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33 **Introduction**

34 Viral hepatitis is an infectious disease that results from liver inflammation caused by a virus [1]. It is
35 considered an outstanding public health concern that affects millions of people annually. The infection is
36 known to be responsible for health conditions such as cirrhosis of the liver and hepatocellular carcinoma
37 (HCC) and consequently a global mortality record of over 1.4 million deaths [2]. African and Western
38 Pacific regions account for 68% of positive cases of hepatitis B viral infection. A national survey of
39 hepatitis B in Nigeria showed a prevalence of 12.2% in the entire population [3].

40 Hepatitis B has been epidemiologically identified as one of the globally most recognized common
41 severe infectious diseases and has been implicated in significant morbidity and mortality rate. It is
42 transmitted through exposure to contaminated blood or body fluids, unprotected sexual contacts with an
43 infected person, blood transfusion, use of contaminated needles, syringes, and sharp objects as well as
44 vertical transmission from mother to child [4].

45 There is high risk of HBV transmission from a hepatitis B surface antigen (HBsAg) mother to a newborn
46 [5]. Reported prevalence of HBsAg among pregnant women varies from one region to another. Although
47 a systematic review of hepatitis B infection among pregnant women in Nigeria revealed a prevalence of
48 14.1%, effort to tackle this infectious disease effectively requires detailed fragmented information on its
49 prevalence. Thus, the need for this research becomes imperative.

50 Masaka is a town in Nasarawa North Central Nigeria. It is a district of Karu Local Government Area of
51 Nasarawa State and is among the towns that forms the Karu Urban area, a conurbation of towns under
52 Karu Local Government Area of Nasarawa State. It is located at the latitude 9⁰ 00' 10.80" N and
53 longitude 7⁰ 40' 14.99" E.

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METHODOLOGY

Study location

The study was carried out in Masaka (latitude 9° 00' 10.80" N and longitude 7° 40' 14.99" E) Karu Local Government Area of Nasarawa state, North Central Nigeria between the month of May and June. Nigeria.

Sample size determination

Multistage sampling technique was adopted to recruit 200 pregnant women. At the preliminary stage, 12 Health Facilities (HF) that provide ANC were recruited with the aid of balloting method of simple random sampling, after which ante-natal clinic attendees that patronize the hospitals were recruited using simple systematic random sampling. Average daily attendance to ANC in the selected hospitals was relied upon to adopt a sampling interval of 10. The first attendee was sampled by balloting and subsequently every 10th attendee was approached for the study till the sample size was achieved [3].

Inclusion Criteria

Pregnant Women receiving ante-natal care (ANC) at any of the selected hospitals in Masaka and within the study age group (18-45) who had not been immunized against immunization were included.

Study instrument and data collection

Semi-structured questionnaire was used with which information on the socio-demographic characteristics of the study population was collected and some of the HBV infection oriented factors such blood transfusion, surgery, and sharing of sharp objects were generated from the respondents using a semi-structured questionnaire.

82 **Sample collection**

83 Precisely 1ml of blood was aseptically collected for hepatitis screening after the consent of the hospital
84 management as well as that of the attendees had been sought and approval granted.

85 **Sample analysis**

86 Enzyme-linked immunosorbent assay (ELISA) kit produced by LabACONR (Hangzhou Biotest Biotech
87 Co., Ltd, China) which has sensitivity and specificity of 99.9% and 99.0% respectively was employed to
88 assay. The manufacturer's instructions were carefully observed. The results were reported as positive or
89 negative.

90 **Statistical Analysis**

92 The information obtained from the questionnaires was subjected to descriptive statistical analysis using
93 the (SPSS version 2.80, Claremont, California USA). Chi Square test was employed to determine the
94 relationship between the risk factors and prevalence of the infection. Values obtained were considered
95 significant at $p < 0.05$.

96 **Result**

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99 Two hundred (200) pregnant women were recruited for the study. Of these, 13 were confirmed positive
100 for HBsAg accounting for 6.5% of the sample population. Information on the socio-demographic
101 characteristics of the population (Table 1) indicated that HBsAg prevalence was highest among the 24-35
102 age categories where 8 out of the 13 women tested positive to HBsAg. The study also revealed that
103 prevalence rate was dependent on the attendees' level of education with the highest prevalence rate of
104 10.71% reported for the uneducated members of the sample population. Of the 200 women examined, 181
105 were married, while 19 was unmarried. Reported HBV prevalence for these two categories was 12% and
106 1% respectively. The study further revealed prevalence rates of 6.8 % and 5.6% for the urban and rural
107 residents respectively. Predisposing factors to HBsAg were examined (Table 2) 16 pregnant ANC

