

Hepatitis B virus seroprevalence and vaccine uptake among pregnant women attending Antenatal Care at the Mount Mary Hospital Buea, South West Region

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ABSTRACT

Background: Hepatitis B virus (HBV) infection remains a major global public health challenge, particularly in sub-Saharan Africa where chronic infection is highly endemic. HBV can be transmitted vertically from mother to child during pregnancy or at delivery. Although vaccination is highly effective in preventing HBV infection and mother-to-child transmission, vaccine uptake among women of reproductive age remains suboptimal in many low- and middle-income countries. This study determined the seroprevalence of HBV infection, hepatitis B vaccine uptake, and identified perceived barriers to vaccine uptake among pregnant women attending antenatal care (ANC) at Mount Mary Hospital Buea. **Methods:** A hospital-based cross-sectional study was conducted among 120 pregnant women, recruited using convenience sampling after providing written informed consent. Data was collected using a structured interviewer-administered questionnaire. Venous blood samples were collected and screened for hepatitis B surface antigen (HBsAg) using a rapid immunochromatographic assay. Data were entered and analysed using IBM SPSS Statistics version 25. **Results:** The mean age of participants was predominantly 20–24 years (36.7%). The seroprevalence of hepatitis B virus was 8.3%. Only 24 (20.0%) participants reported previous hepatitis B vaccination and only five (4.2%) had completed the recommended three-dose vaccination schedule. Major perceived barriers to vaccine uptake included vaccine is too expensive (80%), unaware of infection in unborn baby (80%), do not know where to get the vaccine (74%) and fear of vaccine side effects (70%). **Conclusion:** HBV infection remains moderately endemic among pregnant women attending antenatal care at Mount Mary Hospital, while hepatitis B vaccine uptake is unacceptably low.

Keywords: Antenatal care, hepatitis B virus, Mount Mary Hospital, pregnant women, seroprevalence, vaccine uptake

INTRODUCTION

Hepatitis B virus (HBV) infection is one of the leading causes of chronic liver disease worldwide and remains a major public health concern despite the availability of an effective vaccine. HBV is an enveloped, partially double-stranded DNA virus belonging to the family Hepadnaviridae that primarily infects hepatocytes. Infection may present as acute hepatitis or progress to chronic hepatitis, cirrhosis, and hepatocellular carcinoma, accounting for substantial morbidity and mortality worldwide [1, 2].

According to the World Health Organization (WHO), Hepatitis and tuberculosis were the second leading causes of death from communicable diseases in 2022, after COVID-19. The estimated number of people newly infected by viral hepatitis declined from 2.5 million in 2019 to 2.2 million in 2022. Reduced infections show that interventions such as vaccination are working, but with 6,000 people still infected each day. Hepatitis related

deaths increased to 1.3 million in 2022 from 1.1 million in 2019 and every day 3,500 people are dying from viral hepatitis [3].

Pregnant women represent a priority population for HBV prevention because maternal infection substantially increases the risk of mother-to-child transmission (MTCT). In highly endemic settings, transmission occurring during pregnancy, delivery, or the neonatal period accounts for a considerable proportion of chronic HBV infections [3, 4]. Without appropriate preventive interventions, up to 90% of infants infected perinatally may develop chronic HBV infection, placing them at increased risk of liver cirrhosis and hepatocellular carcinoma later in life [4, 5]. Consequently, prevention of maternal HBV infection and interruption of vertical transmission constitute key components of the WHO strategy for eliminating viral hepatitis as a public health threat by 2030 [3].

Cameroon is classified as a country with high HBV endemicity which is one of WHO's 38 focus countries accounting for almost 80% of global hepatitis infections and deaths [3]. In Cameroon, a systematic review estimated the pooled prevalence of hepatitis B surface antigen (HBsAg) in the general population at approximately 11.2%, while studies among pregnant women have reported prevalence estimates ranging from 7% to 12% [6,7]. Previous studies conducted in the South-West Region, including the Buea, Limbe, and Muyuka Health Districts, have similarly demonstrated substantial HBV prevalence among antenatal clinic attendees, highlighting the continued public health importance of maternal HBV infection despite improvements in antenatal care services [8, 9].

