Journal of Clinical and Cellular Immunology

OPEN ACCESS Freely available online

Research Article

Prevalence and Associated Factors of Hepatitis B Virus Infection among Pregnant Women Attending Antenatal Care in Agena Health Center, South Ethiopia: A Cross-Sectional Study

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ABSTRACT

Objective: Hepatitis B Virus (HBV) is the world's most common and highly contagious liver infection and main routes of transmission are: mother to child, *via* open wounds, sexual contact, blood transfusion and other blood contact related activities. Prevalence of HBV among pregnant women in Africa ranges from 3.67-16.5% and in Ethiopia 2.4 to 7.8%. Hepatitis B infection leads to high morbidity and mortality for mother as well as for their infants due to the vertical transmission.

Methodology: An institution based cross sectional study was conducted with a total of 194 of pregnant women attending antenatal care at Agena health center from May 1-30/2019. The collected data was entered into Epi-data 4.2.0.0 and exported to SPSS (Software Package for Social Science) version 25 for data analysis. Binary and multivariable Logistic regression was performed to determine each factor and to check the association between independent variable and HBV infection.

Results: The prevalence of HBV in Agena health center among pregnant women were 4.1% and it was associated with marital status, history of hospital admission and history of abortion.

Conclusion: The prevalence of HBV in Agena health center among pregnant women was intermediate. Since routine screening and immunization of all pregnant women is mandatory.

Keywords: Hepatitis B infection; Pregnant women; Agena health center

INTRODUCTION

World Health Organization report that more than 350 million people are infected with HBV since 2017 worldwide [1]. HBV is highly contagious and its main routes of transmission are: mother to child, *via* open wounds, sexual contact, blood transfusion and other blood contact related activities [2]. The WHO (World Health Organization) has launched a global program against hepatitis in May 2016 which aims to reduce by 90% the number of new cases of hepatitis, reduce by 65% the number of hepatitis related deaths, and treat 80% of eligible people infected with viral hepatitis by 2030 [3].

Even if HBV is the most common and highly contagious diseases for the whole population, it is highly prevalent among pregnant women (9.41% general population versus 11.11% pregnant women) and it has different maternal complications and fetal death due to vertical transmission [4]. There is a high chance of vertical transmission from HBV infected mothers to their infants during delivery and during breast feeding [5,6]. To prevent the vertical transmission of HBV Antiviral therapy for infected pregnant women is very crucial [7]. Hepatitis B vaccination should be given for the infant who is infected with HBV [8].

HBsAg (Hepatitis B surface Antigen) prevalence among pregnant women was 3.1% in Shenyang, China. Only 23.4% and 17.7% of pregnant women knew their HBV status before gestation and before delivery respectively [9]. The prevalence of HBV infections among pregnant women in Africa was 6.8% and child vaccination, routine and universal antenatal hepatitis B virus screening program is very important [10]. The prevalence of HBV infections among pregnant women was 16.5% and 9.2% in Osogbo, Nigeria and

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Received: 21-Nov-2022, Manuscript No. JCCI-22-20277; **Editor assigned:** 23-Nov-2022, Pre QC No. JCCI-22-20277 (PQ); **Reviewed:** 08-Dec-2022, QC No. JCCI-22-20277; **Revised:** 16-Dec-2022, Manuscript No. JCCI-22-20277 (R); **Published:** 23-Dec-2022, DOI: 10.35248/2155-9899.22.13.674.

Citation: Workye H, Niguse M, Tadesse I, Karim A (2022) Prevalence and Associated Factors of Hepatitis B Virus Infection among Pregnant Women Attending Antenatal Care in Agena Health Center, South Ethiopia: A Cross-Sectional Study. J Clin Cell Immunol.13:674.

Gambia respectively. Studies show that the prevalence was low among pregnant women who were vaccinated for HBV infection but high prevalence was seen among pregnant women who did not vaccinated for HBV infection [11,12].

