

PREVALENCE OF HEPATITIS B AND C VIRAL INFECTIONS IN PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN NNEWI, NIGERIA

Oluboyo, B.O

Department of Human Virology, Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Nigeria

Ugochukwu, V.I

Oluboyo, A.O

Ihim, A.C

Chukwuma, G.O

Ogenyi S.I

Onyemelukwe, A

Department of Medical Laboratory Science,
Faculty of Health Sciences and Technology, College of Health Sciences,
Nnamdi Azikiwe University, Nnewi Campus, Nigeria

Abstract

Infections due to Hepatitis B and C viruses are significant health problems around the globe, Nigeria inclusive. This study was conducted among 100 pregnant women attending ante natal clinic at NnamdiAzikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria to determine the seroprevalence of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) and to determine whether liver amino transferases can be affected. The blood samples were tested for hepatitis B surface antigen (HBsAg) and Anti-HCV using HBsAg and Anti-HCV one step rapid test strip and furthermore using ELISA technique. Serum alanine aminotransferase (ALT) and serum aspartate aminotransferase (AST) activities were also estimated in all the subjects using Reitman - Frankel method. The results showed that six percent(6%) and one percent (1%) of the 100 blood samples tested positive for HBV and HCV respectively. The mean AST levels for HBsAg negative and positive subjects were 10.55 ± 2.36 and 12.17 ± 2.23 respectively while the mean ALT levels were 5.54 ± 1.94 and 8.00 ± 3.10 respectively. The mean AST for anti-HCV negative and positive subjects were 10.67 ± 2.38 and 9.00 ± 0.00 respectively while the ALT were 5.71 ± 2.09 and 4.00 ± 0.00 respectively.

There was significant increase in the levels of ALT between the HBsAg positive and negative pregnant subjects ($P < 0.05$). HBV and HCV infection can be present in pregnant women and can alter liver amino transferases. Therefore testing for HBsAg and Anti-HCV is recommended for all pregnant women at first prenatal and postnatal visit so that HBsAg and HCV positive mothers will receive prompt intervention.

Keywords: HBV, HCV, Pregnancy, serum amino transeferases

Introduction

Hepatitis B virus (HBV) is a DNA virus of the family *hepadnaviridae* and the causative agent of hepatitis B infection (Pungpaponget *et al*, 2007). It is 50 - 100 times more infectious than HIV and 10 times more infectious than hepatitis C virus (HCV). Many carriers do not realize they are infected with the virus, thus it is referred to as a “silent killer” (Samuel *et al*, 2004). The minimum infectious dose is so low that such practices like sharing a tooth brush or a razor blade can transmit infection (Chang, 2008). HBV also shares similar routes of transmission with HIV (Willey *et al*, 2008). Approximately 350 million people are infected with HBV worldwide (Liu and Hou, 2006; Eke *et al*, 2011) with Nigeria classified among the group of countries endemic for HBV infection. Hepatitis C virus is an RNA virus of the *flaviviridaefamily* and appears to have humans and chimpanzees as the only species susceptible to its infection (Polyak, 2006). About 170 million people are infected with HCV worldwide (Liu and Hou, 2006). Apart from being detected in blood, it has also been detected in semen (Cavallero *et al*, 2008) and saliva (Chen *et al*, 2009).

HBV and HCV account for a substantial portion of liver diseases worldwide and infected individuals can remain asymptomatic for decades. However, more than 80% of them become chronic carriers which result in an increased risk of liver cirrhosis, liver cancer and liver failure 20 - 30 years later (Volfet *et al*, 2008). They share similar modes of transmission; co-infection is not uncommon especially in areas of high prevalence and among people at high risk for parenteral infection (Liu and Hou, 2006). In Nigeria, the prevalence rates of HBV and HCV in pregnant women differ from one locality to another. Yakasai *et al* (2012) reported a prevalence of 7.9 and 7.6% among HBsAg among pregnant women and nonpregnant women respectively in Kano, Nigeria while Oladeinde *et al* (2013) reported a prevalent rate of 8 (2.2%) and 3 (0.8%) of HBV and HCV infections among pregnant women in Benin City, Nigeria. Co-infection of HBV and HCV seems to result in more severe disease than either infection alone. Others may have overt symptomatic liver disease with anorexia, nausea, right upper quadrant pain, dark urine, and pruritus. Measurements of serum amino

transferases have remained the most useful test for the routine diagnosis of liver diseases during pregnancy (Ali *et al*, 2012). Changes in the value of certain serum liver function tests occur during normal pregnancy and an understanding of these physiological changes is necessary for the management of liver diseases. However, HCV and HBV can be prevented by early detection and therapy (Xuanet *al*, 2007). Thus, the study aimed to determine the prevalence of HBV and HCV in pregnant women and to determine whether liver amino transferases can be affected.

