Factors Associated with HBsAg Seropositivity among Pregnant Women Receiving Antenatal Care at 10 Community Health Centers in Freetown, Sierra Leone: A Cross-Sectional Study

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Abstract: Hepatitis B (HBV) is a major public health threat in Sierra Leone. Pregnant women are disproportionately impacted, yet little is known about the epidemiology of HBV in this group. We conducted a cross-sectional study of pregnant women aged ≥16 years receiving antenatal care across 10 community health centers in Freetown from July to September 2021 to assess the prevalence and associated factors of HBsAg seropositivity. A logistic regression was used to identify the predictors of HBsAg seropositivity. In total, 394 pregnant women were screened. The mean age was 24.4 ± 4.9 years, 78.2% were married, and 47.2% were in the second trimester. Only 1% had received the HBV vaccine. The prevalence of HBsAg was 7.9%, while HIV was 5.8% and HIV/HBV co-infection was 0.3%. Regarding high-risk practices, 76.6% reported female genital circumcision, 41.9% ear piercing, 29.0% endorsed multiple sexual partners, and 23.6% reported sexually transmitted infections. In the logistic regression analysis, having a husband/partner with HBV (adjusted odds ratio (aOR): 6.54; 95% CI: [1.72–24.86]; p = 0.006) and residing in Central Freetown (aOR: 4.00; 95% CI: [1.46–11.00]; p = 0.007) were independently associated with HBsAg seropositivity. Our findings support the scaling up of HBV services to target pregnant women and their partners for screening and vaccination to help reduce mother-to-child transmission rates in Sierra Leone.

Keywords: hepatitis B infection; pregnancy; antenatal screening; Sierra Leone

1. Introduction

Hepatitis B virus (HBV) poses a major public health threat globally. Recent reports have indicated that there are an estimated 296 million people chronically infected with HBV (CHB) [1]. Sub-Saharan Africa (SSA) has the second highest burden of HBV, with 6.1% of the general population affected by CHB [1]. The clinical consequences of untreated CHB are devastating, with 1 million people estimated to prematurely die annually from cirrhosis, end-stage liver disease and hepatocellular carcinoma [1]. Consequently, in 2015, the World Health Organization (WHO) launched an ambitious global agenda aiming to eliminate HBV and the other hepatitis viruses as a public health threat by the year 2030 [2].

HBV is transmitted horizontally via infected bodily fluids, as with sexual contact, transfusion of contaminated blood products and sharps or needlestick injury, or vertically through mother-to-child transmission (MTCT) or perinatally [3]. In hyperendemic regions
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we utilized the resources of KnowHep Foundation Sierra Leone, a local non-governmental organization dedicated to raising awareness about viral hepatitis, to assess the prevalence and clinical impact of HBV among pregnant women, especially in high transmission urban areas where they may be most vulnerable to the consequences of the disease. In this study, we utilized the resources of KnowHep Foundation Sierra Leone, a local non-governmental organization dedicated to raising awareness about viral hepatitis, to assess the prevalence and associated factors of HBsAg seropositive status among pregnant women receiving antenatal care across 10 community health centers (CHCs) (Figure 1) in Freetown, the capital and most populous city of Sierra Leone.

Figure 1. Community health center (CHC) locations in Freetown, Sierra Leone [16]. Abbreviations: CHC, community health center.
2. Results

2.1. Socio-Demographic Characteristics of Study Participants

A total of 394 pregnant women were enrolled in the study. Table 1 displays the characteristics of the study participants. The mean age was 24.4 ± 4.9 years and nearly half of them were in the second trimester of pregnancy (47.2%, 186/394) and primigravidae (45.4%, 179/384). The majority were Muslims (73.1%, 288/394), married (78.2%, 308/394), had attained secondary level of education (223/394, 56.6%) and were employed in the informal sector (53.0%, 209/394).

