**HEPATITIS B VIRUS SCREENING AND LIVER ENZYMES AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN ENUGU STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY TEACHING HOSPITAL PARKLANE.**

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**NOVEMBER, 2024**

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**BY**

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**A RESEARCH PROJECT PRESENTED TO THE DEPARTMENT OF MEDICAL LABORATORY SCIENCE, FACULTY OF ALLIED HEALTH SCIENCES ENUGU STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF MEDICAL LABORATORY SCIENCE (BMLS) IN MEDICAL LABORATORY SCIENCE.**

**NOVEMBER, 2024.**

**DECLARATION**

I, OKOH CHIDERA CYNTHIA, hereby declare that the research project titled HEPATITIS B VIRUS SCREENING AND LIVER ENZYMES OF SEROPOSITIVE HBV AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN ENUGU STATE UNIVERSITY TEACHING HOSPITAL PARKLANE, is based on the original work carried out by me under the supervision of PROFESSOR HUMPHREY NWOBODO, in partial fulfillment of the requirements for the award of Bachelor of Medical Laboratory Science degree at Enugu State University of Science and Technology.

NAME:OKOH CHIDERA CYNTHIA

DATE: NOVEMBER 2024

SIGNATURE:

**CERTIFICATION**

I hereby certify that the work recorded in this research project, emanated from the research carried out by OKOH CHIDERA CYNTHIA of the Department of Medical Laboratory Science, Enugu State University of Science and Technology, and supervised by me.

PROF. HUMPHREY NWOBODO November, 2024

(Supervisor)

Dr. MIRIAM ANIAGOLU November, 2024

(HOD)

**DEDICATION**

**I Dedicate this work to God Almighty**

**ACKNOWLEDGEMENT**

First and Foremost,I wish to thank God almighty for his immeasurable help and provisions in my life.i also wish to Acknowledge the role of my Supervisor.PROFESSOR HUMPHREY NWOBODO in guiding me throughout the preparation of this work.The leadership of the department through its head.DR.MIRIAM ANIAGOLU as well as the support of all the scientists and technicians at ENUGU STATE UNIVERSITY TEACHING HOSPITAL PARKLANE,especially the microbiology unit.i will not fail to acknowledge and thank my Sponsor and Benefactor.MRS UCHECHUKWU OKOH and all my friends and colleagues whom in one way or the other contributed to the success of this work.Thank you all.

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**LIST OF ABBREVIATIONS**

* ****HBV**** - Hepatitis B Virus
* ****HCC**** - Hepatocellular Carcinoma
* ****MTCT**** - Mother-to-Child Transmission
* ****WHO**** - World Health Organization
* ****ALT**** - Alanine Aminotransferase
* ****AST**** - Aspartate Aminotransferase
* ****ALP**** - Alkaline Phosphatase
* ****SGPT**** - Serum Glutamic Pyruvic Transaminase
* ****HBeAg**** - Hepatitis B e Antigen
* ****HBsAg**** - Hepatitis B Surface Antigen
* ****HIV**** - Human Immunodeficiency Virus
* ****NPI**** - National Program on Immunization
* ****IVD**** - In Vitro Diagnostic
* ****RDT**** - Rapid Diagnostic Test
* ****POC**** - Point-of-Care

**Abstract**

Chronic Hepatitis B Virus (HBV) infection is a significant global health issue, particularly affecting pregnant women in low- and middle-income countries. This study aims to determine the prevalence, knowledge, attitudes, practices, and risk factors associated with HBV infection among pregnant women attending antenatal clinic in Enugu State University of Technology Teaching Hospital Parklane, Nigeria. This is a cross-sectional design, involving 111 pregnant women recruited from Antenatal Clinic in Enugu State University of Science and Technology Teaching Hospital Parklane. Ethical Clearance were Obtained and Patients Consent Were Given.Data were collected through structured questionnaires assessing sociodemographic factors, knowledge, attitudes, and practices regarding HBV..This Study was between June 1st—November 21st 2024. Blood samples were screened for HBV seropositivity using rapid test kit, and liver function tests were performed on seropositive participants.The prevalence of HBV infection among the participants was found to be 2.7%. Forty three participants (38.7%)and forty four Participants(39.6)were in their second and third trimester respectively while the rest were in their first trimester.the result, the ALT, ALP, AST, direct bilirubin and total bilirubin level (77.0±10.41, 104.67±3.93, 43.17±7.80, 8.49±0.06 and 7.24±0.85 respectively) of the positive participants were higher compared to the negative control. Also, knowledge about HBV was (3.39%), while attitudes were n ( 3.06%), and practices towards prevention were(3.60%).Despite high knowledge levels, only 2.7% reported having been tested for HBV, indicating a significant gap between awareness and practice. In conclusion, this study recorded a 2.7% prevalence of HBV with majority of the pregnant women showing significant knowledge of HBV.

**CHAPTER 1**

**1.0 INTRODUCTION**

**1.1 BACKGROUND OF THE STUDY**

Chronic hepatitis B viral infection is a global public health threat that is responsible for a significant rise in death and debilitation in liver-related illnesses (Maitha, 2023). It can be contracted at birth and subsequently, through infected blood and body fluids during interpersonal contact (Seto *et al*., 2018). The hepatitis B virus is the source of hepatitis B, a liver infection. Both acute (short-lived and severe) and chronic (long-lived) infections are common. They are different clinical phases, some lasting decades, typical of the course of a chronic HBV infection. The most frequent end stage is the development of liver cirrhosis and in worst-case scenarios, liver cancer (Tu *et al.,* 2020). However, these disease outcomes are also influenced by other clinical and viral characteristics and by host immune responses to viral replication in the body (Tang et al.,2018). An elevated level of hepatitis B viral DNA in the serum is the primary risk factor and diagnostic for the progression of the disease in people with chronic infection (Seto *et al.*, 2018). When combined with other virological indicators, liver biochemistry, and abdominal ultrasonography, the disease's progression can be effectively monitored, and the prognosis and course of treatment can be determined (Seto *et al*., 2018).

