



(RESEARCH ARTICLE)



Prevalence of Hepatitis B infections and associated risk factors among pregnant women at Hawa Memorial Saviour Hospital in the Abuakwa North Municipality, Ghana

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Abstract

Background: Hepatitis B virus infection is one of the most common public health problems worldwide. Over one million people globally are estimated to die annually of virus-related chronic liver disease. The routes of transmission include perinatal transmission at birth, unprotected sexual intercourse, injecting drugs, contaminated blood, and blood products, and through medical practices. In Ghana, there is a paucity of information about the prevalence of the Hepatitis B virus, its risk factors, knowledge, attitude, and practices among the population including pregnant women who are at higher risk of the infection.

Methodology: This was a cross-sectional study conducted among a sample of 260 systematically selected pregnant women attending an Antenatal Clinic at Hawa Memorial Saviour Hospital in the Abuakwa North Municipality of the Eastern Region of Ghana. Demographic characteristics, risk factors, and respondents' perceived knowledge, attitudes and practices on the disease were evaluated using a standardized structured questionnaire. Blood samples of participants were taken to determine their Hepatitis B seroprevalence using the HBV detection kit set device after the questionnaires were administered. Descriptive statistics were used to report on variables of key, while a Person's Chi-Square test was employed to determine the association between selected variables and an outcome variable.

Results: The seropositivity of Hepatitis B among pregnant women was 4.6% which is an intermediate endemicity. The majority of the study participants were between the age group 30-34years (35.38%). However, the study found that the infection rate was highest among age groups 20-24years (12%). The sociodemographic characteristics of the respondents in the study showed that only marital status ($p < 0.05$) was significantly associated with Hepatitis B infection. There was inadequate knowledge among respondents which was largely due to a low level of education on Hepatitis B infection at the Antenatal clinic of the Hospital. The study also found that respondents that are categorized as having low-risk levels had a seropositivity rate of 5.3% which is higher than the overall seropositivity rate of the study, and even though most people had good practices, Hepatitis B infection was highly prevalent among them.

Conclusions: The study showed that Hepatitis B virus infection was highest (12%) among the age groups of 20-24 years. Only the respondents' marital status ($p < 0.05$) was noted to be significantly associated with infection. The detected inadequate knowledge, attitudes, and practices in the transmission and prevention of the disease call for full attention to the risk factor among respondents in the development of relevant policies and public health programs to address this important public health problem.

Keywords: Hepatitis B virus; Knowledge; Attitude; Practice; Risk Factors, Pregnant women, Abuakwa North

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1. Introduction

The Hepatitis B virus (HBV) infection is one of the most common public health problems worldwide, as over one million people die annually of its related chronic liver disease. Recent studies conducted in Ethiopia showed moderate endemicity (3-7.8%) of HBV among pregnant women. Maternal to fetal transmission from chronic carriers exceeds 90% and accounts for up to 40% of the world's chronic carriers in endemic areas [1]. Globally, Hepatitis B virus infection is considered a major public health issue, and around 30% of the global population's serological tests show the positivity of either current or past infection [2]. Worldwide, there are approximately 350 million carriers of the Hepatitis B virus. These are carriers providing a huge reservoir for HBV, and over two (2) billion individuals alive today have been infected at some point in their lives [3]. Sub-Saharan Africa including Ghana is an HBV-endemic area and an estimated 5% – 10% of the population in the region is infected. However, research on the knowledge and vaccination status of the disease in rural communities in Ghana is lacking [4]. This study, therefore, seeks to evaluate the prevalence, risk factors, knowledge, attitude, and practices (KAP) of Hepatitis B infection among pregnant women in Hawa Memorial Saviour Hospital in the Abuakwa North Municipality of the Eastern Region of Ghana.

2. Material and methods

Data for this study were collected with a questionnaire designed on socio-demographic characteristics, risk factors, and KAP of HBV. In addition, blood samples were collected from each study subject. All blood specimens were screened using an HBV detection kit. The whole blood specimen was collected and used for detection with a test kit of sensitivity and specificity of 99.0% and 99.8% respectively for the *Wondfo* one-step rapid test. An amount of 20ul of whole blood was transferred into the test region of the device, adding two drops of diluent, and waiting for a 20 minutes incubation period. The appearance of two solid red lines in the test region indicated that HBsAg is positive, while a single red line indicated a negative HBsAg. The data was extracted from the questionnaire, with the Laboratory results entered into Microsoft Excel and then imported into *SPSS Statistical Package Software version 22* for analysis.

