Prevalence and factors associated with hepatitis B virus infection among pregnant women receiving antenatal care service at Addis Ababa public hospitals Re-revised final 2

by Wogayehu W/Amlak

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DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

BLACK LION SCHOOL OF MEDICINE

ADDIS ABABA, ETHIOPIA.

Title:

Prevalence and factors associated with hepatitis B virus infection among pregnant women receiving antenatal care service at Addis Ababa public hospitals [in five hospitals - Army Specialized teaching Hospital; TASH; GMH; ZMH MRH].

A multicenter descriptive cross - sectional study

A research thesis to be submitted for partial fulfilment of the specialty in Obstetrics and gynecology.

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ADDIS ABABA, ETHIOPIA

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The full title of a research project	Prevalence and factors associated with hepatitis B virus infection among pregnant women receiving antenatal care service at Addis Ababa public hospitals [in five hospitals - Army Specialized teaching Hospital; **TASH; GMH; ZMH MRH]:** A multicenter descriptive cross - sectional study
Duration of study	December 2023 to June 2024 G.C.
Study area	Addis Ababa
Study cost	43,200. 00 ETB.
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Abbreviations and Acronyms

DNA-	Deoxy ribose nucleic Acid
ETB-	Ethiopian birr
GMH-	Gandi Memorial Hospital
HBV-	Hepatitis B virus
HBeAg-	Hepatitis B virus envelope antigen
HBSAg-	Hepatitis B virus surface antigen
HB-BD-	Anti-Hepatitis B virus birth dose vaccine
MRH-	Menelik II Referral Hospital
MTCT-	Maternal -to-child-transmission
PI-	Principal Investigator
TASH-	Tikur Anbessa Specialize Hospital
ZMH –	Zewditu Memorial Hospital
CI-	Confidence interval
AOR-	Adjusted odds ratio
COR-	Crude odds ratio

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Abstract

BACKGROUND: Hepatitis refers to inflammation of liver tissue which may result from several causes, among which hepatitis B viral infection is most known globally. It is a major public health problem worldwide. During pregnancy, viral hepatitis can lead to vertical transmission, and maternal complications. The study's main aim was to determine the HBV infection prevalence and related factors among pregnant women who had antenatal care service at five hospitals in Addis Ababa.

METHOD: A multicenter cross-sectional descriptive study conducted from December 2023 to June 2024 G.C. Single population proportion formula was used to calculate the sample size. Four hundred twenty-two pregnant women were recruited randomly from the five 5 target public hospitals. Laboratory blood sample test results and structured questionnaires were used to collect the data until the sample size was completed. SPSS version 25 statistical soft ware was used to analyze data.

Result: The prevalence of HBsAg sero-positivity among pregnant women was 6.6%, 95% CI (4.5, 9.4). Participants with Lack and low level of education AORs 0.004(0.000, 0.219), 0.010(0.000, 0.615 , giving care for patients with yellow eye discoloration with AOR=0.108(0.014, 0.839)**;** history of sexually transmitted infections with AOR=0.000(0.000, 0.011)**;** coinfection with HIV with AOR=0.002(0.000, 0.060) ;ear piercing practice with AOR=0.001(0.000, 0.187)**;**knowledge on HBV with AOR=0.081(0.007, 0.893) ; and vaccination status AOR=0.091 (0.012, 0.694)were significant predictors of HBV sero positivity.

Conclusion: In this study the sero-prevalence of HBsAg [positivity] is 6.6%; WHO intermediate endemicity, [2-8] %. Level of education, history of giving care to patients with yellow eye discoloration, ear piercing practices, STI history, HIV/HBV co-infection, having not vaccinated for HBV, and lack of knowledge on HBV were statistically significant.

Recommendation: Increasing awareness regarding transmission and prevention infection of HBV among pregnant women at ANC may reduce the risk of infection from the virus and the disease burden to them and their children. This finding provides update insights for policy makers and concerned bodies about scaling up screening pregnant women for HBV

Keywords: Prevalence, Hepatitis B virus, Pregnant women, cross sectional study, logistic regression, Addis Ababa, Ethiopia.

1. Introduction

1.1. BACKGROUND

Hepatitis refers to inflammation of liver tissue which may result from several causes, among which hepatitis B viral infection is most known globally. [1, 2] Hepatitis B virus (HBV) is an enveloped DNA virus with potential to cause chronic and acute diseases. It is also oncogenic, transforming liver cells into hepatocellular carcinoma (primary liver cancer). Its incubation period is about 75 days being detected in blood in 30–60 days. It is more virulent and contagious than human immunodeficiency virus (HIV).[3] Viral hepatitis pandemic has huge effect on human lives, communities and health systems. Hepatitis-related liver cirrhosis and cancer, and acute infection are responsible for an estimated 1.4 million deaths per year that is comparable to that caused by HIV and tuberculosis. hepatitis B virus is responsible for about 47% of these deaths. In addition, estimated 2.6 million people are co-infected with HIV and hepatitis B virus[4]. In 2019, hepatitis B was responsible for about 820 000 deaths, mostly from cirrhosis and hepatocellular carcinoma. [5]

A pregnancy that has been complicated by HBV infection presents a management challenge for the mother and the newborn. [6, 7] Prevention of mother - to - child transmission (PMTCT) during antenatal care (ANC) with universal screening of pregnant women and universal vaccination of infants is one of the universal efforts to curb the impact of chronic HBV infection. [8-10] This study aimed to determine the current magnitude of HBV infection and associated factors among women receiving antenatal care at public hospitals in Addis Ababa, Ethiopia.

