

Original Research Article

Screening for hepatitis B virus among HIV infected women seeking for Antiretroviral Therapy at National Institute for Pharmaceutical Research and Development (NIPRD), Abuja, Nigeria.

ABSTRACT

Background: Hepatitis B virus (HBV) infection is endemic and well documented in different locations of Nigeria among different sub-groups. Information regarding the prevalence of HBV in HIV infected women is scarce especially in Abuja, the capital city of Nigeria. **Aim:** This study aimed at determining the prevalence of Hepatitis B surface antigen (HBsAg) among HIV infected women seeking for antiretroviral therapy (ART) at National Institute for Pharmaceutical Research and Development (NIPRD), Abuja, Nigeria. **Materials and Methods:** A health facility-based cross-sectional study was carried out in our laboratory from May, 2017 to March, 2019 among 1,386 recruited HIV infected women that were screened for HBsAg. Positive samples were confirmed using ELISA. Their socio-demographic data were collected using a questionnaire and written informed consent was obtained prior to study. Data were analyzed using frequency distribution table and SPSS (version 20.0). **Results:** Out of the 1,386 HIV infected women tested, 114 were seropositive for HBV infection giving an infection prevalence of 8.2%. The highest prevalence (2.2%) was observed at age group 25 – 29 years and followed by (1.7%) at age groups of 20 – 24 and 35 – 39 years. **Conclusion:** This present finding confirms high endemic of HBV infection. We recommend that HIV infected women should be routinely screened for HBV as part of ART commencement requirement.

Keywords: Cross-sectional, Prevalence, Hepatitis B virus, Antiretroviral Therapy, Questionnaire, Nigeria

1.0 INTRODUCTION

The national prevalence of HIV was estimated to be 1.8% in 1991 to 4.5% in 1996, 5.8% in 2001, 5.0% in 2003 and 4.4% in 2005. However, the national prevalence seemed to stabilize between 2005 and 2010 as shown by the reported prevalence 4.4% (2005), 4.6% (2008), and 4.1% (2010), which ranged from 1.0% in Kebbi State to 12.7% in Benue State [1]. Based on the overall national prevalence of 4.1% obtained in 2010, it is estimated that 3.1million people in Nigeria are living with HIV/AIDS in 2010 and about 1.5 million require ARV drugs [2]. The national prevalence was further reduced in 2014 to 3.0% which implied that over 3.4 million Nigerians are currently infected with the virus and about 2.5 million needs ART [3].

Hepatitis B virus (HBV) causes hepatitis B infection. It is transmitted through sexual intercourse, newborns of infected mothers during childbirth, breastfeeding and through

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41 the placenta during childbirth, and also by exchange of saliva or other mucosal fluids
42 during kissing with an infected person [4]. The virus is an enveloped DNA virus that
43 infects the human liver that causes inflammation, hepatocellular necrosis and other liver
44 challenges. Potentially, this virus is referring as life-threatening cause of liver diseases
45 worldwide that can either be acute or chronic and it may range from symptomless
46 infection or mild disease to symptomatic or greatly fulminant inflammation [5]. The acute
47 or chronic viral hepatitis B infection is usually a self-limiting disease known with
48 hepatocellular necrosis and mild inflammation with a case mortality rate between 0.5 to
49 1% [6].

50 | Some studies depict increasing access to **antiretroviral therapy (ART)** and therefore
51 burden of viral hepatitis infection in resource limited settings is expected to raise as is
52 now the case in Europe and North America [7,8]. It is therefore, of great concern if this
53 is not addressed, viral hepatitis related challenge may hinder the success of ART
54 programs in developing countries [8]. Understanding the prevalence and disease
55 characteristics of HBV coinfection with HIV is thus significant [9]. Guidelines for the
56 clinical management of HIV patients recommends screening for viral hepatitis but
57 unfortunately this is not standard practice Nigeria, as it is not included in the
58 recommended package of baseline commencement laboratory tests.