In Ethiopia the prevalence of hepatitis B virus infection among pregnant women was intermediate (4.7%), with the prevalence of HBSAg positivity ranging from 2.3% to 7.8% [13]. Different studies in Ethiopia shows those pregnant women who have history of multiple sexual partners, history of abortion, and history of surgical procedures, body tattooing and ear/nose piercing have a high chance of infected with HBV [14-18].

Prevention of HBV infection among pregnant women is very important to prevent the transmission of HBV infection from mother-to-child. An effective strategy for reducing the incidence of the infection is identifying and handling the associated factors as well as giving awareness for the pregnant women. However, limited information has been published regarding the prevalence of HBV among pregnant women in Ethiopia as well as in Gurage zone and there is no evidence based interventions. Therefore, the aim of this study was to assess the sero-prevalence and risk factors of positive HBsAg status among pregnant women receiving care at the Agena health center Ante-Natal Care (ANC) clinic.

MATERIALS AND METHODS

Study design and area

Institutional based cross-sectional study design was conducted in Agena town, Ezha woreda at Agena health center, Gurage zone SNNPR (South Nation Nationalities People Region) from May 1-30, 2019. Agena is the only urban kebele found in Ezha woreda, Gurage zone, and SNNPR of Ethiopia. Agena is located 198 km from Addis Ababa (south west), 38 km from wolkite (east) and 23.17 km from Wolkite.

Source population

The source populations were all pregnant mothers who were attending ANC in Agena Healt Center.

Study populations

The study populations were pregnant mothers who were attending ANC follow-up and fulfill the inclusion criteria in AHC from May 1-30, 2019.

Exclusion criteria and inclusion criteria

The pregnant women who have at least one ANC visit at AHC were included in the study.

The pregnant women whose HBV status is unknown, who is already in labour, who is seriously ill or admitted in the ICU ward was excluded from the study.

Sampling size determination

The sample size was determined by using a single population proportion formula considering the following assumptions: standard normal distribution with confidence interval (CI) of 95% (Za/2=1.96), absolute precision or tolerable margin of error (d=0.05), and the prevalence of HBV infection among pregnant women Attending Antenatal Care in Public Health Facilities, Dire Dawa in 2018 was 8.4% [19]. Assuming a 10 % non-response rate a total sample size of 194 pregnant women was selected from Agena Health Center. A study participant was selected by using systematic random sampling method from the appointment log of May, 2019.

Data collection tool and method

Data was collected by face-to-face interview using structured and pre-tested questionnaire which is adapted from relevant literatures and modified to local context in such a way that all the variables to be assessed were included and HBV status was taken from routine ANC document for each participants. The tool was first prepared in English and translated to Amharic then to the local Guragegna language then back to English again to check for its consistency.

Data processing and analysis

Data was checked for completeness and cleaned before it was entered to a computer. Then it was coded and entered into EpiData version 4.2.0.0 and importing to SPSS version 25 software packages for data analysis. Frequencies and proportions were used to describe the study participants. The data was presented by using tables and graphs.

Bivariate analysis and crude odds ratio with 95% confidence interval (CI) was used to see the association between independent variable and the outcome variable by using binary logistic regression. Independent variables with p- value of =0.25 were included in the multivariate analysis to control confounding factors. Adjusted odds ratio along with 95% CI was estimated to identify the factor associated with HBV infection among pregnant women using multivariable logistic regression analysis. Level of statistical significance was declared at P-value=0.05.

RESULTS

Socio-demographic and economic characteristic

194 pregnant women were included in the analysis, and majority of them 138(71.1%) were urban in residence, 72(37.1%) were between 25-29 years old, 164 (84.5%) were from Gurage ethnic group and most of the study participants 174 (89.7%) were married.

Among the pregnant women 118(60.8) completed their primary education, 91(46.9%) of them were merchant, 85(43.8%) had an average monthly income between 500-1500 ETB and 140(72.2%) were multigravida (Table 1).