2.1. Sample Size

The study population included pregnant women from age fifteen (15) to age forty-four (44) who were attending antenatal care clinics at the Hawa Memorial Saviour Hospital in the Abuakwa North Municipality in the Eastern Region of Ghana. Pregnant women attending an antenatal clinic, who had not been vaccinated against Hepatitis B and were not aware of their infection status and those pregnant women attending an antenatal clinic who were vaccinated against the disease knew they were positive (had previously tested positive) were included and excluded from the study respectively during data collection. A systematic random sampling technique was employed in recruiting the study participants. All pregnant women who were attending the Hospital Antenatal Clinic during the data collection period were approached and consented. The sample size for the study was estimated using Cochran's formula as shown below at a 95% confidence interval, 5% margin of error and a prevalence level of 19% [5].

$$n = \frac{z^2 \times pq}{e^2}$$

Where,

n = sample size [6]

z = the z-score that corresponds with 95% confidence intervals which are 1.96

p = proportion of pregnant women with knowledge of Hepatitis B virus which is 19% or 0.19

q = 1-p. That is, (1-0.19) =0.81

e= margin of error set at 0.05.

Therefore,

$$n = \frac{1.96^2 \times (0.19)(0.81)}{0.05^2} = \frac{0.5912}{0.0025} \approx 236$$

The estimated sample size was 236. However, a 10% non-response rate of 24 was added thereby making the working sample size for the study to be 260.

2.2. Statistical Analysis

Data were entered, cleaned, and analyzed using *SPSS Statistical Package Software version 22*. Descriptive statistics such as frequencies and proportions were used to summarize the data. Bivariate and multivariate analyses were used to

examine the relationship between variables (Seroprevalence and knowledge, attitude, and practice) as well as selected socio-demographic factors. Statistical significance was considered for a p-value < 0.05.

3. Results

The 260 participants recruited for the study provided all the needed responses for full analysis resulting in a 100.00% response rate for the study. The seropositivity of Hepatitis B among pregnant women was 4.6% which is an intermediate endemicity. The majority of the study participants were between the age group 30-34years (35.38%). The majority of the study participants (78.85%) were married at the time of enrollment. Four out of ten of the respondents indicated Primary education as their highest attained level of formal education, whereas 27 representing 10.38% had no formal education at the time of participation in the study.

More than half of the pregnant women had a second antenatal care visit during their pregnancy state (61.16%). In terms of gestational period, a greater proportion of study participants were in their second trimester (50.77%) during their antenatal care visit, followed by the first-trimester visit (33.08%) and the third trimester 16.15%. About participants' sources of obtaining information about Hepatitis B, a greater number of respondents (34.23%) indicated television as their preferred source of Hepatitis B virus information, followed by (33.46%) for Hospital/Health centres, Radio (23.46%) and others (8.85%) was the least preferred source of information on Hepatitis B virus infection (*Table 1*).

Table 1 Socio-Demographic Characteristics of Respondents

| Variable (N =260) | Categories | n (%) |
|------------------------------------|------------------------|------------|
| Age Group | 15-19yrs | 8(3.08) |
| | 20-24yrs | 25(9.62) |
| | 25-29yrs | 75(28.85) |
| | 30-34yrs | 92(35.38) |
| | 35-39yrs | 53(20.38) |
| | 40-44 | 7(2.69) |
| Marital Status | Single | 52(20.00) |
| | Married | 205(78.85) |
| | Divorce/Widowed | 3(1.15) |
| Highest Educational Level | No Formal Education | 27(10.38) |
| | Primary | 104(40.00) |
| | Secondary | 68(26.16) |
| | Tertiary | 61(23.46) |
| Number of ANC Visits | First Visit | 61(23.46) |
| | Second Visit | 159(61.16) |
| | Third Visit | 40(15.38) |
| Gestational Period | 1st Trimester | 86(33.08) |
| | 2nd Trimester | 132(50.77) |
| | 3rd Trimester | 42(16.15) |
| Preferred Source of HB Information | Television | 89(34.23) |
| | Hospital/Health Center | 87(33.46) |
| | Radio | 61(23.46) |
| | Others | 23(8.85) |
| Hepatitis B seropositivity | Positive | 12(4.6) |
| | Negative | 248(95.4) |

The ascertain the risk level of contracting the disease, a set of 12 questions to solicit the needed information were asked, see Table 2 below. Each question was scored on a scale of 1 and 0 for exposure and each non-exposure respectively. The risk factors were classified as high risk, medium risk, and low risk. Exposure to 4 or fewer risk factors was considered *low risk*, while exposure to indicators between 5 and 7 was classified as *medium risk*, and anything more than 8 was considered *high risk*. Out of the 260 respondents, about 1.5% were at higher risk of contracting Hepatitis B, 22.7% fell within the medium-risk category and the majority (75.8) were in the low-risk category.