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60 In 2018, World Health Organization (WHO) reported an estimated 257million people are
61 living with HBV infection (as defined by hepatitis B surface antigen reactive) [10]. In the
62 developed countries, chronic HBV co-infection are found among estimated 30% of HIV-
63 positive persons, with only non or approximately 1% being co-infected with HIV and
64 HBV [11]. Some studies carried out across Nigeria have shown difference prevalence
65 frequencies of HIV/HBV co-infection from 9.2% to as high as 70.5% [12,13,14,15]. The
66 seroprevalence of HBV infection is very high in the developing countries of sub-Saharan
67 Africa and South East Asia where about 8 - 10% are chronic infectious carriers; and
68 these same geographic regions have over two-thirds of the worldwide HIV burden
69 [16,17].

70 HBV infections occur more frequently among HIV infected patients due to the shared
71 routes of transmission and further worsens the outcome for the mother and the infant
72 with a more rapid clinical and immunological progression [18,19]. Although, most
73 perinatal and horizontal transmission of HBV occur in areas of greater endemicity as
74 most infections are acquired in the first 5 years of life around Asia and Africa geographic
75 regions and estimated 25% of infected children will die of HBV related chronic liver
76 disease in adulthood [20,21].

77 The clinical presentation of non-specificity and the chronic course that makes the early
78 diagnosis of HBV difficult [20,21]. Thus, there may therefore be a silent or latent
79 epidemic of HBV among women Living with HIV/AIDS which still remain unclear and
80 thereby no intervention plan to scrub such menace.

81 Although different studies on prevalence of HBV infection in Nigeria have been
82 | previously carried out in different part of the country, **but**, there is paucity of published
83 data on the prevalence of hepatitis B virus amongst HIV infected women in Abuja, the

84 capital city of Nigeria. Therefore, it is of great significant to investigate the proportion
85 and frequency of HBV co-infection among HIV infected women attending care at
86 National Institute for Pharmaceutical Research and Development (NIPRD) Abuja in
87 order to understand and profound interventions aimed at management, prevention, care
88 and treatment in view of its growing public health importance. Thereby, providing a
89 window of opportunity for patient education and behavioral modification by counselling
90 and improved management of HBV co-infection in HIV infected women to achieve better
91 outcome and ART usages. Hence, this present study is aim to investigate the
92 prevalence of HBV among HIV infected women in Abuja commencing care and
93 management on ART.

94 **2.0 MATERIALS AND METHODS**

95 **2.1 Study area and design**

96 The cross-sectional study was carried out at National Institute for Pharmaceutical
97 Research and Development (NIPRD) Abuja from May 2017 to March 2019 among HIV
98 infected women on their first visit to our health facility seeking for antiretroviral therapy
99 (ART) commencement.

100 Abuja is the Federal Capital City of Nigeria. The city is lying between latitude 8.25°N
101 and 9.20°E of the equator and longitude 6.45°N and 7.39°E of Greenwich Meridian and
102 located at the centre of the country with a landmass of approximately 7,315 km², of
103 which the actual city occupies 275.3 km². It is found at the Savannah area with
104 moderate climatic weather conditions. The capital city is located at the north of the
105 confluence of the River Niger and Benue River [22].

106 National Institute for Pharmaceutical Research and Development (NIPRD) Abuja is one
107 of the HIV care and treatment centre, highest medical research and referral institution in
108 Nigeria charged with the responsibility to conduct research into disease of public health
109 significant. Although, with the Federal Government of Nigeria programme in 2002 on
110 ART commencement. It was selected principally to provide the research backup and
111 referral centre serving a large population in the heart of Abuja and its environs for the
112 national HIV programme implementations. Presently, the facility provides free
113 comprehensive care, treatment and support for over 6,646 HIV patients. Patients are
114 recruited into the HIV treatment programme following HIV confirmations or a referral
115 from the HIV Counseling and Testing Centre (HCT), Virology laboratory of NIPRD,
116 Abuja or transfer from other government recognized HIV treatment centres in the
117 country.

