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Seroprevalence of Hepatitis B Surface Antigen in Pregnant Women of General Hospital Agbor, Delta State

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Reportedly transmitted through unprotected sexual intercourse with infected person(s), experts have estimated new cases of hepatitis B virus (HBV) infections to be over 70,000 per year in the United States. With little or no records of such in Nigeria, this study investigated the prevalence of hepatitis B surface antigen at different trimesters of pregnancy in women who visit general hospital Agbor, Delta state, Nigeria; for antenatal care. A total of one hundred (100) pregnant and fifty (50) non-pregnant (control) women were ethically recruited for the exercise. They were then sub-grouped by age and duration of pregnancy (trimester); and an Acon serological strip was used to obtain blood samples from each subject. Obtained blood was then assayed for the presence of hepatitis B virus (in serum) and compared with those of control (non-pregnant) group. Following careful comparison of differences in mean (using the Analysis of variance), study found a 5%

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prevalence rate (of hepatitis B) in pregnant than non-pregnant (2% prevalence) women. Study also observed a statistically significant increase in hepatitis B surface antigen for non-pregnant women of age bracket 20-24 years (2.6% prevalence) to pregnant women of between 20-24 years. HBV infection therefore has high prevalence rate in pregnant than non-pregnant women as they are often more exposed to unprotected sexual intercourse. We recommend regular and continuous HBV screening in pregnancy to help circumvent HBV infection related ailments and complications. The same is also suggested for non-pregnant women for purpose of proper vaccination.

Keywords: Hepatitis B; pregnancy; sero-prevalence; antenatal.

1. INTRODUCTION

Hepatitis, inflammation of the liver caused by viruses, bacterial infections, or continuous exposure to alcohol, drugs, or toxic chemicals, such as those found in aerosol sprays and paint thinners [1,2]. Hepatitis can also result from an autoimmune disorder, in which the body mistakenly sends disease-fighting cells to attack its own healthy tissue, in this case the liver. Irrespective of its cause, hepatitis reduces the liver's functional abilities, including its filtering prowess for harmful infectious agents from the blood, as well as its capacity to store blood sugar and converting it to usable energy forms that are necessary for life [3-5].

Depending on cause and overall health infected individual, the symptoms of hepatitis vary significantly, with selected cases showing few noticeable symptoms [6]. If present however, symptoms may include general weakness and fatigue, loss of appetite, nausea, fever, and abdominal pains/tenderness. Another symptom is jaundice, which apparently occurs as a yellowing of the skin and eyes due to the liver's failure to break down excess yellow-colored bile pigments in the blood. In acute hepatitis, symptoms often subside without treatment within a few weeks or months. About 5 percent of cases develop into an incurable form of the disease called chronic hepatitis, which may last for years [7,8]. Chronic hepatitis causes slowly progressive liver damage that may lead to cirrhosis, a condition in which healthy liver tissue is replaced with dead, nonfunctional scar tissue. In some cases, cancer of the liver develops [6].

Although it has many different causes, hepatitis most often results from infection by one of several hepatitis viruses. All hepatitis viruses are contagious, but each is differently passed from one person to another [9]. Over the las decade, the WHO issued its first guideline for the treatment of chronic hepatitis B in Nigeria, positing that globally, some over 240 million people have chronic hepatitis B infection with increasing risk of dying, and highest rate more to be found in Africa and Asia [7]. In Nigeria, even though no specific treatment option is fully documented, effective medicines however exists that can prevent this condition in people. However, due to lack of clear evidence-based guide and poor living standard, most sufferers who need these medicines cannot afford them [7].

Recently, A WHO report has it that HBV is a common infectious disease that accounts for a major cause of global health problems. The report further posits that an estimated 2 billion earthlings are sero-positive of past or present HBV infection, with 350 million of such cases reportedly chronically infected, putting sufferers at risk of HBV-related liver diseases [10]. In another study, HBV was reported to be 50 to 100 times more infectious than the AIDS due to HIV, and 10 times more infectious than hepatitis C virus (HCV). Tentatively, it is an important cause of liver diseases; with associated co-morbidities and liver failure, cirrhosis and liver cancer [11].