1.2. Statement of the problem

1.2.1. Global burden; prevalence and disease impact.

World Health Organization (WHO) in 2019 estimated that 1.5 million new infections occuring each year and 296 million people had chronic HBV infection. Furthermore, it was reported that 1.34 million deaths were attributable to hepatitis, and that was equivalent to tuberculosis related deaths but higher than HIV related deaths in 2015. More over, 1.8 milion under 5 years childrren were living with HBV infection [11].

Why is HBV infection transmission remains difficult to control-the current practice to break the chain? WHO endorsed a global initiative in 2016 that declared to stop viral hepatitis being a public health threat by 2030. However only few sub-Saharan African countries were on track to

achieving this goal. Universal vaccination of infants to reduce new infections, and universal HBV testing and treatment of pregnant women are required to eliminate HBV [12]. A number of HBV infection predictors had been identified including:- blood transfusion, mother to child transmission (MTCT), history of abortion, unprotected sex, undergoing surgical, dental, medical, or delivery procedures, sharing needles and razor blades, and history of sexually transmitted infections.[13, 14] In endemic areas, MTCT is the main route of HBV infection [15, 16]. The maternal HBV infection status is the main predictor for MTCT. This correlates with the presence of Hepatitis B envelope antigen (HBeAg) and high HBV Deoxyribonucleic acid (DNA) levels [17-19]. If appropriate immunoprophylaxis is not provided, 90% of exposed infants will develop chronic hepatitis B infection compared to 10–25% and 5–10% of children and exposed immuno-competent adults respectively. These infected offsprings ultimately also serve as reservoirs for subsequent horizontal infection. [20]

1.2.2. Prevalence and impact in developing and poor countries

HBV infection prevalence is highest in Sub Saharan Africa, however only 0·1% of those with chronic HBV infection get antiviral treatment. [21] In Africa, HBV and Hepatitis C viral infections are highly endemic and are responsible for 80% of cirrhosis and HCC cases. HBV is primarily responsible for end stage liver disease. [22] WHO reported that HBV infection affects more than 5% of the population in Sub Saharan -Africa, and in some areas it may reach up to 15%. HBV infection during childhood is responsible for estimated 25% of young adults who die prematurely from HBV-related cirrhosis or HCC. [2]

1.2.3. Prevalence and disease impact in Ethiopia

Adequate data is lacking to show the prevalence of HBV infection in Ethiopia. Being part of the sub Saharan Africa and based on the limited findings from some studies, the prevalence and the disease burden in Ethiopia is regarded as high. According to a systematic reviews and meta-analyses of local data, in the general population the prevalence of HBV was 6% - 7.4%; while the major source infection for newborns were 5%–7% of pregnant mothers [23] .

Regional studies in Ethiopia [Hawassa[3], Jimma[24] , Gambella [25, 26], Debre Tabor [27], Bahir Dar [28] ,Harare[29] , Mekelle[30, 31],] showed a seroprevalence of HBV 3.7%, 5.3% , 3.8%, 8% , 6.6 %, 7.9 % ,4.9% , 8.1% among pregnant women, respectively .

1.2.4. The current knowledge of the prevalence and disease impact in In Addis Ababa

In Addis Ababa, according to limited published studies, the HBV infection prevalence among pregnant women was between 3.04%[22, 32] and 7% [33]. According to a study report in 2019/20 in Addis Ababa HBV co-infections in pregnant women were reported with HIV in 3.4% and with HCV in 1.1%. However, none of them had triplex infection. [26] The synergetic interaction between the STIs might aggravate disease progression [34]. The clinical implications of combined infections (HBV, HIV, syphilis and HSV-2) in pregnant women was an area left for further study as a recommendation 9 years back in the city[35].

1.3. Justification of the study

Even if there exist limited studies done on the prevalence of HBV and associated factors during pregnancy with heterogenous results in Addis Ababa, there is dearth of information since the past 5 years in spite the continuously growing population in the city. The findings of this current study reckoned the current burden of HBV infection and its associated risk factors in pregnancy at Addis Ababa, so that might help as an input for intervention practices

1.4. Significance of the study

Knowing the current burden and related factors of HBV infection during pregnancy in Addis Ababa study hospitals could be input for enhancing their current practices of screening, treatment of eligible pregnant women, and prevention of MTCT.

Also, service providers in the study Hospitals; patient, equipment and waste handlers, midwives, nurses, residents, paramedics, and specialists could benefit from enhancing precaution of universal infection prevention in their current practices, status awareness test, and hence will get vaccines for them and advocate their patients and their families.

Last but not the least, the current knowledge from this study could be input for Addis Ababa Health Bureau in its perspective plan build-into Ministry Of Health strategies in such a way that : universal HBV screening during pregnancy, provision of immune prophylaxis with both Hepatitis-B imunoglobulin (HbIgD) and vaccine for the newborn to HBV infected mothers, and vaccination of high risk mothers and children, creating awareness on the virus and its mode of transmissions are going to be effective ways to decrease the risk of HBV transmission.

2. Literature review

Approximately 296 million people around the world are affected by Hepatitis B, including more than 6 million under 5 children. It contributes to an estimated yearly 820,000 deaths, and 25% of chronic HBV infections progress to liver cancer[36]. When it comes to pregnant women, a study published in 2023, showed a global HBV prevalence of 8% among pregnant women 8%[36].