Presently, 3.5% of people worldwide have a persistent hepatitis B viral infection which is a leading cause of liver cirrhosis and hepatocellular carcinoma (HCC) (Yuen, *et al*., 2018). The high mortality rate is accounted for by over 1.3 million fatalities annually (Yuen *et al*., 2018). The WHO Western Pacific Region and the WHO African Region have the greatest rates of chronic infection, with 97 million and 65 million individuals, respectively, suffering from this condition (Papastergiou *et al.,* 2015).

Hepatitis B is most frequently transmitted from mother to child at birth (perinatal transmission) or horizontally (exposure to contaminated blood and body fluids), particularly between an infected and an uninfected child within the first five years of life, in highly endemic areas. When infants acquire an infection from their mothers or before turning five years old, a chronic infection has the potential to develop. Once perinatally infected with the hepatitis B virus, as much as forty percent of men and 15% of women will die from hepatocellular carcinoma or liver cirrhosis (Trépo, Chan and Lok 2014).

 Furthermore, less than 5% of adult occurrences of hepatitis B infection result in chronic hepatitis, whereas around 95% of cases of hepatitis B infection occur during infancy and early childhood (Lavanchy and Kane, 2016). This forms the cornerstone for bolstering and prioritizing child vaccinations. Since a reliable and safe vaccine became available in 1981, the prevalence of the disease has significantly decreased, albeit at a fluctuating rate, as a result of baby vaccination campaigns and to a lesser extent, by the use of antiviral therapy to reduce the viral load of chronically infected individuals (Lampertico *et al.,* 2017). Long-term antiviral treatment can also reverse cirrhosis and reduce hepatocellular carcinoma.

Over one-third of persistent HBV infections globally are caused by mother-to-child transmission (MTCT) (Ma *et al.,* 2014; Tang *et al.*, 2018). Furthermore, 25% of people with chronic infection die from HBV-related consequences, which include cirrhosis and hepatic cancer, in an estimated 15% to 40% of cases (Tang *et al.*, 2018). Either during pregnancy and after delivery, MTCT can happen. The worldwide burden of new chronic HBV infections can be decreased by lowering MTCT transmission rates and treating mothers with antiviral drugs, as well as by screening pregnant women for HBV infection and offering infant postexposure prophylaxis (Nelson, Jamieson and Murphy, 2014).

**1.2 STATEMENT OF PROBLEM**

Hepatitis B virus (HBV) infection is a significant global public health concern, particularly in low- and middle-income countries where the burden of infectious diseases remains high (Hsu, Huang, and Nguyen, 2023). Among these vulnerable populations, pregnant women are particularly at risk, as HBV can have severe implications for both maternal and neonatal health (Wright *et al.*, 2018). In Enugu State, Nigeria, the prevalence of HBV continues to be alarmingly high, with estimates suggesting that a substantial proportion of the population is living with the virus (Freeland, 2023). This situation poses serious risks, including the potential for chronic liver disease and the transmission of the virus from mother to child during pregnancy, childbirth, or breastfeeding (Freeland, 2023). Despite the existence of effective preventive measures, such as vaccination and antiviral therapies, there remains a critical lack of comprehensive data regarding the HBV profile among pregnant women attending healthcare facilities in Enugu State (Freeland, 2023; Ademoyegun, and Aremu, 2024). The Enugu State University of Technology Teaching Hospital Parklane serves a diverse population, yet there is insufficient research focusing specifically on the prevalence and characteristics of HBV infection within this demographic (Ugwu, and Ugwu, 2024). This knowledge gap poses significant challenges for healthcare providers and policymakers who seek to implement effective interventions to reduce the incidence of HBV. Understanding the epidemiological characteristics of HBV among pregnant women is essential for several reasons. First, the transmission of HBV from mother to child can lead to chronic infections in newborns, which may result in long-term health issues, including liver cirrhosis and hepatocellular carcinoma (Wondmeneh, and Mekonnen, 2024). The World Health Organization (WHO) emphasizes the importance of screening pregnant women for HBV to identify those who are infected and to initiate appropriate management strategies (WHO, 2015). However, in many regions, including Enugu State, routine screening practices may be lacking, and awareness about the disease remains low among both healthcare providers and the general population (Aniwada, and Obionu, 2016).

Moreover, socio-economic factors play a critical role in the prevalence of HBV infection. Access to healthcare services, education about the disease, and the availability of vaccination programs can significantly influence infection rates (Nankya-Mutyoba, *et al.*, 2018). Pregnant women in Enugu State may face various barriers, including limited access to prenatal care, inadequate health education, and socio-economic challenges that prevent them from receiving timely screening and vaccination (Aniwada, and Obionu, 2016; Nankya-Mutyoba *et al*., 2018). These factors contribute to the persistence of HBV in the community and highlight the need for targeted public health interventions. Additionally, the stigma associated with HBV infection can deter individuals from seeking testing and treatment (Mokaya *et al*., 2018). Many people harbor misconceptions about the transmission and implications of HBV, leading to fear and discrimination against those who are infected (Mokaya *et al.,* 2018). This stigma can be particularly pronounced among pregnant women, who may be concerned about the impact of their infection on their pregnancy and the health of their child (Freeland *et al.,* 2021). Addressing these social determinants of health is crucial for improving HBV management and reducing transmission rates. This study aims to fill the existing knowledge gap by investigating the HBV profile among pregnant women at the Enugu State University of Technology Teaching Hospital Parklane. By assessing the prevalence of HBV, identifying risk factors, and evaluating the level of awareness and access to preventive measures, this research will provide valuable insights that can inform healthcare policies and practices (Getaz *et al*., 2018). Furthermore, the findings will contribute to the development of targeted educational programs to raise awareness about HBV among pregnant women and healthcare providers.

In conclusion, the high prevalence of HBV among pregnant women in Enugu State necessitates urgent attention. Understanding the HBV profile in this population is essential for implementing effective public health strategies aimed at reducing transmission rates and improving maternal and child health outcomes (Getaz *et al.*, 2018). This study will serve as a critical step toward addressing the challenges posed by HBV in Enugu State, ultimately contributing to the global efforts to combat this preventable yet serious infectious disease.

