

**Original Research Article****SEROPREVALENCE OF HEPATITIS B VIRUS AMONG PREGNANT WOMEN  
ATTENDING ANTE-NATAL CLINIC AT GENERAL HOSPITAL ARGUNGU, KEBBI  
STATE NIGERIA****ABSTRACT:**

Hepatitis B virus infection is caused by Hepatitis B virus, and the virus can be transmitted from infected mother to her new born child during pregnancy. This research work was aimed at determining the prevalence of Hepatitis B virus among pregnant women attending ante-natal clinic in General Hospital Argungu. 300 serum samples were assayed using ACON Rapid Test Strip Kit. 38 (12.7%) of the patients have antibodies to HBV. From the research the highest prevalence of HBsAg was found among the age group 20 – 29 years and lowest among the age group of 30 – 39 years. 2<sup>nd</sup> trimester (4 – 6 months) had the highest prevalence rate of 11.3%, followed by 3<sup>rd</sup> trimester (7 – 9 months) with 1.3%, while the 1<sup>st</sup> trimester (1 – 3 months) had zero prevalence (0%). Those that shared sharp objects had the prevalence of 4.6%. Those that had blood transfusion had prevalence of 1.0% while those that are unvaccinated had the highest prevalence of 12.3%. The family type or status i.e. monogamy or polygamy, from the three hundred subjects screened, two hundred and thirty nine family type of the subjects were monogamous and sixty one were polygamous which represent 9.0% and 3.6% respectively. It was observed that fifty had primary education, two hundred and thirty six had secondary education, twenty had tertiary education and ninety four had informal education. Those that had secondary education had the highest prevalence of 7.0% while those with primary education have the least prevalence with 1.0%. This study shows that there are tendencies of vertical transmission from these infected mothers to their new born babies. It is therefore recommended that more study with advance technology such as PCR should be encouraged and more research should be conducted on a large population in other states of the country so as established the endemicity of HBV.

*Keywords:* sero prevalence, HBV, Pregnant Women, General Hospital.

## INTRODUCTION

30  
31

32 Hepatitis B virus (HBV) is a DNA virus belonging to the family Hepadna-viridae with Hepatitis  
33 B Surface Antigen (HBsAg) being a complex antigen found on its surface (Brooks *et al.*, 2007,  
34 Hallinger and Dienstag, 1990). The recognition of hepatitis B virus was first made by Blumberg.  
35 When testing the serum of an **Australianaborigine**, which he described as Australian antigen and  
36 is later termed hepatitis B surface antigen<sup>(13)</sup> Hepatitis B virus has been recognized as one of the  
37 public challenges worldwide with approximately two billion people infected, an estimated 1 – 2  
38 million annual death due to infection and about 400 million persons being chronic carriers  
39 (WHO, 2000).

40 **In man**, hepatitis B virus is among the most important cause of acute inflammation and necrosis  
41 of the liver and it is an etiological agent of hepato-cellular carcinoma. HBV attack the liver and  
42 cause livelong infection, cirrhosis of the liver, liver cancer, liver failure and death (Koneman *et*  
43 *al.*, 1992). Hepatitis B virus is transmitted parentarally and most common by transfusion of HBV  
44 infected blood or blood products, intravenous drug abuse, from mother to child, needle stick  
45 injury, ear piercing, tattooing and other tribal ceremonies, barbers razors etc. infection may also  
46 spread by formites, sharing of toothbrush, abrasion and sexual contact (hetero or homosexual)  
47 with infected persons.<sup>(14)</sup> Neonates born of chronically infected mothers are 70 – 90% at risk of  
48 the infection progressing to chronic phase (Lin and Kichner, 2004).

49 Since detection of HBsAg in serum is an indicative of either acute or chronic phase of HBV  
50 infection, this investigation was carried out to detect the prevalence of HBsAg in the Sera of  
51 Pregnant women attending General Hospital Argungu with a view of establishing the  
52 seroprevalence of HBV infection among pregnant women attending the hospital (Lin and  
53 Kichner, 2004).

## MATERIALS AND METHOD

54

### **Study Area**

55  
56 The research was designed in order to study the prevalence rate of Hepatitis B surface antigen  
57 infection among pregnant women in Argungu metropolis. General Hospital Argungu was used  
58 for the purpose of this study.