Various studies label endemicity of HBV infection in Africa as high (≥8%) and intermediate (2-7%) [37] . Systematic reviews and meta-analyses revealed HBV prevalence rates in pregnant women of 9.7%, 7.7%, 4.127%, 3.2 7% and 1.94 – 11.6 % in Gambia[38], Ghana[39], Somali[40], Eritrea[41], and Ethiopia respectively. [42] According to a systematic review and meta-analyses of local studies the prevalence of HBV in the general population ranged from 6% to 8.4% [43] where as 5%–7% of pregnant women were the major source of infection for their newborns[44]

The overall pooled prevalence of HBV in an updated systematic review and meta-analysis in Ethiopia,was 6% and among subgroups, pregnant women, healthcare workers, and HIV positive patients accounted for 5% for each group [30, 45] A prevalence of 7% HBV infection was reported among medical and non-medical waste handlers working in three Hospitals in Addis Ababa. The prevalence was high in medical waste handlers in contrast to a prevallence of 0.8% in non medical waste handllers[46].

A cross sectional study in Tirunesh Beijing General Hospital reported a prevalence of 6% [42] while the reported prevalence was 3.04% in a prospective multicenter cohort study done in 5 public hospitals in Addis Ababa. [33]

WHO in 2016 set a goal to eliminate hepatitis B globally by 2030. It was encouraged by the fact that scaling up coverage of the infant HBV vaccine series has led to greatly reduced Horizontal transmission in most countries while vertical transmission was became increasingly dominant [12]. By 2030 estimated 710,000 (580,000 to 890,000) deaths could be prevented in 110 low and middle income countries by timely scaling up HBV birth dose vaccination to 90% of new-borns compared to status quo. And Africa would be to benefit the most. [5, 11].

Several factors were identified that increase HBV transmission risk. A case – control study from Palestine showed that HBV positive patients reported history of dental visits, hospitalization,

blood transfusion, sharing shaving equipment, intravenous drug use, or having lived abroad compared to controls were[14].

A Systematic Review and Meta-Analysis of all studies conducted in Ethiopia, between January 2004 and May 2018 revealed that histories of blood transfusion, multiple sexual partners, abortion, and body tattoo increased risk of HBV infection. [47] A descriptive cross sectional study done in Addis Ababa reported HBV /HIV co-infections in 3.7% of pregnant women. [33]. Another study done in Addis Ababa in 2014 indicated that 22.2 % of HBV posittive pregnant women were HIV co infected. The study also reported that histories of tattooing and abortion were associated significantly with HBV-infection. [48].

3. Conceptual framework.

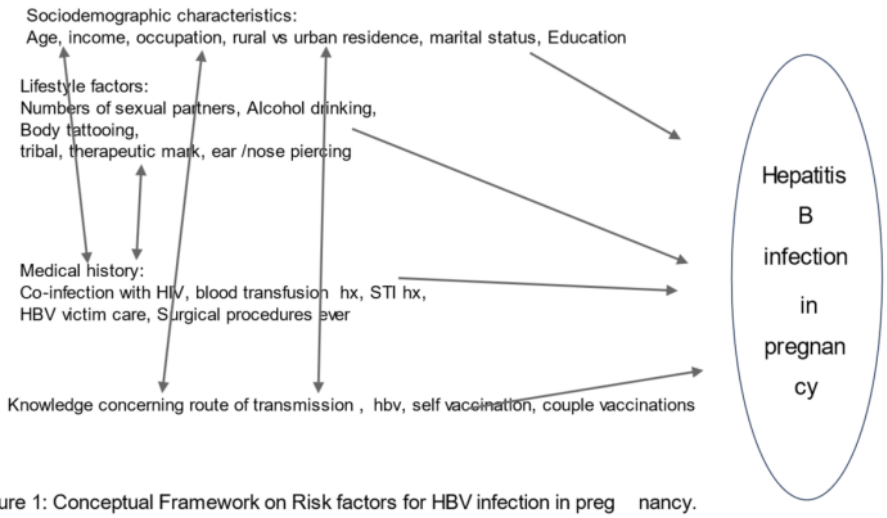

Figure 1: Conceptual Framework on Risk factors for HBV infection in preg nancy.

Figure 1: Conceptual Framework on factors associated with HBV infection during pregnancy**[49]**

4. Objectives

4.1. General objective

To determine the HBV infection prevalence and associated factors among pregnant women receiving ante-natal care at public Hospitals in Addis Ababa.

4.2. Specific objectives

4.2.1. To determine the prevalence of HBV among pregnant women receiving antenatal care at public Hospitals

4.2.2. To identify factors associated with HBV among pregnant women receiving antenatal care at public Hospitals

5. Methods and Materials

5.1. Study area,

Addis Ababa is the capital and largest city of Ethiopia. In the 2007 census, the city's population was estimated to be 2,739,551 inhabitants. The estimated population of Addis Ababa in 2023 has reached 5,460,591[50], whereas back in 1950, the population stood at 392,000. The population density in the area is projected to be approximately 5,165 people per square kilometers.

- Study period was- From December 2023 to June 2024 G.C.
- Study design was- A Cross-sectional study design.
- Source population was- All pregnant women in Addis Ababa health facility care service during the study period.
- Study popullation:- All pregnant women receiving antenatal care service in the five public hospitals in AddisAbaba during the study period.

5.2. Eligibility criteria

5.2.1 Inclusion criteria- All pregnant women who were attending ANC services in the target hospitals and who gave informed consent to be included.

5.2.2. Excllusion criteria:

- Mothers of first visit
- Pregnant women who were criticaly ill and no table to communicate
- Those with no adequate laboratory test result report for HBV, RVI, and VDRL in their medical record or referral sheet.