108 attendees had never had surgery and none tested positive to HBsAg, while of the remaining examined
 109 184 subjects, 13 tested positive accounting for 7.1% of the sub-population. This was not statistically
 110 significant ($\chi^2 = 1.124$, $P = 0.289$), While 12 subjects had been transfused with blood in the past and
 111 none tested positive to HBsAg, 13 subjects accounting for (7.1%) of the remaining examined 188 subjects
 112 who had never been transfused tested positive to HBsAg. This was not statistically significant ($\chi^2 = 0.826$,
 113 $P = 0.363$). 12 (7.4%) out of the 161 ANC attendees who has agreed to sharing sharp objects with friends
 114 and family members tested positive to HBsAg. However, only 1 (2.5%) of the 39 attendees who had
 115 never shared sharp objects with anyone tested positive to HBsAg. This was not significant ($\chi^2 = 1.116$, $P =$
 116 0.290). 30 ANC attendees had tribal marks/tattoos on one part of their body or the other, while 170 ANC
 117 attendees had no tribal mark/tattoos on any part of the body. Of the 30 attendees with tribal mark/tattoo,
 118 only 3(10%) tested positive, while 27(90%) had no had no tribal mark/tattoo. However, of the 170 ANC
 119 attendees without tribal mark/tattoo, 11(7.9%) tested positive, while the remaining 159(93.5%) tested
 120 positive. This was not statistically significant ($\chi^2 = 0.608$, $P = 0.435$). 11 (7.9%) out of the 138 ANC
 121 attendees who has agreed to pedicure/manicure tested positive to HBsAg. However, only 2 (3.2%) out of
 122 the 62 attendees who never had pedicure/manicure tested positive to HBsAg. This was not significant
 123 ($\chi^2 = 1.416$, $P = 0.234$).

Table 1. Socio-demographic characteristics of Masaka ANC attendees

Age	Number (n)	Positive	Prevalence (%)
18-24	50	3	6
24-35	106	8	7.5
34-45	44	2	4.5
Education status			
No formal education	28	3	10.71
Primary	42	3	7.14
Secondary	81	5	6.17
Tertiary	49	2	4.08
Marital Status			
Married	181	12	6.63
Single	19	1	5.26

Residence

Rural	147	3	5.6
Urban	147	10	6.8

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Table 2: Factors predisposing pregnant women to HBsAg

Factors	Number(n)	HBsAg (+)	HBsAg (-)	X ²	P-value
Surgery					
Yes	16	0(0)	16(100)	1.124	0.289
No	184	13(7.0)	171(92.9)		
Blood Transfusion					
Yes	12	0(0)	12(100)	0.826	0.363
No	188	13(7.1)	175(95.6)		
Sharing of sharp objects					
Yes	161	12(7.4)	149(92.5)	1.116	0.290
No	39	1(2.5)	38(97.4)		
Tribal marks/tattoos					
Yes	30	3(10)	27(90)	0.608	0.435
No	170	11(6.4)	159(93.5)		
Pedicure/manicure					
Yes	138	11(7.9)	127(92.0)	1.416	0.234
No	62	2(3.2)	60(96.7)		

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Discussion

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128 Although national survey on seroprevalence of hepatitis B infection confirms that HBV infection

129 is highly endemic in Nigeria accounting for prevalence in the neighborhood of the estimated

130 prevalence reported for sub-Saharan Africa [6], tackling the menace requires a clear view of

131 the prevalence obtained when varying dimensions of the bulk information are revealed. Hepatitis

132 B virus infection can lead to maternal morbidity and mortality. It also has the potential to cause

133 chronic infection in newborn. Aside the fact that the prevalence of HBV infection varies in

134 different parts of the world, regional and population specific variation also abound. Suppression

135 of the immune system that characterises pregnancy is clinically and epidemiologically significant
136 during hepatitis B virus infection among pregnant women. In most epidemiological studies on
137 HBsAg, there has been a link between age and acquisition of HBsAg. The age of acquiring the
138 infection is one of the major determinants of the prevalence rate of HBsAg. In this study, HBsAg
139 was highest among 25-35 years age categories. The study is consistent with the finding from the
140 study of Habiba and Memon [7] where majority of those that tested positive were in the age
141 range of 25-35. This may be attributed to the fact that most women in Nigeria nowadays marry
142 within this age range and become pregnant and consequently resumes ante-natal which exposes
143 them to HBV screening and identification. Highest prevalence was reported for the “no formal
144 education” (10.71%) while the least prevalence was recorded for the most “educated group” (4.08%) of
145 the study population. Reduction in prevalence with respect to the aforementioned category was reported
146 in the order thus: no formal education<primary<secondary<tertiary. This may be as a result of increased
147 awareness on the causes and prevention of infection among the educated group. This finding however
148 contradicts the result of Eke et al [8] which reported the least prevalence among the “no formal education
149 category”

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151 Unprotected sex is known to be a means of transmission of HBV, and marriage provides a
152 means of unprotected sex, which could increase the chances of exposure and transmission of
153 HBV. In this study, the prevalence of HBV among the married was higher (6.63%) than that
154 recorded for the single (5.26%). This is consistent with the outcome of a prevalence study among
155 married and unmarried students by Bhattarai et al [9] which revealed a higher prevalence of
156 HBsAg for the married students than the single students. From this study, it was noted that all
157 predisposing factors examined were not statistically significant predisposing factors to HBV
158 infection. This is consistent with the findings of Akani et al [10] which claim that previous

159 histories of tribal marks/tattoos, previous contact with hepatitis B infected persons, previous
160 histories of surgery/dental manipulations and blood transfusion were statistically significant
161 predisposing factor to HBsAg infection. The study also revealed a higher prevalence for the rural
162 dwellers (6.8%) and 5.6% for the urban dwellers. This may be attributed to poor sanitary conditions, lack
163 of infrastructural development and insignificant presence of the government in the rural areas.

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165 **Conclusion**

166 In conclusion, although a HBV prevalence rate of 6.5% was recorded in this study, it lower than
167 the reported national prevalence rate of 14.5% and therefore must be put in check to avoid
168 upsurge.

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