Studies on SERO – Epidemiology and Socio-Demographic factors in Hepatitis B Virus Infection and Syphilis In Calabar, Nigeria

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Abstract: Sexually transmitted infections (STIs) such as Hepatitis B and Syphilis are considered important public health problems worldwide and they share similar route of transmission. This study was carried out to assess the seroprevalence of Hepatitis B surface antigen (HBsAg) and syphilis antibodies in the blood samples of persons living in the Calabar metropolis. A total of 422 subjects were recruited through convenience sampling method. Serum from these subjects were screened for HBsAg and syphilis antibodies using one step HBsAg test strip and ultra-rapid test strip (Acon laboratory, USA) respectively. Syphilis antibodies were confirmed using qualitative TreponemapallidumHemaglutination (TPHA) test kit (Spin react, S. A. Spain). The prevalence of HBsAg was 5% and Syphilis 1.4%. The rate of infection was higher in males than in females for both HBsAg and syphilis 6.7% vs 3.0% ; 1.8% vs 1% though with no significant difference (p>0.05). The age group 40 – 49 years in HBsAg had the highest prevalence of 15.6%, while the lowest prevalence of 2.7% was found in the age group 20-29 years. With regard to marital status, the higher prevalence of 8.5% (9/108) was found among married subjects for HBsAg, but with no significant difference (P>0.05) between marital status groups. Secondary school level of education was associated with high infection rate of 9.6% for HBsAg and 4.3% for syphilis; but infection rates were generally comparable (p>0.05) among the educational levels. Civil servants had the highest prevalence of HBsAg of 13.0% (9/69) among the occupational groups (p>0.05). The results of this study has shown that there is a low prevalence of Hepatitis B and syphilis in Calabar. However control measures should be put in place through enlightened campaigns on the mode of transmission of these diseases to completely eradicate them.

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I. Introduction

1.1 Background of the study

Hepatitis B Virus and Treponemapallidum are causative agents of Hepatitis B and syphilis infection respectively. Both Hepatitis B and syphilis are sexually transmitted infections (STIs) and represent a major public health problem in developing countries (Feleke et al., 2006). It is however, an endemic disease in Asia and Sub-Saharan Africa, with seropositivity rate ranging from 15 to 60% in Africa (Alikor and Erhabor, 2007). Millions of people suffer from these diseases due to poor nutrition and adverse living conditions (WHO, 2003).

Hepatitis B virus (HBV), a DNA virus of the family hepadnaviridae, is the causative agent of hepatitis B infection (Pungpapong et al., 2007). It is an extremely resistant chronic strain capable of withstanding extreme temperatures and humidity and can survive when stored for 15 years at -200C, for 24 months at -800C, for 6 months at room temperature and for 7 days at 440C (Pyrsopoulous, 2007). The virus particle (viron) consists of an outer lipid envelope and an icosahedral nucleo-capsid which encloses the viral DNA and DNA polymerase that has reverse transcriptase ability (Locarnini, 2004). HBV is very contagious and relatively easy to be transmitted from one person to another through blood transfusion, blood products, body fluids (urine, semen, sweat, saliva and teams) use of contaminated needles, vertical transmission (mother to child through infected birth canal) and sexual contact (Brooks et al., 2007). The virus is known to be highly infectious and associated with long term morbidity and mortality due to complication like liver cirrhosis, portal hypertension, and hepato-cellular carcinoma (Feleke et al., 2006). Worldwide more than 2 billion people are infected with HBV while 350mllions have chronic infection (Kurbanov et al., 2010). The prevalence of HBV varies according to the endemicity of infection in a given area. In some more developed areas, such as Beijing and Shanghai, the HBsAg carrier rate is as low as 3.03%, while in the less developed areas, such as western and southern provinces in China, serum HBsAg prevalence rate is still greater than 8% ( Zhuang, 2005; Zhang et al., 2006).

Lin et al., (2003) reported 12.0 % prevalence rate in Taiwan, while 17.3 % was reported in Burkina Faso (Collenberget al., 2006). Nigeria is an old endemic area for HBV with carrier rate of 15 to 37% (David et al., 2013), with carrier rate, it is estimated that 12% of the total population being chronic carriers of HBsAg (Olumide, 2007). The Diagnosis of HBV infection involved serum or blood tests that detect either the viral....

