



Factors Associated With Hepatitis B Incidence In Pregnant Women

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Abstract

Hepatitis B remains a significant public health concern and can be transmitted vertically from mother to child. Screening among pregnant women is implemented through the national triple elimination program to prevent mother-to-child transmission. Identifying associated risk factors is essential to strengthen preventive strategies. This study aimed to determine factors associated with hepatitis B infection among pregnant women. A cross-sectional study was conducted at a community health center in Mataram City. The population consisted of 56 pregnant women diagnosed with hepatitis B in 2024. Using a 1:1 ratio of hepatitis B-positive and hepatitis B-negative pregnant women, with an additional 10% to anticipate dropouts, the final sample comprised 122 respondents selected through purposive sampling based on inclusion and exclusion criteria. Bivariate analysis using the Chi-square test showed significant associations between hepatitis B infection and maternal knowledge ($p = 0.001$) as well as age ($p = 0.021$). Attitude, family support, health worker support, education, employment status, and parity were not significantly associated ($p > 0.05$). Logistic regression analysis ($\alpha = 5\%$) confirmed that knowledge ($p = 0.000$) and age ($p = 0.027$) were significantly related to hepatitis B infection. At $\alpha = 10\%$, education also showed a significant association ($p = 0.070$). Multivariate logistic regression revealed that knowledge (OR = 3.892; $p = 0.000$), education (OR = 2.682; $p = 0.011$), and age (OR = 0.298; $p = 0.027$) were significant predictors, collectively explaining 30.2% of hepatitis B incidence. In conclusion, maternal knowledge, age, and education are significantly associated with hepatitis B infection among pregnant women.

Keywords: Associated Factors; Pregnant Women; Hepatitis B

INTRODUCTION

Hepatitis B is the second leading cause of death after tuberculosis. In 2022, 1.3 million people died from hepatitis B infection, with the majority of cases occurring in people aged 30-50 years. An estimated 12% occurred in children, infected directly during pregnancy or childbirth (World Health Organization., 2024). The prevalence of HBsAg in Southeast Asia in 2025 was 14.97%, indicating a high risk of transmission (Ott et al., 2012).

In Indonesia, hepatitis B screening for pregnant women has been implemented through the triple elimination program. Nationally, screening coverage for pregnant women was 65.7% and 75.1% in West Nusa Tenggara Province. The prevalence of hepatitis B in Indonesia in 2023 was 0.12%, and 0.33% in West Nusa Tenggara Province. In 2024, 56 cases were reported among pregnant women in Mataram City (BKPK Kemenkes RI, 2023); (Dikes Kota Mataram, 2024). This indicates that cases are still being detected, necessitating strengthening

prevention efforts at the community and health service levels.

The incidence of hepatitis B in pregnant women is influenced by behavioral and biological factors, such as unprotected sexual intercourse and a history of unsafe abortion. Pregnant women who engage in unprotected sexual intercourse are 5.04 times more likely to be infected with hepatitis B, and a history of unsafe abortion increases the risk by 3.51 times compared to those without such a history (Bardoe et al., 2025).

Hepatitis B infection in pregnant women has physical and psychological impacts. Lack of knowledge and access to antiviral treatment leads to stress during pregnancy (X. Liu et al., 2022). Research results show no statistically significant difference between premature birth, fetal growth retardation, and labor complications in pregnant women with hepatitis B infection (Lobstein et al., 2010). Therefore, prevention and control measures are needed to stop mother-to-child transmission.

Behavioral determinants, knowledge, and social factors also play a significant role. Pregnant women generally understand that hepatitis B is caused by a virus, can disrupt liver function, and is transmitted through needle sticks, unsafe sexual intercourse, and mother-to-child transmission. They are willing to seek consultation and examination when symptoms appear (Alaridah et al., 2024). Support from health workers in providing information and counseling can help reduce anxiety in pregnant women, as can family support that fosters a good understanding of hepatitis B (Ahad et al., 2022). A good level of knowledge and attitude influences pregnant women's participation in hepatitis B screening (Sekarini et al., 2025), and good knowledge increases the likelihood of receiving antiviral treatment during pregnancy (X. Liu et al., 2022).

Prevention efforts from mother to baby are carried out through national hepatitis B screening for all pregnant women from early pregnancy, administration of HBIG within 24 hours of delivery, and antiviral therapy for mothers with high viral loads (Ngu et al., 2024). Although national prevention efforts have been carried out, there are still gaps in knowledge, attitudes, and support from health workers that influence pregnant women's participation in hepatitis B screening. Therefore, this study aims to identify factors associated with the

incidence of hepatitis B infection in pregnant women in Mataram City.