Table 1. Socio-demographic and health-related characteristics of study participants (N = 394).

| Characteristics                  | Variables          | N (%)   |
|----------------------------------|--------------------|---------|
| Age, years                       | Mean (standard deviation) 24.4 ± 4.9 |
|                                  | <20 58 (14.7)       |         |
|                                  | 20–29 274 (69.5)    |         |
|                                  | 30–39 60 (15.2)     |         |
|                                  | 40–49 2 (0.5)       |         |
| Religion                         | Muslim 288 (73.1)   |         |
|                                  | Christian 106 (26.9) |         |
| Ethnicity                        | Temne 155 (39.3)    |         |
|                                  | Mende 71 (18.0)     |         |
|                                  | Limba 57 (14.5)     |         |
|                                  | Others 111 (28.2)   |         |
| Relationship status              | Single 82 (20.8)    |         |
|                                  | Married 308 (78.2)  |         |
|                                  | Widowed 4 (1.0)     |         |
| Highest education attained       | No formal education 110 (27.9) |         |
|                                  | Primary schooling 42 (10.7) |         |
|                                  | Secondary schooling 223 (56.6) |         |
|                                  | Tertiary level 19 (4.8) |         |
| Area of residence in Freetown    | Eastern 198 (50.3)  |         |
|                                  | Western 136 (34.5)  |         |
|                                  | Central 60 (15.2)   |         |
| Employment status                | Formal sector 34 (8.6) |         |
|                                  | Informal sector 209 (53.0) |         |
|                                  | Student 35 (8.9)    |         |
|                                  | Housewife 65 (16.5) |         |
|                                  | Unemployed 51 (12.9) |         |
| Pregnancy stage                  | First trimester 45 (11.4) |         |
|                                  | Second trimester 186 (47.2) |         |
|                                  | Third trimester 163 (41.4) |         |
| Gravidity                        | First pregnancy 147 (37.3) |         |
|                                  | Second pregnancy 152 (38.6) |         |
|                                  | Third pregnancy 65 (16.5) |         |
|                                  | Fourth pregnancy 22 (5.6) |         |
|                                  | Fifth pregnancy 8 (2.0) |         |
| Characteristics                          | Variables                      | N (%)  |
|-----------------------------------------|-------------------------------|--------|
| Parity                                  |                               |        |
|                                        | Nulliparous                   | 145 (36.8) |
|                                        | Primiparous                   | 179 (45.4) |
|                                        | Multiparous                   | 70 (17.8)  |
| Awareness of own HBV status             | Yes                           | 5 (1.3)   |
|                                        | No                            | 389 (98.7) |
| Husband/partner with HBV                | Yes                           | 16 (4.1)   |
|                                        | No                            | 378 (95.9) |
| History of multiple sexual partners     | Yes                           | 90 (22.8)  |
|                                        | No                            | 304 (77.2) |
| History of any sexually transmitted infections | Yes                | 93 (23.6)  |
|                                        | Unknown                       | 300 (76.1) |
|                                        |                               | 1 (0.3)    |
| Sharing toothbrush                      | Yes                           | 24 (6.1)   |
|                                        | No                            | 370 (93.9) |
| Body tattoo                            | Yes                           | 45 (11.4)  |
|                                        | No                            | 349 (88.6) |
| Ear piercing                            | Yes                           | 165 (41.9) |
|                                        | No                            | 229 (58.1) |
| History of prior surgery                | Yes                           | 20 (5.1)   |
|                                        | No                            | 374 (94.9) |
| History of female genital circumcision  | Yes                           | 302 (76.6) |
|                                        | No                            | 92 (23.4)  |
| History of HBV vaccination              | Yes                           | 4 (1.0)    |
|                                        | No                            | 390 (99.0) |
| History of abortion                     | Yes                           | 39 (9.9)   |
|                                        | No                            | 355 (90.1) |
| History of C-section                    | Yes                           | 15 (3.8)   |
|                                        | No                            | 379 (96.2) |
| History of receiving blood transfusion  | Yes                           | 9 (2.3)    |
|                                        | No                            | 385 (97.7) |
| History of tonsillectomy                | Yes                           | 6 (1.5)    |
|                                        | No                            | 388 (98.5) |
| Family history of liver disease         | Yes                           | 3 (0.8)    |
|                                        | No                            | 391 (99.2) |
| HBsAg positive                          | Yes                           | 31 (7.9%)  |
|                                        | No                            | 363 (92.1) |
| HIV positive                            | Yes                           | 23 (5.8)   |
|                                        | No                            | 371 (94.2) |
| HIV/HBV co-infection                    | Yes                           | 1 (0.3%)   |
|                                        | No                            | 393 (99.7) |
2.2. Prevalence of HBV Status Awareness, High-Risk Practices and HBV Vaccination Status

