 1)*

**Magnitude of HBV infection**

A total of 16 (4.7%) with (95 %CI=2.7,7.7) respondents was found to be positive for HBV infection. A total of 8 (5.3%) respondent’s was observed in the age group of 26-30 years. Five (19.2%) respondents were reported in daily laborers. None of respondents were positive who were vaccinated for HBV. *(Table 2)*

**Factors associated with Hepatitis B virus infection**

Both bivariate and multivariable logistic regression analyses (backward conditional selection) were done to assess socio demographic and other predictable variables in relation to hepatitis B infection of the pregnant women. In bivariate analysis residency, educational status, previous place of birth, number of pregnancy, history of blood transfusion, history of body tattooing, having history multiple sexual partners, history of unsafe drug injection, history of sharing of sharp materials and the history of traditional tonsillectomy were factors significantly associated with hepatitis B infection.

Under multivariable logistic regression analysis showed that three predictor variables were statistically significant associated with HBV infections.
Pregnant women who had history of blood transfusion were 5.2 times more likely of being infected by HBV than pregnant women who had no history of blood transfusion [AOR = 5.2; 95% CI = 1.2-22.3, p-value = 0.03].

Having history of multiple sexual partners were 4.6 times more likely to be infected by HBV [AOR = 4.6; 95% CI = 1.1-19.6, p-value = 0.04] than women who were living with their partner.

Pregnant women who had history of traditional tonsillectomy were about 3.4 times more likely of being infected than those had no history of traditional tonsillectomy [AOR = 3.4; 95% CI = 1.1-10.9, p-value = 0.03]. (Table 3)

Discussion

Hepatitis B virus infection is a public health problem and a major cause of morbidity and mortality, particularly in developing countries (10). Worldwide, the prevalence of chronic HBV infection categorize in to three classes which are: high (>8%), intermediate (2-8%), and low (<2%) (11). Most countries in the world still considered intermediate to highly prevalent for HBV infection (11).

In this study found to be that the magnitude of HBsAg among study participants were 16 (4.7%) (95% CI = 2.7, 7.7) with a response rate of 100%. According to established criterion, the prevalence of HBsAg among pregnant women in this study area can be classified as an intermediate category (11).

This finding is in line with different studies were done with a proportion of 5.3% in Debre Tabor general hospital (12), 5.5% in Tigray (13), 3% St. Paul’s millennium medical college
and Selam health center(14), 3.7% in Jimma (15), 6% in Addis Ababa (45), 6.9% in Deder hospital, eastern Ethiopia (3), 7.3% in Gondar health center (16), and 4.9% in Dessie Referral hospital (17). This might be due to the sampling method, risky socio cultural and risky behavioral practice and methods used to screen HBsAg infection were the same.

But, relatively it is higher than 2.5% of prevalence which were reported from three public hospitals in Addis Ababa (18). This difference might be due to risky socio cultural and risky behavioral practices were low. However, it is lower than the study conducted in Hawassa referral hospital 7.8% (9). This difference might be due to the methods used to screen highly sensitive and specific and risky socio cultural and behavioral practiced were high.

On the other hand in comparison with other countries in line results were reported three studies in Nigeria, 3.8% (19), 4.7% (20) and 6.6% (21), 5.6% in Sudanese (22), Two studies in China 6.71% (23) and 7.44% (24). This similarity might be due to the methods used for screening and sampling techniques was the same.

However, higher results were reported in Mali 8% (25), Yemen 10.8% (26), Uganda 11.8% (27), Nigeria 12% (28) and Kenya 14.1% (29). This variation might be due to differences in sampling method, geographical variation, cultural and behavioral differences regarding possible risk factors of HBV infection, and differences in the test methods employed to detect HBV infection.

Whereas, lower prevalence 0.14% to 0.97%, 0.9%, 1%, 1.5%, 1.6% and 2.1% were reported in USA (30), Brazil (31), Kenya (32), Libya (8), Saudi Arabia (33) and North Turkey (25), respectively. This variation may be due to in developed nations, where regular screening and vaccination for HBV were performed.
In fact, this study demonstrated that having a history of blood transfusion, having a history multiple sexual partners and having a history of tonsillectomy were significant predictors of HBV infection.

Conclusion

This study revealed that the magnitude of HBV infection was low intermediate. Having history of blood transfusion, having history of multiple sexual partners and having history of tonsillectomy were significantly associated variables with HBV infection. Avoiding cultural malpractice, ensuring sterility while taking blood for transfusion and create awareness in the community about the transmission and prevention methods may decrease the magnitude of hepatitis B surface antigen virus infection.

Limitation

This study shares the limitations of cross-sectional studies and hence may not be possible to establish temporal relationship between hepatitis B virus infection and explanatory variables.

List Of Abbreviations

AIDS: Acquired Immunodeficiency Syndrome, ANC: Antenatal Clinic, AOR: Adjusted Odd Ratio, APHI: Amhara public Health Institution, BSc: Bachelor of science, CDC: Center for Disease Control, COR: Crude Odd Ratio, DNA: Deoxyribonucleic Acid,, ELISA: Enzyme linked immunosorbent assay, FGM: Female genital mutilation, HBeAg: Hepatitis B „e“ antigen , HBsAg: Hepatitis B Surface Antigen, HBV: Hepatitis B Virus, HCV : Hepatitis C Virus, HIV; Human Immunodeficiency Virus, IEC: Information Education Communication, MSc: Masters of Science, SPSS: Statistical Package for Social Science, USA: United States of America, WHO: World Health Organization

Declarations
**Ethical approval**

Ethical clearance was obtained from the ethical review committee of Bahir Dar University College of medicine and health science. Permission letter was obtained from Amhara regional health bureau and also asked from Felegehiwot comprehensive specialized Hospital. Then the objective of the study was explained to the identified study subjects. Written informed consent had applied when collecting data from pregnant women attending routine antenatal clinics. Anonymity was maintained by using identity numbers instead of patient names. Beside, all the data abstracted was kept confidential and not used for any other purposes than the stated research objective.

**Consent to Publish**

Not Applicable

**Availability of data and materials**

All related data has been presented within the manuscript. The data set supporting the conclusions of this article is available from the authors on request.

**Competing interests**

The authors have declared that no competing interests exist.

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**Author contribution**

FK wrote the proposal, participated in data collection, analyzed the data and drafted the paper. FK, GG, AA, and KG approved the proposal with some revisions, participated in data collection, analysis and manuscript writing. All authors read and approved the final manuscript.

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Additional File

Additional file 1: Table S1: Socio demographic characteristics of pregnant women attending antenatal clinic at Felegehiwot referral hospital, May 2018 (n=338).

Tables

Due to technical limitations, tables are only available as a download in the supplemental files section.

Supplementary Files

This is a list of supplementary files associated with the primary manuscript. Click to download.

Tables.pdf
Table s1 HEPATOJITIS.pdf