5.3. Sample size determination and sampling technique

A single popullation proportion formula was employed to calculate the sample size assuming the proportion of pregnant women exposed to HBV =50% to those not-exposed among the participants to get maximum sample [61],i.e., p=0.5,1-p=0.5;95% confidence level (CI); and Zα=1.96, and a margin of error of 5%[D=0.05].

n= [Zα/2]2 p[1-p] ÷ D2

n= [3.8416x.025] ÷ .0025

n= 384

Final sample size, N= n plus 10% contingency = 422

A total of 422 study participants were selected proportionally from each study hospital using systematic random sampling technique. Participants were continuously enrolled until the calculated sample size was achieved.

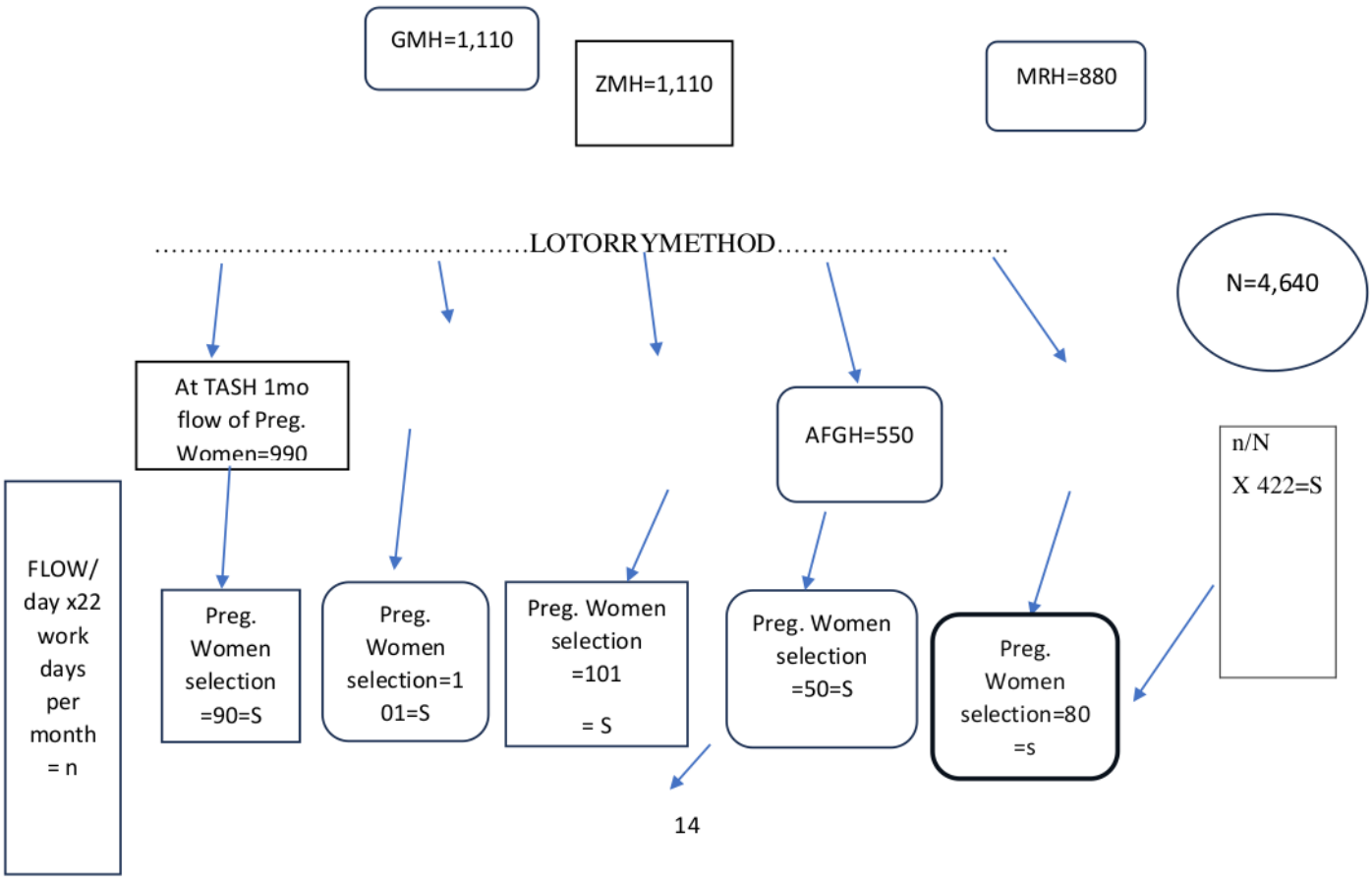

Figure 2. Sampling techniques

5.4. Study variables

Dependent Variables

- Status of HBV infection [HBsAg seropositivity] of the pregnant woman.

Independent Variables

- Socio-demographic variables; (Age, Educational level, Occupation, Average monthly Income, Residence, Marital status)
- Obstetric factors;(Abortion, parity, age at 1st pregnancy)
- Life styles and behavioral factors (Numbers of sexual partners, Alcohol drinking, Body tattooing, tribal, therapeutic mark, ear /nose piercing)

- Medical history:

Co-infection with HIV, blood transfusion hx, STI hx, HBV victim care, Surgical procedures ever

- Knowledge concerning HBV, route of transmission, self vaccination, couple vaccinations

5.5. Operational definitions

- Prevalence: Percentage of pregnant women that are seropositive for HBV with HBsAg.
- Piercing

This is a type of body beautification where a sharp material punctures a hole in the body ears or nose parts where jewelry had been inserted.

