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3 **SEROPREVALENCE OF HEPATITIS B SURFACE ANTIGEN IN**  
4 **PREGNANT WOMEN OF GENERAL HOSPITAL AGBOR, DELTA**  
5 **STATE**

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7  
8 **Abstract:**

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10 Reportedly transmitted through unprotected sexual intercourse with infected person(s),  
11 experts have estimated new cases of hepatitis B virus (HBV) infections to be over 70,000 per  
12 year in the United States. With little or no records of such in Nigeria, this study investigated  
13 the prevalence of hepatitis B surface antigen at different trimesters of pregnancy in women  
14 who visit general hospital Agbor, Delta state, Nigeria; for antenatal care. A total of one  
15 hundred (100) pregnant and fifty (50) non-pregnant (control) women were ethically recruited  
16 for the exercise. They were then sub-grouped by age and duration of pregnancy (trimester);  
17 and an Acon serological strip was used to obtain blood samples from each subject. Obtained  
18 blood was then assayed for the presence of hepatitis B virus (in serum) and compared with  
19 those of control (non-pregnant) group. Following careful comparison of differences in mean  
20 (using the Analysis of variance), study found a 5% prevalence rate (of hepatitis B) in  
21 pregnant than non-pregnant (2% prevalence) women. Study also observed a statistically  
22 significant increase in hepatitis B surface antigen for non-pregnant women of age bracket 20-  
23 24 years (2.6% prevalence) to pregnant women of between 20-24 years. HBV infection  
24 therefore has high prevalence rate in pregnant than non-pregnant women as they are often  
25 more exposed to unprotected sexual intercourse. We recommend regular and continuous  
26 HBV screening in pregnancy to help circumvent HBV infection related ailments and  
27 complications. The same is also suggested for non-pregnant women for purpose of proper  
28 vaccination.

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29 **Keywords:** Hepatitis B, Pregnancy, Sero-prevalence, Antenatal

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30  
31 **INTRODUCTION**

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

39 Depending on cause and overall health infected individual, the symptoms of hepatitis  
40 vary significantly, with selected cases showing few noticeable symptoms [6]. If present  
41 however, symptoms may include general weakness and fatigue, loss of appetite, nausea,

42 fever, and abdominal pains/tenderness. Another symptom is jaundice, which apparently  
43 occurs as a yellowing of the skin and eyes due to the liver's failure to break down excess  
44 yellow-colored bile pigments in the blood. In acute hepatitis, symptoms often subside without  
45 treatment within a few weeks or months. About 5 percent of cases develop into an incurable  
46 form of the disease called chronic hepatitis, which may last for years [7&8]. Chronic hepatitis  
47 causes slowly progressive liver damage that may lead to cirrhosis, a condition in which  
48 healthy liver tissue is replaced with dead, nonfunctional scar tissue. In some cases, cancer of  
49 the liver develops [6].

50 Although it has many different causes, hepatitis most often results from infection by  
51 one of several hepatitis viruses. All hepatitis viruses are contagious, but each is differently  
52 passed from one person to another [9].

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

61 Epidemiologically, the prevalence of HBV varies from as low as 2% in developed  
62 countries to about 8% in developing countries. Here, even though sex, age and socio-  
63 economic status are reported risk factors that exacerbate it [12], however, available studies  
64 have suggest its degree of endemicity to often correlate with predominant mode of  
65 transmission. HBV disease has an enormous impact on health and national economy of many  
66 countries, and its severity is highly variable and quite unpredictable. The minimum infectious  
67 dose is so low that such practices like sharing of tooth brush or a razor blade can elicit its  
68 quick transmittion [13 & 14]. Hepatitis B virus also shares similar routes of transmission with  
69 HIV [6], Currently having four recognized modes of transmission (Viral Hepatitis Prevention  
70 Board, 1996); from mother to child at birth (prenatal), by contact with infected person  
71 (horizontal), by sexual contact and by exposure to blood or other infected fluids [7].