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antigen or proteins produced by the virus or antibodies produced by the host (Bonino et al., 1987). Prevention of HBV infection depends on 3 strategies; behaviour modification to prevent disease transmission, passive immunoprophylaxis and active immunization (Jinlin et al., 2005).

Syphilis is a systemic disease caused by a bacterium named Treponemapallidum, a member of the order spirochaetales, family Spirochaetacea and genus Treponema(Tramont, 2005). Morphologically-Treponemapallidum is a slender, tightly coiled, uncellular, helical cell, measuring 6-15 µm long and 0.14-0.2µm wide (Kinghorn, 2004). Its size makes it invisible under the light microscope and it is usually identified using dark field microscopy by its distinctive undulating movements at its center that distinguishes it from other pathogenic treponemes.

The primary mode of transmission of Treponemapallidum is sexual contact (Rosanna and Hook, 2006). Unlike other STIs (e.g. HIV), syphilis is readily transmitted by oral and kissing at or near an infectious lesion, in addition to vaginal and oral intercourse (Molly and Frank, 2008). The second most common mode of transmission is utero – transmission (Molly and Frank, 2008). Additionally, transmission can occur at delivery if the newborn comes in contact with a contagious lesion, (Fiumana, 1975). Other possible modes of transmission include receipt of blood product from donor with syphilis. Although this risk has been significantly reduced secondary to serologic testing (JAMA, 1995). The risk of needle sharing is unclear but appears to be low (Hwang et al., 2000; Kinghorn, 2004).

Non - sexual cutaneous transmission has been reported among health care workers and laboratory personnel whose unprotected hands have come in contact with the treponemes (Pike, 1976; Tramont, 2005).Syphilis is a chronic infection with many diverse clinical manifestation like genital ulceration, regional lymphadenopathy and complication like neuro-syphilis that occurs in distinct stages (primary, secondary and tertiary) (Rebecca et al., 2006). Unless prompt diagnosis and treatment of syphilis are performed, other serious complications like male and female infertility may result, and in pregnancy, adverse outcome such as still birth, perinatal death and serious neonatal infections may occurs (Schimind, 2004).

The World Health Organization (1999) estimated that there were 12 million cases of syphilis globally (Nwokedi et al., 2005). Conventionally, the laboratory diagnosis of syphilis is made by direct identification of Treponemapallidum with dark ground microscopy and demonstrating antibodies by various serological tests (Young et al., 1989). Abstinence from sexual activity until rendered noninfectious by antibiotic therapy remains the main mode of prevention. In Nigeria, there is paucity of information on syphilis. Available information here usually comes from seroprevalence sentinel surveys of women attending ante -natal clinics (ANC) (FMOHN, 2004). Nevertheless, HBV infection and syphilis constitute a huge health and economic burden for developing countries. The importance of STIs has been widely recognized in the advent of HIV/AIDS pandemic and consequently there are good evidences that the control of STIs can contribute a great deal to the reduction of HIV transmission (Mayaud and Mabey, 2004). Thesudy aim at determining the relationship between socio-demographic factors , serological assay and the prevalence of HBV and Treponemapallidum infections in the urban population in Calabar.

II. Materials And Methods

Study setting
This study was carried out in Calabar Municipal and Calabar South Local Government Areas Cross River State

Study population
A total of 422Samples were collected from consented pregnant and non-pregnant women, blood donors, students and any individual willing to participate in the study.

a) Specimen collection
Three millimeters of blood was aseptically collected through vein puncture from all participants using sterile syringes and transferred directly into a dry sterile test tube; after complete clot retraction, the serum was separated in the laboratory using a centrifuge. The serum was tested for the presence of HBsAg and TreponemaPallidumantibodies within 3 hours after collection

Laboratory screening for hepatitis B and syphilis
a.) Screening for hepatitis B
Hepatitis B surface antigen (HBsAg) screening test was carried out using One Step Hepatitis B Surface antigen test strip (Acon Laboratories, USA).
Principle of the test:
The ACON HBsAg One Step Hepatitis B Surface Antigen Test Strip is a qualitative, lateral flow immunoassay for the detection of HBsAg in serum or plasma. The membrane is pre-coated with anti-HBsAg
antibodies on the test line region of the strip. During testing, the serum or plasma reacts with the particle coated with anti-HBsAg antibody. The mixture migrates upward on the membrane chromatographically by capillary attraction to react with anti-HBsAg antibodies on the membrane and generate a colored line. The presence of this colored line in the test region indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a colored line will always appear in the control line region indicating the proper volume of specimen has been added and membrane wicking has occurred.

