IOSR Journal Of Pharmacy And Biological Sciences (IOSR-JPBS)
e-ISSN:2278-3008, p-ISSN:2319-7676. Volume 14, Issue 1 Ser. V (Jan – Feb 2019), PP 09-17
www.Iosrjournals.Org

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

Konlak. D. G & Mbah. M
Corresponding Author: Konlak. D

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.*

Date of Submission: 04-02-2019 Date of acceptance:22-02-2019

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 (Felek*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 (Pyrsopoulos, 2007). The virus particle (virion) consists of an outer lipid envelope and an icosahedral nucleo-caspid which encloses the viral DNA and DNA polymerase that has reverse transcriptase activity (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 (Felek*et al*., 2006). Worldwide more than 2 billion people are infected with HBV while 350millions 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 aswestern 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 (Collenberg*et 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

antigen or proteins produced by the virus or antibodies produced by the host (Boninoet *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 Spirochaectacea and genus Treponema(Tramont, 2005). Morphologically-*Treponemapallidum* is a slender, tighly coiled, unicellular, helical cell, measuring 6-15 µm long and 0.14-0.2µm wide (Kinghorm, 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 sex 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; Kinghom, 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). Thestudy 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 andany individual willing to participate in the study.

a) Specimen collection

Threemillimeters of blood was aseptically collectedthrough 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 *TreponemaPallidum*antibodies within 3 hours after collection

Laboratory screening for hepatitis B andsyphilis

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 sticked in the middle of the test card with arrow pointing downward.
- The dropper was held vertically and 3 drops of serumtransferred (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 immunoassay 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 sticked 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 statiscally significant difference was observed between the gender in HBV and Syphilis ($X^2 = 3.063$; $p>0.05$).

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 Calabaris 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 1.3% and 0.9% respectively for bachelor and married, divorce participants recorded 0%. There wasa statisticallysignificant difference observed among the different married group.(X2= 0.192 ; 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 Statisticallysignificant 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 nostatistically 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 nostatistically 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 29.62%(125) and 33.9%(143) respectively.

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

		HBsAg	Syphilis
Gender	Frequency n(%)	Pos(%)	Pos(%)
Male	223(53.0)	15(6.7)	4(1.8)
Female	199(47.0)	6(3.0)	2(1.0)
Total	422	21(5%)	6(1.4%)

$X^2_{cal}=3.063$ 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

Age (years)	No tested n(%)	No (%) Positive Hepatitis B	Within Syphilis
<19	26(6.2)	1(3.8)	0(0.0)
20-29	261(62.0)	7(2.7)	3(1.1)
30-39	97(23.0)	8(8.2)	1(1.0)
40-49	32(7.6)	5(15.6)	1(3.1)
>50	6(1.4)	0(0.0)	1(16.7)
Total	422	21(5%)	6(1.4%)

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

Table 3
Prevalence Of HbsAG And Syphilisaccording To Marital Status In Calabar

	No tested	No (%) Positive with	
Marital status	n(%)	Hepatitis B	Syphilis
Single	314(74.4)	12(3.8)	4(1.3)
Married	108(25.6)	9(8.3)	1(0.9)
Total	422	21 (5%)	6(1.4%)

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

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

		No (%) positive	With
Educational level	No tested n(%)	Hepatitis B	Syphilis
University	272(64.5)	11(4.0)	2(0.7)
Secondary	94(22.0)	9(9.6)	4(4.3)
Primary	22(5.2)	0(0.0)	0(0.0)
None	34(8.0)	1(2.9)	0(0.0)
Total	422	21(5%)	6(1.4%)

$X^2=6.153$ df=3 P>0.05 (HBsAg) $X^2=7.107$ df=3 P > 0.69 (Syphilis)

Table 5: Prevalence Of HbsAG And Syphilis Infection In Relation To Occupational Status In Calabar

	No tested	No (%) Positive with	
Occupation	n(%)	Hepatitis B	Syphilis
Civil servants	69(16.4)	9(13.0)	2(2.9)
Students	228(54.0)	7(3.1)	1(0.4)
Traders	59(14.0)	4(6.8)	2(3.4)
House wives	10(2.4)	1(10.0)	0(0.0)
Waiters	4(0.9)	0(0.0)	1(25.0)
Others	52(12.3)	0(0.0)	0(0.0)
Total	422	21(5%)	6(1.4%)

$X^2 = 34.15$ df=22 P>0.05 $x^2 = 21.03$ df= 22 p>0.05

Table 6: Prevalence Of Hbsag Andsyphilis According To Level Of Perception (Awareness) In Calabar