Epidemiologically, the prevalence of HBV varies from as low as 2% in developed countries to about 8% in developing countries. Here, even though sex, age and socio-economic status are reported risk factors that exacerbate it [12], however, available studies have suggest its degree of endemicity to often correlate with predominant mode of transmission. HBV disease has an enormous impact on health and national economy of many countries, and its severity is highly variable and quite unpredictable. The minimum infectious dose is so low that such practices like sharing of tooth brush or a razor blade can elicit its quick transmition [13,14]. Hepatitis B virus also shares similar routes of transmission with HIV [6], Currently having four recognized modes of transmission (Viral Hepatitis Prevention Board,

1996); from mother to child at birth (prenatal), by contact with infected person (horizontal), by sexual contact and by exposure to blood or other infected fluids [7].

Irrespective of age group, HBV reportedly affects people across diverse spheres and ethnicities, predominantly more in young adults than the elderly [1]. Currently, Nigeria ranks high in the list of highly endemic HBV infected countries; with about 75% of its population reportedly likely to have been exposed to HBV at one time or the other in their life [2,4,9]. To this point, current study was crafted to investigate the prevalence of HBV surface antigen in pregnant women in Nigeria, using general hospital, Agbor as a case study.

1.1 Aim of Study

Study aimed at examining the sero-prevalence of hepatitis B surface antigen in pregnant women of general hospital agbor, Delta State. Specifically, study investigated the prevalence of HBV by age and trimester of pregnancy.

2. MATERIALS AND METHODS

2.1 Study Design

The study was analytical, and was designed to determine (by age and trimester), the incidences of Hepatitis B in pregnant women; specifically those that regularly attend antenatal screening at the general hospital in Agbor, Delta State.

2.2 Study Population

The population for this study comprised of pregnant women who attended the antenatal care unit of the general hospital, Agbor, Delta State. A total of one hundred (100) pregnant women and fifty (50) non-pregnant women (control) were randomly sought from the population.

2.3 Sample Collection

With the aid of a Pasteur pipette (specimen dropper), blood samples were collected from subjects (in 21 days, spanning a total of three weeks), and serology for hepatitis B was conducted on obtained blood samples to ascertain the presence of HBV in blood. Analysis of obtained sample for HBV positivity was done with the Acon Serological strips (ELISA).

2.4 Procedure

About three (3) drops of blood from each collected sample were vertically dropped into a sample pad of test strip, which was placed on the test cards. Thereafter, a drop of buffer was dispensed on the strip containing sampled plasma or serum. The mixture was then left to react with the HBsAg antibodies and conjugated particles for a period of 15 minutes; following which result was read.

2.5 Principle

The Hepatitis B surface antigen rapid strip test is a quantitative solid phase of a two site sandwich immunoassay procedure, used to detect the presence of hepatitis B serum antigen (HBsAg) in the whole blood serum and/or plasma. Here, the whole blood serum or plasma specimen reacts with anti HBsAg antibodies, and the conjugate migrate upwards to the membrane by capillary action. This leads to their reaction with the membrane to generate a colour line. However, presence of two colour lines will indicate a positive result, while a single colour line will indicate a negative result.

2.6 Ethical Considerations

Ethical clearance was obtained from the general hospital, Agbor, before actual sample collection, consent forms were administered to seek participants' permission. Only subjects whose consent we got were actually investigated.

3. RESULTS

Table 1 shows the prevalence rate of Hepatitis B surface antigen (HBsAg) amongst pregnant and non-pregnant women. From the table, total number of sampled pregnant women was 100 (test group). Of these, 5% were seen to be positive for HBsAg, with 2% of total non-pregnant women (100) showing positive for HBsAg. Apparently, 95% of sampled pregnant women were negative for HBsAg, with non-pregnant cases having 98% HBsAg negative.

Table 2 shows the percentage prevalence by age of HBsAg in pregnant and Non-Pregnant women. Therefore, pregnant women between ages 20-24, 25-29 and 30-34 had a relatively high prevalence rate of 10%, 4.7% and 3.7% respectively. All were statistically significant (at $p < .05$) upon comparison with Non-pregnant women.

Fig. 1 compares the percentage prevalence of Hepatitis B Virus (by age) for pregnant women. Here, significant number of sampled pregnant women between ages 20 through 34 years tested positive for HBV.