**Test procedure:**
- The pouch was brought to room temperature before it was opened.
- The tape from the test card was pulled off, and the test strip was stucked in the middle of the test card with arrow pointing downward.
- The dropper was held vertically and 3 drops of serum transferred (approximately 75 µl) onto the specimen pad of the test strip and the timer was set on.
- The colored line(s) appeared after 15 minutes.

**Interpretation of results:**
- Positive: Two colored lines appear. One should be in the control region (C) and another should be in the test region (T).
- Negative: One colored line appears in the control region (C). No apparent colored line appears in the test region (T).
- Invalid: control line fail to appears

**Serological screening for syphilis**

Syphilis Ultra-rapid test strip (Acon Laboratories, USA).

A rapid test for the diagnosis of syphilis to detect antibodies (IgG and IgM) to Treponemapallidum (TP) qualitatively in whole blood, serum or plasma.

**Principle of the test:**

The Syphilis ultra-rapid test strip (whole blood, serum or plasma) is a qualitative membrane based immunooassay for detection of TP antibodies (IgG and IgM) in whole blood, serum or plasma. In this procedure, recombinant syphilis antigen is immobilized in the test line region of the test. After specimen is added to the specimen pad it react with syphilis antigen coated particles that have been applied to specimen pad. The mixtures migrate chromatographically along the length of the test and interact with the immobilized syphilis antigen. The double antigen test format can detect both IgG and IgM in specimens. If the specimen contains TP antibodies, a colored line will appear in the test line region indicating a positive result. If the specimen does not contain TP antibodies, a colored line will not appear in this region indicating a negative result. To serve as a procedural control, a colored line will always appear in the control line region, indicating that the proper volume of specimen has been added and membrane wicking as occurred.

**Test procedure:**
- The pouch was brought to room temperature before it was opened.
- The tape from the test card was pulled off, and the test strip was stucked in the middle of the test card with arrow pointing downward.
- The dropper was held vertically and 2 drops of serum were transferred (approximately 50µl) onto the specimen pad of the test strip, then 1 drop of buffer (approximately 40µl) was added and the timer set on.
- The colored line(s) was (were) after 10 minutes.

**Interpretation of results:**
- Positive: Two colored lines appear. One should be in the control region (C) and another should be in the test region (T).
- Negative: One colored line appears in the control region (C). No apparent colored line appears in the test region (T).
- Invalid: control line fail to appears

**Confirmatory test for syphilis antibody**

All the samples found to contain Treponemapallidum antibodies using syphilis ultra-rapid test strip were further tested using the qualitative Treponemapallidum Hemagglutination (TPHA) test kit (Larsen, 1981). All the reagent controls and serum samples were allowed to reach room temperature before use. Serum samples were used un-inactivated.
A 1:10 dilution of each serum sample was made in micro titer plates using the diluents. From this, doubling dilutions were made to provide a final volume of 25ul and a dilution ranging from 1/20 to 1/2560. Aliquots of 75ul of the sensitized chicken erythrocytes was added to each well to give a final dilution ranging from 1/80 to 1/10.240.

The procedure was repeated for the positive and negative controls taking into account their 1/20 pre-dilution. The serum was controlled by making similar dilutions of the positive and negative controls but adding un-sensitized chicken erythrocytes in place of the sensitized wells. Each microtitre plate was mixed by gently agitating for a few seconds. The plates were covered and incubated at room temperature for 45 minutes to 1hour away from heat, direct sunlight and sources of vibration as directed by the manufacturer.

Plates were read after the recommended incubation time. Reading and interpretation of the results based on the methods of Larsen (1981). Wells revealing agglutination with uniform mat of cells covering entire well base sometimes with folded edges were graded as positive and score 4 +; uniform mat of cells partly covering the base was scored 3+; uniform mat of cells surrounded by a ring of cells was scored 2+, while smaller mat surrounded by a smaller, more defined ring of cells than 2+ was scored 1+. A button with a clear center will be graded as borderline and scored ±. A compact button appearance in the well base was graded as negative.

A sample was reported as positive, if any reaction ranging from borderline to 4+ was observed in 1/160 dilution and or above. A negative result was recorded for samples not showing any agglutination.