Table 1: Socio-demographic and economic characteristics of the pregnant women (n=194) attending antenatal care at Agena health center, Gurage zone, Ethiopia, 2019.

Variables		Frequency	Percentage
Age	15-19	3	1.5
	20-24	59	30.4
	25-29	72	37.1
	30-34	40	20.6
	>35	20	10.3
Residence	Urban	138	71.1
	Rural	56	28.9

Ethnicity	Gurage	164	84.5
	Amhara	12	6.2
	Oromo	6	3.1
	Others	12	6.2
Marital status	Single	20	10.3
	Married	174	89.7
Educational level	cannot read and write	26	13.4
	read and write(informal)	40	20.6
	Primary (1-8)	118	60.8
	high school and above	30	15.5
Occupation	government employee	18	9.3
	Merchant	91	46.9
	house wife	81	41.8
	Others	4	2.1
Income	<500	42	21.6
	500-1500	85	43.8
	1501-2000	50	25.8
	>2000	17	8.8
Gravidity	Primi	54	27.8
	Multi	140	72.2

Hospital associated factors for HBV infection

Among the total population of the respondents 27(13.9%) had at least one history of hospital admission, 25(12.8%) had history of dental procedure in hospital, 20(10.3%) of them had surgical procedure and blood transfusion or donation each in their previous history (Table 2).

Table 2: Hospital associated factors of the pregnant women attending antenatal care at Agena health center, SNNPR, Gurage zone, Ethiopia, 2019 (n=194).

Variables		Frequency	Percent
Hospitalization	Yes	27	13.9
	No	167	86.1
Dental procedure	Yes	25	12.8
	No	169	87.2
Blood transfusion	Yes	20	10.3
	No	174	89.7
Surgical procedure	Yes	20	10.3
	No	174	89.7

Socio cultural behavioral associated factors of HBV infection

Based on this study among the total respondents 31(15.9%) of them had history of abortion, 185(95.3%) had history of circumcision, 192(98.9%) were had ear piercing, 61(31.4%) had history of alcohol consumption, 5(2.6%) had history of chat chewing, and 15(6.7%) had tattoo on their body (Table 3).

Table 3: Socio-cultural and behavioral associated factors of the pregnant women attending antenatal care at Agena health center, SNNPR, Gurage zone, Ethiopia, 2019 (n=194).

Variables		Frequency	Percent
Abortion	Yes	31	15.9
	No	163	84.1
Circumcision	Yes	185	95.3
	No	9	4.7
Ear piercing	Yes	192	99
	No	2	1
Alcohol	Yes	61	31.4
	No	133	68.6
Chat	Yes	5	2.6
	No	189	97.4
Tattoo	Yes	15	6.7
	No	179	93.3

Prevalence of hepatitis B virus

Based on this study, the prevalence of HBV in Agena health center among pregnant women were 4.1% which categorized as intermediate according to WHO classification 2%-7% (Figure 1).

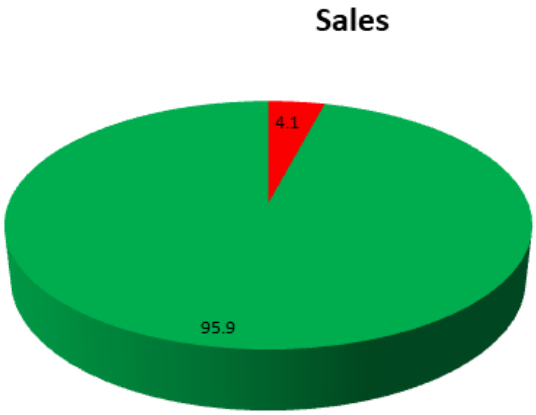

Figure 1: Prevalence of HBV infection among pregnant women attending antenatal care at Agena health center, South Nation Nationalities People Region (SNNPR), Gurage zone, Ethiopia, 2019 (n=194).