METHOD

This study used a cross-sectional design. The population was all 56 pregnant women diagnosed with hepatitis B in Mataram City in 2024. The sample size was calculated using a 1:1 ratio (hepatitis B-positive and hepatitis B-negative pregnant women), with 10% added to the total sample, resulting in a total sample of 122 women. The sampling technique used purposive sampling in accordance with inclusion and exclusion criteria. The inclusion criteria for this study were pregnant women who had their pregnancy checked at a community health center and were willing to be respondents. Exclusion criteria were pregnant women who had changed their address since the initial data collection. The sample in this study consisted of pregnant women with and without hepatitis B infection who were registered at the time of the study. Data collection took place in September and October 2025.

The independent variables in this study were respondent characteristics (age, education, occupation, and number of pregnancies), knowledge, attitudes, family support, and support from health workers, while the dependent variable was pregnant women diagnosed with Hepatitis B. The data sources used were secondary and primary data. Secondary data were obtained from patient registers of pregnant women diagnosed and not diagnosed with Hepatitis B at community health centers in Mataram City. Primary data were obtained from respondents using a questionnaire. To reach the population of pregnant women diagnosed with Hepatitis B, the researchers involved village midwives as enumerators.

The research we submitted has been declared to have passed ethical testing and obtained approval from the Research Ethics Committee of the Faculty of Medicine and Health Sciences, University of Mataram. Research ethics number : 247/UN18.F8/ETIK/2025. The midwives, together with the researchers, conducted direct interviews with respondents using a questionnaire. Pregnant women who were not diagnosed with Hepatitis B were given a questionnaire during their routine check-up at the community health center. Classification of knowledge levels was categorized

as good, sufficient, and poor based on a predetermined cut-off point. The variables of attitude, health worker support, and family support used a Likert scale and were categorized into 2 categories with a cut-off point of <50% (poor or less supportive attitude) and >50% (good or supportive attitude). Validity testing was conducted on 20 pregnant women. The validity test was conducted using Pearson correlation with the criteria of

calculated $r > \text{table } r (\alpha = 0.05)$. Reliability testing used Cronbach's Alpha with the criteria of $\alpha \geq 0.70$. For statements of family support and support from health workers, validity and reliability tests were not carried out because there was only 1 statement. The validity test results showed that all questions were valid and reliable (Table 1).

Table 1.
Results Of Validity And Reliability Tests Of Questions on Knowledge And Attitudes of Pregnant Women Towards Hepatitis B

No.	Knowledge Questions	Validity Test Results (R table = 0.444)	Description
1	Hepatitis B, also known as jaundice, is a disease caused by the hepatitis B virus that causes inflammation of the liver.	0.449	Valid
2	Hepatitis B infection in pregnant women can lead to liver damage and even death.	0.6468	Valid
3	Risk factors for hepatitis B infection include using used syringes, having unprotected sex, and sharing personal items such as toothbrushes or razors with an infected person.	0.763	Valid
4	Pregnant women can transmit the hepatitis B virus to their babies	0.450	Valid
5	Signs and symptoms of hepatitis B infection in pregnant women include fatigue, loss of appetite, nausea and vomiting, right-sided abdominal pain, muscle and joint pain, and jaundice.	0.618	Valid
6	Babies infected with hepatitis B can be breastfed.	0.685	Valid
7	Pregnant women with hepatitis B infection can deliver vaginally.	0.567	Valid
8	The risks for babies born to mothers with hepatitis B infection include preterm birth, a birth weight of less than 2000 grams, and birth defects.	0.621	Valid
9	Treatment for pregnant women with hepatitis B infection includes vaccination, antiviral therapy, immunoglobulin administration, and hepatitis B immunization for newborns.	0.568	Valid
	Cronbach's Alpha Results	0.785	Reliabel
No	Attitude Questions	Validity Test Results (R table = 0.444)	Description
1	I believe Hepatitis B infection is treatable.	0.650	Valid
2	I feel comfortable discussing Hepatitis B symptoms with my husband, such as right-sided abdominal pain, muscle and joint pain, and jaundice.	0.898	Valid
3	I feel like I can easily obtain information about Hepatitis B	0.777	Valid
4	I am worried about contracting Hepatitis B.	0.776	Valid
5	I am still embarrassed to seek information about Hepatitis B.	0.579	
	Cronbach's Alpha Results	0.803	Reliabel

The research data were analyzed descriptively and analytically. Bivariate analysis was performed to determine the relationship between the variables studied using chi-square analysis with $p < 0.05$ and logistic regression analysis. Multivariate analysis was performed to determine the influencing factors using logistic regression with $p < 0.05$.

