

Sero-Frequency of Hepatitis B among Pregnant Women in Umrowaba City at North Kordofan State

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Abstract:

Background: *Infection of mothers with Hepatitis B virus during pregnancy is associated with high risk of maternal complications and has become a leading cause of fetal death. The hepatitis virus is found in blood and other body fluids and is transmitted from person to person; the most common routes of infection includes mother to infant during child birth. This is a cross-sectional study aimed to detected Hepatitis B virus sero-frequency in pregnant ladies in Umrowaba Teaching Hospital, North Kordofan State Sudan.*

Methods: *90 serum specimen was collected and analyzed by ELISA. Result correlated with age, history of abortion, trimester of pregnancy, gravidity type of delivery, history of other surgical operation, and history of blood transfusion.*

Result: *Out of 90 sample evaluated for Hepatitis B surface Antigen (HBsAg), 23 (25.6%) were positive and 67 (74.4%) were negative for HBsAg. The result showed higher frequency (11.1%) for HBsAg in age group of 26-35 years .HBsAg sero-frequencies was*

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insignificantly associated age, history of abortion, trimester of pregnancy, gravidity type of delivery, history of other surgical operation, and history of blood transfusion.

Conclusions: *High sero-positivity for hepatitis B was observed among pregnant ladies, Introduction of blood and blood products screening for HBV in all blood banks in the country and the inclusion of HBV vaccination as part of the extended program of immunization are two major achievements in the battle against viral hepatitis in this country. This is expected to reduce the carrier pool and eventually reduce infection rate.*

Key words: Hepatitis B, HBsAg, pregnant women, ELISA, Umrowaba Teaching Hospital, Sudan.

Introduction:

Hepatitis is an inflammation of the liver characterized by the presence of inflammatory cells in the tissue of the organ. It may occur with limited or no symptoms, but often leads to jaundice, anorexia (poor appetite) and malaise. Hepatitis is acute when it lasts less than six months and chronic when it persist longer¹. The hepatitis virus is found in the blood and other body fluids and is transmitted from person to person, the most common routes of infection includes blood transfusions and blood products where there is no screening for blood borne viruses, medical or dental interventions in countries where equipment is not adequately sterilized mother to infant during childbirth, sexual transmission (in the case of hepatitis B), sharing equipment for injecting drugs, sharing straws, notes etc. for snorting cocaine, sharing razors, toothbrushes or other household articles, tattooing and body piercing if done using unsterile equipment ².

The hepatitis B virus, a hepadnavirus, is a 42 nm partially double stranded DNA virus, composed of a 27 nm nucleocapsid core (HBcAg), surrounded by an outer lipoprotein

coat (also called envelope) containing the surface antigen (HBsAg)³.

Hepatitis B is a major disease of serious global public health proportion. It is preventable with safe and effective vaccines that have been available since 1982. Of the 2 billion people who have been infected with the hepatitis B virus (HBV) globally, more than 350 million have chronic (lifelong) infections⁴. Over 20 million people are infected annually with this virus⁵.

Viral hepatitis during pregnancy is associated with high risk of maternal complications leading cause in maternal mortality⁶, is also said to be the most familiar cause of jaundice in pregnancy⁷.

Peri-natal transmission of this disease occurs if the mother has had acute Hepatitis B infection during late pregnancy, in the first postpartum or if the mother is a chronic HBsAg carrier⁸.

Using this information, the epidemiology of viral hepatitis during pregnancy is essential for health planners and program managers⁹.

Maternal acute hepatitis B in the third trimester is associated with a high likelihood of perinatal HBV transmission, but most perinatal infection occur in infants born to mother with chronic HBV infection¹⁰.

The prevalence of HBV infection varies widely, with rate ranging from 0.1% to 20% in different parts of the world¹¹.

The prevalence of HBV infection according to geographical area, may be high (8%), intermediate (2% - 7%) or low (less than 2%)¹².

In several studies from different regions of Nigeria, the prevalence of hepatitis B surface Antigen (HBsAg) among normal population was reported from minimum 2% to a maximum of 14.3% - average 6.8 % in Europe and America, chronic hepatitis B virus carriers are found in less than 2% of

population ¹¹. In endemic areas, most individuals are infected by vertical transmission ¹³.

In Africa, more than half of the population becomes HBV infected during their life time, and about 8% of inhabitant becomes chronic carriers; most of the infections take place during delivery or infancy ¹⁴.

The global burden of the disease attributable to hepatitis B remains enormous, and this is due to the lack of universal immunization ⁶.