Vaccination remains the most effective strategy for preventing HBV infection. The recombinant hepatitis B vaccine induces protective immunity in more than 90–95% of healthy individuals who complete the recommended three-dose schedule (10,11). In addition to universal infant immunization, vaccination of susceptible women of reproductive age is an effective strategy for preventing maternal infection and reducing the risk of vertical transmission [11]. Nevertheless, hepatitis B vaccine uptake among adults in many African countries remains low owing to limited awareness, financial constraints, inadequate recommendations from healthcare providers, misconceptions regarding vaccine safety, and poor accessibility of vaccination services [12, 13].

Although routine HBV screening during pregnancy has increasingly been recommended in Cameroon, evidence regarding hepatitis B vaccine uptake among pregnant women remains limited, particularly in semi-urban health facilities such as Mount Mary Hospital in Buea. Understanding the burden of maternal HBV infection, vaccine uptake and identifying perceived barriers to vaccination are essential for informing targeted interventions aimed at improving maternal health outcomes and accelerating progress toward the WHO hepatitis elimination targets [11].

This study therefore aimed to determine the seroprevalence of hepatitis B virus infection, assess hepatitis B vaccine uptake, and identify barriers to vaccination among pregnant women attending antenatal care at Mount Mary Hospital, Buea, Cameroon.

METHODS

Study design and setting

A hospital-based cross-sectional study which was to assess HBV seroprevalence and vaccine uptake among pregnant women attending ANC at Mount Mary Hospital February to May 2026. The cross-sectional approach is suitable for estimating disease burden and determining vaccine uptake at a single point in time.

Mount Mary Hospital is situated in Buea, in the Fako Division of the South-West Region of Cameroon. Buea serves as both the divisional headquarters and the regional capital, situated on the south-eastern slopes of Mount Cameroon, the highest peak in West and Central Africa, rising to approximately 4,095 metres above sea level [14]. Mount Mary Hospital is a faith-based secondary healthcare facility that provides comprehensive maternal and child health services, including antenatal care (ANC), delivery services, postnatal care, childhood immunization, and routine laboratory investigations. The hospital receives a large number of pregnant women

from Buea and neighboring communities, making it an appropriate setting for assessing hepatitis B virus (HBV) infection and vaccine uptake among pregnant women.

Study population

The study population comprised pregnant women attending routine antenatal care at Mount Mary Hospital during the study period. Eligible participants were enrolled irrespective of age, parity, or gestational age.

Inclusion criteria

Pregnant women attending antenatal clinic during the study period and voluntarily provided written informed consent were included in the study.

Exclusion criteria

Pregnant women who were critically ill at the time of recruitment or were unable to provide reliable information regarding their hepatitis B vaccination history were excluded from the study.

Sample size determination

The minimum sample size was calculated using Cochran's formula for estimating a single population proportion:

$$n = \frac{Z^2 P(1-P)}{d^2}$$

where:

- n = minimum required sample size;
- Z = standard normal deviate corresponding to the 95% confidence level (1.96);
- P = estimated prevalence of HBV among pregnant women (7.5%), obtained from a previous study conducted in the Muyuka Health District [9];
- d = margin of error (5%).

The calculated minimum sample size was 107 participants. A total of 120 participants were enrolled into this study to anticipate factors like effect size, loss of data, voluntary withdrawal and for greater precision.

Sampling technique

Participants were recruited using a convenient sampling technique. The aim and importance of the study were explained to all pregnant women attending ANC during the study period and eligible pregnant women were consecutively invited to participate. Only participants who met the inclusion criteria and voluntarily gave their consent/assent were enrolled into the study.

Data collection

Data were collected using a structured interviewer-administered questionnaire developed after reviewing relevant literature on hepatitis B infection and vaccination among pregnant women. The questionnaire was reviewed by the team to assess its content validity, clarity, relevance, and comprehensiveness. The questionnaire was pretested among 30 pregnant women attending ANC at Buea road integrated health centre with characteristics similar to the study population but who were not included in the final study. Feedback from the pretest was used to improve the wording, sequence, and clarity of the questions. The questionnaire comprised three sections; section A: socio-demographic characteristics; section B: hepatitis B vaccination history; section C: perceived barriers to hepatitis B vaccine uptake.