RESULT AND DISCUSSION

1. Descriptive Analysis

Descriptive analysis was used in this study to determine the frequency distribution of each research variable. Respondent characteristics included age, education, occupation, and number of pregnancies. The results of the descriptive analysis are presented in Table 2.

Table 2.
Descriptive Analysis of Maternal Characteristics with Hepatitis B Incidence In Pregnant Women

Variables	Frequency (n=122)	%
Hepatitis B Incident		
Hepatitis B Positive	27	22,1
Hepatitis B Negative	95	77,9
Age		
≤20 years	11	9,0
>20-35 years	94	77,1
>35 years	17	13,9
Education		
Primary (Elementary, Middle School)	23	18,9
Secondary (High School/Equivalent)	61	50,0
Higher (Diploma/Bachelor's Degree)	38	31,1
Occupation		
Not Working (Housewife)	85	69,7
Working	37	30,3
Gravida		
Primigravida (First pregnancy)	89	73,0
Multigravida (2-3 pregnancies)	31	25,4
Grande Multigravida (>3 pregnancies)	2	1,60

From table 1 above shows that 27 pregnant women (22.1%) had hepatitis B. Respondents were mostly aged >20-35 years (77.1%), had secondary education (50%), were unemployed (69.7%), and were primigravida (73%).

The results of this study are the same as the research (Diniarti, *et al*, 2022), studies show that hepatitis B occurs in women of reproductive age, with low educational attainment, and in multigravida.

The recommended age for pregnancy and childbirth is 20-35, as women's reproductive organs are ready for pregnancy. Meanwhile, women aged 35 and over are at high risk for pregnancy and delivery, which can lead to low birth weight, high blood pressure, preeclampsia, and other complications. Employment is related to income, which leads to better access to healthcare.

Table 3. Descriptive Analysis of Knowledge, Attitudes, Family Support, and Healthcare Professional Support in Hepatitis B Incidence in Pregnant Women

Variables	Frequency (n=122)	%
Knowledge		
Insufficient	13	10,7
Sufficient	36	29,5
Good	73	59,8

Attitude		
Less supportive	3	2,5
Supportive	95	97,5
Family support		
Less supportive	19	15,6
Supportive	103	84,4
Healthcare worker support		
Less supportive	16	13,1
Supportive	106	86,9

From table 3 shows that the majority of pregnant women have good knowledge (59.8%), supportive attitudes (97.5%), supportive families (84.4%) and supportive health workers (86.9%).

2. Bivariate Analysis

Bivariate analysis in this study was used to determine the relationship between each independent variable and the incidence of hepatitis B. Bivariate analysis was conducted using 2 (two) methods, namely the cross tabulation method with the Chi Square test and the logistic regression method using a significance level of $\alpha = 5\%$. The results of the bivariate analysis are presented in Table 4.

Knowledge of pregnant women shows good knowledge about the cause of hepatitis B is a virus that causes inflammation of the liver (87.7%), hepatitis infection can cause liver damage and even death (70.49%), risk factors for transmission through unsafe sexual relations, sharing personal equipment (toothbrushes, razors) (71.31%), pregnant women can transmit hepatitis to their babies (72.13%), signs and symptoms of hepatitis B infection (76.23%), breast milk can be given to babies from mothers with hepatitis B (93.44%), pregnant women with hepatitis B infection can give

birth normally (69.67%) and the risk of babies born to mothers with hepatitis B (74.59%).

Supportive attitudes among pregnant women include belief that hepatitis B can be effectively treated, feeling comfortable discussing it with their husbands, easily accessible information about hepatitis B, and concerns about transmitting it to their babies. Families, especially husbands and healthcare professionals, are very supportive, encouraging pregnant women to visit healthcare facilities during their pregnancies.