Table 2 Risk Factors with Hepatitis B Infection (n=260)

| Risk Factors | Yes n (%) | No n (%) | Don't Know |
|--|--------------|-------------|------------|
| History of previous blood transfusion | 60 (23.1) | 200 (76.9) | |
| Having a C-section | 53(20.4) | 207(79.6) | |
| Giving birth at the health facility | 167(64.2) | 93(35.8) | |
| History of surgery | 71(27.3) | 189(72.7) | |
| Having a history of teeth pulling or teeth cleaning | 60(23.1) | 200(76.5) | |
| Knows the husband has other wives | 66(25.4) | 194(74.6) | |
| Exposure to intramuscular or intravenous injections | 195(75.0) | 65(25.0) | |
| Exposed to a needle contaminated with the blood of someone | 23(8.8) | 228(87.7) | 9(3.5) |
| Having ear or nose piercing | 199(76.5) | 57(21.9) | 4(1.5) |
| Genitally mutilated (FGM/c) | 17(6.5) | 237(91.2) | 6(2.3) |
| Having a partner carrier of the HB virus | 14(5.4) | 197(75.8) | 49(18.8) |
| Having family members infected with the HB virus | 23(8.8) | 162(62.3) | 75(28.8) |

The findings from a bivariate analysis of selected sociodemographic variables to ascertain the level of association with HBV infection among pregnant women attending antenatal care at Hawa Memorial Saviour Hospital revealed that none of the variables was significantly associated with Hepatitis B infection. However, there was a high positivity rate (5.3%) among the low-risk level group relative to the high and medium-risk levels which had a positivity rate of 3.5% and 0.0% respectively (Table 3). The study also found that respondents that are categorized as having low-risk levels had a seropositivity rate of 5.3% which is higher than the overall seropositivity rate of the study, and even though most people had good practices, Hepatitis B infection was highly prevalent among them.

The knowledge level of the study participants on Hepatitis B was measured with a score of 0 for the wrong answer and 1 for the correct answer. The aggregated score ranged from a minimum of 0 and a maximum of 20 points. An aggregate score greater than 10 points were taken as "Adequate Knowledge", whereas a total score less or equal to 10 was designated as "Inadequate Knowledge" of Hepatitis B. Of the total 260 pregnant women who participated in the study, the majority representing 88.5% indicated they were aware of HBV infection while the rest (11.5%) indicated otherwise. Approximately 44% of the study participants knew that Hepatitis B infection can affect the liver and 43.8% knew an infected person remains infected for life. Majority of the respondents 53.8% showed that Hepatitis B can affect any age group and 51.2% knew it is transmitted through contaminated instruments.

Also, about 16.2% of the respondents identified symptoms such as nausea, vomiting, and loss of appetite, and 36.5% knew that Hepatitis B can be asymptomatic. Around 48% of the respondents identified that Hepatitis B can be transmitted by unsterilized syringe needle and surgical instrument, 52.3% through contaminated blood and blood products, 38.1% through blades of the barber and ear and nose pierces, 58.8% from mother to child, 26.5% through unsafe sex and 38.8% did not know how Hepatitis B is transmitted. A larger proportion of the study participants believed that Hepatitis B required a specific diet for treatment. A lower proportion of the respondents 8.8% knew about the Hepatitis B vaccine and its availability. More than half (68.1%) of the study participants knew about the availability of the Hepatitis B vaccine in Ghana (Table 4).

