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ORIGINAL RESEARCH

Knowledge, Attitude, and Associated Factors Towards Vertical Transmission of Hepatitis B Virus Among Pregnant Women Attending Antenatal Care in Tertiary Hospitals in Amhara Region, Northwest Ethiopia: A Cross-Sectional Study

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Purpose: Hepatitis B virus (HBV) infection is a major public health problem globally. Mother-to-child transmission (MTCT) of HBV is high in endemic countries; however, little is known about pregnant women`s knowledge and attitudes regarding MTCT and prevention methods in Ethiopia. Therefore, this study aimed to assess the knowledge, attitude and associated factors of pregnant women towards MTCT of HBV and its prevention in three tertiary hospitals in the Amhara region, northwestern Ethiopia.

Materials and Methods: A cross-sectional study was conducted from May 1, 2018 to September 30, 2019. A total of 1121 pregnant women participated in the study. A structured questionnaire was used to collect the sociodemographic, knowledge, and attitudes of pregnant women towards MTCT of HBV and its prevention. Data were analyzed using SPPS version 20. χ^2-test, multivariate logistic regression, Spearman correlation, and analysis of variance (ANOVA) were used for data analysis.

Results: The majority of 89.6%; 95% CI (87.9–91.3%) pregnant women had poor knowledge of MTCT of HBV and its prevention. However, more than half of the study participants had favorable attitudes. Only 141 (12.6%) of the pregnant women knew that HBV transmitted from mother-to-child and 169 (15.1%) knew that HBV had a vaccine. There was a significant difference in attitude between the three hospitals (P<0.001). In multivariable analysis, education, gravida and vaccination history were independent factors significantly associated with good knowledge and favorable attitudes while income and residence significantly associated only to knowledge and attitude, respectively. There was a significant positive correlation between the knowledge and attitude of pregnant women (P<0.001).

Conclusion: The knowledge of pregnant women was found to be poor and their attitude was also limited to MTCT of HBV infection and its prevention. Educational status and vaccination history were predictors of knowledge and attitude, but income and residence only to knowledge and attitude, respectively. This study revealed a lack of knowledge in pregnant women for the prevention and control of MTCT of HBV. This calls for the Amhara Health Bureau and Ministry of Health to promote health education programs for pregnant women attending antenatal care on MTCT of HBV and its prevention methods to improve knowledge and attitudes.

Keywords: knowledge, attitude, pregnant women, mother-to-child transmission, hepatitis B virus, Ethiopia

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Introduction

Viral hepatitis infection is a public health challenge worldwide. It is responsible for an estimated 1.4 million deaths per year from acute and chronic hepatitis-related cirrhosis and carcinoma, comparable to the death toll of HIV and tuberculosis.[1] Hepatitis B virus (HBV) is responsible for more than 250 million people with chronic infection and one of the leading causes of cirrhosis and hepatocellular carcinoma worldwide.[2] HBV burden is high in developing countries especially in Asia and Africa. In the sub-Saharan region, approximately 100 million people are chronically infected with HBV.[3] The risk of HBV chronicity is inversely proportional to age; about 70–90% of infants infected up to 1 year will develop chronic HBV infection.[4]

Hepatitis B virus can be transmitted through blood transfusion, infected blood products, unprotected sex, body fluids and mother-to-child. In endemic areas, the most common transmission route is mother-to-child transmission (MTCT) during birth.[5] A pregnant woman positive for hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg) or high viral load, the chance of transmission from mother to infant is higher. In Africa, a systematic review and meta-analysis showed that 38% of pregnant women positive for HBeAg were at risk of MTCT.[6] To prevent MTCT, provisions of active HBV and passive hepatitis B immunoglobulin (HBIG) vaccines are recommended widely for infants born to HBsAg-positive pregnant mothers. This strategy has been demonstrated to be effective in many HBV endemic countries like Taiwan and China and to prevent MTCT up to 90%.[7] Understanding the protective and risk factors related to MTCT is important for improving vaccination strategies against HBV infection and further elimination of hepatitis infection. The World Health Organization (WHO) has set a goal to prevent 50% of MTCT of HBV by 2020 and reduce HBsAg prevalence, less than 0.1% in children, eliminating hepatitis virus as a public health threat by 2030.[1] Despite this in Ethiopia, there is no routine screening for HBV in pregnant women and also the birth dose hepatitis B vaccines have not yet started in the country.[4]

In Ethiopia, the seroprevalence of HBsAg was reported from 2.4% to 8% in pregnant women and up to 14% in the general population.[8–10] Moreover, a systematic and meta-analysis in Ethiopia showed that the seroprevalence of HBsAg was 4.7% in pregnant women and 7.8% in the general population.[11,12] However, in Ethiopia, HBV is given less attention at the program level with regard to creating awareness of the community on the mode of transmission, preventive measures, screening during pregnancy, and unavailability of treatment for the newborn if the mother is HBV positive. Similarly, in our country, viral hepatitis, commonly known as ``Yewefe Beshita`` in Amharic language means disease of bats, people believed that transmitted through bat feces and urine. People do not have a proper understanding of viral hepatitis transmission, disease patterns and treatment.[13]

A few studies were done about knowledge of HBV transmission and prevention among pregnant women and general populations in different countries.[14–20] However, there is a paucity of studies on the knowledge and attitude toward MTCT of HBV and its prevention among pregnant women in Ethiopia. Therefore, this study aimed to determine the knowledge, attitude, and associated factors of vertical transmission of hepatitis B virus among pregnant women attending antenatal care (ANC) in three tertiary hospitals in the Amhara national regional state, Ethiopia.