The same research results were conducted by(H. Liu et al., 2025), Respondents knowledge included that hepatitis B infection can develop into cirrhosis and liver cancer, can be transmitted from mother to fetus, direct contact with patients, and standard treatment is important. Support from health workers, especially doctors, helps patients by providing information on treatment options, recommending regular check-ups, encouraging patients and their families to get hepatitis B vaccinations, providing counseling on healthy living, and providing appropriate treatment. Respondents' income is related to their knowledge of hepatitis B. Higher income levels have better knowledge of hepatitis B, and urban areas are more likely to be affected than rural areas.

Table 4
Analysis of the Relationship Between Variables and the Incidence of Hepatitis B in Pregnant Women

Variable	Cross Tab Chi Square		Regresi Logistik	
	Chi Square Value	P Value	B Value	P Value
Age	7,700	0,021	-1,225	0,011
Education	5,320	0,070	0,732	0,025
Occupation	0,739	0,390	-0,393	0,392
Gravidity	1,046	0,593	-0,050	0,909
Knowledge	13,140	0,001	1,074	0,001
Attitude	0,224	0,636	0,581	0,640

Family Support	0,015	0,902	-0,075	0,902
Healthcare Professional Support	0,088	0,767	0,185	0,767

From table 4 above shows the results of bivariate analysis using the cross tabulation method with the Chi Square test and the logistic regression method with $\alpha = 5\%$ showing that there are 2 (two) independent variables that both have a relationship with the incidence of hepatitis B as the dependent variable. The two independent variables are knowledge of hepatitis B and maternal age.

There is 1 (one) independent variable that influences the incidence of hepatitis B when analyzed using logistic regression, but is not related to the incidence of hepatitis B when analyzed using the cross tabulation method with the Chi Square test. The independent variable is maternal education. If the α used is 10%, then the results of the cross tabulation method with the Chi Square test show that maternal education has a relationship with the

Multivariate Analysis

Multivariate analysis was conducted using the logistic regression method by entering all variables

incidence of hepatitis B ($p = 0.070$) or less than $\alpha = 10\%$. Research conducted by (Belay et al., 2025) primigravida, education level, urban residence, income, having good knowledge and attitude about hepatitis B in pregnant women.

Sources of information about hepatitis were obtained from health workers, social media, family or friends, and television. Information obtained about hepatitis B included prevention methods, treatment methods, signs and symptoms, and the mechanism of hepatitis B transmission. (Shibabaw et al., 2024). There is a relationship between mother's class activities as a source of information and the role of village midwives with hepatitis B examinations (Inayah, 2022)

and the significance level used was $\alpha = 5$. The results of the multivariate analysis are presented in Table 5.

Table 5.
Multivariate Analysis of the Influence of Variables on the Incidence of Hepatitis B in Pregnant Women

Variable	B Value	P Value
Hepatitis B Knowledge	1,572	0,000
Age	-1,198	0,038
Education	1,085	0,006
Occupation	-0,275	0,611
Gravidity	0,110	0,847
Attitude	0,996	0,460
Family Support	-0,765	0,647
Healthcare Professional Support	-0,389	0,825

The results of multivariate analysis using logistic regression in table 4 show that there are 3 (three) dependent variables that influence the incidence of hepatitis B. The three dependent variables are knowledge of hepatitis B, age and maternal education with a value ($p < 0.005$). Meanwhile, the variables of occupation, gravida, attitude, family support and support from health workers did not show any influence on the incidence of hepatitis B in pregnant women with a value ($p > 0.05$).

Research conducted by (Temesgen et al., 2025) shows that factors related to hepatitis B

infection are basic education, history of changing partners, sharing needles, and history of hepatitis in the family.

Similar to the linear regression method, the logistic regression analysis also uses the best model selection method to determine the most appropriate logistic regression model and eliminate all independent variables that have no effect on the model. The final results of the best model selection for logistic regression are shown in Table 6.

Table 6.
Multivariate Analysis of Variables Most Influential in Hepatitis B
Incidence in Pregnant Women

Dependent Variable	B Value	P Value	OR
Knowledge	1,359	0,000	3,892
Age	-1,211	0,027	0,298
Education	0,987	0,011	2,682