Table 3 Association between selected Sociodemographic characteristics and Seropositivity

| Variables | Categories | Hep B Seropositivity | | Total | χ^2 | P-Value |
|---------------------------|---------------------|----------------------|-----------------|-------|----------|---------|
| | | Negative n (248) | Positive n (12) | | | |
| Age Groups | 15-19 | 8 | 0 | 8 | 5.718 | 0.335 |
| | 20-24 | 22 | 3 | 25 | | |
| | 25-29 | 73 | 2 | 75 | | |
| | 30-34 | 88 | 4 | 92 | | |
| | 35-39 | 51 | 2 | 53 | | |
| | 40-44 | 6 | 1 | 7 | | |
| Highest Educational Level | No Formal Education | 25 | 2 | 27 | 3.195 | 0.362 |
| | Primary | 97 | 7 | 104 | | |
| | Secondary | 66 | 2 | 68 | | |
| | Tertiary | 60 | 1 | 61 | | |
| Marital Status | Single | 49 | 3 | 52 | 0.326 | 0.850 |
| | Married | 196 | 9 | 205 | | |
| | Divorced/Widowed | 3 | 0 | 3 | | |
| Risk Level | Low Risk | 187 | 10 | 197 | 0.490 | 0.783 |
| | Medium Risk | 57 | 2 | 59 | | |
| | High Risk | 4 | 0 | 4 | | |

Table 4 Knowledge of Respondents about Hepatitis B Virus Infection

| Risk Factors | Yes n (%) | No n (%) | Don't Know |
|---|------------|-----------|------------|
| Awareness about Hep B | 230 (88.5) | 30 (11.5) | |
| Can Hepatitis B affect liver function? | 113(43.5) | 117(45.0) | 30(11.5) |
| Will an infected person remain infected for life? | 114(43.8) | 43(16.5) | 103(39.6) |
| Can Hepatitis B affect any age group? | 140(53.8) | 39(15.0) | 81(31.2) |
| Can the Hepatitis B virus be transmitted by contaminated needles, sharp objects and tattoo instruments? | 133(51.2) | 40(15.4) | 87(33.5) |
| Is Hepatitis B a viral disease? | 66(25.4) | 164(63.1) | 30(11.5) |
| Are nausea, vomiting and loss of appetite common symptoms of Hepatitis B? | 42(16.2) | 94(36.2) | 124(47.7) |
| There are no symptoms of Hepatitis B in some patients | 95(36.5) | 46(17.7) | 119(45.8) |
| Can the Hepatitis B virus be transmitted by an unsterilized syringe, needle or surgical instrument? | 124(47.7) | 44(16.9) | 92(35.4) |
| Can Hepatitis B be transmitted by contaminated blood and blood product? | 136(52.3) | 35(13.5) | 89(34.2) |
| Can Hepatitis B be transmitted by blades of the barber/ear and nose pierces? | 99(38.1) | 53(20.4) | 108(41.5) |

| | | | |
|--|-----------|-----------|-----------|
| Can Hepatitis B be transmitted from a person without symptoms | 86(33.1) | 72(27.7) | 102(39.2) |
| Can Hepatitis B be transmitted by a mother to a child? | 153(58.8) | 30(11.5) | 77(29.6) |
| Can Hepatitis B be transmitted by unsafe sex? | 69(26.5) | 90(34.6) | 101(38.8) |
| Can the Hepatitis B virus be transmitted by sharing food and water with a Hepatitis B infected person? | 55(21.2) | 126(48.5) | 79(30.4) |
| Is Hepatitis B curable/treatable? | 77(29.6) | 116(44.6) | 67(25.8) |
| Can Hepatitis B be self-cured by the body? | 76(29.2) | 103(39.6) | 81(31.2) |
| Is vaccination available for Hepatitis B? | 184(70.8) | 23(8.8) | 53(20.4) |
| Is a specific diet required for the treatment of Hepatitis B? | 142(54.6) | 47(18.1) | 71(27.3) |
| Is the Hepatitis B vaccine available in Ghana? | 177(68.1) | 53(20.4) | 30(11.5) |
| Do you think you can get Hepatitis B? | 163(62.7) | 97(37.3) | |

Out of the total respondents, 156 (60%) demonstrated adequate knowledge concerning HBV infection, and 7(4.5%) of them were seropositive for HBsAg. Approximately, 4.8% of those who demonstrated inadequate knowledge had a relatively high percentage of HBV infection. A Pearson's Chi-Square test between knowledge level and the disease seropositivity of the study participant did not find any significant association between the indicators ($p \geq 0.564$) as indicated in Table 5 below.

Table 5 Association Between Knowledge level and Hepatitis B Seropositivity

| Knowledge Level | Hepatitis B seropositivity | | Total (n=260) | χ^2 | P-Value |
|-----------------|----------------------------|--------------------|------------------|----------|---------|
| | Negative (n=248) | Positive (n=12) | | | |
| Inadequate | 99(95.2) | 5(4.8) | 104(40%) | 0.015 | 0.564 |
| Adequate | 149(95.5) | 7(4.5) | 156(60%) | | |

Regarding attitude towards HBV infection among the 260 pregnant women interviewed, 37.3% think they can't get Hepatitis B virus infection, 37% said they will feel ashamed if they contract HBV and nearly half (45.8%) of the respondents mentioned they will be comfortable talking to their physicians if they contract the virus. Approximately, 76% preferred going to the health facility when they observed signs and symptoms of the disease.