This study aimed to detect sero-frequency of HBsAg among pregnant women attending Umrowaba Teaching Hospital during March to April 2015.

Material and Methods:

This was descriptive cross-sectional study which had been conducted in Umrowaba Teaching Hospital, north Kordofan state Sudan March to April 2015, ninety pregnant ladies were enrolled, Data was collected by using direct interviewing questionnaire; ethical clearance was obtained from research ethical committee of faculty of graduate studies and ministry of health North Kordofan state, written consent also was obtained from Pregnant ladies.

Experimental work:

Samples collection: blood samples were collected from 90 pregnant ladies, under direct medical supervision by medial vein puncture using 5 ml syringe into plain tube to obtain serum by centrifugation at 5000 rpm for 10 min. serums was kept in -20°C till serological study was performed. Specimens were processed by Enzyme linked immune sorbent assay (ELISA) (3rd generation ELISA) (Foresight- Germany) for detection Hepatitis B surface Ag.

All reagents and samples were allowed to reach room temperature for 15minutes before use.

Washing buffer was prepared 1:25 from buffer concentrate with distilled water. 100µl of sample was added into appropriate wells except the blank well and 100µl of negative control and positive control was added into negative and positive wells separately appropriate wells. 50 µl from Peroxidase-Conjugate Reagent except the blank was added to the appropriate wells. Micro-titers wells was flicked for 30 seconds and mixed well, and then plate was covered and incubated for 60 minutes at 37°C. Plate was taken out and 350µl of wash buffer was added to each well and aspirated off. This step was repeated for 5 times then wells let to dry. Then 50µl of substrate chromogen A and 50µl substrate chromogen B solution was added in to each well including the Blank and mixed by tapping the plate gently. The plate was incubated at 37°C for 10 min. 50 µl Stop solution was added into each well and mixed gently.

Measuring the absorbance: The plate reader was calibrated with blank well and the absorbance was read at 450/630-700 nm. The results were calculated by relating each sample optical density (OD) value to the Cut off value of plate. Calculation of Cut off (C.O) value.

$$C.O = *Nc + 0.070*$$

*Nc= the mean absorbance value for the two negative controls.

The absorbance was read with micro well reader at 450nm.

Interpretation of Results:

Negative results: samples giving absorbance less than Cut-off value are negative for this assay. **Positive result:** sample giving absorbance equal to or greater than Cut-off considered

initially reactive. Borderline: sample with absorbance to Cut-off value are considered borderline and retesting of these samples in duplicate is recommended.

Data analysis: Data was analyzed by SPSS (Statistical Package of Social Science) software program version 16.

Results: Out of 90 sera from pregnant women tested for HBsAg, 23 (25.6%) were positive and 67 (74.4%) were negative (figure1).

The highest prevalence of 10 (11.1%) was recorded in age group of 15-25 & 26–35 years while the lowest of 3 (3.3%) was recorded in age group (36-45) years. This difference was not statistically significant ($p = 0.362$) (Table 1).

According to residence factor the higher prevalence of sero-positivity was observed in village resident 22(24.4%) with ($p = 0.010$) which statistically considered as significant difference (table 2). Also the highest prevalence was observed in multigravde16 (17.8%) there was no significant difference ($p = 0.850$) between gravity type and HBsAg sero-positivity (Table 2), However the higher prevalence rates 13(14.4%) observed in women at their third trimester (Table 2). Also there was no significant difference ($p = 0.329$) between trimesters and HBsAg sero-positivity (Table 2). In considering history of abortion, the higher sero-positive rate 20(22.2%) was observed in women whom had no history of abortion, statistically considered as no significant difference ($p=0.573$) (Table 2). In considering types of delivery a higher prevalence11 (17.2%) in normal delivery with no significant difference ($p=0.505$) (table 2). While no significant difference according to history of jaundice ($p=0.753$), history of chronic illnesses($p = 0.753$) and history of blood transfusion ($p = 0.423$) (table 3).