Information collected included age, marital status, educational level, occupation, area of residence, parity, gestational age, previous HBV screening, vaccination status, number of vaccine doses received, place and timing of vaccination, and perceived barriers to vaccine uptake.

Blood sample collection and laboratory procedures

Approximately 3–4 ml of venous blood was collected aseptically, at the ANC unit from each participant by a trained laboratory professional using sterile disposable syringes. Blood specimens were transferred into plain tubes, labelled with unique identification codes, and transported immediately to the hospital laboratory for analysis.

Samples were centrifuged to obtain serum, which was tested for hepatitis B surface antigen (HBsAg) using a commercially available rapid immunochromatographic assay according to the manufacturer's instructions. Briefly, serum was dispensed onto the sample well of the test cassette, and results were interpreted after 15 minutes. The appearance of both the control and test lines indicated a positive result, whereas the presence of only the control line indicated a negative result. Tests without a visible control line were considered invalid and repeated using a new test device.

Data management and statistical analysis

Completed questionnaires were checked daily for completeness and consistency before data entry. Data were entered into Microsoft Excel, cleaned, and exported to IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA) for analysis. The seroprevalence of hepatitis B virus was determined by dividing the number of participants who tested positive by the total number of study participants. Descriptive statistics were used to summarize participants' characteristics. Categorical variables were presented as frequencies and percentages.

Ethical considerations

Ethical clearance was obtained from the regional ethics committee for human health research South West (No1035/CRERSH/SW/C/04/2026). Administrative authorization was obtained from the South-West Regional Delegation of Public Health and written approval from the head of Mount Mary Hospital before commencement of the study. Signed assent and/or consent form indicated voluntary participation. All participants who were positive for HBV were sent to the medical doctor for treatment. Each participant was free to withdraw consent at any time. Participation was entirely voluntary, and confidentiality was maintained throughout the study by assigning unique identification numbers instead of participant names. Laboratory results were communicated confidentially to participants, and those who tested positive for HBsAg were referred for appropriate clinical evaluation and management in accordance with national treatment guidelines.

RESULTS

Socio-Demographic/obstetric Characteristics of Respondents

A total of 120 pregnant women took part in the study. The largest proportion of the participants, 44 (36.7%), were within the age group 20–24 years, with more than half of the participants 64 (53.3%) being single. Regarding level of education, the highest percentage of participants, 46 (38.3%), had attained secondary education but a considerable number of participants, 14 (11.7%), had no formal education. According to trimester, the greatest proportion of participants, 44 (36.7%), were in the second trimester, while the lowest percentage, 36 (30%), were in the first trimester. Among the study participants, 42 (35%), had a child and 10 (8.3%), had more than three children (Table 1).

Table 1: Socio-Demographic/Obstetric Characteristics of Respondents

Variable	Category	Frequency (n=120)	Percentage (%)
Age group	15-19 years	24	20



	20–24 years	44	36.7
	25–29 years	33	27.5
	30 years and above	19	15.8
Marital Status	Single	64	53.3
	Married	44	36.7
	Divorced	12	10
Religion	Islam	44	36.7
	Christian	76	63.3
Level of Education	No formal education	14	11.7
	Primary	22	18.3
	Secondary	46	38.3
	Tertiary	38	31.7
Occupation	Student	38	31.7
	Employed	32	26.6
	Unemployed	30	25.0
	Business	20	17.7
Area of Residence	Buea Town	30	25.0
	Great Soppo	28	23.3
	Bonduma	25	20.8
	Bokwango	21	17.5
	Other areas	16	13.3
Trimester	First (1–12 weeks)	36	30.0
	Second (13–27 weeks)	44	36.7
	Third (28–40 weeks)	40	33.3
Number of Children	1 child	42	35.0
	2 children	38	31.7
	3 children	30	25.0
	More than 3	10	8.3

Seroprevalence of HBV among pregnant women at Mount Mary Hospital

Among the 120 pregnant women who were enrolled in this study, 10 tested positive for hepatitis B virus giving a prevalence of 8.3% (figure 1).