Materials and Methods

Study Area, Design, and Period

An institution-based cross-sectional study was conducted in ANC of three tertiary hospitals in the Amhara national regional state: The University of Gondar Comprehensive Specialized Hospital (UOGCSH), Felege Hiwot Comprehensive Specialized Hospital (FHCSH) and Debre Markos Referral Hospital (DMRH). The University of Gondar Comprehensive Specialized Hospital is located in Gondar, 750 km northwest of Addis Ababa. The hospital serves more than six million inhabitants in the Amhara national regional state. Felege Hiwot Comprehensive Specialized Hospital is located in Bahir Dar, the capital city of the Amhara region and serves more than seven million people. Debre Markos Referral Hospital is Zonal Hospital, which serves three million people in the East Gojjam Zone. The study was conducted from May 1, 2018 to September 30, 2019.

Study Population, Sample Size, and Sampling Technique

The study population was all pregnant women who were attending antenatal care (ANC) in the three tertiary hospitals during the study period. Those pregnant women seriously ill were excluded from the study. The sample size was calculated using a single population proportion formula based on the following assumptions: There is no study on

knowledge, attitude and associated factors towards MTCT of HBV among pregnant women in Ethiopia. The assumption, Z distribution with a 95% confidence interval 1.96%, margin of error (d) 2%, and proportion (p) 50% were used to maximize the sample size. The final sample size was computed using the formula $n=Z^2_{\alpha/2} P(1-P)/d^2$. After adding 5% of the nonresponse rate, the final sample size was 1121. A systematic random sampling technique was used to select the study participants.

Operational Definition and Measurements

Knowledge

Information stored in memory assessed in terms of what the participants knew about HBV.

Knowledgeable

Study participants who correctly answered greater than or equal to 50% of knowledge-related questions among the 11 questions and the correct answer scored 1 and wrong answer scored 0.

Not Knowledgeable

Study participants who answered less than 50% of knowledge-related questions about HBV among 11 knowledge questions.

Attitude

The complex interaction of beliefs, feelings, and values to respond in a manner towards HBV transmission and its prevention.

Favorable attitude

Study participants who answered correctly greater than or equal to 50% of the attitude-related questions about HBV.

Unfavorable Attitude

Study participants who answered less than 50% of the attitude-related questions about HBV transmission and prevention.

Questionnaire and Data Collection

The questionnaire is mainly a data collection tool, which was jointly prepared by the study team and a literature review of previous comparable study[18] in English and translated into the local language Amharic for data collection purposes and then retranslated back into English to ensure its consistency, wording, and for data entry purposes. The questionnaire was validated for its consistency by using Cronbach's alpha test and the value was (α = 0.83). This value showed that it had good internal consistency. The questionnaire consisted of 25 items divided into three parts: demographic information, knowledge of transmission and prevention of HBV, and attitudes about HBV. The demographic information included age, religion, residence, marital status, monthly income, level of education, occupational status, parity, gravida and HBV vaccination history. The knowledge section has three perspectives: 1) general knowledge of HBV (4 items: Q1, Q7, Q8, Q9); 2) modes of transmission (5 items: Q2, Q3, Q4, Q5, Q6); and 3) knowledge of vaccine and MTCT of HBV (2 items: Q10, Q11). The attitude section consisted of 4 items (Q1, Q2, Q3, and Q4) and was mainly about the prevention of MTCT of HBV and follow-up after birth. For each item, there were two response options: Yes and No. After getting permission from the pregnant women, sociodemographic, knowledge, and attitudes towards MTCT of HBV and prevention methods were collected using interview administered questionnaire by trained experienced senior Midwifery nurses.

Data Quality Management

One day of training was given to data collectors and supervisors about data collection and ethical issues. The data collectors were trained on the study protocol (approach to the study participant, data collection procedures, and quality issues) before the start of the study. To ensure the quality of the data, questionnaires were prepared in English and translated into Amharic and retranslated back into English to ensure its consistency. The questionnaires were pretested before two weeks in actual data collection for the study on 5% of sampled pregnant women in the Poly Health Center in Gondar, Town, which has similar characteristics in the study area. Data collection was closely supervised by three medical microbiologists and investigators. The collected data were checked for completeness, consistency and accuracy on a daily basis. Data editing and clearance were to assure the appropriateness of data for analysis.