- Tattooing: Any form of body art that is created when ink is inserted, using a needle or other sharp materials into the dermis layer of the skin.
- Knowledge: Those participants who scored 50% and above from all asked questions were labeled as have good knowledge while those who scored less than 50% were labeled as having poor knowledge on HBV infection and transmission

5.6. Data collection methods.

1. Data was collected by 5 trained data collectors (4 BSC nurses and a midwife) who were working at a particular Healthcare facility, through a face-to-face interview. The data collection was supervised by a trained MPH officer. A one-day training was given to the supervisor and data collectors. All the completed questionnaires were checked by the principal investigator for completeness. Data collectors, introduce themselves, read the information sheet and aquire consent before data collection. After informed consent and participants were coded and then, the interview was held in a private room in each hospital.

- The questionnaire was be grouped into five categories;
    - Socio-demographic variables,
    - Co-existing medical illness,
    - Obstetrics and gynecologic variables,
    - Life styles and behavioral factors and
    - Questionsfilled from medical records

2. A structured pretested questionnaire adapted from a WHO checklist for the assessment of hepatitis B infection in antenatal patients was used to collect data on socio-demographic information, life style, obstetric history, medical/surgery history, knowledge and factors on MTCT [62,63].

3. Laboratory test results were collectedfrom participants' medical records that attending physicians routinely investigate, and from referral sheets. After reading the information sheet to the study participants and verbal consent was obtained from all participants before the data

access. Those with test results positive for HBSAg, reactive for RVI and VDRL were counselled and linked to the appropriate infection prevention department for further care.

5.7. Ethical clearance was obtained from the institutional ethical review board of Addis Ababa University, College of Health Science.

- Permission from the hospitals to participate in the study was obtained
- Verbal informed consent was obtained from all participants.

The respondent's privacy and the confidentiality of the information of accessingthe participants' medical records and laboratory test result was respected, and their names was never made public. Those who declined and who have no investigation test result were+excluded from the study.

5.8. Pretestbefore full scale study was done on 21 pregnant [5%] women at Saint Paul's millennium Hospital for comment and correction.

5.9. Data safety- Data was collected from December 1/2023G.C. to until the sample size was completed, and waskept in a safe place via strong passwords.

5.10. Data handling and analysis

- Chi square test was used to examine and summarize the distribution of each independent variable.
- Data was enterred and analyzed by SPSS-version 25 software using descriptive and logistic regression analyses.
- The Bivariate analysis was used to test the association between the independent and outcome variables.
- All variables with a p-value of less than 0.25 in the bivariate analysis were then added to the multivariate logistic regression model.
- Factors in the multivariable analysis were deemed significant predictors having p-value less than 0.05.

5.11. Data Quality Assurance

- Data was collected by trained data collectors;supervised and reviewed by the principal investigator, who carefully have regulated the data compilation system and data completeness.

- To assure the study's validity, double data entry and random check was performed.
- During the data collecting period, the participants' confidentiality and privacy was respected, by trained data collectors and the investigator.

5.12 Dissemination Plan

The result of the study will be presented to the department of obstetrics and gynecology, AAU. The final report will be submitted to TASH, MRH., Armed General Hospital, Addis Ababa city Health Bureau, Zewditu memorial hospital and Gandhi memorial hospital. Moreover, the report will be published in peer reviewed journal for wider availability of the findings.

6. Result

6.1 Sociodemographic characteristics of the study participants

A total of 422 pregnant women were enrolled, with response rate of 100%. The median age of participants was 26.9 with standard deviation of ±4.7 years, with a minimum of 15 years and a maximum of 44years. Among 189 married pregnant women 106 were single, 127 were divorced and widowed. regarding educational level, 60(14.2%) cannot read and write, 143(33.9%) women attended elementary level 219(51.9%) attended secondary school and above. The majority of respondents, that is 374(88.6%), resided in Addis Ababa and the remaining 48(11.4%) respondents lived outside Addis Ababa before their current residence

Table 1. Sociodemographic characteristics of the study participant pregnant women receiving antenatal care in Addis Ababa public hospitals, 2024G.C. (N=422)

Variables	Characteristics	Frequency	Percent (%)
Age in years	**<16**	**2**	**0.5**
	16-24	**81**	**19.2**
	25-33	**167**	**39.6**
	34-42	**163**	**38.6**

	>42	**9**	**2.1**
Residences	**Addis Ababa**	**374**	**88.6**
	Outside Addis Ababa	**48**	**11.4**
Educational status	**Not read and write**	**60**	**14.2**
	Primary school	**143**	**33.9**
	Secondary school and above	**219**	**51.9**
	Married	**189**	**44.8**
	Single	**106**	**25.1**
	Divorced and Widowed	**127**	**30.1**
Occupational status	**Employed**	**143**	**33.9**
	Unemployed	**81**	**19.2**
	Housewife	**151**	**35.8**
	student	**47**	**11.1**
Income	**<5000**	**155**	**36.7**
	≥5000	**267**	**63.7**

6.2 Obstetrics and gynecologic clinical experiences and exposure related characteristics of the respondents

Majority of the respondents, that is, 320/422[75.8%] were multiparous; and 150[35.5%] were preterm , 180[42.7%] were term but92[21.8%]donot have known date. Of the 422 respondents, 263[62.6%] experienced induced, medical and surgical abortion while the rest did not haveany. 197[46.7%] of the respondents had history of blood transfusion,104[24.6%] attended some kind of surgery in a health facility, 68[16.1%] gave care to a patient with yellow discoloration of eye, and 21[5%] had history of STI of some kind.