III. Results

The prevalence of Hepatitis B and Syphilis infection in relation to gender is showed in Table 1. 223 (53%) males and 199 (47%) females participated. The highest prevalence of HBsAg and syphilis were 6.7% and 1.8% respectively in males, while females recorded 4% and 2% respectively. There was no statistically significant difference was observed between the gender in HBV and Syphilis (X² = 3.063 ; p>0.05).

The result of the prevalence of Hepatitis B and Syphilis infection in relation to age is shown in table 2. The age of participant ranged from 18-62 years, majority of participants were in the age group of 20-29 years. The highest prevalence of HBsAg was 15.6% in the age group of 40-49 years; followed by 8.2% in the age group of 30-39 years. 3.8% and 2.7% were in the age group 10-19 and 20-29 years respectively. The age group > 50 recorded 0%. There was no statistically significant difference among different age group. (X²= 13.154, p>0.05)

For syphilis, the highest prevalence 16.7% was in the group of participant with age range > 50 followed by 3.1%, 1.1% and 1.0% respectively for age group of 40-49 years, 20-29 years and 30-39 years. The age group < 19 years recorded 0%. Also there was a statistically significant difference of syphilis positively amongst difference group age as in HBV. (X²= 11.230, p<0.05).

The Prevalence of HBsAg and syphilis according to marital status in Calabar is presented in Table 3. Among the 422 participants, bachelors 314(74.4%) had the highest percentage of participants followed by married individuals 108 (25.2%). Married individuals recorded high prevalence of 8.5% for HBsAg followed by bachelor 3.8%, divorce and widow recorded 0.0 %. There was no significant difference among the different marital group. (X²=3.49 df=1 P=0.06). While for Syphilis the highest prevalence was found among widow 100%, followed by bachelor 3.1% and 0.9% respectively for bachelor and married, divorce participants recorded 0%. There was statistically significant difference observed among the different married group. (X²=0.193 ; p<0.05)

Table 4 shows the prevalence of HBsAg and syphilis according to level of education in Calabar. Metropolis.

The majority of participants 272(64.5%) were educated at tertiary level while those with no background of education had 34(8%). The highest prevalence for HBsAg9.6% was among individuals with secondary school level of education followed by tertiary institution 4%. Those with no record of education 2.9%; Individuals with primary base as education scored 0%.There was no Statistically significant difference observed among the different level of education. (X²=6.153; p>0.05)

For syphilis the highest prevalence 4.3% was among individual having secondary school base level as education, followed by individual with tertiary level of education 0.7%. Participants with primary base level of education and those with no record of education recorded 0%.There was no Statistically significant difference observed among the different level of education.(X²=7.10; p>0.05).

Table 5 Shows the prevalence of HBsAg and syphilis infection in relation to occupational status in Calabar Metropolis, the highest prevalence of HBsAg was found among Civil servants (13.0%) , followed by house wife (10.0%); Traders and students recorded 6.8% and 3.1% respectively. There was a no statistically significant difference among different occupational group.(X² = 34.15 ; P>0.05)
For Syphilis the highest prevalence was recorded among waiters (25.0%), followed by traders and Civil servants with 3.4% and 2.9% respectively. All others professions recorded 0.0%. There was a nonstatistically significant difference was observed among different occupational groups. ($X^2 = 21.03; \ p>0.05$)

Table 6 shows the prevalence of HBsAg and syphilis according to level of perception (awareness) in Calabar.

The knowledge about both diseases was inferred from questionnaires in which 10 questions were used to test the proportion of correct answers.  
0 No knowledge  
1 – 3 Correct answers = Poor answers  
4 - 6 Correct answers = Reasonable answers  
7≥ Correct answers = Good

Table 6 shows the prevalence of Hepatitis B and Syphilis infection in relation to level of perception (Awareness). With regard to HBV, 26.3% (111) had no knowledge about the disease while 10.9% (46) had poor knowledge, reasonable and good had 27.6% (116) and 35.9% (149) respectively. For Syphilis, 21.8% (92) had no knowledge about the disease while 14.7% (62) had poor knowledge, reasonable and good knowledge recorded 29.6% (125) and 33.9% (143) respectively.