Data Processing and Analysis

Before data entry, the collected data were checked for completeness, consistency, and coded manually. Data were entered into SPSS version 20, cleaned, and recoded. A correct response to each question coded 1 point, and incorrect or missing responses coded zero points. The HBV knowledge score was calculated based on the sum of correct answers to the 11 knowledge questions. The

score ranged from 0 to 11 points. The attitude score was calculated as the sum of the correct answers to the 4 attitude questions. Sociodemographic characteristics were analyzed using descriptive statistics such as frequencies, mean, and standard deviation. Chi-square (χ^2) test and analysis of variance (ANOVA) were used to test for differences across the three hospitals. The Spearman correlation coefficient was used to analyze the relationship between knowledge and attitude scores. Binary logistic regression was used to determine the association between the outcome variable and explanatory sociodemographic variables. All variables in the bivariate logistic regression model whose p-value less than or equal to 0.2 were included in the multivariable analysis model. Adjusted odds ratio (AOR) with a 95% confidence interval was used to control cofounders and to report the strength of the association. The model fitness test was done using the Hosmer and Lemeshow statistical tests. Factors with a p-value <0.05 were considered to declare statistically significant with a 95% confidence interval.

Ethics Approval and Consent to Participate

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of the University of Gondar. Written informed consent was obtained from each pregnant woman before enrolling in this study. This study was conducted in accordance with the Declaration of Helsinki, and that participants under the age of 18 years were approved by the ethics committee to provide informed consent on their own behalf. Anonymity data collection was maintained throughout the study. Study participants were identified only by their code numbers. Confidentiality of information was maintained by locking the information using a computer password.

Results

Sociodemographic Characteristics of Study Participants

A total of 1121 pregnant women participated in the study. Of these, 593 (52.9%) of participants were from the University of Gondar Comprehensive Specialized Hospital and 447 (39.9) were from Felege-Hiwot Comprehensive Specialized Hospital and the rest were from Debre Markos Referral Hospital. The ages of the study participants ranged from 17 to 45 years with a mean age of 27.2 ±4.8 years. A large proportion of pregnant women 1094 (97.6%) were married. The majority, 895 (79.8%) of the participants were from urban. Most of the study participants 1064 (94.9%) were Orthodox Christians. Nearly two-thirds of the pregnant women 732 (65.3%) were housewives. Only 20 (1.8%) pregnant women were vaccinated for HBV before the study period (Table 1).

Knowledge of Pregnant Women Towards Hepatitis B Virus

The majority, 89.6%, 95%; CI:(87.9–91.3%) of pregnant women had poor knowledge. Only 153 (13.6%) of the pregnant women knew that hepatitis B was caused by a virus. Moreover, a majority,980 (87.4%) of the pregnant women did not know the hepatitis B virus transmitted from mother to child. Only 169 (15.1%) of the pregnant women knew that there was a vaccine for hepatitis B virus (Table 2).

Attitudes of Pregnant Women Towards Hepatitis B Virus

The mean score of attitudes was 2.27±1.80. More than half, 53.3% with 95%; CI (50.2, 56.4%) of the pregnant women had a favorable attitude towards hepatitis B transmission, screening and vaccination. Only 57% of pregnant women agreed to let their babies take the hepatitis B virus vaccine. There was a significant difference in attitude across the three hospitals (P<0.001) (Table 3).

Relationship Between Knowledge and Attitudes

A Spearman correlation coefficient was calculated for the relationship between participants' knowledge and attitudes. A weak positive correlation was found (r (1119): 0.217, p <0.001), indicating a significant linear relationship between knowledge and attitudes.

Factors Affecting the Knowledge and Attitudes of Pregnant Women

Educational status was an independent factor significantly associated with pregnant women's knowledge. The odds of good knowledge of HBV transmission and prevention were twenty times (AOR=20, 95% CI:(2.5, 158)) more likely among pregnant women attending primary education, fifty-three times (AOR=53, 95% CI:(7.1, 408)) more likely to attend secondary school and above, than those who did not attend formal education. Similarly, the study participants had primigravida were nearly three times

Table 1 Sociodemographic Characteristics of Pregnant Women Attending ANC of Three Tertiary Hospitals from May 1, 2018 to September 30, 2019 (n=112)