**1.3 JUSTIFICATION OF STUDY**

The most prevalent type of chronic hepatitis in the world is caused by HBV infection, which is also a potentially avoidable global health issue. According to the World Health Organization (WHO) estimates, about 240 million people globally have a chronic HBV infection. Most of them, especially in highly endemic locations, develop their illnesses in infancy or during the perinatal period (Bogler *et al*., 2018). Perinatal or newborn transmission may be the cause of almost one-third of chronic infections, even in low-endemic regions. Previous study data indicates that after contracting HBV, neonates have a 90 percent likelihood of becoming chronic carriers, with children under the age of three having a 50% chance, and adults having only a 5% chance of developing chronic hepatitis (Yi et al., 2016). Because of this, vertical transmission—also known as mother-to-child transmission (MTCT) during the perinatal or postpartum stages has been identified as the critical stage in the prevention of chronic HBV infections (Yi *et al.,* 2016). On the other hand, when HBV infections happen early in childhood or in individuals with compromised immune systems, such as those with Down syndrome or dialysis patients, they are more prone to progress into chronic infections (Verstegen et al., 2020). According to a review, newborns who contract HBV from their infected mothers while still in utero or during the perinatal period have the highest incidence of chronicity. Virtually all of these infants grow up to be chronic carriers (Stevens *et al.*, 2017). Also, the review showed that carrier rates drop for infections acquired later in childhood and are <5% among healthy adults.

Moreso, the highest rate of chronic carrier (>85%) and subsequently elevated incidence of chronic liver disease and hepatocellular cancer are caused by mother-to-child perinatal transmission (Ma *et al.*, 2014). Consequently, among the top ten causes of mortality in Asian and African nations with high rates of perinatal and early childhood infection are cirrhosis or HCC, of which more than half are caused by HBV infection (Stevens *et al.*, 2017).

It is important to comprehend the workings of mother-to-child perinatal transmission to stop the spread of HBV and minimize the mortality rates of chronic HBV infections.

Three potential modes of perinatal transmission are known: 1) Intrauterine, 2) Intrapartum (during birth), and 3) Postpartum (via close contact or breast milk) transmission (Shih and Liu, 2017)

Identifying HBV-positive mothers for whom intervention may lower MTCT risk allows for the stopping of mother-to-child transmission (MTCT) through universal screening of expectant women during the second trimester. The single most significant predictor of MTCT is the level of HBV DNA in HBV-positive mothers. It is important to add that HBeAg, HBe Ab, anti-HB core IgG, and HIV status are additional risk factors (Bleich and Swenson, 2014). Presently, giving HepatitisB immunoglobulin (HBIG) within 12 hours of birth and the first dose of the HBV vaccination within 24 hours of birth is advised for infants delivered to HBsAg-positive moms (Voiculescu, 2015). For the prophylaxis of MTCT, antiviral medication is advised in the third trimester of pregnancy in a subgroup of patients based on their HBeAg and HBV DNA status; however, stopping antivirals after delivery is linked to a markedly elevated risk of recurrence (Lee, Bang and Lee, 2021). In high-risk neonates, the HBV immunization by itself was found to be somewhat protective. However in a Taiwanese trial, just 23 percent of newborns who received the vaccine one week after birth went on to become chronic carriers (Hu et al., 2018). Though there was evidence of success even when treatment started one month after birth, at a lesser rate: 40% of newborns developed into carriers (Lin and Kao, 2015)This showed that administration of vaccines alone were insufficient for the control of transmission hence the approach to combine the use of HBIG and vaccines was visited and marked improvements have been noted (Yi *et al.,* 2016).

Therefore, the combined administration of HBIG with the Hepatitis B vaccine is more effective in reducing the prevalence of MTCT than either the vaccine or HBIG alone. Numerous studies, including Cochrane systematic reviews, suggest that immunization alone is not adequate to prevent MTCT of HBV in these HBsAg-positive mothers (Stevens et al., 2017). According to WHO (2022) standards, newborns whose mothers are HBsAg-positive may benefit further from HBIG in addition to vaccination, especially if they are also HBeAg-positive. Because neonates are universally receiving passive and active immunoprophylaxis, the rate of HBV transmission has dropped by 85–95%. Therefore, the WHO and the majority of guidelines recommended that infants delivered to women who tested positive for HBsAg receive the HBIG and Hepatitis B vaccines within 12 hours of delivery (WHO, 2022). As part of the full immunoprophylaxis procedure, the infants also need to receive at least two further doses of the HBV vaccine at one month and six months after birth (Yi *et al.,* 2016). By 2030, the World Health Organization wants to completely eradicate HBV. To achieve this , efforts have to be made in endemic regions such as Sub- Saharan Africa to screen pregnant women for HBV infection, treat mothers with antiviral medication and offer infant post-exposure prophylaxis within 24 hours of birth. This could also be aided by creating awareness and educational campaigns in prenatal care for pregnant women in every healthcare setting.

**1.3 AIM**

This study aims to Determine the Prevalence of Hepatitis B virus(HBV)infection evaluate the knowledge attitudes, practices, risk factors of the virus (HBV) among pregnant women visiting prenatal clinics at Enugu State University of Technology (ESUT), Enugu.

**1.4 SPECIFIC OBJECTIVES**

1. Determine the frequency of HBV infection among expectant mothers at ESUT prenatal clinics and management of seropositive cases.
2. Determine the liver function of seropositive women through the analysis of biochemical parameters vis-a-vis ALT, AST, ALP and Bilirubin.
3. Determine the risk factors for HBV infection among ESUT pregnant women, such as shared personal hygiene products, unprotected sexual contact, history of blood transfusions or injections, and perinatal transmission.
4. Evaluate the knowledge, attitudes, and practices of pregnant women on testing, vaccination, prevention, and current HBV preventive measures.

**CHAPTER 2**

**2.0 LITERATURE REVIEW**

**2.1 HEPATITIS VIRUS**

Hepatitis B virus (HBV) belongs to the family Hepadnaviridae. It is an encapsulated DNA virus. The antigen for HBV, which is now known as surface antigen but was once named as "Australia antigen" according to research published in 1965 by Blumberg and colleagues, was initially found in an Australian aborigine (Tsukuda and Watashi, 2020).