	No (%) Positive with	
Level of Perception	Hepatitis B	Syphilis
No idea	111(26.3)	92(21.8)
Poor	46(10.9)	62(14.7)
Reasonable	116(27.5)	125(29.62)
Good	149(35.5)	143(33.9)
Total	422	422

IV. Discussion

Sexually transmitted infections (STI_s), are wide spread in developing countries and constitute a major public health problem in sub-Sahara (*Olokoba et al., 2009*). This study has shown that the prevalence of HBsAg infection is 5% in Calabar metropolis which is similar to that ofOpanaye et al ., 2006 who carried out similar studies at Ikeja(Nigeria) and also got the same prevalence of 5%. However other studies carried outin sexually active adults in Port Harcourt by (Okonko *et al.,* 2012) ;in Abuja by (Bassey *et al.,* 2009)and in Turkey byOggugunal et al. (2011) had a lower prevalence of 1.3%, 3.8% and 3.4%respectively The low prevalence recorded in this study may be due to the anti HBV vaccination policy by the government (Jatau *et al.,* 2009). Also, Screening of Blood donors for HBV and the massive campaign against HIV/AIDS, could have contributed to the reduction in its transmission through blood transfusion and sexual route respectively.

In contrast,the high rate of infection of 50.7% was recorded by Gabriel *et al*(2013) in Abakiliki, 6.6% was also recorded by Pennap*et al.* (2011) in a study among women attending ANC in Federal Medical Center Keffi,18.2% , 14.3% and 38.5% were reported inMakurdi (Luka *et al.,* 2008), Jos by Alao *et al.,* 2009and in Zariaby Amuta *et al.,* 2012

. This high prevalence of ofHBsAg among different cities in Nigeria is probably indicative of disparate rates of contact with risk factors (Mohammad *et al.,* 2012).

The prevalence rate of syphilis in this study was 1.4% which is higher than that of Olokoba *et al.* (2009) who recorded 1.2% when studying voluntary blood donors 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 (Buseri*et 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 Ghanaians ,Tanzanians and Sudaneses donors respectively (Mateee*t 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,Keffiby Pennap *et al.,* 2011but 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 (Musthapha and Jibril, 2004). The higher prevalence rate of HBVmay 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(Kamel*et 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 byOkoloba *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 higherHBsAg 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 bySharif *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 Felek*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 (Okonko*et la.,* 2012)which showed high positivity in females than males. Another study carried out in India by Sumuta*et 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% HBsAgsero prevalence, while singles 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 ofOtebayo*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 (Amuta*et 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% wererecorded for married and single women in North Central Nigeria (Pennap *et al.,* 2011). Okonko*et 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.%) 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 that9.6% 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. Amuta*et 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 participantswith 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 byPennap*et al*(2011) in Nassarawa State. However high prevalence of 8.8%, 13.0% and 10.5% wererecorded 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 Piazhanamal*et al* (2009) in India who recorded the prevalence 36.6% and 59.3% for good and moderate knowledge among dental interns respectively. Bijay*et al*(2009) in another study in India, recorded 38% and 32% as lvels of awareness of HBV and vaccine respectively. Sabeena*et 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 78.29% 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.

References

[1]. Abdallah,T. M., Mohamed, M. H. & Ali, A. A. (2011).Seroprevalence and epidemiological factors of hepatitis B virus (HBV) infection in Eastern Sudan.*International Journal of Medical Science*,*3*(7): 239-241.

[2]. Alao, O.O., Okwori,E.E.,Egwu,C.&Audu,F. (2009).Seroprevalence of hepatitis B surface antigen among prospective blood donors in an urban area in Benue State.*Internet Journalof Hematology*,*5*: 1-3.

[3]. Alikor, E. A. &Erhabor, O. N. (2007).Seroprevalence of hepatitis B surface antigenaemia in children in tertiary health institution in Niger Delta of Nigeria.*Nigeria Journal of Medicine*,*16*(3):250-251.

[4]. Alter, M.J.& Margolis, H.S. (1990).The emergency of hepatitis B as a sexually transmitted disease.*MedicalClinic of North America*, *74*(6):1529-1541.

[5]. Amuta, E. U., Houmsow, S. R., Sar, T. T.&Aunobi, E.M. (2012). Seroprevalence of hepatitis B among hospital patients in Makurdimetropolis,Benue State, Nigeria.*International Journal of Biology Allied and Health Science*, *1* (1): 29- 35.

[6]. Bassey, E.B., Moses,A.E.,Udo,S.M.&Umo,A.N. (2009).Parallel and overlapping human immunodeficiency virus, hepatitis B and C virus infections.*Online Journal of Health Allied Science*, *8*: 1-5.