Figures and tables:

Figure 1: Sero-frequency of HBsAg among pregnant women (n=90)

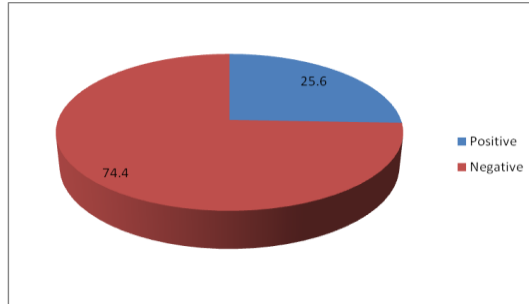


Table 1: Sero-frequency of HBsAg among pregnant women according to their age (n=90).

| | No, Positive, (%) | No, Negative, (%) | Total ,No,(%) | P -value |
|-----------------|-------------------|-------------------|---------------|----------|
| Age range/years | | | | 0.362** |
| 15-25 | 10(11.1%) | 33(36.7%) | 43(47.8%) | |
| 26-35 | 10(11.1%) | 31(34.4%) | 41(45.5%) | |
| 36-45 | 3(3.3%) | 3(3.3%) | 6(6.6%) | |
| Total | 23(25.6%) | 67(74.4%) | 90(100%) | |

** Not significant different at the 0.05 level.

Table 2: Sero-frequency HBsAg among pregnant women in relation to demographic data and risk factors (n=90)

| | HBsAg positive, No, (%) | HBsAg Negative, No, (%) | P value |
|---------------------|-------------------------|-------------------------|---------|
| Residence | | | 0.010* |
| Town | 2(2.2%) | 25(27.8%) | |
| Village | 21(27.8%) | 42(62.7%) | |
| History of abortion | | | 0.573** |
| Yes | 3(3.3%) | 6(6,7%) | |
| No | 20(22.2%) | 61(67.8%) | |
| Gravidity | | | 0.850** |
| Primigravidity | 7(7.8%) | 19(21.1%) | |
| Multigravidity | 16(17.8%) | 48(53.3%) | |
| Types of Delivery | | | 0.505** |
| Normal | 11(17.2) | 37(57.8%) | |
| Section | 5(7.8%) | 11(17.2) | |
| Primigravidity. | 7(7.8%) | 19(21.1%) | |
| Trimester of | | | 0.329** |

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| | | | |
|------------------|-----------|-----------|--|
| pregnant women | | | |
| First trimester | 4(4.4%) | 15(16.7%) | |
| Second trimester | 6(6.7%) | 26(28.9%) | |
| Third trimester | 13(14.4%) | 26(28.9%) | |

* significant different at the 0.05 level

** Not significant different at the 0.05 level

Table 3: Sero-frequency HBsAg among pregnant ladies in relation to other risk factors (n=90)

| | HBsAg positive, No, (%) | HBsAg negative, No, (%) | p value |
|------------------------------|-------------------------|-------------------------|-----------|
| History of jaundice | | | 0.753** |
| Yes | 1(1.1%) | 2(2.2%) | |
| No | 22(24.4%) | 65(72.3%) | |
| Chronic illnesses | | | 0.769** |
| Yes | | 1(1.1%) | 4(4.4%) |
| No | | 22(24.4%) | 63(70.1%) |
| History of blood transfusion | | | 0.423** |
| Yes | 1(1.1%) | 1(1.1%) | |
| No | 22(24.4%) | 66(73.3%) | |

** Not significant different at the 0.05 level

Discussion :

Infections due to Hepatitis B (HBV) are significant health problems around the globe. Worldwide, viral hepatitis is the commonest cause of hepatic dysfunction in pregnancy. In our study, the frequency of Hepatitis B among antenatal patients attending Umrowaba Teaching Hospital North Kordofan was 25.6%. That may not supports the WHO's report for Nigeria¹³ as highly endemic area with prevalence greater than 8% for HBV. This higher result is similar to that of 26% sero-prevalence which reported in southern Sudan¹⁵. Also it is higher than other study in Khartoum state, Sudan, on pregnant women which showed an HBsAg carrier rate of 5.6%²¹.

The prevalence of HBV infection reported in this study was higher than the results of studies in different parts of Iran,

including Bonab in East Azerbaijan (3.2%)¹⁶, Qazvin in Iran (3.4%)¹⁷, and also higher than prevalence reported in Port Harcourt and Jos (10.3%), seem to be higher when compared with other studies from Enugu (14.9%)¹⁸ Jos (5.2%) and Kaduna (11.9%)¹⁹. In a recent study, 90 pregnant women were screened for Hepatitis B, 2.2% of them were positives for HBsAg. These results are lower than our findings rate of HBsAg²⁰.

Conclusion:

High sero-positivity for hepatitis B was observed among pregnant ladies, therefore the need to institute public health measure to reduce disease burden and transmission including routine screening of all pregnant mothers for HBV infections, introduction of vaccination programme and increase population awareness about the disease and its transmission routes.

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