The proportion of participants who reported that they had previously tested positive and were aware of their HBV status was low at 1.3% (5/394). Additionally, 4.1% (16/394) reported having a husband/partner with HBV (Table 1).

Of the high-risk practices explored, 76.6% (302/394) reported a history of female genital circumcision, 41.9% (165/394) had an ear piercing, 23.6% (93/394) endorsed a history of sexually transmitted infections, 22.8% (90/394) reported having had multiple sexual partners in the past, and 11.4% (45/394) had a tattoo. Furthermore, 5.1% (20/394) had a history of undergoing surgery, while 2.3% (9/394) had received a blood transfusion in the past (Table 1). Of note, only 1% (4/394) of study participants reported having received at least one dose of the HBV vaccination (Table 1).

2.3. Prevalence of HBsAg, HIV and HIV/HBV Co-Infection

Thirty-one of the 394 study participants tested positive for HBsAg, yielding an overall seroprevalence rate of 7.9%. The prevalence of HIV was 5.8% (23/394), while the prevalence of HIV/HBV co-infection was 0.3% (1/394) (Table 1).

The majority of participants who tested positive for HBsAg were aged 20–29 years (71.0%, 22/31), were married (74.2%, 23/31), employed (64.5%, 20/31) and in the second trimester of pregnancy (54.8%, 17/31) (Table 2).

Table 2. Univariate analysis of factors associated with HBsAg seropositivity among pregnant women.

| Characteristics                | Variables      | HBsAg Positive N (%) | HBsAg Negative N (%) | p-Value |
|--------------------------------|----------------|----------------------|----------------------|---------|
| Age, years                     | <20            | 6 (19.4)             | 52 (14.3)            | 0.628   |
|                                | 20–29          | 22 (71.0)            | 252 (69.4)           |         |
|                                | 30–39          | 3 (9.7)              | 57 (15.7)            |         |
|                                | 40–49          | -                    | 2 (0.6)              |         |
| Religion                       | Muslim         | 23 (74.2)            | 265 (73.0)           | 1.000   |
|                                | Christian      | 8 (25.8)             | 98 (27.0)            |         |
| Ethnicity                      | Temne          | 12 (38.7)            | 143 (39.4)           | 0.972   |
|                                | Mende          | 5 (16.1)             | 66 (18.2)            |         |
|                                | Limba          | 4 (12.9)             | 53 (14.6)            |         |
|                                | Others         | 10 (32.3)            | 101 (27.8)           |         |
| Relationship status            | Single         | 7 (22.6)             | 75 (20.7)            | 0.353   |
|                                | Married        | 23 (74.2)            | 285 (78.5)           |         |
|                                | Widowed        | 1 (3.2)              | 3 (0.8)              |         |
| Highest education attained     | No formal education | 10 (32.3)            | 100 (27.5)           | 0.399   |
|                                | Primary schooling | 5 (16.1)             | 37 (10.2)            |         |
|                                | Secondary schooling | 14 (45.2)           | 209 (57.6)           |         |
|                                | Tertiary level | 2 (6.5)              | 17 (4.7)             |         |
| Area of residence in Freetown  | Eastern        | 10 (32.3)            | 188 (51.8)           | 0.040   |
|                                | Western        | 12 (38.7)            | 124 (34.2)           |         |
|                                | Central        | 9 (29.0)             | 51 (14.0)            |         |
| Employment status              | Employed       | 20 (64.5)            | 223 (61.4)           | 0.848   |
|                                | Unemployed     | 11 (35.5)            | 140 (38.6)           |         |
| Pregnancy stage                | First trimester | 5 (16.1)             | 40 (11.0)            | 0.264   |
|                                | Second trimester | 17 (54.8)            | 169 (46.6)           |         |
|                                | Third trimester | 9 (29.0)             | 154 (42.4)           |         |
Table 2. Cont.