[7]. Brooks, G.F., Caroll, K.C., Butel, J.S.& More, S.A. (2007). *Medical microbiology*(24th ed.).New York: McGraw Hill, 425-443.

[8]. Bruce, M. R.(2005). History of syphilis.*Clinical Infectious Disease*,*40*(10): 1454-1463.

[9]. Buseri, F., Seiyaboh, E.& Jeremiah,Z. (2010).Surveying infections among pregnant women in the Niger Delta, Nigeria. *Global Journalof InfectiousDisease, 2*:203-211.

[10]. David, O. M., Oluduro, A. O., Ariyo, A. B., Ayeni, D.&Famurewa, O.(2013).Sero-epidemiological survey of hepatitis B surface antigenaemia in children and adolescents in Ekiti State, Nigeria. *Journal of Public Health and Epidemiology*,*5*(1), 11-14.

[11]. Ejele, O., Erhabor, O.&Nwauche, C. (2005).Trends in the prevalence of some transfusion-transmissible infections among blood donors in Port Harcourt, Nigeria.*Haematology*,*8*: 273-277.

[12]. Elfaki, A.M., Eldour, A.A. &Elsheikh, N.M.(2008).Sero-prevalence of immunodeficiency virus, hepatitis B and C and syphilis among blood donors at ElObeid Teaching Hospital, West Sudan.*Sudan Journal of Medical Sciences*,*3*(4):333-338.

[13]. Federal Ministry of Health Nigeria (2004).*Technical report on 2003 nationalHIV/ syphilis sentinel survey among pregnant women attendinganti natal clinic in Abuja*.Abuja: Federal Ministry of Health Nigeria.

[14]. Fiumara, N. J. (1975).Syphilis in newborn children.*Clinical Obstetric Gynecology*, *18*:183-189.

[15]. Gabriel, U.,Ilot, A. &Obiora, I. (2013).Sero epidemiology of hepatitis B antigenaemia among adult Nigerian with clinical features of liver disease attending a primary care clinic in resource constrained setting ofeastern. Nigeria.*North American Journal of Medical Science*,*5* (4): 293-300.

[16]. Jepsen, O. B., Hougen, K. H.& Birch-Andersen, A.(1968).Electron microscopy of *Treponemapallidum* Nichols.*Acta Pathologica et MicrobiologicaScandinavica, 74*:241-258.

[17]. Jinlin, H., Zhihua, L.& Fan, G. (2005).Epidemiology and prevention of hepatitis B. *International Journal of Medical Sciences,2*(1): 50-57.

[18]. Karki, S., Tiwari, B. R., Ghimire, P., Maharjan, A. &Rajkamikar, M. (2008). Sero prevalence of specific antibodies to *Trepoemapallidum* in blood donors. *Journal of Nepal Health Research Council,6*(13): 98-100.

[19]. Karumudi, U. R.&Augenbraun, M.(2005).Syphilis and HIV: a dangerous duo. *Expert Review of Anti-infective Therapy, 3*:825-831.

[20]. Kurbanov, F., Tanaka, Y. &Mizokami, M. (2010).Geographical and genetic diversity of the human hepatitis B virus.*HepatologyandResearch, 40*(1):14-30.

[21]. Locarnini, S. (2004).Molecular virology of hepatitis B virus. *Seminars in Liver Disease, 24*(1): 3–10.

[22]. Luka, S. A., Ibrahim, M.B.&Illiya, S.N. (2008).Seroprevalence of hepatitis B surface antigen among pregnant women attending Amadou Bello University Teaching Hospital Zaria.*Nigeria Journal of Parasitology*,*29*(1):38-41.