118 **2.2 Study populations**

119 The study populations include all HIV infected women seeking to commence ART
120 treatment, who agreed and signed an informed consent to participate in the study. A
121 total of 1, 386 HIV infected women were recruited in our laboratory, Human Virology unit
122 of Microbiology and Biotechnology Department, NIPRD, Abuja for the study.

123 **2.3 Selection Criteria**

124 **2.3.1 Inclusion criterion**

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125 HIV infected women seeking for ART commencement in NIPRD facility during the
126 period of data collection (May 2017 to March 2019) and consented to participate in the
127 study were included.

128 **2.3.2 Exclusion criterion**

129 HIV infected women who did not consent to participate in the study were excluded.

130 **2.4 Research Questionnaire**

131 A well-researched structured self-administered questionnaire was designed to achieved
132 the desire objective of the study and was used to collect baseline socio-demographic
133 characteristics of all patients who consented. The questionnaire before the study was
134 pre-tested on a total of 25 HIV infected woman in our health facility with the necessary
135 modification and corrections made after the pre-test.

136 The socio-demographic variants include age, present place of stay, educational status,
137 occupational status, marital status, ever tested for HBV, history of previous blood
138 transfusion, alcoholism and phone numbers.

139 **2.5 Samples collection**

140 A total of 1,386 blood samples were collected from HIV infected women seeking for
141 ART commencement. About five millilitres (5mL) of venous blood were carefully drawn
142 from the veins of each patient into a well labeled Ethylene Diethel Tetracetic Acid (K2
143 EDTA) tube for CD4+ count and haematological assay as required for ART
144 commencement baseline parameters. After the assay, the blood samples were
145 centrifuged at 4,000 revolutions per minutes (rpm) for 10 minutes in order to obtain a
146 clear supernatant plasma. The plasma was aliquoted into cryovials and stored in the -
147 40°C freezer until ready for serological screenings for HBV.

148 **2.6 Serological screening**

149 All the plasma samples were screened for HBV infection based on the
150 immunochromatographic technique (ICT). Serological diagnosis was carried out using
151 Rapid diagnostic tests (RDTs), for HBV infection the SD BIOLINE (Standard Diagnostic
152 (SD) Inc., Korea) one step HBV test kit was used for detection of HBV infection. The
153 immunochromatographic rapid test is a qualitative detection of antibodies specific to
154 HBV in blood with a sensitivity of 100% and specificity of 99.4%. The screening was
155 carried out according to manufacturer's instructions found on the standard operation
156 procedure insert.

157 | The sero-positive samples to HBsAg detected by RDTs screening were further
158 confirmed by another rapid ELISA according to manufacturer's specifications.

159 **2.7 Data analysis**

160 The data were analyzed using frequency distribution table and figure. Each entry in the
161 table contains the frequency or count of the occurrences of values within a particular
162 group or interval, and in this way, the table and figure summarizes the distribution of

163 values in the sample or variable. Statistical package for social science SPSS (version
164 20.0), (Chicago, Illinois) was used in other statistical analysis. Data like patients socio-
165 demographic characteristics was summarized using simple frequency tables. Level of
166 significance was determined at $P < 0.05$ at 95% Confidence interval.