Table 1 Prevalence Of HbsAG And Syphilis According To Gender In Calabar

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency n(%)</th>
<th>HBsAg Pos(%)</th>
<th>Syphilis Pos(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>223(53.0)</td>
<td>15(6.7)</td>
<td>4(1.8)</td>
</tr>
<tr>
<td>Female</td>
<td>199(47.0)</td>
<td>6(3.0)</td>
<td>2(1.0)</td>
</tr>
<tr>
<td>Total</td>
<td>422</td>
<td>21(5%)</td>
<td>6(1.4%)</td>
</tr>
</tbody>
</table>

$X^2_{cal}=3.063 \ df=1 \ P<0.050$ $X^2_{cal}=3.063 \ df=1 \ P<0.050$

Table 2 Prevalence Of HbsAG And Syphilis According To Age In Calabar

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No tested n(%)</th>
<th>No (%) Positive</th>
<th>Within Hepatitis B</th>
<th>Syphilis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;19</td>
<td>26(6.2)</td>
<td>1(3.8)</td>
<td>0(0.0)</td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>261(62.0)</td>
<td>7(2.7)</td>
<td>3(1.1)</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>97(33.0)</td>
<td>8(8.2)</td>
<td>1(1.0)</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>32(7.6)</td>
<td>5(15.6)</td>
<td>1(3.1)</td>
<td></td>
</tr>
<tr>
<td>&gt;50</td>
<td>6(1.4)</td>
<td>0(0.0)</td>
<td>1(16.7)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>422</td>
<td>21(5%)</td>
<td>6(1.4%)</td>
<td></td>
</tr>
</tbody>
</table>

$X^2=13.16 \ df=4 \ P=0.011$ $X^2=11.23 \ df=4 \ P=0.024$

Table 3 Prevalence Of HbsAG And Syphilis according To Marital Status In Calabar

<table>
<thead>
<tr>
<th>Marital status</th>
<th>No tested n(%)</th>
<th>No (%) Positive with Hepatitis B</th>
<th>Syphilis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>314(74.4)</td>
<td>12(3.8)</td>
<td>4(1.3)</td>
</tr>
<tr>
<td>Married</td>
<td>108(25.6)</td>
<td>9(8.3)</td>
<td>1(0.9)</td>
</tr>
<tr>
<td>Total</td>
<td>422</td>
<td>21 (5%)</td>
<td>6(1.4%)</td>
</tr>
</tbody>
</table>

$X^2=3.49 \ df=1 \ P<0.06$ $X^2=0.192 \ df=1 \ P<0.05$

Table 4 Prevalence of HBsAG And Syphilis According To Level Of Education In Calabar

<table>
<thead>
<tr>
<th>Educational level</th>
<th>No tested n(%)</th>
<th>Hepatitis B</th>
<th>Syphilis</th>
</tr>
</thead>
<tbody>
<tr>
<td>University</td>
<td>272(64.5)</td>
<td>11(4.0)</td>
<td>2(0.7)</td>
</tr>
<tr>
<td>Secondary</td>
<td>94(22.0)</td>
<td>9(9.6)</td>
<td>4(4.3)</td>
</tr>
<tr>
<td>Primary</td>
<td>22(5.2)</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>None</td>
<td>34(8.0)</td>
<td>1(2.9)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>Total</td>
<td>422</td>
<td>21(5%)</td>
<td>6(1.4%)</td>
</tr>
</tbody>
</table>

$X^2=6.153 \ df=3 \ P>0.05$ (HBsAg) $X^2=7.107 \ df=3 \ P > 0.69$ (Syphilis)
The prevalence rate of HBsAg (5%) was recorded by Olokoba (2009) in a study among women attending ANC in Yola, North Eastern Nigeria. Lower prevalence of 0.1% and 0.8% were also obtained from similar research in Port Harcourt and Ibadan respectively (Ejele et al., 2005; Darklo et al., 2012). Despite this very low prevalence, it is important to trace the sexual partner and treat them together. Some reasons contributing to this low prevalence may be better management of sexually transmitted infections in this area and improved health care and reduction in risk behavior among populations (Pennap et al., 2011).