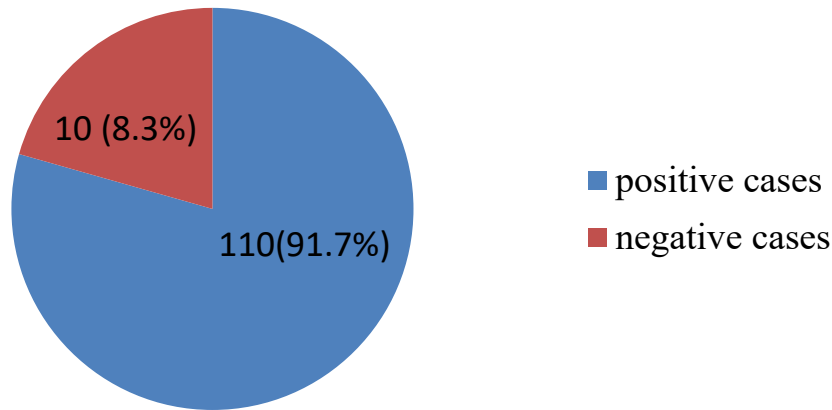


Figure 1: Seroprevalence of HBV among pregnant women at Mount Mary Hospital

Hepatitis B Vaccine Uptake among Pregnant Women at Mount Mary Hospital

Among the 120 pregnant women enrolled in the study, 24 (20.0%) had received at least one dose of the hepatitis B vaccine, while 96 (80.0%) had never been vaccinated. Of the vaccinated participants, only 5 (4.2% of the total sample; 20.8% of vaccinated women) had completed the recommended three-dose vaccination schedule. Seven (5.8%) had received two doses, whereas 12 (10.0%) had received only one dose (Figure 2).

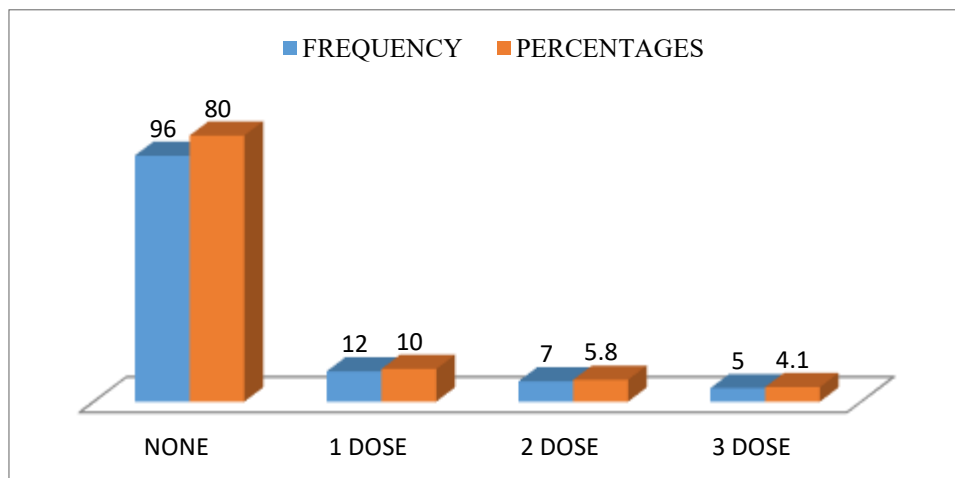


Figure 2: Hepatitis B Vaccine Uptake among Pregnant Women

Most participants 90 (75.0%) reported having heard of hepatitis B virus infection, while 30 (25.0%) had never heard of the disease. Only 28 (23.3%) participants had ever undergone hepatitis B testing, whereas 92 (76.7%) had never been tested. Among the vaccinated women (n = 24), half (12; 50.0%) received the vaccine before pregnancy, 8 (33.3%) during the current pregnancy, and 4 (16.7%) after a previous pregnancy. Most vaccinations were administered in government health facilities (19; 79.2%), while 5 (20.8%) were received in private health facilities (Table 2).