Fig. 2 represents changes in HBV with various trimesters of pregnancy in participants. Visible here is prevalence rates of (number of positive) 23%, 20% and 17% for Third, First and Second Trimesters respectively. This implies that sero-prevalence of HBV is trimester independent.

Fig. 3 shows a comparison between sero-prevalence of HBV (by age) with various trimesters of pregnancy (for pregnant women) and non-pregnancy states. As seen, higher prevalence rate occur in women of age brackets 15-19, 20-24, 25-29, 30-34, and 35-39; with those between 25-29 posing highest upon comparison for all sampled women. Here, FTP = First Trimester Pregnant women, NP=Non-Pregnant women, STP=Second Trimester Pregnant women, and TTP=Third Trimester Pregnant women.

Table 1. Prevalence of hepatitis B surface antigen between pregnant and non-pregnant women

	No screened	No positive	No negative	Mean	p-value
Pregnant Women	100	5(5%)	95(95%)	1.24	Insignificant
Non Pregnant Women (Control)	100	2(2%)	98(98%)	1.24	Insignificant

Table 2. Sero-prevalence of hepatitis B surface antigen by age in pregnant and non-pregnant women

Age (Years)	Pregnant women	No. positive N (%)	No. negative N (%)	Non-pregnant women	No. positive N (%)	No. negative N (%)
10-14	1	0	1 (1%)	4	0	4 (4%)
15-19	4	0	4 (4%)	43	1 (2.3%)	42 (42%)
20-24	20	2 (10%)	18 (18%)	38	1 (2.6%)	37 (37%)
25-29	43	2 (4.7%)	41 (41%)	10	0	10 (10%)
30-34	27	1 (3.7%)	26 (26%)	2	0	2 (2%)
35-39	3	0	3 (3%)	1	0	1 (1%)
40-44	1	0	1 (1%)	2	0	2 (2%)
45-49	1	0	1 (1%)	0	0	0
Total	100	5	94	100	2	98

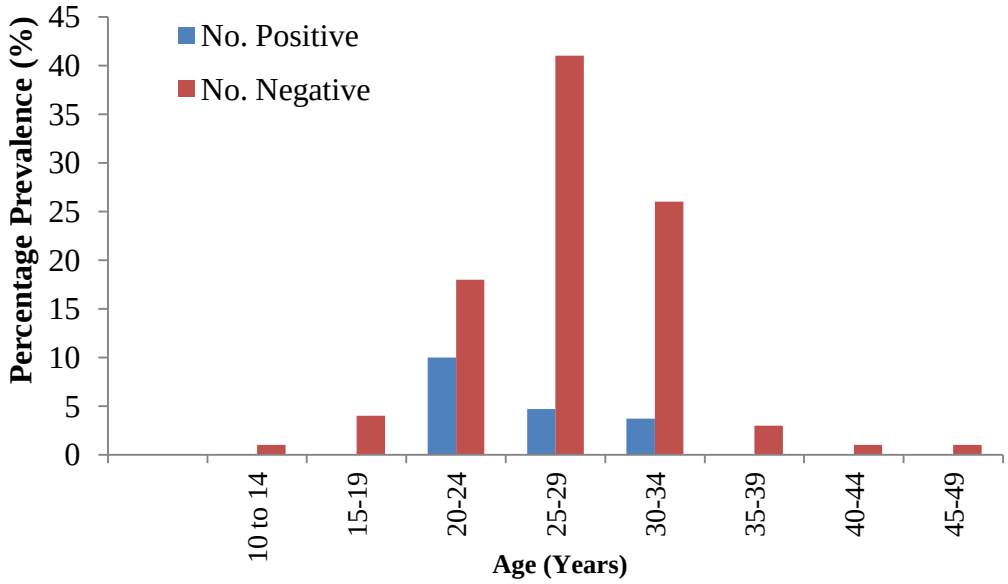

Fig. 1. Comparing percentage hepatitis B positives to negatives (by age) in pregnant women