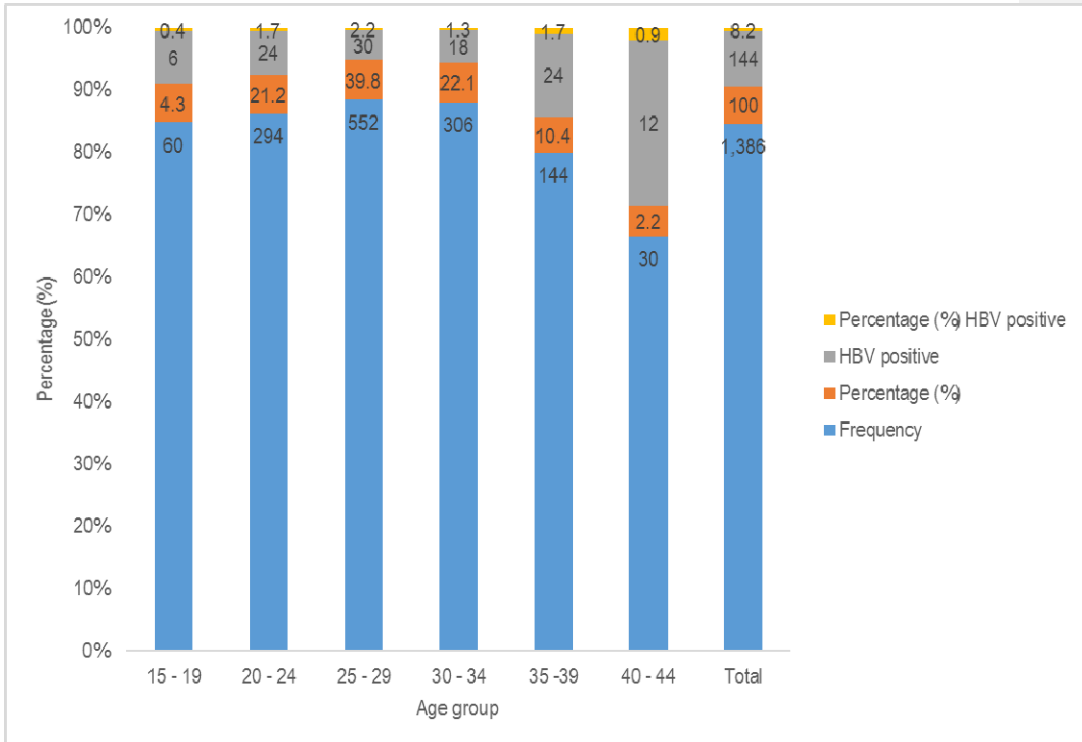
167 **3.0 RESULTS**

168 A total number of 1,386 HIV infected women were included in this study with age
169 ranged from 15 to 44 years (mean age of 37.0) that came for care at NIPRD ART clinic.
170 Out of the total number of women recruited and screened for HBV infection, 114 (8.2%)
171 tested positive while 1,272 (91.8%) tested negative for HBV infection. The highest
172 prevalence of 2.2% was seen at age group 25 – 29, followed by 1.7% amongst age
173 groups 20 – 24 and 35 – 39. The lowest prevalence of 0.4% was observed at age
174 group of 15 – 19 years. The age group 25 - 29 years were most represented age group
175 (39.8%) and also had the highest HBV infection (2.2%). There was no concurrent
176 infection of HIV and hepatitis B infection observed in this present study. The age
177 distribution and HBV results of screened study patients are shown in Figure 1.

178 **3.1 Socio-demographic characteristics of the 1,386 HIV infected women in** 179 **NIPRD, Abuja.**

180 Table 1: depicts the sociodemographic characteristics of the study participant. It was
181 observed that the prevalence of HBV varied according to age and marital status of the
182 women in the NIPRD ART clinic. Of the 1,386 patients, 941 (67.9%) were married, 151
183 (11%) were not married, 42 (3%) were divorcees or separated while 252 (18.2%) are
184 widowers. The study recorded more rural settler's patients than urban settlers (65% vs
185 35%). Only 11% of the subjects had no formal education. Majority of the women
186 (50.1%) had secondary level of education and closely followed by primary education
187 (23.5%). Also, majority of the women were unemployed (43.5%). The blood transfusion
188 and alcohol consumption were only observed among 8.9% and 10.6% respectively.