Table 2. Obstetrics and gynecologic clinical experiences and exposure related characteristics of the respondent pregnant women receiving antenatal care in Addis Ababa public hospitals, 2024G.C. (N=422)

Variables	Characteristics	Frequency	Percent (%)
Gravidity.	**1**	**102**	**24.2**
	≥ 2	**320**	**75.8**
Gestational age [wk]	**Preterm**	**150**	**35.5**
	Term	**180**	**42.7**
	Unknown	**92**	**21.8**
History of abortion [Induced, surgical]	**Yes**	**158**	**37.4**
	No	**264**	**62.6**
History of blood transfusion	**Yes**	**197**	**46.7**
	No	**225**	**53.3**
History of surgical procedures attended	**Yes**	**104**	**24.6**
	No	**318**	**75.4**
Sexually transmitted infection history	**Yes**	**21**	**5.0**
	No	**401**	**95.0**
Gave care for a patient with yellow eye discoloration	**Yes**	**68**	**16.1**
	No	**354**	**83.9**

6.3 cultural practice and behavioral factors of the respondents

Regarding the cultural practices,125[29.6%] had tattoo, 149[35.3%] had nose pierced,and the majority 348[82.5%] had their ears pierced. Of the 422 study participants,121[28.7%] had history of multiple sexual partners, and 186[44.1%] used to drink alcohol frequently.

Table 3. cultural practice and behavioral factors of the respondent pregnant women receiving antenatal care in Addis Ababa public hospitals, 2024G.C. (N=422)

Variables	Characteristics	Frequency	percentage (%)
Tattooing	**Yes**	125	29.6
	No	297	70.4
Nose pierced	**Yes**	149	35.3
	No	273	64.7
Ear pierced	**Yes**	348	82.5
	No	74	17.5
Frequent alcohol drinking	**Yes**	186	44.1
	No	234	55.9
Have multiple sexual partners	**yes**	121	28.7
	No	301	71.3

6.4 outcomes from medical records of the study participants

The prevalence of HBsAg seropositivity was 6.6% [28/422]. Of the 422 pregnant study participants ,15[3.6

%] were reactive for RVI, 2[0.47%] were reactive for syphilis, and 1[0.23%] participant was found to be infected with the three organisms.

Table 4. participants medical record information of predictors of HBV sero-positivity of women receiving antenatal care in Addis Ababa public hospitals, 2024G.C. (N=422)

Variable	Characteristics	Frequency	Percentage
HIV test result [from record]	**reactive**	**15**	**3.6**
	Non-reactive	**407**	**96.4**
HBsAg test result [from record]	**Positive**	**28**	**6.60**
	Negative	**422**	**93.40**
VDRL test result [from record]	**reactive**	**2**	**0.47**
	Non-reactive	**420**	**99.53**
PITC/VDRL/HBsAg	**Reactive /positive**	**1**	**0.23**
	Non-reactive/negative	**421**	**99.77**

6.5 knowledge assessment score and HBV vaccination status of the respondents

More than 50% of the respondents,54.5% were not knowledgeable to HBV, its route of transmission, its impact on their pregnancy, and/or on them; and 115[27.3%] were not vaccinated for HBV.

Table 5. knowledge assessment score and HBV vaccination status of the respondent women receiving antenatal care in Addis Ababa public hospitals, 2024G.C. (N=422)

Variable	Characteristics	Frequency	Percentage
Knowledgeable to about 50% and above of the knowledge questions	**yes**	192	45.5
	No	230	54.5
Vaccinated for HBV	**yes**	307	72.7
	No	115	27.3

variable	HBV	p-value	COR with 95%CI	p-value	AOR with 95%CI

6.6 Predictors of HBsAg sero-positivity

The result of multivariate logistic regression analysis showed that there is no statistically significant difference between HBV seropositivity and some socio demographic characteristics such asage, occupation, residence, and income; between HBV infection and parity and history of abortion; history of blood transfusion , history of attended surgical procedures , having multiple sexual partner, frequent alcohol drinking; between HBV infection and cultural practices like tattooing , nose piercing with p-value > 0.05. However other variables such as level of education; cultural practices like ear piercing; coinfection with HIV, STI; giving care to a patient with yellow eye discoloration; and lack of knowledge and not being vaccinated for HBV were significantly associated with HBsAg sero positivity with p-value <0.05

table.6. Bivariate and multivariate logistics regression of association between HBV sero positivity and independent variables among pregnant women receiving antenatal care in the 5 government hospitals in Addis Ababa, 2024. (N=422)

	positive	negative				
level of education			0.000		0.040	
cannot read and write	13	47	0.000	0.102(0.037, 0.282)	0.012	0.005(0.000, 0.305)
learn(ed) in primary school	9	134	0.107	0.419(0.146, 1.205)	0.040	0.013(0.000,0.813)
learn(ed) in secondary school and above	6	213	1		1	
ever pierced your ear						
Yes	27	321	0.077	0.163(0.022,1.218	0.009	0.001(0.000, 0.187)
No	1	73	1		1	
HIV test result from medical record						
positive	9	6	**0.000**	0.033(0.011, 0.101)	**0.000**	0.002(0.000, 0.060)
Negative	19	388	1		1	
ever contacted any sexually transmitted infection						