Members of this virus family mostly infect hepatocytes in their respective hosts and have a limited host range. After infection, the nucleus changes the circular, partially double-stranded virion DNA into a covalently closed circular DNA (cccDNA). Because of the extremely stable properties of cccDNA, there is a low likelihood of recovery and persistent infection (Lamontagne Bagga, and Bouchard, 2016). Seven proteins are encoded by the HBV genome: precore/HBeAg, HBx, core, polymerase, L-, M-, and S-HBsAg. These viral proteins, when combined with host-derived substances, enable HBV to multiply in host cells.

Depending on the host immune response's capacity to eradicate the infection, a liver infection may be either transitory (less than six months) or chronic (lifelong). Hepatocellular carcinoma (HCC) and cirrhosis can develop from immune-mediated liver damage brought on by recurrent infections (Seeger and Mason, 2015).

**2.2 EPIDEMIOLOGY**

Classified as one of the most common diseases in the world, hepatitis B has been estimated to be responsible for 800,000 annual fatalities, primarily from cirrhosis and liver cancer. The World Health Assembly recognized viral hepatitis as a global public health issue in its 2010 and 2014 resolutions, which ranked HBV as the 15th cause of death worldwide among all causes of mortality(Lavanchy and Kante, 2016) The incidence of chronic carriage varies from 0.1% to over 20% worldwide. Of patients with chronic infection, 15–40% will get liver cirrhosis, liver failure, or hepatocellular cancer; the remaining 15–25% will eventually pass away (Lavanchy and Kane, 2016).

Globally, there were over 2 billion cases of HBV infection as of 2014, of which 240 million were chronic carriers. The prevalence varies from less than 0.5% in regions with low endemicity to more than 8% in nations with high endemicity (Papastergiou et al., 2015). In places with low endemicity, the infection is primarily acquired during adolescence and early adulthood through high-risk behaviors, whereas in high-endemic settings, the most prevalent route of transmission is perinatally, that is from infected mothers to newborns.

In sub-Saharan Africa, HBV infection is common, with a frequency of more than 8% in regions like West Africa - Burkina Faso, Ivory Coast, Gambia, Ghana, Guinea, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo), Southern Sudan, Angola, Uganda, and Somalia (Stasi, Silvestri, and Voller, 2017).

Africa has a 7–26% prevalence rate of HBsAg, making it a highly endemic region. Nigeria is one of the nations where HBV infection is endemic, with around 18 million people living with the virus (Umego et al., 2018). The first national survey as reported by (Olayinka et al., 2016) on seroprevalence of hepatitis B showed a frequency of 12.2% confirming Nigeria as a high endemic region. Another study in 2017 showed a marked seroprevalence increase (Ott et al., 2017). A recent meta- analysis of quantitative data by Ajuwon et al., (2021) showed a pooled prevalence of 9.5% in their final studies, with rural areas having the greatest HBV prevalence (10.7%). Among the six geopolitical zones or regions in Nigeria, the North West area has the greatest frequency (12.1%). Generally, the decrease in the prevalence of HBV can be attributed to the expansion of national immunization programs with over 80% coverage worldwide (is this a global decrease or specific to Nigeria?).

One of the main reservoirs for the hepatitis B virus's persistence and continuous transmission is pregnant women. A study by Atilola et al., (2018) on the epidemiology of HBV infection among pregnant women in South-West Nigeria showed a prevalence estimate of 10.5% and a positive association with blood transfusion before three months. A data meta-analysis showed a pooled prevalence of HBV infection among pregnant women in Nigeria to be 6.49% with no confirmed association with any risk factors except a notable decrease in prevalence among women with higher education levels (Olakunde et al., 2021). With the above studies, there exists a gap where a better understanding of the epidemiology of HBV infection among pregnant women in Nigeria along with their knowledge, attitude and practices of screening and management of HBV infection in pregnancy will aid in the eradication of this disease and its impact on society to negligible levels.

**2.3.RISK FACTORS AND ASSOCIATIONS**

The hepatitis B virus (HBV) affects around 2 billion individuals globally. 240 million of them are long-term HBV carriers who stand a high risk of mortality from cirrhosis of the liver, acute fulminant liver disease, or hepatocellular carcinoma (HCC), (Mueller et al., 2015). A Turkish study found that the following factors were significant predictors of HBsAg positivity: living in the Southeast, being married, having a male gender, having close contact with a hepatitis patient, having less education than a high school diploma, having orodental interventions, and having previously used non-disposable needles (Tozun et al., 2015).

Adults contract HBV through coming into touch with infected blood or bodily fluids such saliva, vaginal secretions, and semen. As a result, common methods of transmission include sexual activity, sharing of sharp items during some traditional or cultural rites, such as local circumcision, using infected or improperly sanitized devices, and transfusion of unscreened blood and its products. In areas with a high endemicity, it may also spread through alternative accidental or horizontal transmission channels, such as prolonged household contacts without sexual activity (Olayinka et al., 2016). A study in Northern Tanzania established that health care workers are at an increased occupational risk of contracting hepatitis B and direct contact with infectious materials was the primary risk factor majorly due to needle stick injuries and scenarios requiring extensive medical treatments, such as surgery (Mueller et al., 2015).

Smoking significantly affects the link between a high burden of metabolic risk variables and an elevated risk of HCC in a study of males with chronic HBV infection in Taiwan, ages 40–65 (Yu et al., 2017). In addition to having the ability to develop into hepatocellular carcinoma and cirrhosis, a Chinese cohort study observed that individuals with HBsAg seropositive status had a chance of developing several non-liver malignancies, such as lymphoma, stomach, mouth, and colorectal cancers (Song et al., 2019). Research indicates that in nations where HBV infection is either endemic or intermediate to high, the prevalence of HIV-HBV co-infection can reach 10–20%. Additionally, the prevalence may reach 20–25% in nations where the viruses are extremely endemic. Mothers can pass both HIV and HBV to their children through sexual relations. Because expectant women serve as a link between their sexual partners and their unborn children, the prevalence of HIV and HBV infection in these women can therefore be interpreted as a reflection of the majority of the community's population (Song et al., 2019. The presence of maternal HBV in the mother may be a separate risk factor for miscarriage (Cui et al., 2016). A review of the harm that hepatitis B infection can cause in mothers and newborns found that maternal HBV infection raised the risk of miscarriage, preterm delivery, pregnancy-induced hypertension, fetal distress, and macrosomia (Oliveira et al., 2020). Additionally, it was discovered to raise the likelihood of intrahepatic cholestasis during pregnancy (ICP) (Xiong et al., 2021). This suggests that it is necessary to monitor pregnant women carefully for persistent HBV infection.