Materials And Methods

This study was carried out in the ante-natal clinic of NnamdiAzikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State of Nigeria.

Blood samples were collected from 100 pregnant women who volunteered to participate in the study after a counseling session. One step HBsAg strip by ACON Laboratories incorporated, USA and One step Anti-HCV strip by ACON Laboratories incorporated, USA. The ACON HBsAg and Anti-HCV device, a rapid chromatographic immunoassay for the qualitative detection of Hepatitis B surface antigen and HCV in serum/plasma was used for screening the participants. Those who were positive were further tested for positivity using MonolisaHBsAg Ultra kits from BIO-RAD and Enzyme immunoassay kits for anti-HCV in serum from Diagnostic Bioprobes, Italy. Serum alanine aminotransferase (ALT) and serum aspartate aminotransferase (AST) activities were estimated in all the subjects using Reitman - Frankel method.

Statistical Analysis

The prevalence of each viral infection (HBV and HCV) was determined from the proportion of the positive individuals in the total population under consideration and expressed as a percentage. The chi-square test was employed to determine the relationships between age and presence of risk factors with HBV and HCV infection at $p < 0.05$.

Results

The results of the prevalence study are presented in the table 1. It shows that out of the 100 pregnant women tested, 6 were positive for HBsAg and 1 was positive for anti-HCV giving an overall prevalence of 6% and 1% respectively. Table 2 shows the prevalence of HBsAg and Anti-HCV among the women based on age groups. The prevalence of HBsAg was highest among the age group (15-20 years) while Anti-HCV was seen in age group (21-26 years). Table 3 shows the percentage of those with history of blood transfusion that were positive for both HBsAg and Anti-HCV as 7.7% and those with no history of blood transfusion that were positive for HBsAg and

Anti-HCV as 5.7% and 0% respectively. There was no significant difference in HBV when those who had blood transfusion and those who did not were compared but there was significant difference in HCV. The percentage of those with history of surgery that were positive for both HBsAg and Anti-HCV was 3.2% and those with no history of surgery who were positive for HBsAg and Anti-HCV were 7.2% and 0% respectively. However, there was no significant difference between them. The percentage of those who used contraceptives and positive for HBsAg and Anti-HCV were 13.6% and 0% respectively while those who do not use contraceptives and were positive for HBsAg and Anti-HCV were 3.8% and 1.3% respectively. There was no significant difference. Furthermore, the percentage of those who had hepatitis who were positive for HBsAg and Anti-HCV were 5.6% and 0% respectively and those who were not positive for HBsAg and Anti-HCV were 6.1% and 1.2% respectively. There was also no significant difference when compared.

Table 4 shows the mean AST levels for HBsAg negative and positive subjects were 10.55 ± 2.36 and 12.17 ± 2.23 respectively while the mean ALT levels were 5.54 ± 1.94 and 8.00 ± 3.10 respectively. There was no significant difference in mean AST levels between those who were HBsAg positive and those that were negative but there was a significant difference in their mean ALT levels ($P < 0.05$) when compared. The mean AST level for anti-HCV negative and positive subjects were 10.67 ± 2.38 and 9.00 ± 0.00 respectively while their mean ALT are 5.71 ± 2.09 and 4.00 ± 0.00 respectively. There was no significant difference in mean AST and ALT levels between those who were HCV positive and those who were negative when compared.

Table 1: Prevalence of HBV and HCV in the Pregnant Women

| Hepatitis serology | Number tested | Positive result (%) | Negative result (%) |
|--------------------|---------------|---------------------|---------------------|
| HBsAg | 100 | 6 | 94 |
| Anti-HCV | 100 | 1 | 99 |

Table 2: Prevalence of HBsAg and Anti-HCV among the women based on Age Groups

| Age group (year) | Number Tested | % HBsAg positivity | % Anti-HCV Positivity |
|------------------|---------------|--------------------|-----------------------|
| 15-20 | 5 | 20 | 0 |
| 21-26 | 22 | 9.1 | 4.5 |
| 27-33 | 46 | 4.3 | 0 |
| 34-40 | 25 | 4 | 0 |
| > 40 | 2 | 0 | 0 |