Characteristics	Category	Number	Percent (%)
Age in year	17–25	464	39.6
	26–45	657	60.4
Marital status	Single	17	1.5
	Married	1094	97.6
	Widowed	1	0.1
	Divorced	9	0.8
Residence	Urban	895	79.8
	Rural	226	20.2
Religion	Orthodox	1064	94.9
	Muslim	49	4.4
	Protestant	7	0.6
	Catholic	1	0.1
Monthly income (ETB)	<2000	159	14.2
	2000–4000	799	71.3
	>4000	163	14.5
Educational status	No education	254	22.7
	Read and write	6	54
	Primary	173	15.4
	High school	302	26.9
	College and above	331	29.5
Variables	**Category**	**Number**	**Frequency (%)**
Occupation	Housewife	732	65.3
	Employed	191	17
	Daily laborers	92	8.2
	Student	33	2.9
	Merchant	73	6.5
Gravida	Primigravida	409	36.5
	Multigravida	712	63.5
Parity	Nullipara	545	48.6
	Multipara	576	51.4
HBV Vaccination history	Yes	20	1.8
	No	1101	98.2
Study site	UOGCSH	593	52.9
	FHCSH	447	39.9
	DMRH	81	7.2

Abbreviations: HBV, hepatitis B virus; DMRH, Debre Markos Referral Hospital; FHCSH, Feleg Hiwot Comprehensive Specialized Hospital; UOGCSH, University of Gondar Comprehensive Specialized Hospital.

(AOR=2.9 CI (1.4–6.0)) more likely with good knowledge than those who had multigravida. Pregnant women who had been vaccinated for HBV vaccine eighteen times (AOR=18, 95% CI (6,50)) more likely with good knowledge than those who were not vaccinated for HBV vaccine. Moreover, pregnant women with a monthly income greater than 4000 ETB (Ethiopian Birr) were three times (AOR=3.2,95% CI:(1.2,8.9) more likely to have good knowledge compared to pregnant women whose monthly income was less than 2000 ETB (Table 4).

Residence, education status, and history of vaccination of the respondents had a significant influence on attitude. Pregnant women in urban areas were two times (AOR=2.0, 95% CI (1.4–2.6)) more likely to have a good attitude than those who live in rural areas. Study participants with educational level of primary education were two times (AOR=2.0, 95% CI (1.0, 3.0)) more likely to have a good attitude compared to those who did not have formal education. Pregnant women who attained secondary school and above were three times (AOR=3.0, 95% CI (2.0,4.0)) more likely to have a good attitude than those who did not have formal education (Table 4).

We computed a one-way ANOVA comparing the attitude scores of study participants of three different hospitals. A significant difference was found among the hospitals ($F(2,1118): 41.7$, $p < 0.001$). Tukey's HSD was used to determine the nature of the differences between hospitals. This analysis revealed that pregnant women who attended Debre Markos Referral Hospital scored lower (M:1.87, SD:1.95) than pregnant women who attended the University of Gondar Comprehensive Specialized Hospital (M:1.89, SD: 1.74). Pregnant women who attended Felege Hiwot Comprehensive Specialized Hospital (M = 2.86, SD: 1.70) were significantly different from the two hospitals.

Discussion

This is a large-scale multicenter study in Ethiopia on the knowledge, attitude and associated factors in pregnant women towards the MTCT of HBV and its prevention. This study has of paramount significance for the Amhara national Regional state Health Bureau, the Ministry of Health, researchers, and health professionals in the prevention and control of HBV infection in pregnant women and their infants. This study revealed that pregnant women had very low knowledge of MTCT of HBV infection and its prevention. This may hinder the prevention of MTCT and further elimination of HBV in Ethiopia. Insufficient knowledge among pregnant women regarding HBV infection, MTCT, and its prevention aspects in this study is consistent with other previous studies in HBV endemic

Table 2 Response of Knowledge of Pregnant Women and Stratified by Hospitals, in the Amhara Region from May 1, 2018 to September 30, 2019 (n=1121)

Knowledge Items	Total Correct Answer, n (%)	Correct Answers, n (%)			χ^2-Test
		UOGCSH	FHCSH	DMRH	P-value
Hepatitis B caused by a virus	153(13.6)	81(13.7)	63(14.1)	9(11.1)	0.77
Hepatitis B can be transmitted through blood transfusion	308(27.5)	142(46.1)	143(46.4)	23(7.5)	0.02
Hepatitis B can be transmitted through unprotected sexual intercourse	325(29)	156(26.3)	142(31.8)	27(33.3)	0.10
Hepatitis B can be transmitted from mother to fetus	141(12.6)	67(11.3)	67(15)	7(8.6)	0.10
Hepatitis B can be transmitted through use of unsafe needles/sharps	312(27.8%)	138(23.3)	154(3.5)	20(24.7)	0.001
An individual can be infected by both HBV and HIV	239(21.3)	114(19.2)	109(24.4)	16(19.8)	0.12
Hepatitis B can cause liver cancer	133(11.9)	62(10.5)	64(14.3)	7(8.6)	0.11
Hepatitis B can cause cirrhosis	130(11.6)	50(8.4)	63(14.1)	17(21.0)	0.001
Hepatitis B has no symptom of disease	199(17.8)	125(21.1)	61(13.6)	13(16)	0.007
There is a vaccine for hepatitis B virus	169(15.1)	89(15)	68(15.2)	12(14.8)	0.99
Babies that are infected perinatally are at higher risk of chronic disease cirrhosis or liver cancer	167(14.9)	91(15.3)	69(15.4)	7(8.6)	0.26

Note: χ^2 = Chi-square.
Abbreviations: HBV, hepatitis B virus; HIV, human immunodeficiency virus.