| Characteristics      | Variables                        | HBsAg Positive N (%) | HBsAg Negative N (%) | p-Value |
|----------------------|----------------------------------|----------------------|----------------------|---------|
| Gravidity            | Primigravid                      | 8 (25.8)             | 139 (38.3)           | 0.182   |
|                      | Multigravid                      | 23 (74.2)            | 224 (61.7)           |         |
| Parity               | Nulliparous                      | 7 (22.6)             | 138 (38.0)           | 0.152   |
|                      | Primiparous                      | 19 (61.3)            | 160 (44.1)           |         |
|                      | Multiparous                      | 5 (16.1)             | 65 (17.9)            |         |
| Husband/partner with HBV | Yes                             | 4 (12.9)             | 12 (3.3)             | 0.029   |
|                      | No                               | 27 (87.1)            | 351 (96.7)           |         |
| Awareness of own HBV status | Yes                            | -                    | 5 (1.4)              | 1.000   |
|                      | No                               |                     | 31 (100)             |         |
|                      |                                  | 5 (1.4)              | 358 (98.6)           |         |
| HIV positive         | Yes                              | 1 (3.2)              | 22 (6.1)             | 0.518   |
|                      | No                               | 30 (96.8)            | 341 (93.9)           |         |
| History of multiple sexual partners | Yes                          | 9 (29.0)             | 81 (22.3)            | 0.504   |
|                      | No                              | 22 (71.0)            | 282 (77.7)           |         |
| History of sexually transmitted infections | Yes                             | 7 (22.6)             | 86 (23.7)            | 1.000   |
|                      | No                             | 24 (77.4)            | 277 (76.3)           |         |
| Body tattoo          | Yes                              | 3 (9.7)              | 42 (11.6)            | 0.789   |
|                      | No                              | 28 (90.3)            | 321 (88.4)           |         |
| Ear piercing         | Yes                              | 12 (38.7)            | 153 (42.1)           | 0.850   |
|                      | No                              | 19 (61.3)            | 210 (57.9)           |         |
| History of prior surgery | Yes                           | 1 (3.2)              | 19 (5.2)             | 0.723   |
|                      | No                              | 30 (96.8)            | 344 (94.8)           |         |
| History of female genital circumcision | Yes                             | 22 (71.0)             | 280 (77.1)            | 0.5061 |
|                      | No                              | 9 (29.0)              | 83 (22.9)             |         |
| History of abortion  | Yes                              | 3 (9.7)              | 36 (9.9)             | 1.000   |
|                      | No                              | 28 (90.3)            | 327 (90.1)           |         |
| History of C-section | Yes                              | -                    | 15 (4.1)             | 0.391   |
|                      | No                              | 31 (100)             | 348 (95.9)           |         |
| History of receiving blood transfusion | Yes                             | -                    | 9 (2.5)              | 0.627   |
|                      | No                              | 31 (100)             | 354 (97.5)           |         |
| History of tonsillectomy | Yes                              | -                    | 6 (1.7)              | 1.000   |
|                      | No                              | 31 (100)             | 357 (98.3)           |         |
| Family history of liver disease | Yes                             | 1 (3.2)              | 2 (0.6)              | 0.218   |
|                      | No                              | 30 (96.8)            | 361 (99.4)           |         |

