

Seroprevalence of Hepatitis B Virus Infection Among Pregnant Women Attending Dei – dei General Hospital Abuja, Nigeria

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ABSTRACT

The study was carried out to investigate seroprevalence of Hepatitis B virus (HBV) infection among pregnant women attending Dei-Dei general hospital in Bwari Area Council, Abuja. The research work was a hospital based cross-sectional study that involved 200 pregnant women of which only 116 were consented, after ethical clearance (approval) was obtained from the Hospital Management. Demographic variables and information considered as risk factors were obtained by administering questionnaires to the participants. Plasmas obtained were stored at $-20^{\circ}\text{C} \pm 2$ until screened for Hepatitis B surface antigen. Hepatitis B surface antigen (HBsAg) in the plasma was detected using SWE-CARE Hepatitis B test strip. The strip is a rapid chromatographic immunoassay for the qualitative detection of Hepatitis B surface Antigen (HBsAg) in whole blood or serums or plasma. The result obtained is statically analyzed using Chi-square test to establish association between the risk factors and HBsAg seropositivity at significant level of $p < 0.05$. Statistically, education, marital status, alcoholism and sex partners were statistically significance among the demographic variables in this study. The HBV seroprevalence rate of 4.3% in this study implies that Dei – Dei, FCT Abuja, Nigeria is an intermediate endemic area of HBV infection based on the criteria of World Health Organization. The demographic variables sampled were major contributing factors to the results obtained.

Key words: seroprevalence, hepatitis B virus, surface antigen, pregnant women, demographic.

INTRODUCTION

A combination of two Greek words “hepatos” (liver) and “itis” (inflammation) gave rise to the current word hepatitis. Hepatitis according to [1] is usually caused by drugs, toxic agents, or viral infections, but it may also arise as a result of an autoimmune response. The recognition of hepatitis B virus (HBV) infection as a disease of public health importance occurred when it

appeared as an adverse event associated with a vaccination program [2]. Hepatitis B infection is a serious disease of humanity and constitutes a global public health problem [3]. Hepatitis B virus can be transmitted by through vertical and horizontal transmission [4].

Hepatitis B infection in Nigeria still remains a public health issue [5]. It remains a major cause of mortality, especially in underdeveloped countries. In this low-resource setting, vertical transmission of hepatitis B virus infection is thought to be major route of transmission. Pregnant women infected with Hepatitis B virus (HBV) can transmit the infection to their fetuses and newborns. Worldwide, it is estimated that more than 2 billion persons are still living with Hepatitis B virus infection [6] if adequate attentions are there is high risk of developing chronic hepatitis, cirrhosis, and primary hepatocellular carcinoma. Despite efforts by many countries to reduce the Hepatitis B virus (HBV) prevalence, the burden is still high. [7] And his coworkers had reported increase in the incidence of chronic hepatitis among pregnant women, especially those in their last trimester, when compared with non-pregnant women. Report from [8] revealed that among the infected mothers the risk of chronic HBV infection is about 70%-90% compared to only 50%-20% from those who are hepatitis B negative. In most developed countries of the world screening for Hepatitis B infection is a routine but it is not yet the practice in Nigeria. Vaccination of new born is also not yet widely available in most low-resource settings [9].

Unfortunately, the coverage of Hepatitis B immunization, though available is still not adequate in Nigeria. Coverage of about 41% was reported earlier [10]. As a result of the poor screening and low vaccination rate in Nigeria, the children born are at risk of developing chronic liver disease later in life. Therefore, there is a need to determine the seroprevalence of Hepatitis B virus among pregnant women and to determine the risk factors that may be associated with having the infection.

MATERIALS AND METHOD

Study Area

The study was carried out at Dei-Dei general hospital in Bwari Area Council, Abuja, Nigeria.

Study Population

The research work was a hospital based cross-sectional study that involved 116 consenting pregnant women from Dei – Dei General Hospital Abuja out of 200 sampling population. However, women those were not pregnant but at the same time attending the hospital were excluded.

Ethical Clearance

Ethical clearance (approval) was obtained from the Hospital Management while demographic variables and information considered as risk factors were obtained with the aid of well-structured questionnaires to the participants.