**2.4 SCREENING AND DIAGNOSIS**

Protease-borne HBV is a partially double-stranded DNA virus that is circular in shape and has multiple serological markers, including anti-HBs, anti-HBc IgM and IgG, and anti-HBeAg (Song, 2016). The first stage in diagnosing HBV is to use serological markers to find antigens and antibodies. Viral load quantification and genotype identification, including quantitative or qualitative molecular testing, are performed to confirm the results of this first diagnosis.

An update on diagnosis of viral hepatitis stated the following: A chronic infection is defined as having HBsAg for more than six months. Anti-HBs is a neutralizing antibody that indicates immunity to HBV infection. HBeAg is a marker of viral replication and risk of infection transmission. Seroconversion of HBeAg to anti-HBe is linked to liver disease remission. Anti-HBc IgG is detectable in patients who have been cured of hepatitis B and among chronic cases of HBV infection (Villar et al., 2015). The American Association for the Study of Liver Diseases (AASLD) currently recommends that all individuals born in countries where the seroprevalence of HBsAg is less than 2%, as well as those born in the United States but not vaccinated as infants whose parents were born in areas with high rates of HBV endemicity (8%), pregnant women, those requiring immunosuppressive therapy, and those at high risk of exposure to HBV (such as blood donors, recipients of blood transfusions, prisoners, and those with a history of liver disease; see the guidelines for a comprehensive list), should be tested for HBV using both HBsAg and anti-HBs test. Those who have undergone screening and test negative for HBs should receive a vaccination (Nguyen et al., 2020). It was also decided that in low-resource areas, a quick point-of-care (POC) assay for HBsAg offers an affordable diagnostic approach

The same categories of individuals that AASLD has identified as needing an HBV screening are also recognized by the World Health Organization (WHO). WHO, however, advises against testing for HBsAg and instead suggests utilizing a single quality-assured serological in vitro diagnostic test (IVD; that is, either a rapid diagnostic test [RDT] or a laboratory-based immunoassay [an enzyme immunoassay or a chemiluminescence immunoassay] (WHO., 2015). This is what is most obtainable in low resource countries. In neonates of HBeAg-positive mothers, the risk of chronic HBV infection following acute exposure ranges from 90% to 25%–30% in infants and children under the age of five, and less than 5% in adults, therefore, it is advised that their newborn receive the HBV vaccine and hepatitis B immune globulin (HBIG) within 12 hours of delivery, and that pregnant women with serum HBV DNA levels greater than 200,000 IU/mL consider antiviral therapy in the third trimester (Terrault et al., 2018).

**2.5. MOTHER-TO-CHILD TRANSMISSION (MTCT)**:

When mothers who have both HBsAg and HBeAg seromarkers are both positive, 70–90% of the mothers' newborns are at risk of contracting HBV. On the other hand, moms who test positive for just HBsAg have a 10–40% increased chance of transmitting HBV (Desalegn et al., 2016). The highest percentage of chronic carrier (>85%) and subsequent high risk of chronic liver disease and hepatocellular cancer is caused by mother-to-child perinatal transmission (Stevens et al., 2017). Despite the universal immunoprophylaxis effort, maternal hepatitis B e antigen (HBeAg) positivity and high HBV-DNA levels are linked to increased transmission of the viral infection to neonates (Chen et al., 2017). There was some controversy on the route and time of infection to neonates as most tested HbsAg negative at birth but positive after 1-3 months post birth. This corresponds with the incubation period for HBV so it has been hypothesized that infants get infected through leakage of fluids between mother and child during delivery rather than during the breast feeding period. Infact, according to guidelines published by the American Association for the Study of Liver Diseases (AASLD), nursing women infected with HBV who are undergoing antiviral medication is not prohibited (Chen et al., 2017). Most notably, Western African nations have been found to have the greatest global burden of co-infection between HBV and HIV (Kafeero et al., 2020). It was also found that the co-infection of HBV and HIV accelerates the replication of HBV and the seropositivity of HBV pre-core antigen (HBeAg) elevating the risk of mother-to-child HBV transmission by increasing the viral load. This study noted that compared to infants of mothers with HBV mono-infection, HBV-infected children born to HBV–HIV co-infected moms are more likely to experience liver problems and mortality from liver conditions. It is therefore a need that control strategies be focused on managing co-infected pregnant mothers of HBV and HIV as a better means of preventing perinatal transmission of HBV and its fatal consequences.

**2.6 PREVENTION AND MANAGEMENT:**

The World Health Organization (WHO) declared in 2016 that viral hepatitis should be eradicated worldwide by 2030 (Tu et al. 2020). HBV can be prevented by vaccination, and vaccination confers over 95% protection against the onset of a chronic infection (Desalegn et al. 2016). HBV vaccinations have shown to be immunogenic (producing solely anti-HBs), safe and effective in high-risk people, and successful in halting the virus's transfer from mother to child during pregnancy, paving the way for eventual control and elimination (Stevens et al., 2017). The World Health Organization (WHO) released management guidelines for chronic hepatitis B infections in low- and middle-income countries in 2015. The guidelines included treatment criteria that were adapted to the resource-constrained settings, as the organization recognized the need to improve the outlook from these diseases (Dusheiko and Lemoine, 2019). The implementation of these guidelines in Sub Saharan African countries is yet to be established and a need for improvement or not is consequently, yet to be addressed. This evident by the WHO atlas statistics of 2022 stating that there are currently 28 national hepatitis programs in Africa, but only 17 of those countries have WHO-recommended testing and treatment protocols (WHO, 2022). In Nigeria, the National Program on Immunization (NPI) included the monovalent HBV vaccine in 2004. The vaccination was administered at 6, 10, and 14 weeks of age. On the other hand, a pentavalent vaccine that included HBV, tetanus, pertussis, diphtheria, and Haemophilus influenza type B was released in 2012 (Olayinka et al., 2016).

