

Epidemiology of hepatitis B virus surface and core antigens among pregnant women visiting Ring Road Hospital for antenatal care in Ibadan South-West, Local Government Area, Oyo State, Nigeria

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Abstract. This study was carried out to determine the prevalence of hepatitis B virus surface and core antigens among pregnant women visiting Ring Road Hospital for antenatal care in Ibadan, South-West, Local Government Area. Out of 150 blood samples collected and screened, using Diaspot® test strips, ten were found positive (6.6%). Pregnant women within 25-29 years had the highest prevalence of (2.7%) the lowest prevalence of 0.6% was found among pregnant women within the age group of 35-39 years. Pregnant women that are from polygamous family had (4.0%) while those from monogamous recorded 2.7%. Similarly, pregnant women with history of blood transfusion had 5.3% while those without history of blood transfusion recorded 1.3%. Chi-square analysis revealed that age, history of blood transfusion and family type are not related to infection with hepatitis B virus in the studied area. More awareness campaign should be organized in order to educate populacion on the possible route of transmission of the disease. This will help bring down the burden of the disease in the studied area and by extensions in Nigeria.

Keywords: Hepatitis B virus, Prevalence, Surface and core, Antigens, Antenatal, Yorubas.

Received
January 14, 2015

Accepted
May 18, 2015

Released
June 30, 2015



Open Access
Full Text Article



1. Introduction

Hepatitis is a condition defined by the irritation or swelling of the liver and it is characterized by the presence of inflammatory cells in the tissue of the liver. The condition can be healing on its own (self-limiting) or can progress to scarring and cirrhosis (Ott et al., 2012). It can be induced by both infectious and non-infectious agents. The former include hepatotropic viruses (hepatitis A, B, C, D and E), of which hepatitis B virus (HBV) is the most infectious and most virulent. While the later includes an over active immune system, use of drugs, alcoholism, chemicals and environmental toxins (Rufai et al., 2014).

To date, Nigeria remain as one of the endemic nations of the world whose citizen health is being challenged with hepatitis B virus with about 20,000,000 people currently infected. This has been attributed to unavailability of vaccine for prophylactic measures (Rufai et al., 2014). The need to have adequate information on the prevalence of hepatitis B surface and core antigens among pregnant woman visiting Ring Road State Hospital, in Oyo State, Nigeria, is born from the fact that the hospital accommodate many people from different parts of Oyo State, couple with the fact that Nigeria need a data base to plan for prophylactic measures, in order to further reduce the burden of hepatitis B. Hence this study is necessary.

Materials and methods

Description of study area

Ibadan South-West is a Local Government Area, in Oyo State, Nigeria. Its headquarters is at Oluyole Estate in Ibadan. It has an area of 40 km² and a population of 282,585 (2006 census). The area is inhabited mostly by Yorubas most of which are civil servants.

Determination of sample size

The sample size for the research work was determined using the Fisher's formula:

$$n = t^2 \times p(1-p) / m^2$$

Where:

n = sample size; t = standard normal deviate at 1.96; p = prevalence of the disease (National Prevalence); m = marginal tolerable error at 0.05%.

Ethical clearance

The ethical clearance was sought for from the Ethical Committee of the Ring Road Hospital, before the commencement of the collection of the blood samples from the pregnant woman.

Sample collection and preparation for screening

The vein puncture method by Julius and Schiff (2007) was employed to aseptically collect 2 mL of blood sample each from 150 pregnant women, using a disposable sterile needle and syringe for each participant. Blood samples were collected and transferred into a labeled plastic microtitre tube coated with ethylenediaminetetraacetic acid (EDTA). The blood samples were transferred into centrifuging tubes immediately and spin at 10,000 revolutions per minute (rpm) for 5 minutes. The plasma cell were collected in each case separately and stored at 4 °C for further analysis (Rufai et al., 2014).

Screening of blood sample

DiaSpot® test strip (with accuracy of 98.5%), a rapid chromatographic immunoassay for the qualitative detection of hepatitis B virus surface and core antigens in plasma was used for the

screening of the plasma cells from the pregnant woman. The test was carried out and interpreted according to the manufacturer's instructions (Rufai et al., 2014).