Other cities in Nigeria reported high prevalence of 3.6% in Maiduguri (Chikwem et al., 1997), 4% in Kano (Nwokedi et al., 2005), 2.97% in Osogbo South Western Nigeria (Taiwo et al., 2007), 5.8% in Bayelsa (Buseriet al., 2010) and 2.2% in Uyo (Onwuezobe et al., 2011). Our value of 1.4% was also lower compared to 12.7%, 7.5%, and 15% from Ghanaian Tanzanians and Sudanese donors respectively (Matteet al., 1999; Adjei et al., 2003; Elfaki et al., 2008). Pennap et al (2011) suggested that this high prevalence may be due to the indiscriminate use of antibiotics in this region since it is common practice in African countries to purchase antibiotics over the counter to treat any disease.

The prevalence rate for HBsAg (15.6%) was found among those of the age group of 40-49 years followed by 8.2% in the age group of 30-39 years. This prevalence of 15.6% for HBsAg is higher than the 12.5% reported in the age group of 40-44 years among pregnant women attending ANC in The Federal Medical Center, Keffi by Pennap et al., 2011 but contrary to the study of Jatau et al. (2009), Buseri et al. (2010) and Ahizechukwu et al. (2011) who did not recorded any prevalence rate of HBsAg in pregnant women of the same age range of 40-44 years in Zaria, Niger delta and Nnewi. However, higher prevalencerate of 41.6% was recorded in the age bracket of 40-49 years in Gombe (Mustapha and Jibril, 2004). The higher prevalence rate of HBV may be due to the greater numbers of years of exposure, lack of adult Hepatitis B vaccination programs and lack of awareness of HBV infection in earlier decade (Kamelet al., 2008).

The highest prevalence of syphilis 16.7% was found in one subject aged above 50 years which is higher than the prevalence of 1.2% reported among those above 50 years in Nepal (Karki et al., 2008). This
finding was contrary to observation by Okoloba et al. (2009) who reported 0% among the age group > 50 years in a study carried out among voluntary donors in the North –Eastern (Nigeria). Statistically there was a statistically significant difference (P<0.05) observed among age groups which may be due to the difference in geographical location, sample size , the periods of time the test was carried out and other different socio cultural practices in the different religions(Okoloba et al., 2009).

With regard to gender the highest prevalence rates of HBsAg and Syphilis were recorded in males as 6.7% and 1.8% respectively, while females recorded 3% and 1% for HBsAg and Syphilis respectively. This high prevalence of HBsAg 6.7% in males compared to 3% females is in line with the findings of Odusanya et al.(2005), who found a significantly higher HBsAg prevalence in males than in females in rural Nigeria. This finding is still in line with the high prevalence of (25.5%) and (10.9%) in males and females respectively in a study conducted among secondary school students in the North Central, Nigeria(Ndako et al., 2011).Nwankwo et al.(2012) in Kano also reported high HBsAg among males (7.6%) than females (0.0%) respectively. Such high prevalence in males than females of 4.5% and 0.04% respectively was also reported in Iran by Sharif et al.(2011).This higher rate of HBV in males than females is likely due to the higher exposure to occupational factors in men (Mohammad et al., 2012). However Amuta et al(2012) in Markurdi Benue State reported that females (41.1%) had higher HBsAg prevalence compared to males (36.2%). This may be explained by multiple sexual partnership and promiscuity which could habitually occur in both sexes.

Also Syphilis antibodies were higher in males (1.8%) than females (1%). High values of 11.9% and 8.2% in males and females respectively were observed by Feleke et al(2009) in Ethiopia. Lower values of 0.6% and 0.9% were recorded in a study carried out in Ibadan among sexually active adults (Okonkoet la., 2012)which showed high positivity in females than males. Another study carried out in India by Sumutaet al(2011) showed a higher prevalence in females than males. The marital status of the studied subjects was equally analyzed in this study and had shown that married individuals had 8.5% HBsAg sero prevalence, while single recorded 3.8%. This result is contrary to the findings of Mohammed et al(2012) in Iran who recorded 6.25% and 1.77% among divorcees and widows/widowers. It is lower compared to the findings of Otebayo et al(2011) who recorded 59.8%, 13.7%, 9.7% and 4.6% for married, singles, widows and divorcees respectively in Ibadan. In many studies, marriage and heterosexual relationships are considered as risk factors for HBV (Alter et al., 1988), such differences are probably due to cultural differences in each community (Mohammed et al., 2012). This high prevalence in single could be due to the fact that they indulge in sexual activities with multiple partners (Amutaet al., 2012).