Table 3 Response of Attitude of Pregnant Women Towards Hepatitis B Virus, Stratified by Hospitals in the Amhara Region from May 1, 2018 to September 30, 2019 (n=1121)

Attitude Items	Total Correct Answer, n (%)	Correct Answers, n (%)			χ^2-Test
		UOGCSH	FHCSH	DMRH	P-value
Are you willing to screened for hepatitis B virus?	677 (60.4)	324(54.6)	315(70.5)	38(46.9)	<0.001
Are you willing to let your baby to take a HBV vaccine?	639 (57)	276(46.5)	325(72.7)	38(46.9)	<0.001
If you have hepatitis B infection, are you willing to let your baby take antibody of hepatitis B?	613 (54.7)	254(42.8)	321(71.8)	38(46.9)	<0.001
Are you willing to take your baby back to clinic after birth screening for hepatitis B virus?	624(55.7)	268(45.2)	318(71.1)	43(46.9)	<0.001

Note: χ^2 = Chi-square.
Abbreviations: HBV, hepatitis B virus; HIV, human immunodeficiency virus.

countries.[15–24] However, sufficient knowledge of pregnant women has been reported in Cameroon.[25,26]

Overall, we observed poor knowledge of HBV infection, transmission, and prevention in this study. Specifically, only 13.6% of pregnant women aware that hepatitis B is a virus in the current study. This finding is lower than studies were reported in China (56.6%) and Saudi Arabia (48.1%) of pregnant women aware that hepatitis B is a virus.[18,24] For MTCT, only (12.6%) of pregnant women knew that HBV can be transmitted from the mother-to-child. Moreover, the majority of pregnant women (71%) did not know that HBV can be transmitted through unprotected sex. The majority (84.9%) of the pregnant women did not know the availability of hepatitis B virus vaccine (Table 2). This finding is comparable with previous study 68.9% in Ethiopia.[21] However, our finding is relatively very high compared to similar studies in China 25.3%, and Saudi Arabia 28%.[18,24] The observation of very low knowledge of pregnant women about transmission and prevention of HBV in this study might be due to the low level of education; one-third of the study participants had no formal education compared with studies in China, and Saudi Arabia, the majority of them were high school and above.[18,19] The other reason for poor knowledge in this study might be that in Ethiopia, traditionally believed that hepatitis disease is considered to be a disease of Bats. Meaning people believed that hepatitis transmitted from feces and urine of Bats rather than infected blood transfusion, unprotected sex, and from infected mother to infant.[13] This belief hinders knowledge of hepatitis virus transmission and its prevention in the country. For these reasons, persons infected with hepatitis viruses seek

Table 4 Multivariable Analysis of Sociodemographic Variables in Relation to Knowledge and Attitude of Pregnant Women Attending in Three Tertiary Hospitals in Amhara Region from May 1, 2018 to September 30, 2019 (n=1121)

Variable	Category	Knowledge		AOR (95% CI)	Attitude		AOR (95% CI)
		Poor n (%)	Good n (%)		Unfavorable n (%)	Favorable n (%)	
Age (year)	17–25 26–45	417(89.9) 587(89.3)	47(10.1) 70(10.7)	0.5(0.3–0.9) 1	193(41.6) 331(50.4)	271(58.4) 326(49.6)	1.3(0.9–1.7) 1
Residence	Urban Rural	790(88.3) 214(94.7)	105(11.7) 12(5.3)	1(0.5–2.0) 1	380(42.5) 144(63.7)	515(57.5) 82(36.3)	2.0(1.4–2.6)*** 1
Marital status	Unmarried Married	25(92.6) 979(89.5)	2(7.4) 115(10.5)	1.5(0.3–7.0) 1	13(48.1) 511(46.7)	14(51.9) 583(53.3)	1.1(0.5–2.6) 1
Education	No education Primary Secondary & above	253(99.6) 220(94) 531(83.9)	1(0.4) 14(6) 102(16.1)	1 20(2.5–158)** 53(7.1–408)***	162(63.8) 118(50.4) 244(38.5)	92(36.2) 116(49.6) 389(61.5)	1 2.0(1.0–3.0)*** 3.0(2.0–4.0)***
Occupation	Housewife Employed	157(82.2) 847(91.1)	34(17.8) 83(8.9)	1(0.6–1.5) 1	63(33) 461(49.6)	128(67) 469(50.4)	1.3(0.9–2) 1
Income (ETB)	<2000 2000–4000 >4000	153(96.2) 719(90) 132(81)	6(3.8) 80(10) 31(19)	1 2.3(0.9–5) 3.2(1.2–8.9)*	94(59.1) 370(46.3) 60(36.8)	65(40.9) 429(53.7) 103(63.2)	1 1.0 (0.8–1.7) 1.3(0.8–2)
Gravida	Primigravida Multigravida	349(85.3) 655(92)	60(14.7) 57(8)	2.9(1.4–6.0)** 1	181(44.3) 343(48.2)	228(55.7) 369(51.8)	0.8(0.5–1.2) 1
Parity	Nulipara Multipara	474(87) 530(92)	71(13) 46(8)	0.6(0.3–1.2) 1	224(41.1) 300(52.1)	321(58.9) 276(47.9)	1(0.7–1.8) 1
HBV history of vaccination	Yes No	8(40) 996(90.5)	12(60) 105(9.5)	18(6–50)*** 1	7(35 517(47)	13(65) 584(53)	2.7(1.0–7.0)* 1
Study site	UOGCSH FHCSH DMRH	544(91.7) 387(86.6) 73(90.1)	49(8.3) 60(13.4) 8(9.9)	1 2.5 (1.6–3.9) 1.2(0.52–2.9)	349(58.9) 132(29.5) 43(53.1)	244(41.1) 315(70.5) 38(46.9)	1 5.0(3.0–6.0) 1.0(0.8–2.0)