2.4. Associated Factors and Predictors of HBsAg Seropositivity

Tables 2 and 3 display the univariate and multivariate analyses of socio-demographic variables, practices and risk factors associated with HBsAg seropositivity. After controlling for confounders in the multivariate logistic regression model, having a husband/partner with HBV (aOR: 6.54; 95% CI: [1.72–24.86]; p = 0.006) and residing in the central part of Freetown (aOR: 4.00; 95% CI: [1.46–11.00]; p = 0.007) emerged as independent predictors of HBsAg seropositive status.
### Table 3. Multivariate analysis of factors associated with HBsAg seropositivity among pregnant women.

| Characteristics | Variables | Adjusted Odds Ratio | 95% Confidence Interval | p-Value |
|-----------------|-----------|---------------------|-------------------------|---------|
| Area of residence in Freetown | Eastern | Reference | | |
| | Western | 2.46 | 0.948–6.39 | 0.064 |
| | Central | 4.00 | 1.46–11.00 | 0.007 |
| Gravidity | Primigravid | Reference | | |
| | Multigravid | 0.80 | 0.16–4.03 | 0.786 |
| Parity | Nulliparous | Reference | | |
| | Primiparous | 2.75 | 0.52–14.59 | 0.234 |
| | Multiparous | 2.08 | 0.30–14.41 | 0.460 |
| Husband/partner with HBV | Yes | 6.54 | 1.72–24.86 | 0.006 |
| | No | Reference | | |

### 3. Discussion

To the best of our knowledge, this is the largest study to date from Sierra Leone that has assessed the prevalence and associated factors of HBsAg seropositive status among pregnant women. We observed an HBsAg prevalence rate of 7.9% among 394 pregnant women seeking antenatal care across 10 CHCs in Freetown. This figure is consistent with estimates from previous studies among non-HIV-infected pregnant women from Sierra Leone (i.e., 6% to 11%) [11,12] and approximates to the criterion for high endemicity (≥8%) [1,4]. Our findings are in agreement with multiple studies conducted in the antenatal care setting in West Africa, which have consistently reported significantly higher HBsAg seroprevalence rates than studies from other regions across SSA [17–19].

Additionally, our study demonstrated a high HIV prevalence of 5.8% among pregnant women. This is 3.5-fold higher than the national HIV prevalence of 1.7% and 2.6-fold higher than the HIV prevalence of 2.2% that was reported among all women in the 2019 Sierra Leone Demographic and Health Survey [13]. On the other hand, the HIV/HBV co-infection rate in this study was extremely low at 0.3%, compared with a recent study by Yendewa et al. [10], which recorded an HIV/HBV prevalence of 18.8% among HIV positive pregnant in Freetown. The low HIV/HBV prevalence among our study participants was reassuring, as current evidence suggests that HIV/HBV co-infection is associated with a high morbidity and mortality, resulting from the early onset of the acquired immune deficiency syndrome (AIDS) [20] and accelerated progression to cirrhosis, end-stage liver disease and hepatocellular carcinoma [21]. Nonetheless, our findings suggest that, similar to key populations, the parallel HIV and HBV epidemics in Sierra Leone may be disproportionately impacting pregnant women, especially in high-transmission urban settings, thus warranting a new policy focus to address this high-risk group.