[23]. Mayaud, P. &Mabey, D. (2004).Approaches to the control of sexually transmitted infections in developing countries; Old problems and modern challenges. *Sexually Transmitted Infection,80*: 174- 182.
[24]. Ndako, J.,Obinna,A.,Nwaukiti,O.,Georgebert, E., Surajudeen, A. J., Onyeka,.& Anthony,T. J. (2011). Studies on the prevalence and risk factors for hepatitis B surface antigen among secondary school students in north central, Nigeria.*Sierra LeoneJournal of Biomedical Research,3* (3): 163 -168.
[25]. Nwankwo,E., Momodu, I., Umar, I., Musa, B. &Adeleke, S. (2012). Serooprevelence of major borne infections among blood donor in Kano, Nigeria.*Turkey Journal of MedicalScience,42*(2): 337-341.
[26]. Nwokedi,E.E., Iliyasu, Z., Dikko, A.U., Azeez, A.O. & Mohammed,B.(2005). Syphilis in a Nigerian paramilitary agency: Need for treatment policy. *Annals of Africa Medicine, 4*: 177-179.
[27]. Odusanya, O. O., Alufohai, F. E., Meurice, F. P., Wellens, R., Weil, J. &Ahon-Khai, V. I. (2005).Prevalence of HBsAg in vaccinated children and controls in rural Nigeria.*International Journal of Infectious Disease,9*(3):139-143.
[28]. Olokoba, L.B., Salawu, F.K., Danburam, A., Desalu, O.O., Badung, L.H., Tidi, S.K., Madala, J., Aderibigbe, S., Abdulrahman, M.B., Wahab, K.W., Babalola, O. M. &Abdulkarim, A. (2009). Syphilis in voluntary blood donors in north-easternNigeria. *European Journal of Scientific Research,31*(3): 335-340.
[29]. Okonko, I. O., Amugweye, K. C., Adeniji, F. O. &Aboulyekeen,R. A. (2012). Syphilis and HIV, HCV and HBsAg co injections among sexually active adults: *Nature and Science,* 10 (1): 66-74.
[30]. Olumide, E. A. (2007). The distribution of HBsAg in Africa and tropics.Report of a population study in Nigeria.*International Journal of Epidemiology,5*(3):279-289.
[31]. Opanaye, A., Fabauwo,A., Ashton,V.& Dada,O.A.(2006). Seroprevalence of HIV and hepatitis B virus markers among pregnant women in Ikeja, Nigeria. *Sexual Health Matters, 7*: 65-68.
[32]. Pennap, G. R., Osanga, E.T.&Ubam,M. (2011). Seroprevalencehepatitis B surface antigen among pregnant women attending anti natal clinic in Federal Medical Center Keffi, Nigeria.*Research Journal of MedicalScience*,*5*(2):80-82.
[33]. Pennap, O. R., Akpu, P. H., Adoga, M. P., Agwale, S.&Akpa, F. (2011).*Treponemapallidium* infection among a cohort of pregnant women in north central Nigeria.*American Journal of Tropical Medicine and Public Health,2*: 31 -36.
[34]. Pennap, G.R., Yakubu,A.,Oyige,O.&Forbi,J. (2010).Prevalence of hepatitis B and C virus infection among people of a local community in Keffi, Nigeria.*African Journal of MicrobiologyResearch, 4*: 274-278.
[35]. Pike, R. M. (1976). Laboratory-associated infections: summary and analysis of 3921 cases. *Health Laboratory Science, 13*:105-114.
[36]. Pungpapong, S., Kim, W. R. &Poterucha, J. J. (2007). Natural history of hepatitis B virus infection: An update for clinicians. *Mayo ClinicalProceedings,82*:967-975.
[37]. Pyrsopoulos, N. T.&Reddy, K. R.(2007). Hepatitis B. e-*Medicine*.Retrieved September 3, 2012 from http://www.e-medicine.com/med/tropic992.htm.
[38]. Suneela, G., Singh, M. M., Nath, A., Bhalla, P., Garg, V., Gupta, V. K.&Uppal, Y. (2007). Prevalence and awareness about sexually transmitted infections among males in urban slums of Delhi. *Indian Journal of Medical Science,61*(5):269-277.
[39]. Taiwo,S.S., Adesiji, O. Y. &Adekanle, A.D. (2007). Screening for syphilis during pregnancy in Nigeria: A practice that must continue. *Sexually Transmitted Infections, 83*(5): 357-358.
[40]. Tramont, E. C. (2005). *Treponema pallidum* (syphilis). In G. L.Mandell, J. E. Bennett and R. Dolin (Eds.),*Principles and practice of infectious diseases.* Orlando, FL: Churchill Livingstone, 2768-2784.
[41]. World Health Organization (WHO) (2003).*Guideline for the management of sexually transmitted infections*.Geneva: World Health Organization, 1-32.
[42]. Young, H., Moyes, A., McMillan, A. & Robertson, D. H. (1989).Screening for treponemal infection by a new enzyme immunoassay.*GenitourinaryMedical Journal,65*(2):72–78.
[43]. Zhang, Z., Feige, J.N., Chang, A.B., Anderson, I. J., Brodianski, V. M., Vitreschak, A. G., Gelfand, M.S.&Saier, M. H. Jr(2006). A transporter of *Escherichia coli* specific for L- and D-methionine is the prototype for a new family within the ABC superfamily. *Archive of Microbiology,180*:88-100.

IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) is UGC approved Journal with Sl. No. 5012, Journal no. 49063.

Konlak. D. G " Studies on Sero – Epidemiology And Socio-Demographicfactors In Hepatitis B Virus Infection And Syphilis In Calabar, Nigeria" IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) 14.1 (2019): 09-17.