Table 3: Prevalence of HBsAg and Anti-HCV in Relation to Associated Risk Factors among the Pregnant Women

| Risk Factors | | Number Tested | % HBsAg Positivity | % Anti-HCV Positivity | χ^2 , P value |
|------------------------------|-----|---------------|--------------------|-----------------------|---------------------------------------|
| History of Blood transfusion | Yes | 13 | 7.7 | 7.7 | HBV 0.076, 0.783 HCV 6.760, 0.009* |
| | No | 87 | 5.7 | 0 | |
| History of Surgery | Yes | 31 | 3.2 | 3.2 | HBV 0.613, 0.434 HCV 2.248, 0.134 |
| | No | 69 | 7.2 | 0 | |
| Contraceptive use | Yes | 22 | 13.6 | 0 | HBV 2.916, 0.088 HCV 0.285, 0.594 |
| | No | 78 | 3.8 | 1.3 | |
| History of hepatitis | Yes | 18 | 5.6 | 0 | HBV 0.008, 0.930 HCV 0.222, 0.638 |
| | No | 82 | 6.1 | 1.2 | |

Significance= $p < 0.05$ * = significant, χ^2 = Chi-square**TABLE 4: T-test for AST and ALT among the pregnant women tested.**

| | Parameter | Status | Mean \pm SD (IU/L) | P value |
|----------|-----------|-----------------|----------------------|---------|
| HBsAg | AST | Negative (n=94) | 10.55 \pm 2.36 | 0.106 |
| | | Positive (n=6) | 12.17 \pm 2.23 | |
| | ALT | Negative (n=94) | 5.54 \pm 1.94 | 0.005* |
| | | Positive (n=6) | 8.00 \pm 3.10 | |
| Anti-HCV | AST | Negative (n=99) | 10.67 \pm 2.38 | 0.487 |
| | | Positive (n=1) | 9.00 \pm 0.00 | |
| | ALT | Negative (n=99) | 5.71 \pm 2.09 | 0.419 |
| | | Positive (n=1) | 4.00 \pm 0.00 | |

Significance= $p < 0.05$

* = significant, SD = standard deviation

Discussion

The prevalence of hepatitis B and C infections varies in different parts of the world from country to country, and from one region to another region and from one population group to another in a country (Zaliet *et al.*, 1996) and since pregnant women have depressed immunity; infections of HBV and HCV are of clinical importance.

This study shows that the prevalence of HBV in the pregnant women is within the intermediate range of prevalence. This result is in line with some works which have been done in many parts of the country where a high incidence of hepatitis B had been detected (Mbaawuaga *et al.*, 2005; Ndams *et al.*, 2008; Luka *et al.*, 2008). However, lower reports were given in some other places (Akaniet *et al.*, 2005; Obi *et al.*, 2006; Ezeaniet *et al.*, 2008; Onakewhoret *et al.*, 2008). Our results also showed that out of the 100 respondents, the highest prevalence for HBsAg were within the age group 15-20 years. The prevalence of HCV antibodies in the pregnant population is lower than those reported among pregnant women in some other parts of the country (Baba *et al.*, 1999; Onakewhoret *et al.*, 2008). This prevalence is in line with similar studies on pregnant women from the Guinea and Côte

d'Ivoire (Romero *et al.*, 1994; Zuccotti, 2006) two countries in the same West African sub-region with Nigeria. This may be due to some factors such as educational status and lack of enlightenment/awareness of HBV and HCV infectivity.

In this study, pregnancy causes no alterations in the levels of the AST aminotransferases. Although, the results of the liver aminotransferases assayed were essentially normal in all the subjects, there was a significant increase in ALT level when the HBsAg positive and negative pregnant subjects were compared. There was also a high frequency of HBsAg seropositivity as compared to HCV among pregnant women in this study and an increased serum ALT level in the positive subjects than in the negative subjects. This is in line with the works of Helsperet *al* (2012) who detected increase ALT in association with HCV infection in primary care patients. The dangers inherent in the observed cases calls for conscious efforts to be addressed especially as it has been reported that infection acquired perinatally and in early childhood is usually asymptomatic but in the people who experience the disease, the severity of symptoms and illness vary widely.

In conclusion, this study revealed that HBV and HCV can be present in pregnant women and can alter liver amino transferases. We suggest that free screening and immunization against HBsAg and HCV of all pregnant women and their infants should be incorporated into the antenatal and postnatal programmes in hospitals so that HBsAg and HCV positive mothers will receive prompt intervention.

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