Furthermore, we undertook a detailed analysis of potential risk factors traditionally attributed to HBV infection. Over three-quarters of participants reported a history of female genital circumcision, while substantially large proportions of study participants also endorsed a history of ear piercing, multiple sexual partners, sexually transmitted infections, body tattooing and surgical procedures. We found that the risk of HBsAg seropositive status did not significantly increase with any of the above-mentioned factors, which are typically associated with the horizontal transmission of HBV, nor with socio-demographic variables such as age, gender, socio-economic status, or educational attainment as previously described by studies from SSA [17–19]. It has been amply established that in endemic settings such as in SSA, HBV is predominantly acquired vertically through MTCT or early in life [1,3], which supports the findings of risk factor analysis in our cohort of pregnant women.
However, although most pregnant women likely acquired HBV vertically, those having a husband/partner with HBV had 6.5 times higher odds of being HBsAg seropositive compared with their counterparts who did not report having a husband/partner with HBV. This effect size, although substantially large, is likely to be an underestimate for several reasons. Firstly, information on the HBV status of the husbands/partners was collected from self-reports and not confirmed by laboratory testing. Secondly, partner testing in this setting may be low due to lack of awareness about HBV; in our cohort, only 1.3% of participants were aware of their HBV status. Thirdly, individual- and community-level stigmas related to HBV and other communicable diseases are highly prevalent and may be negatively influencing health-seeking behavior, including HBV status disclosure [22]. Nonetheless, our study is the first to document a relatively large contribution of sexual transmission in young adults of reproductive age in Sierra Leone and suggests that a mixed HBV transmission dynamic through both sexual and non-sexual contact may in fact be playing a greater role in the HBV epidemic in this hyperendemic setting than has been previously described. Interestingly, Martinson et al. [23] previously described the role of horizontal HBV transmission among children and adults in the West African country of Ghana. Similarly, Nejo et al. [24] observed a 1.7-fold higher risk of HBV among sexually active young adults in Nigeria. This highlights the need to scale up awareness-raising activities, partner screening, and treatment services to identify and link people with HBV into appropriate care.

Pregnant women living in Central Freetown accounted for only 15% of the study population; nonetheless, residence in this part of the city was associated with a 4-fold higher risk of HBV infection. While the reasons for this finding remain unclear, plausible explanations include: poor housing conditions and overcrowding in homes allowing for contact with an index HBV case [23], low socio-economic class [25], increase in commercial sexual activity [26], and lack of access to healthcare [27]. In fact, Central Freetown is densely populated and represents the hub of economic activity of the city, with limited healthcare access and poor housing conditions. Dwelling in crowded urban areas with a high prevalence of risky behaviors such as injection drug use and limited access to healthcare have been identified as major determinants of HBV infection in both developed and resource-limited regions [28,29]. Further research is needed to investigate the factors of HBV chronic carriage in this specific area of Freetown.

The HBV vaccination rate of our cohort was extremely low at 1%. Vaccination is the most effective public health intervention designed to prevent HBV infection and its clinical sequelae [1]. Despite the introduction of HBV vaccination in Sierra Leone in 2009, vaccination is not strictly enforced, and coverage has remained low among adults [13]. In three recent studies among the healthcare workers in Sierra Leone, the HBV vaccination rate ranged from 1.9% to 4.3% [30–32]. The universal screening of pregnant women, immunoglobulin prophylaxis and HBV vaccination for exposed newborns and adults lacking immunity could help reduce MTCT transmission rates in Sierra Leone.

Our study had a few limitations worthy of discussion. Firstly, the study was restricted to urban settings in Freetown and our observations may not be generalizable to the rest of the country. Secondly, we assessed the prevalence of HBsAg and did not undertake a complete characterization of the other sero-markers of HBV or viral-load quantification to determine active disease or prior exposure. Additionally, we were unable to verify HBV immunity through vaccination records or serological testing. Similarly, data on HIV status of participants and HBV status of their husbands/partners were collected through self-report and medical chart review, which likely resulted in an underestimate and were not confirmed with laboratory testing. Despite these limitations, our study provides a comprehensive analysis of the prevalence and associated risk factors of HBV among pregnant women that could help inform the formulation of a comprehensive national policy towards eliminating viral hepatitis as a public health threat by 2030.
4. Materials and Method

4.1. KnowHep Foundation Sierra Leone

KnowHep Foundation Sierra Leone is a non-governmental organization that has been engaged in raising awareness about viral hepatitis in Sierra Leone since 2019 through community outreach, advocacy and collaboration with partners including the Ministry of Health and Sanitation. Founded with the stated mission of improving hepatitis care delivery by reaching at least 80% of the population, KnowHep Foundation Sierra Leone offers free or low-cost services including HBV screening, treatment and monitoring of uncomplicated HBV, referrals of sicker patients for more specialized clinic- or facility-based care, and targeting high-risk groups (e.g., pregnant women and healthcare workers) for risk-reduction education and mass immunization programs.