Information: *Negelkerke* $R^2 = Value = 0,302\%$

The results of a multivariate analysis using linear logistic regression, analyzing all variables related to the incidence of hepatitis B in pregnant women, revealed that the variables influencing the incidence of hepatitis B in pregnant women were knowledge, which had a 3.9-fold increased risk (OR = 3.892; $p = 0.00$), education, which had a 2.68-fold increased risk (OR = 2.682; $p = 0.011$), and age, which had a 0.298-fold increased risk (OR = 0.298; $p = 0.27$). The logistic regression model involving these three variables influenced the incidence of hepatitis B in pregnant women by 30.2%, while the remainder was influenced by other variables. Research conducted by (Foffou et al., 2025) shows that age <25 years is 3.44 times more likely to not undergo hepatitis B screening, basic education is 10 mother to fetus. Mothers who have heard about hepatitis B are more likely to allow their children to be vaccinated. Health workers explained that direct education is more effective (Eberwein et al., 2025). The cost of testing is a barrier to hepatitis B testing, and educational status is related to willingness to pay for the test. (Tochukwu et al., 2024) \

CONCLUSION

The results of this study concluded that there was a significant relationship between maternal knowledge and age and the incidence of hepatitis B, with the most influential factors being maternal

times more likely, unmarried pregnant women are 2 times more likely, low income is 62 times more likely, low knowledge about hepatitis is 2.8 times more likely, pregnant women who are not aware of the availability of screening at health facilities are 46 times more likely to not undergo hepatitis B screening. Research conducted by (Al-Essa et al., 2020) shows that there is a relationship between the level of education, knowledge and attitudes of pregnant women regarding hepatitis B vaccination and the willingness of respondents to allow their babies to receive the hepatitis B vaccine. Higher levels of education are more likely to answer questions correctly about the mode of transmission through blood, transmitted from

knowledge, age, and education. Furthermore, the researchers recommended the need for appropriate interventions for pregnant women particularly to improve knowledge about hepatitis B. A weakness of this study is the small sample size of pregnant women with hepatitis B, so the results cannot be generalized to the general population of pregnant women.

REFERENCES

- Ahad, M., Wallace, J., Xiao, Y., van Gemert, C., Bennett, G., Darby, J., Desmond, P., Hall, S., Holmes, J., Papaluca, T., Glasgow, S., Thompson, A., Hellard, M., Doyle, J., & Howell, J. (2022). Hepatitis B and pregnancy: understanding the experiences of care among pregnant women and recent mothers in metropolitan Melbourne. *BMC Public Health*, 22(1), 1–9. <https://doi.org/10.1186/s12889-022-13112-0>
- Al-Essa, M., Alyahya, A., Al Mulhim, A., Alyousof, A., Al-mulhim, M., & Essa, A. (2020). 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*, 12(1), 1–12. <https://doi.org/10.7759/cureus.6673>
- Alaridah, N., Abu-Mutaw', S., Abu-Assaf, G., Al Dwikat, L., F. Jarrar, R., Abuhani, H. O., Al-Hawadi, B., Alhawadi, S., Al Shdifat, M., & Joudeh, R. M. (2024). Sociodemographic Determinants of Knowledge, Attitudes, and