Factors associated with HBV infection among pregnant women

Those variables with a P-value of ≤ 0.25 in the Binary logistic analysis was entered to multivariable logistic analysis using enter method to identify the independent factors associated with hepatitis B virus among pregnant women.

In bivariate analysis the independent variables: marital status, history of hospitalization, blood transfusion or donation, abortion, circumcision, alcohol drinking, chat chewing, were associated with hepatitis B virus among pregnant women. In multiple logistic regression analysis, the independent variables: marital status, history of hospital admission, and abortion were statistically significant at 5% level and were found to be the associated factors of hepatitis B virus infection among pregnant women (Table 4).

Table 4: Factors associated with HBV among pregnant women at Agena health center, Ethiopia, 2019, n=194.

Variables		HBV		COR (95%CI)	AOR (95%CI)
		YES	NO		
Marital status	Single	4(20.0%)	16(80.0%)	1	1
	Married	4(2.3%)	170 (97.7%)	0.094 (0.021-0.412)	0.66(0.004-0.985)**
Admitted to hospitalization	yes	5(18.5%)	22(81.5%)	1	1
	No	3(1.8)	164 (97.2%)	0.080(0.08-0.360)	0.03(0.002-0.377)***
Abortion	Yes	3(9.7%)	28(90.3%)	3.343 (0.756-14.785)	10.331 (1.161-92.926)**
	No	5(3.07%)	158 (96.93%)	1	1

Note: P<0.05**, P<0.01***

According to this study married pregnant women were 66% times less likely to be reactive to HBV infection than single pregnant women [AOR=0.66(0.004-0.985)]. Those pregnant women with history of hospitalization were 97% times more likely to be reactive to HBV infection than pregnant women who had no history of hospitalization [AOR=0.030(0.002-0.377)], and those pregnant women who had history of abortion were 10 times more likely to be reactive to HBV infection than pregnant women who had no history of abortion [AOR=10.331(1.161-92.926)].

DISCUSSION

Prevalence of Hepatitis B virus in pregnant women

In this study the prevalence of HBV infection among pregnant women in Agena health center was 4.1%. This finding was relatively comparable with study reported from Dawuro Zone, south Ethiopia, Arba Minch Hospital, Bahir Dar city, West Ethiopia and Kinshasa, DR Congo in which prevalence of HBV infection among pregnant women were 3.5%, 4.3%, 3.8% and 4.7% respectively [15,17,18,20].

This prevalence was higher than the studies reported from Shenyang, China, East Wollega Zone, Ethiopia and Addis Ababa, Ethiopia in which prevalence of HBV infection among pregnant women were 3.1%, 2.4% and 4.3% respectively [9,21,22]. The difference might be occurred due to the variation in socio-economic status of the population, sample size, design, and study setting.

This prevalence was lower than the studies reported from Osogbo, Nigeria, Gambia, Yirgalem Hospital, Ethiopia, Deder Hospital, Eastern Ethiopia, Hawassa University referral hospital, Southwestern Nigeria, Yaounde-Cameroon, Eastern Region of Ghana, Buea Health District, Cameroon, Juba Teaching Hospital, Republic of South Sudan, Myanmar-Thailand Border and Shaanxi, China in which the prevalence of HBV infection among pregnant women were 16.5%, 9.20%, 7.2%, 6.9%, 7.8%, 8.3%, 7.7%, 10%, 9.7, 11%,6.2% and 7.07% respectively [11,12,14,16,23-30]. The difference might be occurred due to the variation in duration, because currently there is a great modification regarding to health care service for HBV infection.