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191 **Figure 1: Age distribution and HBV results of the study patients (n = 1,386) at**

192 **NIPRD, Abuja.**

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195 **Table 1: Socio-demographic characteristics of HIV infected women studied (n = 1,386) in**
196 **NIPRD, Abuja.**

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Characteristics	Frequency	Percentage (%)
Educational status		
No formal education	153	11
Primary	326	23.5
Sec. school	694	50.1
Tertiary	213	15.4
Marital status		
Single	151	10.9
Married	941	67.9
Widowed	252	18.2
Divorced	42	3
Occupational status		
Civil servant	223	16.1
Self employed	430	31
Unemployed	603	43.5
Student	130	9.4
Residence		
Rural	901	65
Urban	485	35
Blood transfusion		
Yes	123	8.9
No	1,263	91.1
Alcohol consumption		
Yes	147	10.6
No	1,239	89.4

198 Note: No Patients have evidence of been previously screened for HBV infection.

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201 4.0 DISCUSSION

202 The major objective of the study was to determine the hepatitis B prevalence rate in HIV
203 infected women seeking care and treatment on ART between May 2017 to March 2018,
204 and also to evaluate the endemicity of HBV among HIV infected women in NIPRD,
205 Abuja. The viral hepatitis infection classification of high endemicity as defined by WHO
206 is HBsAg greater than 7% in an adult population [23]. The prevalence of HBV positivity
207 8.2% among HIV infected women in this present study depicts that Abuja and its
208 environs in the central region like other parts of Nigeria is endemic for this viral infection.

209 The rapid HBsAg antibody testing for HBV infection was used in this study, which are
210 useful and powerful tool for screening infections at the point of care and treatment. This
211 testing easily identifies individuals infected with these viruses so as to proffer quick
212 preventive services, additional investigations, care and treatment immediately. The
213 screened individuals are therefore, **are** notified of their infection results or status,
214 allowed to take informed decisions about their health care and other alternatives for
215 treatment, able to be given health talks on how to take steps to limit hepatitis associated
216 infection prognosis for example as regards vaccinations against HBV, alcohol
217 consumptions, and have a reduced risk of transmission to others [24]. The sensitivity
218 and specificity of rapid testing has been queried by some researchers [25]. It also
219 remains unconfirmed whether HIV serostatus affects test effectiveness [25].
220 **Although, Nonetheless,** other researchers [26] concluded that HBsAg rapid diagnostic
221 test is among **the most** accurate assays for screening for HBV infection in HIV infected
222 persons in a Sub-Saharan Africa setting.

223 Liver related disease continued to remain a significant **changer (??)** of health in
224 persons infected with HIV [27]. The negative effects of HIV infection with prognosis of
225 HBV infection **are** well documented with high rates of higher hepatitis viral load, viral
226 persistence and a more rapid prognosis to liver related challenges like cancer, fibrosis
227 and hepato-cellular carcinoma in co-infected persons [7]. Unfortunately, in the most
228 developing countries like Nigeria, **where** screening for HBV is not routine at the
229 commencement assessment of HIV positive persons. In this study, none of study
230 participants have evidence of been previously screened for HBV infection.

231 The finding from this present study **with is a** prevalence rate of 8.2% for HBV infection
232 among women in Abuja, although **a**, much higher prevalence of 11 to 20% was
233 observed by other researchers in Nigeria [28,29], Malawi [30] and Senegal [31] among
234 HIV infected adults. **This is unlikely to reflect the HBV burden in HIV patients.** There are
235 no recent publications or studies that have authenticated these findings. **Theis**
236 prevalence **found** in this study was higher than the 2.9%, 2.5% and 1.53% observed
237 among women in Port Harcourt, South-south Nigeria [32], Iran [33] and amongst Afghan
238 women attending government maternity hospitals in Kabul [34] respectively.

239 This **observed prevalence of 8.2% in this study, value is,** however, lower than the
240 11.0% observed by [35], among women in Makurdi, North-central Nigeria. **It is also**
241 **lower as well as** than the 11.6% observed by [36] and 12.6% **observed by detected** [37]
242 among women in Maiduguri, North-eastern Nigeria, and a rural community in North-
243 central Nigeria, respectively. This was again, lower than the 13.8% observed by
244 Roingard and his co-researchers among Senegalese women in Dakar [38]. **Finally,**

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245 | **the observed prevalence was also lower than** the 63.3% **observed reported** by
246 | Imade and co-workers in Jos, North Central Nigeria **amongst for** Nigerian women [16].
247 | These observed variations in the prevalence of HBV in women may be due to
248 | differences in lack of awareness, low socioeconomic conditions, an unhygienic
249 | environment, cultural practices, sexual behaviour and practices, differences in the
250 | geographical distribution among the regions and variations in the test methods used
251 | and employed to detect Hepatitis B viral infection as reported from literature.