72 Irrespective of age group, HBV reportedly affects people across diverse spheres and  
73 ethnicities, predominantly more in young adults than the elderly [1]. Currently, Nigeria ranks  
74 high in the list of highly endemic HBV infected countries; with about 75% of its population  
75 reportedly likely to have been exposed to HBV at one time or the other in their life [2, 4, and

76 9]. To this point, current study was crafted to investigate the prevalence of HBV surface  
77 antigen in pregnant women in Nigeria, using general hospital, Agbor as a case study

78

### 79 **Aim of Study**

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

83

## 84 **Materials and Methods**

85

### 86 **Study Design**

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

90

### 91 **Study Population**

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

95

### 96 **Sample Collection**

97 With the aid of a Pasteur pipette (specimen dropper), blood samples were collected from  
98 subjects, with serology for hepatitis B was conducted on obtained blood samples to ascertain  
99 the presence of HBV in blood. Analysis of obtained sample for HBV positivity was done  
100 with the Acon Serological strips (ELISA).

101

### 102 **Procedure**

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

108

109 **Principle**

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

117

118 **Ethical Considerations**

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

122

123 **Results**

124 **TABLE 1: Prevalence of Hepatitis B surface antigen between Pregnant and Non-**  
125 **Pregnant Women**

126

	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

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

132

133 **TABLE II: Sero-Prevalence of Hepatitis B surface antigen by Age in Pregnant and Non-**  
134 **Pregnant Women**

135

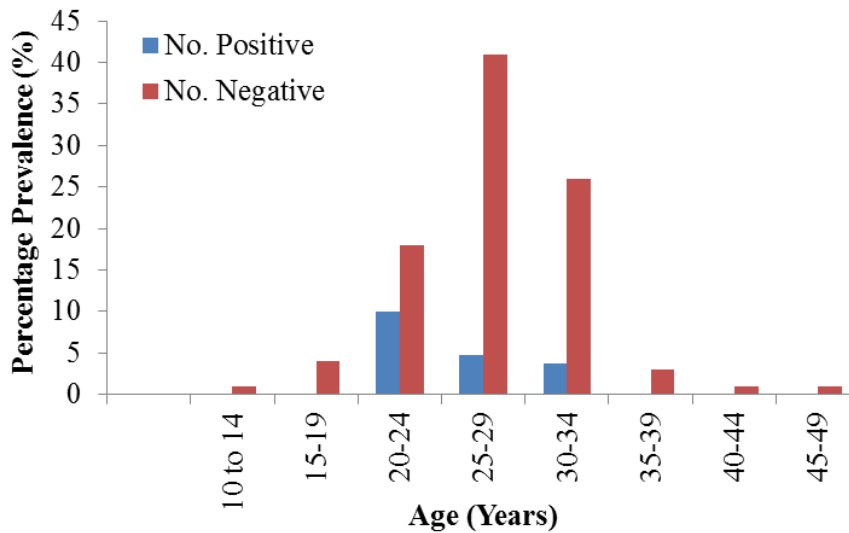
Age (Years)	Pregnant Women	No. Positive	No. Negative	Non-Pregnant Women	No. Positive	No. Negative
10-14	1	0	1 (1%)	4	0	4 (4%)
15-19	4	0	4 (4%)	43	1 (2.3%)	42 (42%)
20-24	20	2 (10%)	18 (18%)	38	1 (2.6%)	37 (37%)
25-29	43	2 (4.7%)	41 (41%)	10	0	10 (10%)
30-34	27	1 (3.7%)	26 (26%)	2	0	2 (2%)

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

136 Above table (table II) shows the percentage prevalence by age of HBsAg in pregnant and Non-  
 137 Pregnant women. For the table, pregnant women between ages 20-24, 25-29 and 30-34 had a  
 138 relatively high prevalence rates of 10%, 4.7% and 3.7% respectively. All were statistically significant  
 139 (at  $p < .05$ ) upon comparison with Non-pregnant women. Here, No. means number of,