Notes: Double asterisk (**) shows P<0.01 and statistically significant, Triple asterisk (***) shows P<0.001 and statistically significant. *=P<0.05.
Abbreviations: AOR, adjusted odds ratio; HBV, hepatitis B virus; DMRH, Debre Markos Referral Hospital; ETB, Ethiopian birr; FHCSH, Feleg Hiwot Comprehensive Specialized Hospital; UOGCSH, University of Gondar Comprehensive Specialized Hospital.

traditional healers than health institutions.[27] This calls for the Ministry of Health to promote health education on hepatitis virus transmission and its prevention through mass media like television, radio, mobile phone, and using health extension workers through door-to-door and health professionals in public health institutions. Furthermore, raise national awareness of viral hepatitis by promoting the national plan celebrating the World Hepatitis Day (July 28), engaging the community and political leader advocates, and ``Champions``.[1]

More than half of (53%) of study participants had favorable attitudes toward the transmission and prevention of HBV in the current study. This finding is similar to a study (54%) in Ethiopia.[21] More than half of (60.4%) of the study participants were willing to screen for HBV during antenatal care visits in this study compared to 83.3% in China.[18] Universal HBV testing of pregnant women during pregnancy is widely recommended by the WHO to reduce MTCT.[28] Despite WHO recommendations, HBV screening is not yet considered a routine test for pregnant women in the prenatal package in public health institutions in Ethiopia. Moreover 57% of pregnant women were willing to let their baby receive the HBV vaccine. However, this finding is much lower than China, and Saudi Arabia.[18,24] This difference could be explained that the HBV vaccine was included in Ethiopia, lately in 2007 in the expanded program of immunization and vaccination given at the age of 6, 10, and 14 weeks after birth.[29] Moreover, only (54.7%) of pregnant women were willing to let their baby take HBV

antibody if the mothers were infected with HBV. The lowest finding in this study might be that the passive HBV antibody is expensive and not easily available in most health facilities in Ethiopia. Prevention of MTCT is key to reducing the burden of chronic HBV infection toll. To prevent MTCT, provisions of active HBV and passive hepatitis B immunoglobulin (HBIG) vaccines are widely recommended for infants born to HBsAg-positive pregnant mothers.[1] However, in our country there is no availability of HBIG in most public health institutions and the birth dose vaccine has not yet started. This is a great challenge to prevent MTCT of HBV and it needs great efforts to address this problem.

In this study, monthly income was an independent factor significantly associated with good knowledge. This finding is similar to that of a study by Gebrechekos et al.[21] This might be due to pregnant women who had good monthly income are more likely to access information about HBV through television, radio, internet and other available technologies than those who had less income. Moreover, education status was a significant factor associated with good knowledge.[18,24] This might be due to pregnant women who have good educational status are more likely to access information through different sources than those who had no educational background. Moreover, primigravida is significantly associated with good knowledge. This might be due to pregnant women who had primigravida are more likely to have good educational status than those who had multigravida. On our observation of the data, most young pregnant women were in primigravida and had a good educational background. Similarly, a history of vaccination in pregnant women is significantly associated with good knowledge. This finding is similar to a study done in Nigeria.[20] This suggests that pregnant women with good knowledge about HBV, they are more likely to be vaccinated and prevent HBV infection.

Residence was found to be significantly associated with a good attitude. Pregnant women who live in urban areas were two times more likely to have a good attitude than their rural counterparts, which is consistent with a study reported in Ethiopia.[21] This might be due to better access to information through different means. In urban areas, there are different ways of accessing information through television, radio and other technologies that may not be available in rural areas. In this study, educational status was significantly associated with a good attitude. This finding is supported by similar studies.[18,19] Study participants who were more educated were more likely to have good attitudes than those who did not have formal education. Educated pregnant women had more chance of accessing information than they did not educated. This helps them to have good attitudes toward HBV transmission and prevention.