Table 2: Hepatitis B Vaccination and screening history among Pregnant Women

Variables	Category	Frequency (n)	Percentage (%)
Heard of Hepatitis B virus	Yes	90	75
	No	30	25

Ever tested for Hepatitis B	yes	28	23.3
	No	92	76.7
Time of vaccination	Before pregnancy	12	50
	During pregnancy	8	33.3
	After previous pregnancy	4	16.7
Place of vaccination	Private hospital	5	20.8
	Government hospital	19	79.2

Barriers to Hepatitis B vaccine uptake among pregnant women at Mount Mary Hospital

Several perceived barriers to hepatitis B vaccine uptake were identified among the study participants (Figure 3). The most frequently reported barriers include; cost of vaccination (66.7%), inadequate knowledge of infection on unborn baby (66.7%) and Lack of knowledge about where to obtain the vaccine (61.7%). Other barriers were; fear of vaccine side effects (58.3%), vaccine could transmit hepatitis B infection (56.7%), the three-dose vaccination schedule were to many (51.7%) and accessibility to vaccination services was also identified as a barrier (48.3%).

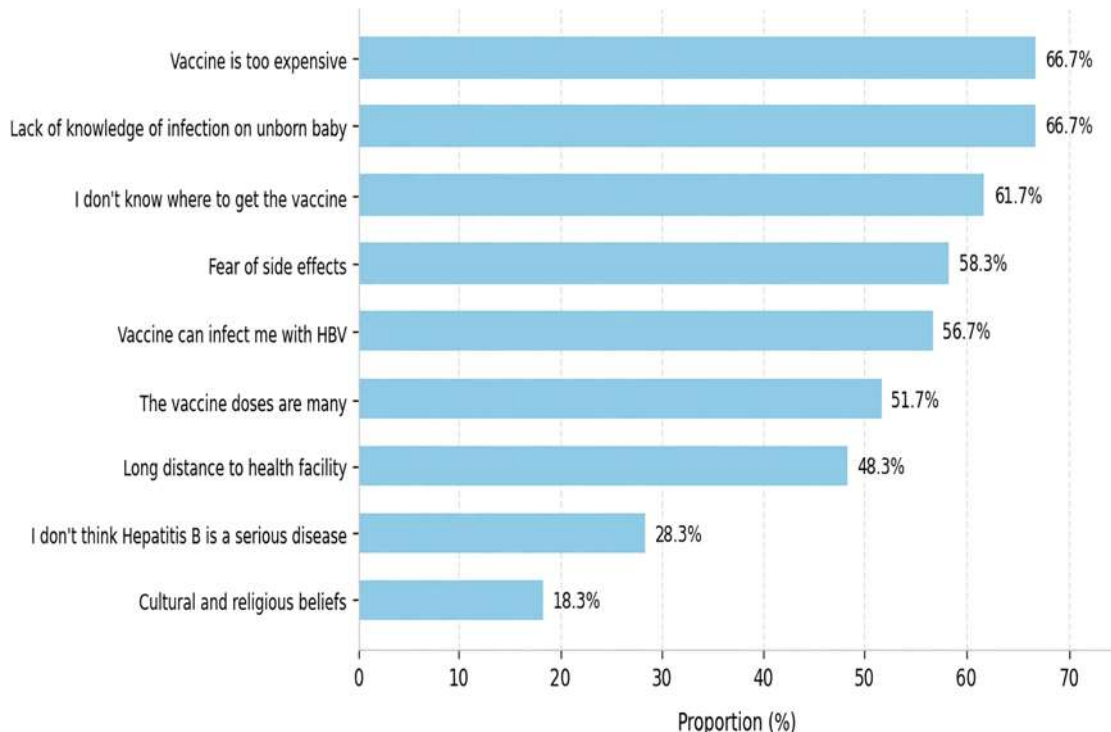


Figure 3: Perceived barriers to uptake of HBV Vaccine among pregnant women at Mount Mary Hospital

DISCUSSION

This study had a hepatitis B seroprevalence of 8.3% among pregnant women attending antenatal care at Mount Mary Hospital, indicating an intermediate-to-high endemicity of HBV infection according to the World Health

Organization classification [3]. The prevalence observed is slightly lower than the 9.7% reported among pregnant women in the Buea Health District by Frambo et al. [8], but remains considerably high. The lower prevalence may reflect improvements in antenatal screening, public awareness, and preventive interventions implemented over recent years. Nevertheless, the persistence of a relatively high prevalence suggests ongoing transmission within the community and highlights the continued risk of mother-to-child transmission.