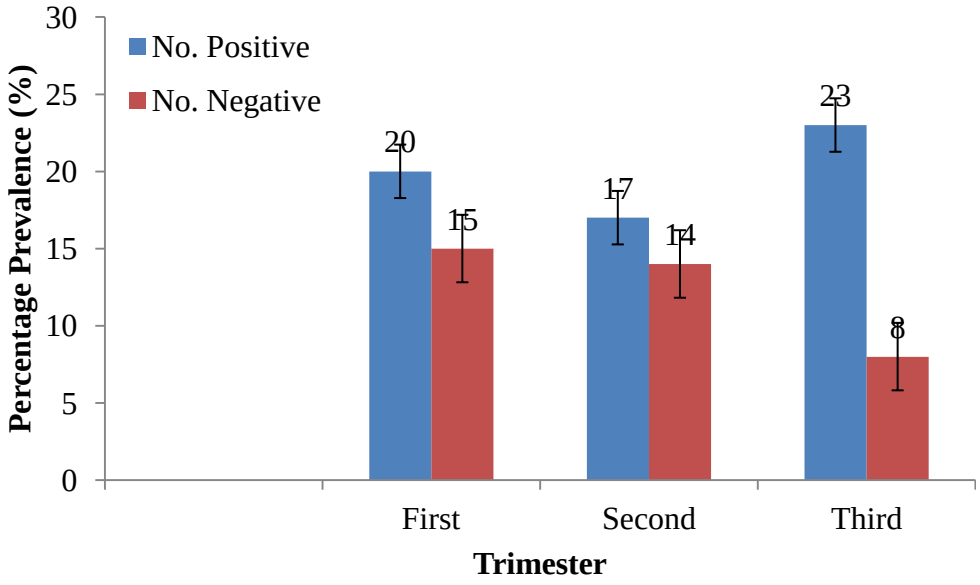

Fig. 2. Comparing Percentage Prevalence of Hepatitis B by trimester in pregnant women

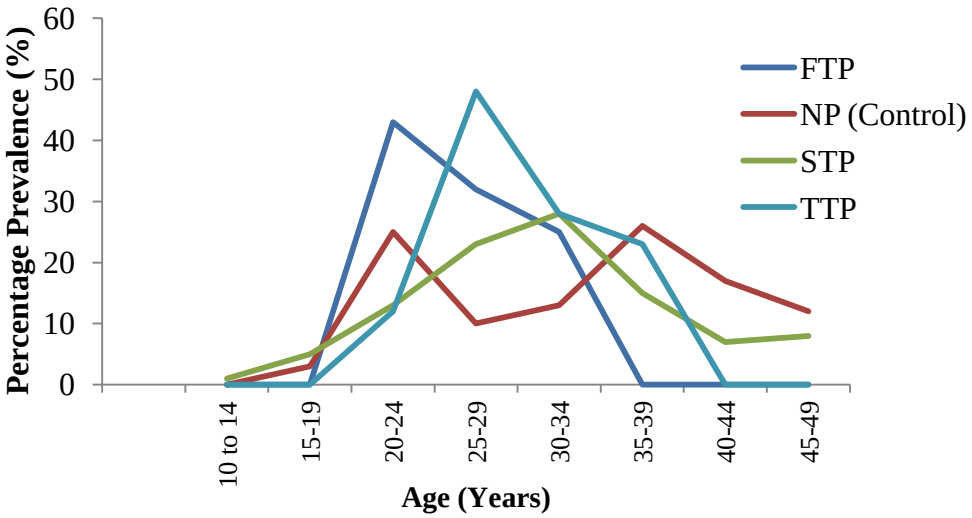

Fig. 3. Comparing percentage sero-prevalence of hepatitis B by age and trimester of pregnancy

4. DISCUSSION

According to the centre for disease control and prevention (CDC) 2005, the prevalence of hepatitis B infection varies in different parts of the world. Investigation on the prevalence rate of Hepatitis B surface antigen among pregnant women (test) in General Hospital, Agbor, Delta State. Investigation was also carried out on non-pregnant women (control). Result showed that the prevalence rate in pregnant women was higher than in non-pregnant women, being 5% in pregnant women and 2% in non-pregnant women in the general study population.

Studies have shown various percentage of Hepatitis B in pregnant women across different countries. The CDC goals of 2005 included an objective that by the year 2000, 90% of pregnant women would be screened in health centres before delivery. For current study, General Hospital, Delta state showed a 5% prevalence rate of HBsAg in pregnant as against 2% rate for non-pregnant women. This prevalence is higher than that of in general population as reported by Zahedan of Iran [15] who showed less than 3% prevalence in Barbers. In another study among 103 barbers, Zahedan showed 8.7% prevalence for HBsAg as well.