According to recent statistics, neonates receiving immunoprophylaxis with hepatitis B immunoglobulin plus the hepatitis B vaccine can lower the rate of mother-to-child transmission (MTCT) from 90% to 10%. Still, immunoprophylaxis has a failure risk ranging from 10 to 30% in children born to mothers with an HBV DNA level higher than 200,000 IU/ml. Antiviral medication administered to the mother in the third trimester can effectively eliminate transmission (Nguyen et al., 2020). The most recommended antiviral therapy in most cases is the long-term administration of a strong nucleoside analogue with a high barrier to resistance, such as entecavir, tenofovir disoproxil, or tenofovir alafenamide (Lampertico et al., 2017). The administration of the HBV vaccination should begin at birth in low-income areas with high HIV prevalence so as to fully benefit from it, it is also cost-effective to add a birth dosage to the present three-dose schedule. For therapy, given that tenofovir has a strong barrier to resistance and has been used extensively in HIV-infected pregnant women, even though medications like telbivudine and lamivudine have been demonstrated to prevent MTCT. Though, constant monitoring is required, it has a good safety profile throughout pregnancy (Andersson et al., 2015). Hepatitis B virus (HBV) infection has no known virological cure, although it is possible to eradicate HBV thanks to current treatments that limit viral replication and prevent mother-to-child transmission. Following set guidelines can help in controlling the fatal consquences of this infection in our region and consequently, the total eradication of the virus.

**2.7 PSYCHO-SOCIAL AND SOCIO-ECONOMIC IMPACT OF HBV INFECTION DURING PREGNANCY**

When HBV is diagnosed, a patient's quality of life is negatively impacted, particularly in the first three months following diagnosis, and they may experience dread, anxiety, despair, and concerns about stigma. Among the most significant negative effects of having the Hepatitis B virus are worry of spreading the illness to friends, family, and coworkers, as well as dread of social rejection (Valizadeh et al., 2016). Healthcare personnel may also be affected by inaccurate and outdated information, which may have an effect on patient outcomes (Tu et al., 2020). They also observed that people's access to testing and treatment is severely hampered by some misunderstandings about HBV infection, which are biased toward actions that are not widely accepted in the community. Furthermore, because of the prejudice that goes along with them, these may be damaging in and of themselves. According to numerous studies, individuals with chronic hepatitis B infection experience social exclusion from their communities, which has a substantial cumulative impact. According to (Abdi et al., 2015), three fundamental tactics are involved in a therapeutic strategy to treating hepatitis B during pregnancy: (1) treating HBV infection in pregnant women; (2) screening pregnant women and doing a standard HBsAg test at the first prenatal visit; and (3) preventing mother-infant transmission. Now these can be hampered if the patient is unaware or averse to complying with these strategies. Studies have shown that patients with hepatitis B infection experience very varied psychological responses, which influence how they choose to treat and monitor their illness. Hence it seems vital to develop health interventions that prioritize psychological care in order to prevent problems, as well as to carry out educational and consultation programs regarding hepatitis, particularly by medical centers and the media.

A study in China showed that anxiety and stress levels were higher in pregnant women with chronic HBV infection than in pregnant women in good health. Their main source of stress was worrying for the mother's and the child's safety and health (Zhou et al., 2015). Pregnant women in Uganda were the subject of a study that found misconceptions about vaccinations and gaps in their knowledge of basic infection characteristics, such as risk factors and transmission of HBV infection. These misconceptions were likely to affect the mothers' preventive behaviors and increase their risk of contracting the infection if no action was taken. Thus, to promote improved preventive measures among this susceptible population group, tailored health education is required during prenatal visits and ensuing health campaigns (Afolabi et al., 2022).

**2.8 KNOWLEDGE, ATTITUDE AND PRACTICES**

Concerning studies conducted to assess the knowledge, attitude and practices towards HBV among pregnant women, there exists a paucity of current data and on its effects on our chosen population group.

According to 72.9% of participants in a 2015 study done in Nigeria, pregnant women showed a high level of awareness of the transfer of HBV from mother to child (Gboeze et al., 2015). This could be attributed to regular antenatal lessons.

However, to further eliminate hepatitis infection and improve immunization techniques against HBV infection, pregnant mothers must comprehend the protective and risk variables associated with perinatal transmission and more importantly, their practice and sustenance. Therefore this study also aims to determine this variable among pregnant women attending the antenatal clinic at Parklane hospital, Enugu, Nigeria.

**CHAPTER 3**

**3.0 MATERIAL AND METHOD**

**3.1 RESEARCH DESIGN:** The chosen research design is a mixed cross-sectional design.

This is recommended as we will be combining both quantitative and qualitative methods to gather data at a single point in time.

**3.2 STUDY POPULATION:** All expectant mothers who attended the ESUT Parklane Hospital's antenatal care (ANC) clinic in Enugu, Nigeria, throughout the study period.

•Inclusion criteria: Pregnant women who are willing to engage and give informed consent.

•Exclusion criteria: Refusal to participate or insufficient data.

**3.3 STUDY AREA:** The study area is Enugu State University Teaching Hospital Parklane Enugu, Nigeria. Which is situated near Shoprite (Shopping Plaza) in the center of Enugu (Coal City) GRA. The hospital is run by the Enugu state government and has several accolades from various health agencies.

**3.4 SAMPLE SIZE**: Using an appropriate sample size calculator from calaculator.net and considering prevalence estimates from previous studies on HBV infection among pregnant women in Nigeria (around 14.1%) and a desired margin of error of not less than 5%, a sample size of 110 was determined and shall be recruited for this study.

Using the Cochrane Sample Size formular

**n=√(N×Z² ×p×q) ÷ (E² × (N-1)+ Z²×p×q)**

where N= estimated population size of ESUT =2000

Z= Confidence Interval= 1.96 or 95%

p = estimated proportion of the population (maternity ward)= 10% or 0.1

q = estimated proportion of population not being studied= 90% or 0.9

E= margin of error = 0.056

**SS = 110 participants**

**3.5 DATA COLLECTION:**

**Duration:** Data was collected for over a period of (3)months that is, September - NOVEMBER 2024.

**Data collection tools:**

A standard questionnaire designed to gather data on sociodemographic factors such as age, marital status, and education levels along with an assessment of their knowledge, attitudes and practices regarding hepatitis B infection shall be drafted and distributed amongst the recruited participants.