- Practices Toward Hepatitis B Infection Among Pregnant Women: A Cross-National Study in Jordan. *Cureus*, 16(4). <https://doi.org/10.7759/cureus.58053>
- Bardoe, D., Hayford, D., Bio, R. B., & Yar, D. D. (2025). Prevalence and Correlates of Hepatitis B in Pregnancy: Evidence From a Cross-Sectional Study in Bono East Region, Ghana. *Health Science Reports*, 8(9), 1–14. <https://doi.org/10.1002/hsr2.71263>
- Belay, A., Assefa, A., Zeleke, F. T., Animaw, M., Argaw, M., Endeshaw, F., Alemu, S. B., Sahile, A., & Abera, M. (2025). Knowledge, attitudes, and factors associated with vertical transmission of hepatitis B among pregnant women in Gurage Zone, Ethiopia. *Scientific Reports*, 15(1), 1–11. <https://doi.org/10.1038/s41598-025-94010-4>
- BKPK Kemenkes RI. (2023). Survei Kesehatan Indonesia. In *Jakarta*. <https://www.badankebijakan.kemkes.go.id/sk-i-2023-dalam-angka/>
- Dikes Kota Mataram. (2024). *PWS KIA*.
- Diniarti, F., Rohani, T., & Prasentya, W. (2022). Determinant Factors of Hepatitis B Incidence On Pregnant Women. *Jurnal Riset Kesehatan Poltekkes Depkes Bandung*, 14(1), 197–205. <https://mail.juriskes.com/index.php/jrk/article/view/1971>
- Eberwein, A. E., Cummings, P. R., Cummings, D., Andre, J., & Jacobsen, K. H. (2025). Hepatitis B (HBsAg) prevalence among obstetric patients in Caluquembe, Angola, 2023–2024. *Plos One*, 20(7 July), 2023–2024. <https://doi.org/10.1371/journal.pone.0327426>
- Foffou, F. L. M., Ketchaji, A., Djoko, G. R. P., Njajou, O. T., & Nkenfou, C. N. (2025). Factors associated with low screening for viral hepatitis B in pregnant women in the Djoungolo Health District in Yaounde, Cameroon. *Discover Public Health*, 22(1). <https://doi.org/10.1186/s12982-025-00954-3>
- Inayah, D. (2022). Determinan Pemeriksaan Triple Eliminasi Ibu Hamil di Desa Sukaresmi Kecamatan Megamendung Tahun 2021. *Indonesia Journal of Midwifery Sciences*, 1(4), 125–135. <https://doi.org/10.53801/ijms.v1i4.49>
- Liu, H., Hong, J., Yan, Z., Li, M., Zhai, X., Pan, B., & Ling, C. (2025). Hepatitis B Virus Knowledge and HBV-Related Surveillance Status Among HBsAg-Positive Patients in Qidong City: A Rural-Based Cross-Sectional Survey. *Healthcare (Switzerland)*, 13(1), 1–12. <https://doi.org/10.3390/healthcare13010017>
- Liu, X., Chen, C., Jiang, D., Yan, D., Zhou, Y., Ding, C., Lan, L., Huang, C., Zhang, X., Li, L., & Yang, S. (2022). Psychological stress; Knowledge, attitude and practice and acceptance of antiviral therapy in pregnant women with hepatitis B in Zhejiang, China: A case comparison study. *BMJ Open*, 12(3). <https://doi.org/10.1136/bmjopen-2021-055642>
- Lobstein, S., Faber, R., & Tillmann, H. L. (2010). Prevalence of hepatitis B among pregnant women and its impact on pregnancy and newborn complications at a tertiary Hospital in the eastern part of Germany. *Digestion*, 83(1–2), 76–82. <https://doi.org/10.1159/000320455>
- Ngu, S. F., Cheung, A. N. Y., Jong, K. K., Law, J. Y. P., Lee, A. Y., Lee, J. H. S., Li, W. H., Ma, V., Wong, G. C. Y., Wong, R. W. C., & Chan, K. K. L. (2024). 2024 Hong Kong College of Obstetricians and Gynaecologists Guidelines for cervical cancer prevention and screening. *Hong Kong Medical Journal*, 30(6), 488–497. <https://doi.org/10.12809/hkmj2411547>
- Ott, J. J., Stevens, G. A., & Wiersma, S. T. (2012). The risk of perinatal hepatitis B virus transmission: hepatitis B e antigen (HBeAg) prevalence estimates for all world regions. *BMC Infectious Diseases*, 12. <https://doi.org/10.1186/1471-2334-12-131>
- Sekarini, N. N. A. D., Yanti, L., & Pratiwi, P. I. (2025). Knowledge and attitude factors as determinants of pregnant women's participation in triple elimination program in North Bali. *BIO Web of Conferences*, 152, 1–9. <https://doi.org/10.1051/bioconf/202515201022>
- Shibabaw, A. A., Tegegne, M. D., Walle, A. D., Wubante, S. M., Baykernagn, N. D., Sisay, M. M., & Weldeab, A. N. (2024). Information seeking behavior on hepatitis B virus, and its associated factors among pregnant women at teaching and specialized hospitals, Northwest Ethiopia: A cross-sectional study. *PLoS ONE*, 19(1 January), 1–17. <https://doi.org/10.1371/journal.pone.0286755>
- Temesgen, M. M., Legesse, M., Haile, A. F., Shiferaw, B., & Dessie, T. (2025). *Risk factors associated with hepatitis B virus infection*

among patients attending gastroenterology outpatient department at public hospitals in Northeast Ethiopia : a hospital-based unmatched case-control study.

Tochukwu, E. J., Onyinye, E. N., & Obinna, O. E. (2024). Assessing the awareness and acceptability of hepatitis B immunoglobulin

among pregnant women in Enugu metropolis, Southeast, Nigeria: A cross-sectional study. *SAGE Open Medicine*, 12. <https://doi.org/10.1177/20503121241257083>

World Health Organization. (2024). *Global Hepatitis Report 2024*. <https://www.who.int/publications/i/item/9789240091672>