Yes	17	4	0.000	0.007(0.002, 0.023)	0.000	0.000(0.000, 0.011)
No	11	390	1		1	
ever give cares for a patent with yellow eye discoloration						
Yes	11	57	0.001	0.261(0.116, 0.587)	0.033	0.108(0.014, 0.839)
No	17	337	1		1	
Have you vaccinated for HBV						
Yes	3	304	1		1	
No	25	90	0.000	0.036(0.010, 0.120)	0.021	0.091 (0.012, 0.694)
correctly answered in >= 50% of the knowledge questions						
Yes	5	187	1		1	
No	23	207	0.005	0.241(0.090, 0.646)	0.040	0.081(0.007, 0.893)

p-value <0.05 with 95%CI

7. Discussion

The major objective of the present study was to determine the prevalence of HBV surface antigen sero positivity and factors associated among pregnant women attending Antenatal care in the 5 government hospitals, in Addis Ababa. The prevalence of HBV sero positivity was 6.6%, 95% CI (4.5, 9.4); which was consistent with the study conducted in Addis Ababa 6%[33], yirgalem Hospital 7.2%[51], Felege Hiwot Hospital Bahir Dar 4.7%[47, 52], Dessie R. Hospital 4.9%[53], Debre Tabor District Hospital 5.8%[27], Hong Cong Special Administrative region of China 7.5%[54]. However, the finding was relatively lower than that in the studies conducted in Kenya 9.3%[55], Gambia 9.2%[38], Yemen 10.8%[56]. In contrast, the finding was higher than that in the studies conducted in Wollega Zone 2.4%[57], St, Paul's Hospital Millenium Medical College and Selam HC 3%[58], Bahir Dar city 3.8% [59]

Concerning associated factors:

Lack and low level of education, showed 99.9% more chances of respondents HBV – HBsAg seropositivity With AORs 0.004(0.000, 0.219), 0.010(0.000, 0.615), Similar associations were reported by the study conducted in Hawassa University Referral Hospital where participants with no formal education found to be more likely sero positive for HBsAg, AOR 3.6;95% CI [1.27-10.6], P<0.05[30].Participants with Ear piercing practice, co-infected with HIV care gave to a patient with yellowish eye discoloration [99.9%each], and STI history (80%) were more likely found to be HBsAg sero positive. Similar associations were reported by the study conducted in South Sudan where participants with jaundice AOR10.91,95%CI(2.6,45.2)P<0.05[60] were found to be associated with HBsAg seropositivity ; and by a study previously conducted in Addis Ababa 5 government Hospitals where the odds of having HBV infection was 5.5 times higher among ear pierced mothers AOR5.5,95%CI(1.01-29.69)[33] ; Mothers who had STI were 9.3 times more to have HBV /HIV confection AOR9.3 , CI(1.84-47.1)[26].

Study participants with lack of knowledge in the knowledge assessment score were found to be 99.9 % more chance of sero positive for HBsAg. Similar reports were done in a study at Buea HD in Cameroon [61]where 80% low level of HBV infection 95%CI (5.7-15.0) with 9.7% HBsAg seropositivity. Participants who were not vaccinated for HBV were found to be 99.9 % times more likely sero positive for HBV in this study, similar reports were seen in a study done in University of Zimbabwe College of Health Science birth cohort study where unvaccinated

pregnant women were found to be 96.9% more sero positive for HBV 95%CI (90,100)[62, 63]. Similarly in Tanzania , a prevalence of 5.4% (95% CI, 2.9-9.0) HBV was reported among household contacts even if 40.0% of the household contacts had completed the full HBV vaccination series[63].

Variation of this study outcomes may be due to:

1. The design, methodology and sample size difference
2. The difference in health primary prevention practice on pregnant women in particular and in the community in general
3. Study participant set of population characteristics difference,

Strength and Limitation of the study

- strength

Tried to find out the current burden of HBV infection in the setting of the increased population size of Addis Ababa

- Limitation

Difficult to establish temporal relationship based on the findings of this study, since it is cross sectional design. The study is not community based, so it might not reflect the true incidence in Addis Ababa.

8. Conclusion and recommendations

8.1 Conclusion:

- In this study the seroprevalence of HBsAg [positivity] is 6.6%; WHO intermediate endemicity, [2-8] %[12]
- level of education, history of giving care to patients with yellow eye discoloration, ear piercing practices, STI history, HIV/HBV co-infection, having not vaccinated for HBV, and lack of knowledge on HBV were statistically significant.

8.2 Recommendation:

Increasing awareness, promoting education regarding transmission and prevention infection of HBV among pregnant women at ANC may reduce the risk of infection from the virus and the disease burden to them and their children. This finding also provides update insights for policy makers and concerned bodies about scaling up screening pregnant women for HBV.

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10. Annexe

10.1. Consent form

1: Information sheet

Title of the study:

Prevalence and associated risk factors of preterm birth among mothers who gave birth in Addis Ababa three teaching hospitals, Ethiopia.

Purpose of the study

To assess the prevalence of HBV infection and associated factors among pregnant women receiving antenatal care at public Hospitals in Addis Ababa, Ethiopia,

Procedure

You are selected because you came for antenatal care service. The information you give and that of medical record review of the laboratory report results, and number of marriage or sexual partner will be confidential and will have no identification to keep your privacy. The information will be available only to the study team.

Benefits

There is no direct benefit to you for participating other than the satisfaction because you are contributing to increasing knowledge in this area. If it is found to be important according to yourlaboratoryreport result, you will be counselled and linked to the appropriateunit forfurther care

Risks

There is no risk/discomfort in this study to you or to the fetus. Precaution is going to be taken

to protect the information which you will provide.