The prevalence reported in this study is higher than the 5.7% and 7.5% reported among pregnant women in the Limbe and Muyuka Health Districts [9]. Variations in HBV prevalence across studies may be explained by differences in study populations, vaccination coverage, socioeconomic characteristics, health-seeking behaviour, and access to routine antenatal screening services. In the present study, the low hepatitis B vaccination coverage and the high proportion of women who had never previously been screened for HBV may have contributed to the relatively higher prevalence. These findings reinforce the need for universal antenatal HBV screening and strengthened prevention strategies, including timely vaccination and appropriate management of infected mothers to reduce vertical transmission.

Only 20.0% of pregnant women had received at least one dose of the hepatitis B vaccine, while only 4.2% had completed the recommended three-dose vaccination schedule. This finding indicates a very low level of vaccine uptake among pregnant women in the study setting and suggests that a large proportion remain susceptible to HBV infection. The higher vaccine uptake observed in this study compared with the 14.6% reported by Mengouo et al. [15] may reflect improvements in health education, access to vaccination services, and antenatal care practices, as well as differences in study settings and participant characteristics.

Fear of vaccine side effects was another important barrier identified in this study. Similar findings have been reported by Duclos [17], who identified concerns regarding vaccine safety as a major contributor to vaccine hesitancy globally. Persistent misinformation regarding vaccine safety may discourage pregnant women from accepting vaccination even when vaccines are available, highlighting the importance of counselling during antenatal care. The perceived cost of vaccination also limited vaccine uptake among participants. This finding agrees with Seyed et al. [18], who demonstrated that financial constraints remain an important obstacle to hepatitis B vaccination in many low- and middle-income countries. Expanding subsidized or free vaccination programmes for pregnant women may therefore improve vaccine coverage.

Accessibility challenges were also frequently reported. Similar observations have been documented by van Damme [19] and Chung et al. [20], who reported that long travel distances, limited availability of vaccination services, and weak health systems contribute to poor vaccination uptake. Improving geographical access and integrating hepatitis B vaccination into routine antenatal care could substantially increase vaccine coverage among pregnant women.

These findings demonstrate that both demand-side barriers (knowledge, perceptions, and affordability) and health system barriers (availability and accessibility of vaccination services) contribute to the low uptake of hepatitis B vaccination among pregnant women attending Mount Mary Hospital.

CONCLUSION

The prevalence of hepatitis B virus among pregnant women in the Mount Mary Hospital was found to be 8.3%. There was a low hepatitis B vaccine uptake (20%) among pregnant women at the Mount Mary Hospital with only 5(4.2%) who took all three doses. Perceived barriers to the uptake of the hepatitis B vaccine were; Lack of knowledge, high vaccine cost, fear of side effects, vaccine doses are many, limited access to vaccination services and cultural and religious beliefs. Health authorities and partners should subsidize or provide free HBV vaccines to improve uptake and health education programs should be intensified during ANC and in the communities to improve awareness of HBV transmission, prevention, and the benefits of vaccination.

LIMITATIONS

This study has some limitations. The use of convenient sampling may have introduced selection bias, as participants were recruited based on their availability and willingness to participate, potentially limiting the

representativeness of the study population. In addition, recruitment from a single health facility may limit the generalisability of the findings of this study to pregnant women attending ANC in health facilities in Buea.

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Conflict of interest disclosure

The authors declare that they have no conflict of interest.

Data Availability

All datasets on which the conclusions of the research rely are presented in the paper. However, data is available from the corresponding author upon reasonable request.

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Authors' Contribution

VDTN: contributed to the study design, supervised data collection and analysis, drafted and revised manuscript

TV: study protocol, conducted data collection, laboratory analysis, manuscript drafting

WN: laboratory analysis, manuscript drafting

NNAD: reviewed the study protocol and manuscript drafting

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