### **Ethical Clearance:**

59  
60 Ethical clearance for the study were obtained from ethical committee of General Hospital  
61 Argungu. Informed consent was obtained from the Patients.

### **Study Population**

62  
63 The study population **comprised of 300 pregnant** women attending ANC in Argungu metropolis,  
64 kebbi state.

### 65 **Sample Collection**

66 Five milliliter of whole blood was collected by vein puncture from the anti-cutibal foci after  
67 swabbing with 70% alcohol from each subject aseptically. The blood was allowed to clot; the  
68 serum was centrifuged at 2500 rpm for 20 minutes. It was then separated into sterile sample  
69 bottle and labeled with their antenatal number, and was sued for HBV assay.

### 70 **Laboratory Methods**

71 The ACON rapid test kit was used to test the samples for HBV antibodies. This is a rapid  
72 chromatographic immunoassay for the qualitative detection of antibodies to HBV in serum or  
73 plasma.

### 74 **Principle of the Test**

75 The ACON HBsAg Rapid Test Strip (serum/plasma) is a qualitative, solid phase, two-site  
76 sandwich immunoassay for the detection of HBsAg in whole blood, serum or plasma. The  
77 membrane is pre-coated with anti-HBsAg antibodies on the test line region of the strip. During  
78 testing, the whole blood, serum or plasma specimen reacts with anti-HBsAg antibodies  
79 conjugated particles. The mixture migrates upward on the membrane chromatographically by  
80 capillary action to react with anti-HBsAg antibodies on the membrane and generate a coloured  
81 line. The presence of this coloured line in the test region indicates a positive result, while its  
82 absence indicates a negative result. To serve as a procedural control, a colored line will always  
83 appear in the control line region indicating that proper volume of specimen has been added and  
84 membrane wicking has occurred.

### 85 **Procedure**

86 The test strip and the test samples were allowed to equilibrate to room temperature prior to  
87 testing. The test strip was removed from the sealed foil pouch. The tape from the test card was  
88 peeled off, and the test strip was stocked in the middle of the test card with arrows pointing down  
89 on the test card. By holding the dropper vertically, 3 drops of serum (approximately 75ul) was  
90 transferred onto the “specimen pad” of the test strip, and the timer was started. The result was  
91 read after 15 minutes.

### 92 **Interpretation of Test Results**

- 93 • POSITIVE: Two distinct coloured lines appear. One line should be in the control region  
94 (C) and another line should be in the test region (T).
- 95 • NEGATIVE: One coloured line appears in the control region no apparent coloured line  
96 appears in the test region (T).
- 97 • INVALID: Control line fails to appear. Insufficient specimen volume or incorrect  
98 procedural techniques are the most likely reasons for control line failure. Review the  
99 procedure and repeat the test with a new test strip. If the problem persists, discontinue  
100 using the test kid immediately.

101

102

**RESULTS**

103 A total of three hundred (300) serum samples were collected from pregnant women attending  
 104 ante-natal clinic, General Hospital Argungu. Out of the three hundred serum samples screened  
 105 for HBsAg, thirty eight 38 (12.7%) women were positive for Hepatitis B surface antigen and 262  
 106 (87.44%) were negative for Hepatitis B surface antigen. (Table 1).

107 Table 2 shows the age distribution of HBsAg. The age group 20 – 29 has the highest prevalence  
 108 of 7.33% followed by below 20 years age group with 4.0% while the 30 – 39 years age group has  
 109 the least prevalence of 1.3%, followed by 40 – 49 years age group with zero prevalence.

110 Table 3. Shows the distribution of HBsAg based on trimester. 2<sup>nd</sup> trimester (4 – 6 months) had  
 111 the highest prevalence rate of 11.3%, followed by 3<sup>rd</sup> trimester (7 – 9 months) with 1.3%, while  
 112 the 1<sup>st</sup> trimester (1 – 3 months) had zero prevalence (0%).

113 Table 4. Show the prevalence of HBsAg based on risk factors. Those that shared sharp objects  
 114 had the prevalence of 4.6%. Those that had blood transfusion had prevalence of 1.0% while  
 115 those that are unvaccinated had the highest prevalence of 12.3%. The family type or status i.e.  
 116 monogamy or polygamy, from the three hundred subjects screened, two hundred and thirty nine  
 117 family type of the subjects were monogamous and sixty one were polygamous which represent  
 118 9.0% and 3.6% respectively.