More than half (54.6%) of the respondents cumulatively hinted they will go to the health facility after either their treatment fails or after 3-4weeks of the appearance of symptoms. On the cost of treatment, 51.9% think HBV treatment is expensive. About a third of the respondents (30%) also expressed a fear of death, 28.1% fear the disease will spread to other family members, and 16.1% fear isolation from society (Table 6).

Among the total respondents, 68% had good practices towards Hepatitis B infection. A greater proportion of the respondents (86.5%) had blood test screening for Hepatitis B, and 33.1% indicated that they prefer avoiding the use of sharing the toilet with an infected person which is a bad practice for the respondents.

About 62.3% of the study participants stated they would not share food with an infected person and this is a very bad practice from my respondents. Half of the respondents (50%) indicated they would ask for blood screening and a new syringe before blood transfusion, while 47.7% indicated they would avoid socializing with Hepatitis B infected persons which is a bad practice. About 47.7% also participated in health education programs related to Hepatitis B infection.

Table 6 Attitude of Respondents to Hepatitis B Virus Infection

| Variable | n (%) |
|---|-----------|
| Do you think you can get Hepatitis B | |
| No | 97(37.3) |
| Yes | 163(62.7) |
| What would be your reaction if you found that you have Hepatitis B | |
| Surprised | 67(25.8) |
| Shame | 97(37.3) |
| Fear | 59(22.7) |
| Sad | 37(14.2) |
| Who would you talk to about your illness | |
| Husband | 40(15.4) |
| Parent | 60(23.1) |
| Physician | 119(45.8) |
| No One | 7(2.7) |
| Other Relations | 34(13.1) |
| What will you do if you think that you have symptoms of Hepatitis B | |
| Go to Health Facility | 197(75.8) |
| Go to Traditional Healer | 50(19.2) |
| Do Nothing | 13(5.0) |
| If you have symptoms of Hepatitis B, at what stage will you go to the health facility? | |
| As soon as I realize the symptoms of Hepatitis B | 118(45.4) |
| Own treatment fails | 89(34.2) |
| After 3-4 weeks of the appearance of symptoms | 53(20.4) |
| How expensive do you think is the diagnosis and treatment of Hepatitis B? | |
| Expensive | 135(51.9) |
| Reasonable | 44(16.9) |
| Don't Know | 11(4.2) |
| Free | 6(2.3) |
| Nothing to worry | 64(24.6) |
| What will worry you most if you are diagnosed with Hepatitis B? | |
| Fear of disease spreading to family | 73(28.1) |
| Cost of treatment | 93(35.8) |
| Fear of death | 78(30.0) |
| Isolation from the society | 16(6.2) |

Practices regarding Hepatitis B virus infection were categorized as good and bad. There are eight responses under the practice, a positive response to a question has a score of 1 and 0 scores for a negative response. An aggregate score between 0-3 is termed a “*bad practice*” and a score between 4-8 is termed a “*good practice*” (Table 7).

Table 7 Practices of Respondents Regarding Hepatitis B Virus Infection

| Factors | Yes n (%) | No n (%) |
|---|--------------|-------------|
| Have you been screened for Hepatitis B? | 255 (86.5) | 35 (13.5) |
| Would you avoid sharing a toilet with a Hepatitis B infected person? | 86(33.1) | 174(66.9) |
| Would you share food with a Hepatitis B-infected person? | 98(37.7) | 162(62.3) |
| Do you ask for a new syringe and screening of blood before transfusion? | 140(53.8) | 130(50.0) |
| Do you ask your barber to change the blade/ equipment for ear and nose piercing? | 92(35.4) | 168(64.6) |
| In case you are diagnosed with Hepatitis B, would you go for further investigation and treatment? | 205(78.8) | 55(21.2) |
| Do you avoid meeting with Hepatitis B patients? | 124(47.7) | 136(52.3) |
| Have you ever participated in a health education program related to Hepatitis B? | 124(47.7) | 136(52.3) |

Table 8 below shows the frequency distribution of practice regarding HBV as well as a test of association between practice and seropositivity of the Hepatitis B virus. Out of the 260 respondents interviewed, 177(68%) showed some good practices towards HBV infection while the remaining showed bad practices. There was no significant association between the practice and seropositivity (p -value = 0.348). The research however found out that, 10(5.7%) of the respondents who demonstrated good practice were HBV seropositive.