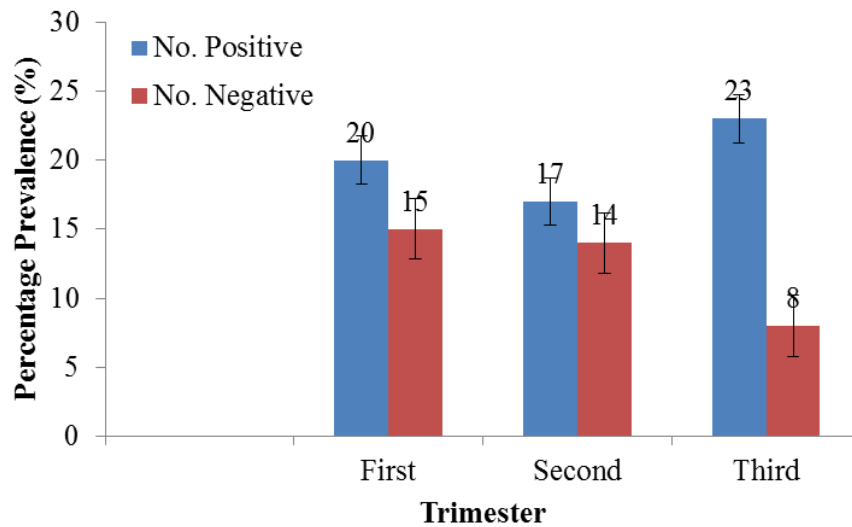
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142 **Figure I: Comparing Percentage Hepatitis B Positives to Negatives (by age) in Pregnant**  
 143 **Women**



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**Figure II: Comparing Percentage Prevalence of Hepatitis B by Trimester in Pregnant Women**



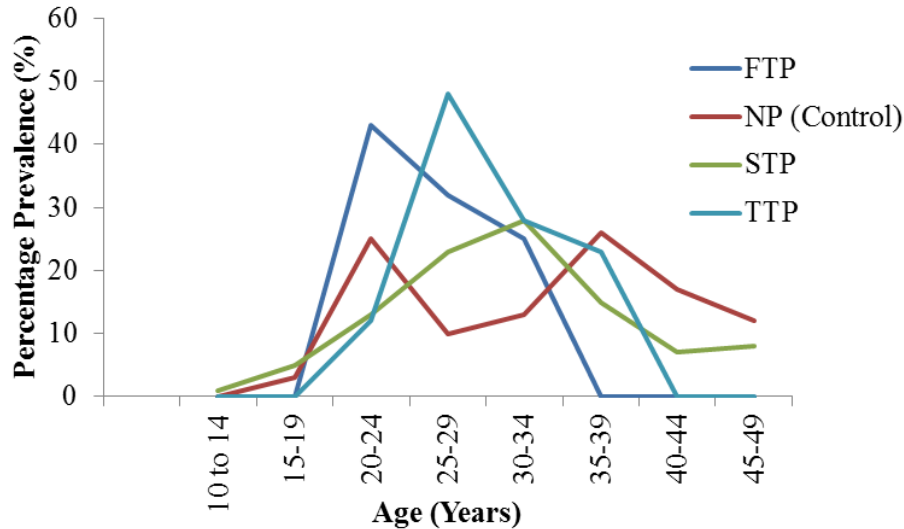
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Above figure (Figure II) represents changes in HBV with various trimesters of pregnancy in participants. Visible here is prevalence rates of (number of positive) 23%, 20% and 17% for Third, First, and Second trimesters respectively.

152 First and Second Trimesters respectively. This implies that sero-prevalence of HBV is trimester  
153 independent

154  
155

156 **Figure III: Comparing Percentage Sero-Prevalence of Hepatitis B by Age and**  
157 **Trimester of Pregnancy**



158  
159

160 Figure III (above) shows a comparison between sero-prevalence of HBV (by age) with various  
161 trimesters of pregnancy (for pregnant women) and non-pregnancy states. As seen, higher prevalence  
162 rate occur in women of age brackets 15-19, 20-24, 25-29, 30-34, and 35-39; with those between 25-  
163 29 posing highest upon comparison for all sampled women. Here, FTP = First Trimester Pregnant  
164 women, NP=Non-Pregnant women, STP=Second Trimester Pregnant women, and TTP=Third  
165 Trimester Pregnant women

166

## 167 Discussion

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

175 Studies have shown various percentage of Hepatitis B in pregnant women across  
176 different countries. The CDC goals of 2005 included an objective that by the year 2000, 90%  
177 of pregnant women would be screened in health centres before delivery. For current study,  
178 General Hospital, Delta state showed a 5% prevalence rate of HBsAg in pregnant as against  
179 2% rate for non-pregnant women. This prevalence is higher than that of in general population

180 as reported by Zahedan of Iran [15] who showed less than 3% prevalence in Barbers. In  
181 another study among 103 barbers, Zahedan showed 8.7% prevalence for HBsAg as well.