119 Table 5. Shows educational qualification of women screened. From the table, it was observed  
 120 that fifty had primary education, two hundred and thirty six had secondary education, twenty had  
 121 tertiary education and ninety four had informal education. Those that had secondary education  
 122 had the highest prevalence of 7.0% while those with primary education have the least prevalence  
 123 with 1.0%.

**TABLE 1: Overall Result of HBsAg Prevalence**

125

<b>Total number</b>	<b>No. of positive (%)</b>	<b>No. of negative (%)</b>
300	38 (12.66)	262 (87.4)

126 HBsAg = Hepatitis B surface antigen, No. = number, % = percent.

127

128

129

130

131 **TABLE 2:** Age Distribution of HBsAg Among the Patients

132

Age (years)	No. screened	No. positive	Prevalence (%)
Below 20	80	12	4.0
20 – 29	177	22	7.3
30 – 39	40	4	1.3
40 – 49	3	0	0.0
<b>Total</b>	<b>300</b>	<b>38</b>	<b>12.6</b>

133 HBsAg = Hepatitis B surface antigen, No. = number, % = percent.

134 **TABLE 3:** Distribution of HBsAg Based on Trimester

135

Trimester	No. screened	No. positive	Prevalence (%)
1 <sup>st</sup> (1-3 months)	8	0	0
2 <sup>nd</sup> (4-6 months)	243	34	11.3
3 <sup>rd</sup> (7-9 months)	49	4	1.3
<b>Total</b>	<b>300</b>	<b>38</b>	<b>12.6</b>

136 HBsAg = Hepatitis B surface antigen, No. = number, % = percent, 1<sup>st</sup> = First, 2<sup>nd</sup> = Second, 3<sup>rd</sup> =  
137 Third.

138

139

140 **TABLE 4:** Distribution of HBsAg with Respect to Risk Factors

141

Age (years)	No. screened	No. positive	Prevalence (%)
<b>1. Sharing with sharp object</b>			
Yes	80	14	4.6
No	220	24	8.0
<b>Total</b>	<b>300</b>	<b>38</b>	<b>12.6</b>
<b>2. Blood transfusion</b>			
Yes	16	3	1.0
No	284	35	11.6
<b>Total</b>	<b>300</b>	<b>38</b>	<b>12.6</b>
<b>3. Vaccination</b>			
Yes	67	1	0.3
No	233	37	12.3
<b>Total</b>	<b>300</b>	<b>38</b>	<b>12.6</b>
<b>4. Family status</b>			
Monogamy	239	27	9.0
Polygamy	61	11	3.6
<b>Total</b>	<b>300</b>	<b>38</b>	<b>12.6</b>

142 HBsAg = Hepatitis B surface antigen, No. = number, % = percent.

143 **TABLE 5:** Distribution of HBsAg Based on Educational Status

144

Education	No. screened	No. positive	Prevalence (%)
Primary	50	3	1.0
Secondary	136	21	7.0
Tertiary	20	6	2.0
Informal	94	8	2.6
<b>Total</b>	<b>300</b>	<b>38</b>	<b>12.6</b>

145 HBsAg = Hepatitis B surface antigen, No. = number, % = percent.

146

**DISCUSSION**

147 The prevalence rates of HBV vary according to the endemicity of the infection in a given area.  
148 Kong *et al.*, (1997) reported prevalence rate of 10.0% among pregnant women in Hong Kong,  
149 Lin *et al.*, (2003) reported 12.0% prevalence rate from Taiwan, while 17.3% was reported for  
150 Burkina Faso (Collenberg *et al.*, 2006). In Nigeria, 11.6% prevalence rate has reported from  
151 Maiduguri, 4.3% from Port Harcourt, 5.7% from Ilorin, in Lagos, prevalence was reported to be  
152 4.4% and 8.3% from Zaria (Harry *et al.*, 1994; Akani *et al.*, 2005; Agbed *et al.*, 2007 and Luka *et*  
153 *al.*, 2008). Very high prevalence rate are mostly reported from the developing nations in Asia  
154 and Africa.