Table 8 Association between Practice Regarding HBV and Seropositivity

| Practice | Hepatitis B virus seropositivity | | Total | χ^2 | P-value |
|---------------|----------------------------------|----------|----------|----------|---------|
| | Negative | Positive | | | |
| Good Practice | 167 | 10(5.7%) | 177(68%) | 1.347 | 0.348 |
| Bad Practice | 81 | 2(2.5%) | 83(32%) | | |

4. Discussion

4.1. Prevalence of Hepatitis B Virus Infection

The increased recognition of HBV infection as a leading cause of death globally has resulted in the development of new structures and policies at the international level, what is now required is immediate attention to implementing these strategies. According to the carrier state among the population, countries are classified as high endemicity (>8%), intermediate endemicity (2-7%), or low endemicity (<2%) [7]. Ghana is found as one of the countries in the region with the highest HBV prevalence. However, the literature on the epidemiology of the disease among pregnant women is limited [8].

From the result of this study, Hepatitis B seropositivity among pregnant women was 4.6% and hence the overall prevalence of Hepatitis B is 4.6% which is within the intermediate endemicity. The study however found that Hepatitis B virus infection was highest among the age groups of 20-24 years (12%). This agrees with similar work done at Mbagathi District Hospital in Nairobi, Kenya which showed high infection among pregnant women with the highest rate of 3.8% seen in the age group 20-24 [9]. The prevalence of this study is lower compared to a similar study that sought to determine the seroprevalence of HBV and associated factors among pregnant women attending antenatal care at Korle-Bu Teaching Hospital which was 7.7%. Also, another related study aimed at determining the seroprevalence among pregnant women in northern Ghana found a prevalence of 7.5% [10].

These findings suggest that HBV still is a public health concern in Ghana and poses a serious threat to pregnant women, irrespective of background or place of residence. A cross-sectional survey among pregnant women in rural Ghana found a seroprevalence of 16.7% in rural settings [11]; far higher than the prevalence found in this study. Trends of Hepatitis

B virus infection over time have shown some consistency in decline since 1995 as indicated in a previous study [12]. The study revealed a downward trend of Hepatitis B virus prevalence of around 17% between 1995-2002, 14% between 2003-2009, and 10% between 2010-2015. This reduction in trend could be an indication of a working vaccination system for Hepatitis B and largely due to a high awareness level about the infection rate.

Among the sociodemographic and obstetrical characteristics of pregnant women assessed in this study, only marital status ($P < 0.05$) was significantly associated with HBsAg infection, a finding, that contradicts the finding of another study studies conducted in the Greater Accra Region where marital status was not a significant contributor to HBV infection among pregnant women [8].

4.2. Participants' Knowledge of Hepatitis B

Knowledge of the expectant mothers on the viral infection required in breaking the transmission chain of HBV was sought. Two-fifths (40%) of the participants had inadequate knowledge regarding HBV infection. The result from this study however differed from an observation made from another study where nearly half of the study participants exhibited inadequate knowledge of Hepatitis B virus infection during the interview session [13]. A similar observation was recorded at Mbagathi District Hospital in Nairobi, Kenya, where 50.2% of the total respondents had inadequate knowledge of HBV infection [9].

To address the issue of inadequate knowledge in Asia, a study was conducted to examine the knowledge of HBV infection in a non-selected cohort of Chinese pregnant women attending an antenatal clinic in 2008. The study found insufficient knowledge of HBV infection in various aspects which were similar to the findings in all other studies in China [14]. Overall, there appears to be a knowledge gap of HBV infection among pregnant women largely due to low levels of education and insufficient education on infection at the various ANC clinics or lack of consistent and sufficient education on the disease infection on the various media platforms. The low level of knowledge among pregnant women presents an imminent threat due to the potential spreading of HBV to sexual partners, newborns, the community, and the country at large.