To determine the serological status, participants will be screened for HbsAg seropositivity and if reactive, a liver function tests shall be conducted for them to evaluate disease progression indicated by increased serum glutamic pyruvic transaminase (SGPT) levels.

**Data collectors:** Trained research assistants familiar with informed consent procedures and data collection techniques shall be recruited for sample collevtion and questionnaire distribution.

**3.6 SAMPLE COLLECTION**: About 4mls of venous blood was collected with precision and care into plain sample containers. After about 10mins at room temperature, the samples are spun and serum obtained are separated into new sets of plain tubes for analysis.

**3.7 SAMPLE ANALYSIS:** HbsAg test strips with manufacturer name: Palmatec, was used to run tests alongside positive and negative controls, following standard operating procedures for POCT testing according to ISO:15189; 2022.

Sero positive samples were analyzed for liver function analytes with an automated chemistry analyzer- Selectra with special emphasis on ALT and AST levels.

**3.8 DATA ANALYSIS:**

 Before analysis, the gathered data was prepared by cross checking for missing information. Data collected was also anonymized to protect the confidentiality of participants. The data was then analyzed using the statistical package for social sciences SPSS. Descriptive statistics was used to summarize sociodemographic characteristics and HBV prevalence. Chi-square tests to assess associations between sociodemographic factors and HBV infection status was also done.

**3.9 ETHICAL CONSIDERATION:**

The Health Research Ethics Committee at Enugu State University Teaching Hospital granted an ethical clearance certificate, reference number:

 Participants in the research gave their consent after being duly informed. The anonymous recording and coding of blood samples and results guaranteed the confidentiality of the participants.

**CHAPTER 4**

**4.0 RESULTS**

**4.1 HEPATITIS B VIRUS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN ESUT TEACHING HOSPITAL PARKLANE.**

One hundred and eleven (111) pregnant women were recruited for this study. 55% of the study population were between 26-35 years old while only 13.5% were between 36-45 years of age. The rest were between 15-25 years. 42.4% of the pregnant women had a tertiary degree, while 41.4% had secondary school certificate. Only 16.2% acquired primary school leaving certificate. 29.7%, 24.3% and 30.6% of the pregnant women were civil servants, artisans and traders respectively while only14.5% and 0.9% were students and unemployed respectively. Majority of the women were married (96.4%)

As only 0.9% were divorced and 2.7% was widowed. 38.7% and 39.6% were in their second and third trimester of pregnancy respectively while the rest were in their first trimester. Majority (68.5%) of the pregnant women had 2-3 children already.

**Table 1**. **Sociodemographic data**

|  |  |
| --- | --- |
| **Demographic data** | N (%) |
| **Age** 15-2526-3536-45**Educational level** PrimarySecondaryTertiary**Occupation** Civil servantArtisanTradersStudents Unemployed **Marital status** Married Divorced Widowed **Trimester of pregnancy**First trimesterSecond trimester Third trimester**Number of previous pregnancies**0-12-34-5>6 | 35(31.5)61(55)15(13.5)18(16.2)46(41.4)47(42.4)33(29.7)27(24.3)34(30.6)16(14.5)1(0.9)107(96.4)1(0.9)3(2.7)24(21.6)43(38.7)44(39.6)23(20.7)76(68.5)11(9.9)1(0.9) |

**Table 2. Knowledge and Attitude**

|  |  |
| --- | --- |
| **Knowledge about hepatitis** | N (%) |
| **What is Hepatitis B?**A liver infection caused by a virusA common coldI don’t know **How can Hepatitis B be transmitted?**From mother to baby during pregnancy or childbirthUnprotected sexual contactSharing personal items like toothbrush, razor, syringe etc**What are some symptoms of Hepatitis B?**No symptoms in all casesFatigue, nausea and vomitingAll of the aboveDark urine and yellowing of the skin (jaundice)**Is there a vaccine available to treat Hepatitis B?**Yes No I don’t know**How can a woman protect her baby from Hepatitis B?**Getting vaccinated during pregnancyThere is no way to prevent transmissionGiving birth through cesarean section | 54(48.6)15(13.5)42(37.8)18(16.2)43(38.7)50(45.0)35(31.5)16(14.4)15(13.5)45(40.5)79(71.2)032(28.2)67(60.4)20(18.0)24(21.6) |

**Table 3.** **Practices towards hepatitis prevention and management**

|  |  |
| --- | --- |
|  | N(%) |
| **Have you ever been tested of Hepatitis B?**Yes No **Do you plan to get vaccinated against Hepatitis B during pregnancy?**Yes No **Do you share needles or syringe with anyone?**Yes No **Do you have multiple sex partners?**Yes No | 3(2.7)108(97.3)94(84.7)17(15.3)5(4.5)106(95.5)0(0.0)111(100) |

**Table 4**

**Mean Score and Standard Deviation ATTITUDE - Likert scale**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S/N | Items  | N |  | SD | Decision  |
| 1 | if I am diagnosed with Hepatitis B, I will be too embarrassed to seek treatment | 111 | 3.29 | 1.16 | Disagree  |
| 2 | A pregnant woman with Hepatitis B cannot have a healthy baby | 111 | 3.65 | .85 | Disagree  |
| 3 | Vaccination is an effective way to prevent Hepatitis B infection | 111 | 3.82 | .48 |  Agree  |
| 4 | It is important for all pregnant women to be tested for Hepatitis B | 111 | 3.62 | .86 |  Agree  |
|  | **Overall mean**  |  | **3.60** | **0.84** | **Neutral**  |

**Table 5. Mean and Standard Deviation of Knowledge, Attitude and Practice**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variables  | N |  | SD | Decision  |
| Knowledge  | 111 | 3.39 | 0.94 | Very good |
| Attitude  | 111 | 3.06 | 1.04 | Neutral  |
| Practice  | 111 | 3.60 | 0.84 | Excellent  |