155 Hepatitis B is one of the diseases of mankind and is a serious global health problem, caused by  
156 the hepatitis B virus. It has been established that HBV infection can be transmitted from mother  
157 to child during birth. High prevalence of HBV among pregnant women increases chances of  
158 HBV in children. From the result obtained in this study, out of 300 samples screened for HBsAg,  
159 38 samples were found positive to hepatitis B virus infection (12.7%). This is in agreement with  
160 earlier reports of 13.8%, 10.0%, 11.6% and 12.0% from Lagos, Hong Kong, Maidurugi and  
161 Taiwan respectively (Harry *et al.*, 1994, Lin *et al.*, 2003 and Nasidi *et al.*, 1983).

162 Within Nigeria, results from this study is higher than the 4.3%, 5.7% and 8.3% reported from  
163 Port Harcourt, Ilorin and Zaria respectively (Agbed *et al.*, 2007, Akani *et al.*, 2005 and Luka *et*  
164 *al.*, 2008). The decrease in prevalence rates among some Nigerians could be due to anti HBsAg  
165 vaccination policy of the government. Detection of HBsAg among the study population has  
166 confirmed statement that detection of HBsAg in serum is indicative of active acute or chronic  
167 hepatitis B virus infection (Hallinger and Dienstag, 199).

168 On the basis of age group, the highest prevalence rate (7.3%) was found among those 20 – 29  
169 years, followed by below 20 years with 4.0% while 40 – 49 years had 0.0% prevalence. This age  
170 of infection correlate well with the age of greatest sexual activity especially among women of  
171 childbearing age, supporting the role of sexual intercourse in the transmission of hepatitis B virus  
172 infection. In this study, women of their second trimester of pregnancy had the highest prevalence  
173 of 11.3%, contrary to observations of Lilavati *et al.*, (2004) that the third trimester in pregnant  
174 women had the highest prevalence rate.

175 Considering various risk factors, pregnant women with history of sharing sharp object have the  
176 highest prevalence of 11.6%, followed by blood transfusion 1.0%, which might be one of the  
177 most pre-disposing of HBV infection among these pregnant women, indicating the significance  
178 of screening blood for HBV infection. From the study, it was observed that highest number of  
179 HBV infectious was found among monogamy type of family, while there are few positive cases  
180 of HBV infection among polygamy family type, this shows that family type (monogamy or  
181 polygamy) does not have much significant in the prevalence of HBV infection in Argungu  
182 metropolis, this is because the spread of most STD's does not depend on family type but defend

183 on so much on the faithfulness of partners which are involved. Those who belong to the  
184 polygamy family who are infected may be due to sharing of husband who is unfaithful or who  
185 becomes infected by an unfaithful co-wife.

## 186 **CONCLUSION**

187  
188 The conclusion from this study is that it is evident that HBV infection is present or occurred  
189 among these pregnant women hence there is still need to educate them about the danger  
190 associated with this virus infection, its possible routes of transmission and possibilities of vertical  
191 transmission to their new born babies from infected mothers.

## 192 **RECOMMENDATIONS**

193  
194 Based on the result obtained in this study the following are recommended.

- 195 1. Every pregnant woman for ante-natal visit should be screened for HBsAg and  
196 government should subsidize HBsAg screening not only for pregnant women but also for  
197 those preparing for pregnancy so that adequate precaution should be taken.
- 198 2. There should be campaign to create awareness on the modes of transmission, the risk  
199 factors as well as how to control the spread of HBV should be intensified and increase  
200 where there is no trust for one another.
- 201 3. Blood for transfusion, blood should be properly screened with latest and modern  
202 equipment and reagents that can detect minute antibody or antigen in the blood.
- 203 4. Sharing of personal items such as tooth brush, razor blades should be discouraged among  
204 the populace.
- 205 5. Health personnel in close contact with infected individuals should be given HBV vaccine  
206 and possible precautions to avoid hospital infection
- 207 6. Infected individual should be treated to reduce spread of the virus in the community.
- 208 7. Routine vaccination of previously unvaccinated children and vaccination of adults at  
209 increased risk for infection.
- 210 8. prevention of perinatal HBV infection through routine screening of all pregnant women  
211 for HBV infection and by providing immunoprophylaxis to infants born to infected  
212 women or to women of unknown infection status.