This study was conducted using the resources of KnowHep Foundation.

4.2. Study Design, Population and Settings

We conducted a cross-sectional study of pregnant women aged ≥16 years who received antenatal care across 10 CHCs in Freetown, Sierra Leone, from July to September 2021. Participants were selected using convenience sampling.

Freetown is the capital and largest city of Sierra Leone. At the time of this study, the population of Freetown was estimated at 1.2 million [7]. The city is divided into the eastern, central and western districts. The eastern and central districts of Freetown are the economic and administrative hubs of the city, while the western district is largely residential.

The health needs of the residents of Freetown are served through a healthcare system that is comprised of the national referral facilities at Connaught Hospital, Ola During Children’s Hospital, Princess Christian Maternity Hospital, and several satellite clinics and peripheral health units or CHCs located throughout Freetown and its environs. The CHCs are staffed by trained community health care workers and nurses.

The study was conducted at the following 10 CHCs in Freetown, as shown in Figure 1.

Western Freetown
1. Ogoo Farm CHC
2. Aberdeen Maternal CHC
3. Murray Town CHC
4. Thompson Bay CHC
5. Wilberforce CHC
Central Freetown
6. Dwarzack CHC
Eastern Freetown
7. Mabela CHC
8. Wellington CHC
9. Susan’s Bay CHC
10. Old Wharf CHC

4.3. Participant Recruitment and Data Collection

Clinic staff and trained research personnel approached clinic attendees and explained the purpose of the study to them. Written informed consent was obtained from participants before enrollment into the study. A structured questionnaire was used to collect socio-demographic and clinical data and information on potential risk factors of HBV infection. The design of the questionnaire was informed by previous studies on this topic in Sierra Leone [10,23]. The questionnaire was piloted among 10 pregnant women to ensure the clarity of questions.

The presence of HBsAg was determined using the rapid-testing kit manufactured by Nantong Egens Diagnosis Biotechnology Co., Ltd. (Rugao, China) according to the
manufacturer’s instructions. The manufacturer reported a sensitivity of 95.5% and a specificity of 98.6% [33]. HIV serostatus was based on self-reports and clinic records.

4.4. Statistical Analyses

Statistical analyses were performed using the SPSS Version 27.0 (Armonk, NY, USA; IBM Corp.). Categorical variables were reported as frequencies (percentages) and compared using Pearson’s chi-square or Fisher’s exact tests. Continuous variables were presented as means (standard deviation) and compared using the non-parametric independent samples Mann–Whitney U-test or Kruskal–Wallis test, as appropriate. Logistic regression was used to identify predictors of HBsAg seropositive status. Factors known to be associated with HBsAg positivity were tested in the univariate analysis. Only variables that attained a p-value of <0.2 in the univariate analysis were included in the multivariate regression model. Associations were reported as crude (OR) or adjusted odds ratios (aOR) with 95% confidence intervals (CI). Differences were considered statistically significant when p was <0.05.

4.5. Ethical Considerations

Clearance was obtained from the Sierra Leone Ethics Scientific and Research Committee of the Ministry of Health and Sanitation of Sierra Leone (approval date 21 July 2021). Written informed consent was obtained from all participants before enrolment into the study.

5. Conclusions

We observed an unacceptably high prevalence of HbsAg (7.9%) among pregnant women over a decade after HBV vaccination was introduced in Sierra Leone in 2009. Although most people acquire HBV perinatally or early in life in this hyperendemic setting, our study demonstrated that sexual transmission may be playing a more critical role in HBV acquisition in adults of reproductive age than has been previously described. Our findings support current calls advocating for scaling up HBV services to pregnant women and their sexual partners to help bring the HBV epidemic under control in Sierra Leone.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Sierra Leone Ethics Scientific and Research Committee of the Ministry of Health and Sanitation of Sierra Leone (approval date 21 July 2021).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

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