We observed that there was a significant difference in the attitudes of study participants in the three hospitals according to one-way ANOVA analysis ($p<0.001$). The difference might be due to awareness of pregnant women who attended each hospital. Moreover, this study also observed correlations between knowledge and attitude. We found that there was a significant positive correlation between knowledge and attitude ($P<0.001$). This might be pregnant women who had good knowledge more likely to have favorable attitudes.

Limitations

We included only four attitude questions, and we also did not include practice questions for pregnant women towards MTCT of HBV and its prevention. It is extremely difficult to evaluate the knowledge, attitude, and associated factors about vertical transmission of hepatitis B when the screening for hepatitis B is commonly not available and hepatitis B vaccines are not given to newborns because the screening for Hepatitis B is not available. This study highlights the importance of the antenatal screening and the vaccinations of the newborns from hepatitis B infected women.

Conclusion and Recommendation

The overall knowledge of study participants was found to be insufficient and their attitude also was limited. Educational status, gravida, and vaccination history were significantly associated with good knowledge and good attitude, whereas income and residence were significantly associated respectively with good knowlegde and attitude. Moreover, there was a significant variation in attitudes between hospitals. Insufficient knowledge among pregnant women in this study poses a great challenge for the prevention MTCT of HBV and further elimination of the disease in Ethiopia. This calls for the Amhara Regional Health Bureau and the Ministry of Health to promote health education through mass media like television, radio and other technologies about hepatitis B virus transmission and prevention strategies in pregnant women and their infants. Public health interventions like routine screening for HBV, treatment and birth dose vaccines for infants are highly needed in Ethiopia to reduce MTCT and for further elimination. A qualitative study is recommended to explore barriers to limited knowledge and attitude. Further studies are mandatory to increase awareness of MTCT of HBV, prevention, and immunization coverage in Ethiopia.

Abbreviations

ANC, antenatal care;HBV, hepatitis B virus; HBeAg, hepatitis B e antigen; HBsAg, hepatitis B surface antigen; DMRH, Debre Markos Referral Hospital; ELISA, enzyme-linked immunosorbent assay; FHCSH, Felege-Hiwot Comprehensive Specialized Hospital; MTCT, mother-to-child transmission; UOGCSH, University of Gondar Comprehensive Specialized Hospital; WHO, World Health Organization.

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Disclosure

All authors declare there is no competing interests.