Specimen Collection

The sample collection was done following the standard method described by [8], whereby 2 ml of venous blood was collected from consenting individuals into labeled EDTA bottles. The blood samples were centrifuged at 3000 rpm for 10 seconds to separate the plasma from the red blood cells. Plasmas obtained were stored below – 20°C until screened for Hepatitis B surface

antigen. Hepatitis B surface antigen (HBsAg) in plasma was detected using SWE – CARE Hepatitis B test strip.

Assay Technique for HBsAg

The HBsAg (one step Hepatitis B surface antigen test trip) is a rapid chromatographic immunoassay for the qualitative detection of Hepatitis B surface Antigen (HBsAg) in whole blood or serums or plasma.

Principle of the Test

The HBsAg is a qualitative, lateral flow immunoassay for the detection of HBsAg in serum or plasma. The membrane is pre-coated with anti – HBsAg antibodies on the test line region of the strip. During testing, the serum or plasma specimen reacts with the particle coated with anti – HBsAg antibody. The mixture migrates upward on the membrane chromatographically by capillary action to react with the anti- HBsAg antibodies on the membrane and generate a red line. The presence of red line in the test region indicates a positive result, while its absence indicates negative result. To serve as a procedural control, a red line will always appear on the control line region indicating that the proper volume of specimen has been added and membrane wicking has occurred.

Assay Procedure

The blood sample in EDTA bottle was centrifuge at 3000 rpm for 5 minutes to obtain the plasma in the laboratory. The sealed end of the strip was cut along the notch. The HBsAg trip was removed and 2.3 drops of the serum was applied on the trip with the arrow pointing downwards. The strips were laid on a plane non – absorbent surface and allowed to stay for 15-20 minutes before result was taken.

Interpretation of Result

The test result was interpreted as follows;

Positive: When two distinct red lines appear on the test strip, with one on the control region (C) and the other on the test region (T). In certain instances the test line may be faint due to the concentration of HBsAg present in the specimen.

Negative: When one red line appears in the control region (C) and there was no apparent red or pink line appearing in the test region (T)

Invalid: When control line fails to appear. This indicates an error and requires a repeated test.

Statistical Analysis

Data generated in this study were tabulated and analyzed using Chi-square (χ^2) statistical tool available in SPSS (version 16.0 for windows) at 5% ($P < 0.05$) level of significance.

RESULTS AND DISCUSSION

Table 1: Seroprevelence of HBV among pregnant women with respect to age.

Age	No of Sample Tested %	No of Positive %	No of Negative%
18 – 23	36 (31.0)	1 (0.86)	35
24 – 29	53 (45.7)	4 (3.5)	49
30 – 35	21 (18.0)	0	21
36 – 41	5 (4.3)	0	5
42 – 47	1 (0.86)	0	1

Table 2: Seroprevalence of HBV with respect to some associated risk factors

Risk Factors		No Examined	Number of Positive Case (%)	X ²	P-value
Occupation	unemployed	63	2 (3.17)	4.396	0.355
	Self-employed	35	3 (8.57)		
	Employed	18	0		
	Total	116	5		
Education	None	30	0	14.979	0.020
	Primary	22	0		
	Secondary	45	4 (8.89)		
	Tertiary	19	1 (5.29)		
	Total	116	5		
Marital Status	Married	116	5 (4.31)	0.00	0.00
	Singled	0	0		
	Total	116	5		
Object Shared	Yes	113	5 (4.31)	68.368	3.841
	No	3	0		
	Total	116	5		
Alcoholism	Yes	0	0	0.00	0.00
	No	116	5 (4.31)		
	Total	116	5		
Blood Transfusion	Yes	6	2 (33.33)	95.796	3.841
	No	110	3 (2.73)		
	Total	116	5		
HBV Knowledge	Yes	21	1 (4.76)	23.638	3.841
	No	95	4 (4.21)		
	Total	116	5		
Sex Partners	One	116	5 (4.31)	0.00	0.00
	Two or More	0	0		
	Total	116	5		
Vaccination	Yes	5	0(4.31)	0.229	3.841
	No	111	5		
	Total	116	5		