For Syphilis, the highest prevalence (1.3%) was found among singles, followed by married(0.9%). Other findings of 0.5% and 0% were recorded for married and single women in North Central Nigeria (Pennap et al., 2011). Okonkoet al. (2012) recorded 1.2% and 0.6% among married and single persons in Port Harcourt. Majority of participants were from tertiary institutions 262(64.9%) followed by individuals with secondary school level of education 94(22.3%). The high frequency of participants observed among individuals of tertiary institutions may due to the fact that the study was carried out in Calabar metropolis where students from higher institutions like University of Calabar, Cross River State University of Science and Technology and College of Health Technology Calabar are resident in the hostels or live nearby.

The findings of this study show that 9.6% of subjects with secondary school level of education were HBsAg positive, followed by participants with tertiary institution 4%. While those with no formal educational background had 2.9%. Lower prevalence of 3.4% and 2.8% was recorded among subjects with higher and lower education status respectively in Saudi Arabia (Kamel et al., 2008). In Iran, 0.64% and 0.99% were recorded by Mohammad et al.(2012) among high school and higher academic level student respectively. Amutaet al.(2012) recorded high prevalence of 84.6%, 68.4%, 38.6% and 29.2% among subjects with no formal education, Primary, Secondary and Tertiary institutions respectively in Makurdi metropolis. The high prevalence observed in individuals with secondary school level of education may be due to the awareness among university scholars of the danger of being infected.

High prevalence of syphilis antibodies (4.3%) was also noted among participants with secondary school level of education. Lower prevalence of 1.01% and 0.0% were recorded from subjects with secondary school level education and tertiary institutions by Pennap et al(2011) in Nassarawa State. However high prevalence of 8.8%, 13.0% and 10.5% were recorded among Grade 7-12, 1-6 and illiterate in Ethiopia (Feleke et al., 2006).

Occupation, which was considered as an index of socio-economic status showed that Civil servants had the highest prevalence of HBsAg(13%), followed by house wives (10%), traders and students recorded 6.8% and 3.1% respectively. These findings are lower compared to 44% recorded among traders, 37.5%, 32.2%, and 12.5% recorded among civil servants, house wives and students respectively in Gombe state by Mustapha et al. (2004). These values were also lower compared to 60%, 46.7%, 35.1%, and 24.9% recorded from farmers, traders, civil servants and students in a study conducted by Amuta et al (2012) in Makurdi metropolis when studying the prevalence of HBV among hospital patients. The value of 3.1% recorded among students is lower.
compared to 11.6% recorded by Kamel et al (2008) in Saudi Arabia. There was the highest prevalence for syphilis antibodies (25%) found among waiters though very high might be due to the fact that a low number of waiters enrolled in this study.

It was followed by traders and Civil servant who recorded 3.4% and 2.9% respectively. However, high values of 22.9% and 15.9% were recorded among traders and Civil servants respectively in a study carried out in Uyo (Nigeria) by Onwuezobe et al (2011). The levels of awareness of both diseases were comparable among the subjects as 73.7% (311) had some ideas about HBV, compared to 78.2% (330) on Syphilis.

For HBV subjects with reasonable and good knowledge recorded 27.5% and 35.3% respectively. Our findings are below the values published of Piazhanama et al (2009) in India who recorded the prevalence 36.6% and 59.3% for good and moderate knowledge among dental interns respectively. Bijayet al (2009) in another study in India, recorded 38% and 32% as levels of awareness of HBV and vaccine respectively. Sabeenaat al (2005) in Karachi University reported that 87% of the study population had little awareness of association between HBV and contaminated needles.

For syphilis, our findings revealed that 21.8% had no idea of the disease while 78.2% had at least some idea about the disease. The findings on awareness recorded by Suneela et al (2007) on syphilis prevalence of 3.6%, further revealed that 70% of study participants were unable to mention at least one symptom of STI.

V. Conclusion And Recommendations

Both Hepatitis B infection and syphilis are found throughout the world but their prevalence is high in Africa compared to Western countries. From our observed prevalence rate of 5% for HBsAg and 1.4% for syphilis, both infections can be transmitted to anybody irrespective of the age, gender, occupation and marital status. Pregnant women are the most at risk of morbidity since they can pass these infections to the unborn children and during delivery. Public awareness programs to educate the public on the modes of transmission of HBV and other STIs are very necessary.

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Studies On Sero – Epidemiology And Socio-Demographic factors In Hepatitis B Virus Infection And Syphilis In


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