Confidentiality

To protect your information, code numbers will be used to identify you and no names will be used. The information you provide will be treated as strictly confidential and will be used for the study only.

Compensation

Your time and participation are appreciated. However, there is no compensation involved.

Withdrawal from the study

Participating in this study is entirely voluntary and you are entitled to refuse to participate as this will not affect you or your newborn (If alive) in any way. There is no penalty for withdrawing. Do you have any questions?

If you need further clarifications regarding this study, you may contact the Principal InvestigatorDr. Wogayehu W/amlak, phone number 0948485188.

2. Informed consent

Dear Madam my name is _____

I am working as a data collector for the study being conducted in this Hospital by Dr. Wogayehu W/amlak who is studying for the specialty of Obstetric sand Gynecology at Addis Ababa University College of Health Science. I kindly request you to give me your attention to explain about the study and about you being selected as the study participant**.**

The study title: Prevalence and associated factors of HBV infection among pregnant women receiving antenatal care in Addis Ababa public Hospitals, Ethiopia,2016EC.

Importance and purpose of the study: The finding of this study will have a paramount importance for knowing the burden of HBV infection and its prevention and management plans.

Procedure and duration: I will interview you using a questionnaire which has few questions to answer. Data will be extracted from your clinical record and I will call you further through telephone to know about the health of you your baby. I will not take more than 30 minutes of your time.

Confidentiality: The data you will provide me will be confidential. There will be no information that will identify you. The finding of this study will be general for the population and is not to describe you individually. There will be code; no need of mentioning you by name on reports of this research.

If you don't agree, thank you!

If you agree to proceed with the interview, Signature……

Name of enumerator …… Signature……. interview date…… phone number…….

Questionnaire Code……..

Supervisor's name …… Signature……. Checking date……

Name of the health facility……...

10.2. Questionnaire

1. questions on Sociodemographic characteristics of pregnant mothers attending ANC clinics in public hospitals in Addis Ababa, Ethiopia,2023G.C.

1.	How old are you?	1. <16 2. 16-24 3. 25-33 4. 34-42 5. >42
2.	Where do you live?	1. In Addis Ababa 2. Outside Addis Ababa
3.	Can you tell me your level of education?	1. I cannot read and write 2. learn(ed) in Primary school 3. secondary school and above
4. 2. 3.	Can you tell me your marital status? Single Divorced and Widowed	1. Married
5. 4.	What is your occupation? student	1. Employed 2. Unemployed 3. Housewife

2. Questions on Pregnancy, lifestyle, cultural practice, and clinical experiences and co-infections related characteristics of pregnant mothers attending ANC clinics in public hospitals in Addis Ababa Hospitals, Ethiopia,2023G.C.

1. How many pregnancies have you ever experienced?	1. 1 2. ≥2
2. Do you remember your last normal menstrual period	1. Yes 2. No
3. If the answer for the question number 2 above is no, do you have ultrasound papers before or at 24wk gestation?	1. yes 2. No
4. If your answer for the question number 3 above is no, what is your total months of amenorrhea? ____	
5. Have you ever experienced abortion?	1. yes 2. No
6. If the answer for the question 5 above is yes, how was it done?	1. spontaneously by itself 2. by health care provider's recommendation
7. Have you done tattoos on your body?	1. Yes 2. No

8. Have you ever pierced your nose?	1. Yes 2. No
9. Have you ever pierced your lips?	1. Yes 2. No
10. Have you ever received blood in medical suite?	1. yes 2. No
11. Have you ever attended any surgery?	1. yes 2. No
12. Have you ever contacted any sexually transmitted infection?	1. yes 2. No
13. How many sexual partners ever do you have?	1. 1 2. >1
14. Have you ever given cares for a patent with yellow eye discoloration?	1. Yes 2. No
15. Do frequently drink alcohol	1. Yes 2. No
16. HIV test result from medical record	1. R 2. NR
17. VDRL test result from medical record	1. R 2. NR
18. HBV test result from laboratory routine report or referral sheet	1. positive 2. negative

3. Questions on Knowledge about HBV and its routes of transmission, and vaccination status among pregnant mothers attending routine ANC clinics in public hospitals in Addis Ababa, Ethiopia,2023G.C.

1.	Hepatitis B is a viral disease	1. Yes 2. No
2.	Hepatitis B viral disease can affect liver function	1. Yes 2. No
3.	Hepatitis B viral disease can bring your liver about to a cancer	1. Yes 2. No
4.	Hepatitis B can affect your fetus	1. Yes 2. No
5.	Jaundice is the common symptoms of hepatitis B viral disease	1. Yes 2. No
6.	Nausea, vomiting and loss of appetite are common symptom of hepatitis B viral disease 1. Yes 2. No	
7.	We can't see symptoms of the hepatitis B in some of the patient	1. Yes 2. No
8.	Hepatitis B can be transmitted by un sterilized syringe needle and surgical instrument 1. Yes 2. No	
9.	Hepatitis B can be transmitted by contaminated blood and blood product	1. Yes 2. No
10.	Hepatitis B can be transmitted by blades of the tattoo/ear or nose pierces	1. Yes 2. No
11.	Hepatitis B can be transmitted by unsafe sex	1. Yes 2. No
12.	Hepatitis B can be transmitted from to your child	1. Yes 2. No
13.	Hepatitis B treatment is available	1. Yes 2. No
14.	Hepatitis B vaccine is available	1. Yes 2. No

15.	Have you vaccinated for HBV	1. Yes 2. No
16.	Knowledgeable to about 50% and above of the knowledge questions	1. Yes 2. No

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