182 Similarly, table II of current study shows Sero-Prevalence of Hepatitis B surface  
183 antigen by Age in Pregnant and Non-Pregnant Women. From the table, higher percentage of  
184 HBsAg positive subjects was seen in pregnant women of age 20-24 years with higher  
185 percentage (41%) of same age bracket proven to be HBsAg negative. The exact reason for  
186 subjects within this age (20-24 years) having to be positive may not be farfetched. It is most  
187 likely traceable to the fact that it is the age with high level of productivity. Expectedly,  
188 unprotected sexual intercourse is probable reason; more so that the said women were married.  
189 This finding aligns with that of Berker et al (2009) [1] who recommended HBsAg test in  
190 pregnancy situations.

191 Hepatitis B virus is highly contagious. Usually, the disease is passed on during the  
192 birth process [16]. In part with acute hepatitis B, vertical transmission occurs in up to 10% of  
193 neonates when acute infection occurs in third trimester [1]. Although the mother usually  
194 becomes jaundiced during the acute stage, 50% of cases have no symptoms, which is one of  
195 the reasons all pregnant women should routinely test for HBsAg at the first prenatal visit.

196 Figure III compares percentage sero-prevalence of Hepatitis B by age and trimester of  
197 pregnancy. Here, it is obvious that majority of pregnant women that tested seropositive for  
198 Hepatitis B were in their first and third trimesters, being of age brackets 20-24 and 25-29  
199 years respectively. Though the possible reason for this is inexplicable, one cannot but think  
200 that the prevalence rate was independent of trimester. For figure II also, third trimester of  
201 pregnancy appears to have highest prevalence for HBsAg than first (higher) and third  
202 trimesters respectively, with each recording a prevalence rates of 23%, 20% and 17%  
203 respectively for third, second and first trimesters. A statistically significant difference ( $p <$   
204  $.05$ ) was returned from differences in mean between trimesters with analysis of variance. This  
205 also implies no relationship (correlation) between prevalence of HBsAg and trimester of  
206 pregnancy.

207 In prenatal screening exercises, HBsAg tests are highly recommended (Eulerici et  
208 al., 2003). If testing has not been during pregnancy, it should be done at the time of delivery.  
209 If a pregnant woman has a positive test, her infant should be vaccinated against hepatitis B,  
210 and made to receive hepatitis B immunoglobulin. This will help reduce the risk that the infant  
211 will become infected to a range from zero to 3% [16]. There is therefore no perfect report on  
212 the pregnancies of HBsAg positivity in other regions of the world, though in most countries,  
213 pregnant women also have higher prevalence rate of Hepatitis B than the non-pregnant

214 women. This implies that pregnant women are most exposed to Hepatitis B infections due to  
215 high exposure to sex. Also, due to the Hepatitis B infection in pregnant women, infections in  
216 neonates arise, causing hepatitis B in children. Also, due to documentation of high prevalence  
217 rate in pregnant than non-pregnant women, it becomes appropriate for pregnant women to  
218 take precautionary measures before, during and after pregnancy to ensure they are screened  
219 for HBsAg and get vaccinated against the virus. Vaccination is also suggested for non-  
220 pregnant women.

221

## 222 **Conclusion**

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

231

## 232 **Recommendations**

233 It is suggested that women regularly screen for presence of hepatitis B in their blood  
234 before, during, and after pregnancy for proper prognosis and vaccination against the virus.  
235 Awareness programmes should also be encouraged, especially for rural communities to keep  
236 the public apprised of the cause, transmission, and symptoms of infection from this virus. We  
237 also recommend for further research in this area.

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239  
240

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