Interpretation of results

The one step hepatitis B surface antigen, strip has a control band (C) and the test band region (T). When two distinct red bands appear, the result is said to be positive. However, the intensity of the red colour in the test band region (T) will vary depending on the concentration of HBsAg and HBcAg present on the specimen. The absent of apparent red line in the test band region (T) indicates a negative result and the result is said to be invalid when the control band fail to appear (Blumberg, 1967).

Data analysis

Data were analyzed using Statistical Package for Social Science (SPSS), version 20. Comparison of categorical variable was done using the chi-square test, non-parametric test, whereas p-value of 0.05 was considered significant level.

Results

Out of 150 blood samples screened for hepatitis B virus, ten were found to be positive representing 6.6% prevalence. The distribution was according to age, family type, and history of blood transfusion, as presented in the tables below.

Discussion

In this study, hepatitis B virus was detected in the blood samples collected from pregnant women visiting Ring Road State Hospital, Ibadan, Nigeria for antenatal care. To the best of my understanding, this study differs from the previous studies in the sense that the study considered socio-economic factors of the pregnant woman, besides the relationship between surface and core antigens of the virus among infected pregnant women. The study reported an overall prevalence of 6.6%. High prevalence was observed with pregnant women within 25-29 years (Table 1).

Table 1. Infection rates according to age ($\chi^2 = 2.64$ at $p < 0.05$; $n = 150$).

Age (yrs)	Surface antigen			Core antigen		
	NSS	NP	PR	NSS	NP	PR
18-24	35	3	2.0	35	3	2.0
25-29	65	4	2.7	65	4	2.7
30-34	30	2	1.3	30	2	1.3
35-39	20	1	0.6	20	1	0.6
Total	150	10	6.6	150	10	6.6

NSS = number of sample screened; NP = number of positive; PR = prevalence.

Table 2. Infection rates according to family type ($\chi^2 = 0.624$ at $p < 0.05$; $n = 150$).

Family type	Surface antigen			Core antigen		
	NSS	NP	PR	NSS	NP	PR
Monogamy	70	4	2.6	70	4	2.6
Polygamy	80	6	4.0	80	6	4.0
Total	150	10	6.6	150	10	6.6

NSS = number of sample screened; NP = number of positive; PR = prevalence.

Table 3. Infection rates according to history of blood transfusion ($\chi^2 = 0.924$ at $p < 0.05$; $n = 150$).

	Surface antigen			Core antigen blood transfusion		
	NSS	NP	PR	NSS	NP	PR
Yes	135	8	5.3	135	8	5.3
No	15	2	1.3	15	2	1.3
Total	150	10	6.6	150	10	6.6

NSS = number of sample screened; NP = number of positive; PR = prevalence.

Reasons to explain the high prevalence among age group 25-29 years could be attributed to unprotected sexual intercourse or multiple sex partners as reported by Samuel et al. (2009). Despite the high prevalence, chi-square test revealed that age was not a factor in the infection rate with hepatitis B surface and core antigens.

Table 2 shows the infection rates according to family type among pregnant women visiting Ring Road State Hospital for antenatal care. High prevalence was observed among pregnant women that are from polygamous homes. The high prevalence could be attributed to multiple sex partners. Despite the infection rate, chi-square test revealed that there was no link between the infection rate and the family type at $p > 0.05$. Although statistically, family type was found not to be a factor in this study, it is difficult to rule out possible transmission of hepatitis B virus in a polygamous family, particularly in a sociocultural settings (Nigeria) where people seems to pay less attention about

screening of blood and other laboratory investigations to determine the health status of would be couples.

High prevalence was recorded among pregnant women with the history of blood transfusion (Table 3). This confirms the findings of earlier study by Obi et al. (2006) who reported that indiscriminate blood transfusion is responsible for high prevalence of infection among people. However, chi-square analysis indicated that the presence of hepatitis B virus surface and core antigens was not associated with blood transfusion among pregnant women in the studied area.

Conclusion

This study confirms the findings of earlier studies that hepatitis B virus is endemic in Nigeria. It has also shown that ignorance remains a key factor in the spread of this virus in the studied area, the study also revealed that the presence of surface antigen automatically means the presence

of core antigen. Hence more Education on modification of lifestyle and sexual behavior should be encouraged. Pregnant women should be routinely screened for hepatitis B virus infection as part of antenatal care, in order to stem vertical or horizontal transmission of the disease.

Conflict of interest statement

Authors declare that they have no conflict of interests.

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