The result in Table 5 revealed that weighted overall mean scores and standard deviations of level of knowledge, attitude towards, and level of practice of Hepatitis B virus profile among pregnant women in ESUT teaching hospital Parklane were as follows ( = 3.39, SD = 0.94; = 3.06, SD = 1.04; and = 3.60, SD = 0.84 respectively). The result confirmed that whereas the participants had very good knowledge of hepatitis B, their practices towards its prevention were excellent, while their attitude towards its management was slightly positive (neutral).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ALT | ALP | AST | Direct Bilirubin | Total Bilirubin |
| **Test IU/L****Negative ControlIU/L****p-value**  | 77.0±10.4167.34±7.690.423 | 104.67±3.9390.0±1.920.321 | 43.17±7.8037.20±4.230.221 | 8.49±0.067.01±0.010.103 | 7.24±0.855.20±0.410.093 |

Only 2.7% of the pregnant women tested positive for hepatitis B virus. The remaining were negative. From the result, the ALT, ALP, AST, direct bilirubin and total bilirubin level (77.0±10.41, 104.67±3.93, 43.17±7.80, 8.49±0.06 and 7.24±0.85 respectively) of the positive participants were higher compared to the negative control (67.34±7.69, 90.0±1.92, 37.20±4.23, 7.01±0.01 and 5.20±0.41 respectively. They were statistically not significant. The result was presented as Mean±std error of mean (SEM).

## CHAPTER 5

## **5.0 DISCUSSION AND CONCLUSION**

**5.1 Prevalence**

The findings of this study provide valuable insights into the hepatitis B virus (HBV) profile among pregnant women attending the Enugu State University of Technology Teaching Hospital Parklane. The low prevalence of HBV infection, with only 2.7% of participants testing positive, is noteworthy given the high rates reported in other studies across Nigeria and sub-Saharan Africa. For instance, a meta-analysis indicated a pooled prevalence of HBV infection among pregnant women in Nigeria to be around 6.49% (Olakunde et al., 2021), suggesting that the population in this study may benefit from effective screening and vaccination programs.

The global burden of HBV is substantial, with approximately 240 million individuals living with chronic infection (WHO, 2022). In regions like sub-Saharan Africa, including Nigeria, the prevalence can reach as high as 12.2% (Olayinka et al., 2016), underscoring the importance of targeted public health interventions. The lower prevalence observed in this study could be attributed to several factors, including increased awareness and access to vaccination, which has been shown to significantly reduce the incidence of HBV (Stevens et al., 2017). The introduction of the hepatitis B vaccine into Nigeria's National Program on Immunization in 2004 may have contributed to this decline in prevalence among pregnant women.

The study revealed that the participants had very good knowledge of hepatitis B, as indicated by a mean knowledge score of 3.39. This finding aligns with previous studies that reported high levels of awareness among pregnant women regarding HBV transmission and prevention methods (Gboeze et al., 2015). However, despite this knowledge, there remains a gap in practices related to testing and vaccination. Only 2.7% of women reported having been tested for HBV, which highlights a critical area for improvement.

This discrepancy between knowledge and practice is not uncommon in public health. Research has shown that while individuals may understand the risks associated with HBV, barriers such as stigma, fear of discrimination, and lack of access to healthcare can hinder their willingness to seek testing and vaccination (Mokaya et al., 2018). The stigma associated with HBV infection, particularly among pregnant women, can lead to anxiety and reluctance to disclose their status, ultimately impacting their health outcomes (Valizadeh et al., 2016).

The study also aimed to identify risk factors associated with HBV infection among pregnant women. While the overall prevalence was low, understanding the socio-economic determinants that contribute to HBV transmission is essential. Factors such as limited access to healthcare services, inadequate health education, and socio-economic challenges were highlighted as barriers to effective screening and vaccination (Nankya-Mutyoba et al., 2018). Pregnant women in Enugu State may face various obstacles, including financial constraints and cultural beliefs that discourage seeking medical care.

Additionally, the study found that most participants were married and had a relatively high level of education, with 42.4% holding a university degree. This demographic profile suggests that educational interventions may be effective in promoting awareness and encouraging preventive behaviors. However, it is crucial to address the knowledge gaps that still exist, particularly regarding the importance of testing and vaccination during pregnancy, with 28.2% having no knowledge of the availability of vaccination and 18% believing that there is no way of preventing MTCT of hepatitis B virus..

Furthermore, the findings of this study underscore the need for enhanced public health initiatives aimed at increasing the screening rates for HBV among pregnant women in Enugu State. The World Health Organization recommends universal screening for HBV during pregnancy to identify infected women and implement appropriate management strategies (WHO, 2015). Given the low testing rates or health seeking behaviour observed in this study, there is an urgent need for healthcare providers to prioritize HBV screening in antenatal care settings.

Moreover, educational campaigns should focus on dispelling myths and reducing stigma associated with HBV. Tailored health education programs that address the specific concerns of pregnant women can improve knowledge and encourage proactive health-seeking behaviors (Afolabi et al., 2022). Such initiatives should also involve community engagement to foster a supportive environment for women to seek testing and treatment without fear of discrimination.

### 5.6 Conclusion

In conclusion, this study provides critical insights into the HBV profile among pregnant women in Enugu State University of Technology Teaching Hospital Parklane. The low prevalence of HBV infection is encouraging but highlights the need for continued vigilance in screening and vaccination efforts. Despite good knowledge levels, the low rates of testing and vaccination practices indicate significant gaps that must be addressed through targeted public health interventions.

To combat the ongoing challenge of HBV, it is essential to implement comprehensive strategies that include routine screening, education, and stigma reduction. By improving access to healthcare services and enhancing awareness about HBV, we can significantly reduce the incidence of mother-to-child transmission and improve maternal and child health outcomes in Enugu State and beyond.

### 5.7 Recommendations

Implement routine HBV screening in all antenatal care clinics to ensure early identification and management of infected women.Develop targeted educational programs to raise awareness about HBV transmission, prevention, and the importance of vaccination among pregnant women and healthcare providers,Also Involve community leaders and organizations in promoting understanding and reducing stigma associated with HBV infection.Ensure that all pregnant women have access to the hepatitis B vaccine and post-exposure prophylaxis for their infants and Establish a monitoring system to evaluate the effectiveness of public health interventions aimed at reducing HBV transmission rates among pregnant women.

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