4.3. Association between Risk Levels and Hepatitis B Virus Seropositivity

Variables are classified under the risk factors as high risk, medium risk, and low risk. Exposure to each risk factor has a score of 1 and 0 for each non-exposure. It is worth noting that only about 1.5% of the respondents were exposed to more than 7 risk factors out of 12 and as such categorized under the high-risk level with no positivity rate amongst this group. On the other hand, more than 75% of the respondents were exposed up to 4 risk factors and as such categorized as having low-risk levels. This group had a positivity rate of 5.3% which is higher than the overall positivity rate found in this study. This is an indication that HBV infection is present even in lower-risk factors since it is perceived that people at a low-risk level might not have a high infection rate. This study, however, did not find any significant association between the risk levels and HBV prevalence. Similar to this finding was Dorte's study revealing that none of the variables made a unique statistically significant contribution to the prevalence of HBV [8].

4.4. Participants' Practices Regarding Hepatitis B

The study revealed that more than two-thirds (68%) of the respondents exhibited some good practices related to HBV infection while the remaining showed bad practices. Up to 5.7% of the respondents with good practices were positive for HBV and 2.5% of those with bad attitudes towards HBV infection. Contrary to the finding of this study, other studies conducted on the African population have shown relatively poor practices amongst the population; approximately 75.7% of the general population had poor practices [15], and only 24.3% had good practices with a mean score of 3.8 ranged between 2 and 7. Other studies have it that, in terms of screening, only (20.6%) have screened for HBV and (2.3%) were vaccinated against HBV, and (91.2%) asked for a new syringe or sharps objects before use [9]. In this study, even though most people had good practices. This is an eye-opener for extra cautiousness in terms of practices towards HBV infection. The study however did not find any significant association between the practice and seropositivity.

4.5. Participants' Attitude towards Hepatitis B

The study found that 37.3% of the respondents perceived they are not susceptible to HBV infection. This finding is relatively lower compared to a similar study conducted in Ethiopia which showed that around 43% of the total study participants thought alike [16]. The combined findings of these studies highlight a serious public health concern which must be given special focus. More than half (54.6%) of the respondents cumulatively, will go to the health facility after either their treatment fails or after 3-4 weeks of the appearance of symptoms. This finding is different from the findings from the Ethiopia group which showed that a higher percentage (47.7%) of them will go to traditional healers when they have symptoms of HBV. Even though the comparative results of these studies are different, they have a central

focus; respondents delay seeking treatment when they get HBV infections in either the findings. It is therefore extremely vital that education geared towards seeking earlier treatment be included in the HBV education package on behavioural change.

5. Conclusion

The study showed that Hepatitis B virus infection was highest among the age groups of 20-24 years (12%) and among the sociodemographic characteristics only marital status ($p < 0.05$) was significantly associated with HBV infection. The inadequate knowledge, attitudes, and practices in the transmission and prevention of the disease call attention to the risk factor among respondents in the development of relevant policies and public health programs to address this important public health problem.

Compliance with ethical standards

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Disclosure of conflict of interest

All authors declare no conflict of interest.

Statement of ethical approval

Ethical approval to undertake the study was obtained from the Ethics Review Board of Ensign Global College. Also, administrative permission was sought from the leadership of the Hawa Memorial Saviour Hospital to allow the research team to collect data in the facility.

Statement of informed consent

The study participants were informed of their rights to voluntarily consent or decline to participate and to withdraw participation at any time without penalty. All respondents were treated equally after explaining to them the purpose of the study and their roles.

Author's contribution

This work was carried out in collaboration with all authors. SAB, SM and SHA participated in conceiving the study and in the development of data collection tools. SAB carried out data collection. SAB and SM participated in the data analysis and SHA drafted the manuscript. All authors read and approved the final manuscript.

References

- [1] Utoo, B.T. (2013). Hepatitis B surface antigenemia (HBsAg) among pregnant women in southern Nigeria. *African Health Sciences*, 13(4), pp.1139-1143. <https://doi.org/10.4314/ahs.v13i4.39>
- [2] Christian, T., Henry, L.Y.C. and Anna, L. (2014). Hepatitis B virus infection. *Lancet*, 384, pp.2053-2063. [https://doi.org/10.1016/s0140-6736\(14\)60220-8](https://doi.org/10.1016/s0140-6736(14)60220-8)
- [3] World Health Organization, 2017. WHO Guidelines on Hepatitis B and C testing. <https://www.who.int/publications/i/item/9789241549981>
- [4] Adam, A. and Fusheini, A. (2020). Knowledge, risk of infection, and vaccination status of Hepatitis B virus among rural high school students in Nanumba North and South Districts of Ghana. *PloS One*, 15(4), p.e0231930. <https://doi.org/10.1371/journal.pone.0231930>
- [5] Hussein, N.R., (2018). Risk factors of Hepatitis B virus infection among blood donors in Duhok city, Kurdistan Region, Iraq. *Caspian Journal of Internal Medicine*, 9(1), p.22. <https://doi.org/10.22088/cjim.9.1.22>
- [6] Cochran, W. C. (1977) 'Snedecor G W & Cochran W G. Statistical methods applied to experiments in agriculture and biology. 5th ed. Ames, Iowa: Iowa State University Press, 1956.', Citation Classics, 19(19), p. 1.