During the study period, a total of 116 consenting antenatal attendees at Dei – Dei General Hospital Abuja were enrolled out of the 200 pregnant women using simple random sampling

technique. The result showed that 5 of the patients tested positive for HBV infection, thus giving a seroprevalence rate of 4.3%. Seroprevalence of HBV among pregnant women with respect of age distribution. The result in Table 1 shows that pregnant women within the age range of 24-29 had the highest prevalence of 4 (3.5%), while those within the age range of 30-35, 36-41 and 42-47 showed no positive result (0%). This may be due to the fact that this age involved are more sexually active and might have involve in multiple sex partners at the same time might not have taking vaccination serious.

Based on the risk factors considered in this study (Marital status, occupation, history of blood transfusion, sharing of sharp objects etc); It was discovered that marital status 5% (4.31), sharing of sharp object 5% (4.41) and sex partners 5% (4.31) are associated with higher prevalence of HBV infection among pregnant women.

The result of this study revealed 4.3% seroprevalence of HBV infection among antenatal attendees at Dei – Dei General Hospital Abuja. This percentage recorded in the studies falls within the range of 2-15% reported by [3] in similar studies in Nigeria. This finding (4.3%) is lower than the findings of Emmanuel and coworkers [11] who reported 12.0% incidence of Hepatitis B Virus in Benue State, Nigeria. This may be due to the fact that the study population being in urban area must have been taking some prophylaxes measures directly or indirectly against the virus. The percentage reported in this study is far lower than 12.4% HBV seroprevalence rate reported by [12] among women of child bearing age in Port Harcourt, Nigeria. It is also lesser than the world Health organization [13] reported rate of hepatitis B (5%) among pregnant women globally. This rate recorded in this study is also lower than 11.6% reported by [14] among pregnant women in Maiduguri Nigeria and 11.5% reported among pregnant women in Ibadan, Oyo State, Nigeria [15]. In Nnewi, Nigeria, HBV seroprevalence rate of 8.3% was found among antenatal clinic attendees [16] and still higher than what is obtained this study. HBV prevalence rate of 7.9% among antenatal attendees in Kano, Nigeria had also been reported [17].

However, the HBV seroprevalence rate of 4.3% obtained in this study is found to be higher than 2 % that reported for the developed world [18]. The wide difference in the HBV seroprevalence rate between developing and developed countries may be because of the widespread usage of hepatitis B vaccine both among children and the adult population in the developed countries.

Result in Table 2, revealed that the highest prevalence of HBV infection was found within the age range of 24-29. However, the HBV prevalence with respect to age distribution and HBsAg seroprevalence was not statistically significant ($p>0.05$). The result showed that out of 53 patients screened within this age group, 4 (3.5) tested positive to HBV infection. This might be attributed to high sexual activity and fertility within this age group. Statistically, there was also no significance ($p>0.05$) in seroprevalence of HBV infection with respect to history of blood transfusion reported in the study. Out of 6 patients screened, 2 (33.3%) tested positive. This might be due to improper screening of blood before transfusion. None out of the 5 pregnant women who were vaccinated tested positive, this is an indication of effective immunization. There was also no significant association of HBV knowledge with prevalence of HBV infection among pregnant women ($p>0.005$). Out of 21 patients screened only 1 (4.76%) tested positive to HBV, while 5 (5.30%) out of the remaining unvaccinated pregnant women tested positive to

HBV. This may not be unconnected with unavailability of vaccine or poor vaccine coverage within the area under study.

CONCLUSION

This study found that 4.3% of the pregnant women attending Dei – Dei, FCT, Abuja as at the time of collecting this data had an intermediate seroprevalence of Hepatitis B surface antigen. This implies that Dei – Dei is an intermediate endemic area of HBV infection based on World Health Organization criteria. Education, marital status blood transfusion and immunization were the risk factors identified in this study. Therefore, HBV screening must be incorporated into the routine antenatal clinical investigations for all women attending antenatal clinics. Awareness campaign of the disease and widespread coverage of the HBV immunization of the population should be encouraged.

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