References

1. World Health Organization. *Global Health Sector Strategy on Viral Hepatitis, 2016–2021*; 2016.
2. World Health Organization. *Global Hepatitis Report, 2017*. Geneva: World Health Organization; 2017.
3. Organization. WH. *Hepatitis Fact Sheet*. 2016. Regional Office for Africa, editor.
4. Breakwell L, Tevi-Benissan C, Childs L, Mihigo R, Tohme R. The status of hepatitis B control in the African region, review. *Pan Afr Med J*. 2017;27(3).
5. Custer B, Sullivan SD, Hazlet TK, Iloeje U, Veenstra DL, Kowdley KV. Global epidemiology of hepatitis B virus. *J Clin Gastroenterol*. 2004;38 (10):158–168. doi:10.1097/00004836-200411003-00008
6. Kean E, Funk A, Shimakawa Y. Systematic review with meta-analysis: the risk of mother to child transmission of HBV infection in Sub- Saharan Africa. *Aliment Pharmacol Ther*. 2016;44:1005–1017. doi:10.1111/apt.13795
7. Wang C, Wang C, Jia ZF, et al. Protective effect of an improved immunization practice of mother-to-infant transmission of hepatitis B virus and risk factors associated with immunoprophylaxis failure. *Medicine*. 2016;95(34).
8. Ejeta E, Debasu R. Sero-epidemiology of Hepatitis B among pregnant women attending antenatal clinic in selected health facilities in East Wollega Zone Ethiopia. *J Hepat*. 2015;22(52).
9. Tunje A, Andargie M, Hiko M, Fikru C, Kejela G. Sero-prevalence of hepatitis B virus and associated factors among pregnant women in Gambella hospital, South Western Ethiopia: facility based cross-sectional study. *BMC Infect Dis*. 2019;19:602. doi:10.1186/s12879-019-4220-z
10. Negero A, Sisay Z, Medhin G. Prevalence of Hepatitis B surface antigen (HBsAg) among visitors of shashemene general hospital voluntary counseling and testing center. *BMC Res Notes*. 2011;4 (1):35. doi:10.1186/1756-0500-4-35
11. Kebede K, Derseh D, Belay A. Hepatitis B virus infection among pregnant women in Ethiopia: a systematic review and meta-analysis of prevalence studies. *BMC Infect Dis*. 2018;18(322):1–9. doi:10.1186/s12879-018-3234-2
12. Belyhun Y, Maier M, Mulu A, Diro E, Liebert UG. Hepatitis viruses in Ethiopia: a systematic review and meta-analysis. *BMC Infect Dis*. 2016;16(761). doi:10.1186/s12879-016-2090-1
13. Shiferaw F, Letebo M, Bane A. Chronic viral hepatitis: policy, regulation, and strategies for its control and elimination in Ethiopia. *Public Health*. 2016;16(1):769.
14. Roushan N, Nasiri Toosi M, Meysamie A, Esteghamati AR, Hajrassuliha H. Hepatitis B knowledge among Iranian adolescents: a national survey. *Iran Red Crescent Med J*. 2013;15(12):e11558. doi:10.5812/ircmj.11558
15. Zheng J, Li Q, Wang J, Zhang G, Wangen KR. Inequality in the hepatitis B awareness level in rural residents from 7 provinces in China. *Hum Vaccin Immunother*. 2017;14:1–9.
16. Malungu Ngaira JA, Kimotho J, Mirigi I, Osman S, Ng'ang'a Z, Lwembe R. Prevalence, awareness and risk factors associated with Hepatitis B infection among pregnant women attending the antenatal clinic at Mbagathi District Hospital in Nairobi, Kenya. *Pan Afr Med J*. 2016;24(315).
17. Mohamed R, Ng CJ, Tong WT, Abidin SZ, Wong LP, Wy L. Knowledge, attitudes and practices among people with chronic hepatitis B attending a hepatology clinic in Malaysia: a cross sectional study. *BMc Public Health*. 2012;12(1):601.
18. Han Z, Yin Y, Zhang Y, Ehrhardt S, Thio CL, Nelson KE. Knowledge of and attitudes towards hepatitis B and its transmission from mother to child among pregnant women in Guangdong Province, China. *Plose One*. 2017;12(6):e0178671.
19. Hang Pham TT, Le TX, Nguyen DT, Luu CM, Truong BD, Tran PD. Knowledge, attitudes and practices of hepatitis B prevention and immunization of pregnant women and mothers in northern vietnam. *Plose One*. 2019;14(4):e0208154.
20. Adeyemi AB, Enabor OO, Ugwu IA, Bello FA, Olayemi OO. Knowledge of hepatitis B virus infection, access to screening and vaccination among pregnant women in Ibadan, Nigeria. *J Obstet Gynaecol*. 2013;33(2):155–159. doi:10.3109/01443615.2012.711389
21. Gebrecherkos T, Girmay G, Lemma M, Negash M. Knowledge, attitude, and practice towards Hepatitis B virus among pregnant women attending antenatal care at the University of Gondar comprehensive specialized Hospital, Northwest Ethiopia. *Int J Hepatol*. 2020;2020. doi:10.1155/2020/5617603
22. Dun-Dery F, Adokiya MN, Walana W, Yirkyio E, Ziem JB. Assessing the knowledge of expectant mothers on mother–to-child transmission of viral hepatitis B in Upper West region of Ghana. *BMC Infect Dis*. 2017;17(416). doi:10.1186/s12879-017-2490-x
23. Abdulai MA, Baiden F, Adjei G, Owusu-Agyei S. Low level of Hepatitis B knowledge and awareness among pregnant women in the Kintampo North Municipality: implications for effective disease control. *Ghana Med J*. 2016;50(3):157–162.
24. Al-Essa M, Alyahya A, Al Mulhim A, Alyousof A, Al-mulhim M, Essa A. Perception of and attitude towards Hepatitis B infection among Saudi pregnant females attending antenatal care unit in Al-Ahsa City, Kingdom of Saudi Arabia. *Cureus*. 2020;12(1).
25. Yankam BM, Anye CS, Nkfusai NC, Shirinde J, Cumber SN. Knowledge and practice of pregnant women and health care workers on hepatitis B prevention in the Limbe and Muyuka health districts of the south west region of Cameroon. *Pan Afr Med J*. 2019;33(310).
26. Eyong EM, Yankam BM, Seraphine E, et al. The prevalence of HBsAg, knowledge and practice of hepatitis B prevention among pregnant women in the Limbe and Muyuka Health Districts of the South West region of Cameroon: a three-year retrospective study. *Pan Afr Med J*. 2019;32:122.
27. Nsibirwa S, Anguzu G, Kamukama S, Ocama P, N-M J. Herbal medicine use among patients with viral and non-viral Hepatitis in Uganda: prevalence, patterns and related factors. *BMC Complementary Med Ther*. 2020;20(169). doi:10.1186/s12906-020-02959-8

28. World Health Organisation. Guidelines on Hepatitis B and C Testing. 2017. Available from: https://www.who.int/ hepatitis/publications/guidelines-hepatitis-c-b-testing/en/. Accessed October 2, 2020.

29. Federal Republic of Ethiopia. *National Expanded Programme on Immunization Comprehensivemulti-Year Plan 2011–2015*. Addis Ababa: Fedral Ministry of Health; 2010.