- [7] MacLachlan, J.H. and Cowie, B.C., 2015. Hepatitis B virus epidemiology. *Cold Spring Harbor Perspectives In Medicine*, 5(5), p.a021410. <https://doi.org/10.1101/cshperspect.a021410>
- [8] Dorte, B.A., Anaba, E.A., Lasse, A.T., Damale, N.K.R. and Maya, E.T. (2020). Seroprevalence of Hepatitis B virus infection and associated factors among pregnant women at Korle-Bu Teaching Hospital, Ghana. *PloS One*, 15(4), p.e0232208. <https://doi.org/10.1371/journal.pone.0232208>
- [9] Ngaira, J.A.M., Kimotho, J., Mirigi, I. and Osman, S. (2016). Prevalence, awareness, and risk factors associated with Hepatitis B infection among pregnant women attending the antenatal clinic at Mbagathi District Hospital in Nairobi, Kenya. *The Pan African Medical Journal*, 2016; 24: 315. <https://doi.org/10.11604/pamj.2016.24.315.9255>
- [10] Anabire, N.G., Aryee, P.A., Abdul-Karim, A., Abdulai, I.B., Quaye, O., Awandare, G.A. and Helegbe, G.K. (2019). Prevalence of Malaria and Hepatitis B among pregnant women in Northern Ghana: Comparing RDTs with PCR. *PloS One*, 14(2), p.e0210365. <https://doi.org/10.1371/journal.pone.0210365>
- [11] Helegbe, G.K., Aryee, P.A., Mohammed, B.S., Wemakor, A., Kolbila, D., Abubakari, A.W., Askanda, S., Alhassan, R., Barnie, C., Donkoh, A.A. and Ofori, E. (2018). Seroprevalence of malaria and Hepatitis B coinfection among pregnant women in Tamale Metropolis of Ghana: a cross-sectional study. *Canadian Journal of Infectious Diseases & Medical Microbiology*. Article ID 5610981 <https://doi.org/10.1155/2018/5610981>
- [12] Ofori-Asenso, R. and Agyeman, A.A. (2016). Hepatitis B in Ghana: a systematic review & meta-analysis of prevalence studies (1995-2015). *BMC Infectious Disease*. 16(1), pp.1-15. <https://doi.org/10.1186/s12879-016-1467-5>
- [13] Kwadzokpui, P.K., Akorsu, E.E., Abaka-Yawson, A., Quarshie, S.S., Amankwah, S.A. and Tawiah, P.A. (2020). Prevalence and knowledge of Hepatitis B virus infection among pregnant women in the Ningo-Prampram District, Ghana. *International Journal of Hepatology*, 2020: 7965146. <https://doi.org/10.1155/2020/7965146>
- [14] Chan, H.L.Y., Tse, C.H., Mo, F., Koh, J., Wong, V.W.S., Wong, G.L.H., Lam Chan, S., Yeo, W., Sung, J.J.Y. and Mok, T.S.K. (2008). High viral load and Hepatitis B virus subgenotype are associated with an increased risk of hepatocellular carcinoma. *Journal of Clinical Oncology*, 26(2), pp.177-182. <https://doi.org/10.1200/jco.2007.13.2043>
- [15] Abongwa, L.E., Sunjo, N.S. and Afah, N.G. (2016). Assessment of knowledge, attitude, and practice towards Hepatitis B among two rural communities of the Anglophone regions in Cameroon. *IRA-International Journal of Applied Sciences*, 4(3), pp.490-505. <http://dx.doi.org/10.21013/jas.v4.n3.p13>
- [16] Gebrecherkos, T., Girmay, G., Lemma, M. and Negash, M. (2020). Knowledge, attitude, and practice towards Hepatitis B virus among pregnant women attending antenatal care at the University of Gondar comprehensive specialized hospital, Northwest Ethiopia. *International Journal of Hepatology*. Article ID 5617603 <https://doi.org/10.1155/2020/5617603>