213

214

215

216



217  
 218  
 219  
 220  
 221  
 222  
 223  
 224  
 225  
 226  
 227  
 228  
 229  
 230  
 231  
 232  
 233  
 234  
 235  
 236  
 237  
 238  
 239  
 240  
 241  
 242  
 243  
 244  
 245  
 246  
 247  
 248  
 249  
 250  
 251  
 252  
 253  
 254  
 255  
 256

## REFERENCES

1. Agbede, O. O., Iseniyi, J. O., Kolewale, M. O., Ojuowa, A. (2007). Risk factors and Seroprevalence of Hepatitis B antigenemia in mothers and their preschool children in Ilorin, Nigeria. *Therapy*. 2007; **4** (1): 67 – 72.
2. Akani, C. I., Ojule, A. C., Opurum, H. C., Ejilemele, A. A. Seroprevalence of HBsAg in pregnant women in part of Port Harcourt, Nigeria. *Post Graduate Medical Journal*. 2005; **12** (4): 266 – 270.
3. Brooks, G. F., Carroll, K. C., Butel, J. S., Morse, S. A. *Medical Microbiology*, 24<sup>th</sup> Edition; International Edition, McGraw Hill Publishers, New York, USA; 2007.
4. Collenberg, E., Ouedraogo, T., Ganame, J., Ackernscher, H. Kynas-wolf, G., Becher, H., Kouyate, B. Krauslich, H.C., Sangave, L., Tiet, D.M. Sero-prevalence of six different viruses among pregnant women and blood donors in rura and urban Burkina Faso: A comparative analysis. *Journal of Medical Virology*. 2006; **78** (5): 638 – 192.
5. Hallinger, F. B. and Dienstag, J. L. (1990). Hepatitis B and Hepatitis D virus in: Murray, P. R., Baron, E. J., Pfaller, M. A. Tenover, F.C. and Tenover, R. H. (eds): *Manual of clinical microbiology*, 7<sup>th</sup> Edition, American Society for Microbiology Asna Press, Washington DC: USA; 1990. P. 1025 – 1042.
6. Harry, T. O., Bajani, M. D., Moses, A. E. Hepatitis B virus infection among blood donors and pregnant women in Maiduguri, Nigeria. *East African Medical Journal*. 1994; **70**: 596 – 597.
7. Koneman, B. W., Allen, S. D., Winn, Jr U. N. C. Diagnostic of infectioncsued by viruses, Chlamydia, rickettsia and related organism and diagnostic microbiology. J.P. Lippincolt 6<sup>th</sup> Edition; 1992. P. 1000 – 1006.
8. Lilavati, G., Chandra, M.P., Umakanta, N. Incidence of HBsAgcarriers state in pregnancy in eastern Orissa. *Journal of Obbstetric and Gynaecology India*. 2004; **54** (2): 136 – 138.
9. Lin, H. H., Kao, J. H., Chang, T. C., Hsu, H.Y., Chen, D.S. Secular trend of age specific prevalence of hepatitis B surface and antigenemia in pregnant women in Taiwan. *Journal of Medical Virology*. 2003; **69** (1): 75 – 86.
10. Lin, K. W., Kirchner, J. T. *Hepatitis B Journal of American Academy of family physicians*. 2004; **69** (1): 75 – 86.
11. Luka, S. A., Ibrahim, M. B., Iliya, S. N. Seroprevalence of hepatitis B surface antigen among pregnant women attending Ahmadu Bello University Teaching Hospital Zaria. *Nigerian Journal of Parasitology*.2008; **29** (1): 38 – 41.
12. Nasidi, A. T. O., Vyazor, S. O., Numumbe, G. M. R., Azzan, B. B., Ancinlev, V. A. Prevalence of Hepatitis B infection marker in two different geographical areas of Nigeria.Proceedings of the first international conference. Lagos, Nigeria; 1983.
13. Rajesh, B., Rattan.L. I. (2008). *Essentials of medical microbiology*, 4<sup>th</sup> edition.Jaypee Brothers Medical Publisher (P) LTD; 2008. P. 391 – 396.

- 257 14. Ugwuja, E., Ugwu, N. Seroprevalence of hepatitis B surface antigen and liver function  
258 tests among adolescents in Abakaliki, South Eastern Nigeria. *The Internet Journal of*  
259 *Tropical Medicine*. 2009; **6** (1): 220 – 229.
- 260 15. WHO (2000). The modes of HIV transmission.Fact sheet.
- 261 16. Kong MS, Liang DC, Shau WY, Chen DS. Universal hepatitis B vaccination in Taiwan  
262 and the incidence of hepatocellular carcinoma in children. *Taiwan Childhood Hepatoma.*  
263 *N Engl J Med*. 1997; 336(26):1855-9.  
264