Associated factors of HBV among pregnant women

In this study only marital status, history of hospitalization and history of abortion were significantly associated with HBV infection among pregnant women. Married pregnant women were 66% times less likely to be reactive to HBV infection than single pregnant women [AOR=0.66(0.004-0.985)]. This finding was inconsistent with studies conducted at Gambia, Yirgalem Hospital, Ethiopia, Dawuro zone, SNNPR, Southwest Ethiopia, Bahir Dar city, Northwest Ethiopia, Health Facilities in East Wollega Zone, West Oromia, Ethiopia, Addis Ababa, Ethiopia and Buea Health District, Cameroon [12,14,15,18,21,22,27]. Generally being single exposes for HBV infection because single women might have multiple sexual partners. But in those studies there might be a wrong generalization due to increased prevalence as a result of married women might be more diagnosed than single during ANC follow up and during the delivery procedure.

Those pregnant women with history of hospitalization were 97% times more likely to be reactive to HBV infection than pregnant women who had no history of hospitalization [AOR=0.030(0.002-0.377)]. This finding was consistent with study conducted at Arba Minch Hospital [17].

Those pregnant women who had history of abortion were 10 times more likely to be reactive to HBV infection than pregnant women who had no history of abortion [AOR=10.331(1.161-92.926)]. This finding was consistent with studies conducted at Dawuro zone, SNNPR, Southwest Ethiopia, at Deder Hospital, Eastern Ethiopia and Bahir Dar city, Northwest Ethiopia [15,16,18]. It might be occurred due to the abortion might be unsafe so it expose for HBV infection. However, no significant association between previous history of abortion and HBsAg positivity was observed at the studies conducted at Yirgalem Hospital, Arba Minch Hospital, and Hawassa university referral hospital [14,17,23]. This may be due to the implementation of policies aimed at reducing the incidence of unsafe abortions and health education related to unsafe abortions.

CONCLUSION

This study has found that the prevalence of HBV infection among pregnant women were intermediate (based on WHO classification with prevalence of 2%-8%). Pregnant women who were married, who had previous history of hospitalization and who had history of abortion were more likely to be infected with Hepatitis B Virus. So more concern should be given for pregnant mothers; who are married, who were hospitalized previously and who have history of abortion regarding to screening and management of Hepatitis B Virus.

RECOMMENDATIONS

Based on this finding the following recommendations were forwarded;

- To Regional health bureau and health facilities; Effort should be made to improve the quality of service in health facilities especially on improving the aseptic technique in different procedures to reduce HBV transmission. Routine screening and immunization of all pregnant women and their infants should be incorporated in the antenatal and postnatal follow up in health facilities to reduce vertical transmission of HBV from infected mothers to their infants.
- For Agena health office and health center; Routinely screening

and treatment should be performed to the pregnant women on follow up and awareness creation should be performed on the transmission and prevention of HBV infection

• For researchers; large epidemiological studies that cover large study population and experimental studies that can show the real cause- effect relationship.

LIMITATION OF THE STUDY

The associated factors were assessed by interview so there might be a recall bias and social desirability and since the study was cross-sectional; it did not show the real cause-effect relationship.

DECLARATION

Competing Interest

There is no competing of interests

ACKNOWLEDGMENT

Firstly we would like to acknowledge the study participants for their participation.

Finally, our grateful appreciation extends for Wolkite University for providing fund to conduct this study and for Gurage Zone Health office and Agena Health center staffs for their support during the study.

ETHICS APPROVAL AND CONSENT TO PARTICIPANT

The ethical clearance was obtained from Wolkite University Institution Research Board. Letter was submitted to Gurage zone health office and Agena Health center then permission was obtained from those bodies. Prior to data collection; written informed consent was received from all participants since all participants are above 16 years old. Respondents were insured about the confidentiality of information obtained and the respondents did not ask to tell their names.

AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request

CONSENT FOR PUBLICATION

It is not applicable for this study

AUTHORS' CONTRIBUTIONS

Haile Workye conceived the study and developed the study design, analysis, report writing and drafted the manuscript. Melese Niguse, Ijigu Tadesse and Amin A/Karim were involved in data collection, data entry analysis and report writing. Both authors read and approved the final manuscript.

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