Similarly, Table 2 of current study shows Sero-Prevalence of Hepatitis B surface antigen by Age in Pregnant and Non-Pregnant Women. From the table, higher percentage of HBsAg positive subjects was seen in pregnant women of age 20-24 years with higher percentage (41%) of same age bracket proven to be HBsAg negative. The exact reason for subjects within this age (20-24 years) having to be positive may not be farfetched. It is most likely traceable to the fact that it is the age with high level of productivity. Expectedly, unprotected sexual intercourse is probable reason; more so that the said women were married. This finding aligns with that of Berker et al. [1] who recommended HBsAg test in pregnancy situations.

Hepatitis B virus is highly contagious. Usually, the disease is passed on during the birth process or during a vaginal delivery or a C-section [16]. When babies become infected with Hepatitis B, they have a 90% chance of developing a lifelong, chronic infection. As many as 1 in 4 people with chronic Hepatitis B develop serious health problems. Hepatitis B can cause liver damage, liver disease, and liver cancer [15,16]. In part with acute hepatitis B, vertical transmission occurs in up to 10% of neonates when acute infection occurs in third trimester [1]. Although the mother usually becomes jaundiced during the acute stage, 50% of cases have no symptoms, which is one of the reasons all pregnant women should routinely test for HBsAg at the first prenatal visit.

Fig. 3 compares percentage sero-prevalence of Hepatitis B by age and trimester of pregnancy. Here, it is obvious that majority of pregnant women that tested seropositive for Hepatitis B were in their first and third trimesters, being of age brackets 20-24 and 25-29 years respectively. Though the possible reason for this is inexplicable, one cannot but think that the prevalence rate was independent of trimester. For Fig. 2 also, third trimester of pregnancy appears to have highest prevalence for HBsAg than first (higher) and third trimesters respectively, with each recording a prevalence rates of 23%, 20% and 17% respectively for third, second and first trimesters. A statistically significant difference ($p < .05$) was returned from differences in mean between trimesters with analysis of variance. This also implies no relationship (correlation) between prevalence of HBsAg and trimester of pregnancy.

In prenatal screening exercises, HBsAg tests are highly recommended (Eulerciary et al., 2003). If testing has not been during pregnancy, it should be done at the time of delivery. If a pregnant woman has a positive test, her infant should be vaccinated against hepatitis B, and made to receive hepatitis B immunoglobulin. This will help reduce the risk that the infant will become infected to a range from zero to 3% [16]. There is therefore no perfect report on the pregnancies of HBsAg positivity in other regions of the world, though in most countries, pregnant women also have higher prevalence rate of Hepatitis B than the non-pregnant women. This implies that pregnant women are most exposed to Hepatitis B infections due to high exposure to sex. Also, due to the Hepatitis B infection in pregnant women, infections in neonates arise, causing hepatitis B in children. Also, due to documentation of high prevalence rate in pregnant than non-pregnant women, it becomes appropriate for pregnant women to take precautionary measures before, during and after pregnancy to ensure they are screened for HBsAg and get vaccinated against the virus. Vaccination is also suggested for non-pregnant women.

5. CONCLUSION

Hepatitis is an inflammation of the liver. Some types can be caused by various serious diseases, and may be sexually transmitted. In view of this, current study investigated the serum prevalence of Hepatitis B surface Antigen by age (and trimester) in pregnant women from general hospital, Agbor, Delta State. Upon investigation, study observed a 5% prevalence rate (of hepatitis B) in pregnant than non-pregnant (2% prevalence) women. Study also observed a statistically significant increase in hepatitis B surface antigen for non-pregnant women of age bracket 20-24 years (2.6% prevalence) to pregnant women of between 20-24 years.

6. RECOMMENDATIONS

It is suggested that women regularly screen for presence of hepatitis B in their blood before, during, and after pregnancy for proper prognosis and vaccination against the virus. Awareness programmes should also be encouraged, especially for rural communities to keep the public apprised of the cause, transmission, and symptoms of infection from this virus. We also recommend for further research in this area; approaching it from a more sophisticated way with higher sample size.

ETHICAL APPROVAL AND CONSENT

Ethical clearance was obtained from the general hospital, Agbor, before actual sample collection, consent forms were administered to seek participants' permission. Only subjects whose consent we got were actually investigated.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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