252 | One of the sociodemographic characteristics considered in this study was **the** age of the
253 | patients. **The finding from this study showed that**We found that the highest
254 | prevalence (2.2%) of HBV infection was observed in the 25 – 29 years' age group
255 | followed by the 20 – 24 and the 30 – 34 years' age groups. This is **concordant**
256 | **consistent** with the highest HBV infection prevalence rate observed in the 25–29 years'
257 | age group in a comparable study in Ibadan, Nigeria [39], **and it. This** may be **so** due to
258 | the fact that this age range falls within the sexually active and fertile age group and
259 | hence are more at high risk of having a sexual contact with an infected person [40]. This
260 | may be better explanation of the high prevalence of HBV infection at this age group.
261 | Majority of the women (50.1%) tested had secondary education. This may be because
262 | this study was hospital-based in a rural area of Abuja i.e Idu, Karmo, Tashe, Gwawa,
263 | Jiwa, Zauda, Saburi, Dei- Dei etc.

264 | Finally, there were some limitations in this present study. The diagnosis and
265 | qualification of HBV co-infections **was were** based on the detection of HBsAg antibodies
266 | by use of rapid test kit and confirmation by another rapid ELISA. None of molecular
267 | technique testing was done and absence of **HCV RNA** has been described in 10 to 50%
268 | of anti HCV antibody positive persons in some related studies [41]. Data on some
269 | known high- risk factors for acquiring hepatitis, particularly sexual history and practices,
270 | was lacking in part of data collected. The observations/findings in this study cannot be
271 | generalised as they only insight the prevalence among HIV infected women in our
272 | region as compared with studies in other parts of the country.

273 | **5.0 CONCLUSION**

274 | This study revealed a high prevalence of HBV infection amongst women, which
275 | compare well with the findings report by the World Health Organization that HBV
276 | infection is highly endemic in Nigeria and developing countries. This support our
277 | aim/objective of finding out the prevalence of HBV infection among HIV infected women
278 | in our HIV management, care and treatment Hospital at NIPRD, Abuja.

279 | It is therefore, recommended that HBV screening should be part of guidelines on routine
280 | clinical investigations care services to be provided for all HIV infected women except
281 | where a woman has already been reported to be HBV positive as it can influence
282 | management. Health talks and education on prevention, awareness, risk, care and
283 | management of the infection and widespread coverage of the HBV immunization of the
284 | population should be encouraged.

285 | **CONFLICT OF INTEREST**

286 | The authors confirm that this manuscript content has no conflict of interest.

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CONSENT

The patients were enrolled after they were sufficiently counseled on the objectives, risk and importance of the study. Written consents were obtained and all relevant confidentiality was kept throughout and after the study period.

Only the principal investigator held the results of blood samples tested. The patients were informed of their HBV test results as desired and the test results were delivered to individuals in a sealed form. The patients found positive were further counseled and linked to care in addition to the HIV treatments at the institute research clinic (NIPRD).

ETHICAL APPROVAL

Ethical clearance and approval for the study was obtained from the Institutional Review Board (IRB) of National Institute for Pharmaceutical Research and Development (NIPRD), Abuja in accordance with the code of ethics for biomedical research involving human subjects. The confidentiality, anonymity and privacy of all participants were guaranteed at all levels of this study. Written consent was given by participant.

The patients were recruited after they were sufficiently counseled on the objectives, risk and importance of the study. It is only the principal investigator held the results of blood samples tested for the virus. The patients were individually and privately informed of their HBV test results as desired and the test results were delivered in a sealed form. The patients found positive were further counseled and linked to care in addition to the HIV treatments at the institute research clinic (NIPRD).

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