

## SEROPREVALENCE OF HIV, HBsAg, HCV and VDRL AMONG PREGNANT WOMEN IN ABULE-EGBA, LAGOS STATE, NIGERIA.

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### ABSTRACT

Human Immunodeficiency Virus (HIV), Hepatitis B Surface Antigen (HBsAg), Hepatitis C Virus (HCV) and Syphilis (VDRL) infections are common among pregnant women and they pose a major risk to the fetus due to vertical transmission. The aim of this study was to determine the sero-prevalence of HIV, HBsAg, HCV and VDRL infection among pregnant women in Abule-Egba, Lagos State. A total of 150 pregnant women in Abule-Egba, Lagos state were screened for HIV, HBsAg, HCV and VDRL. Prior to the collection of their blood samples, counseling session was held with every subject so as to give them information about what the test entails. 5 milliliter of blood sample was collected from each subject, centrifuged at 3,000rpm for 10 minutes and the plasma was used to determine the sero-prevalence of HIV, HBsAg, HCV and VDRL using rapid diagnostic test kits. Post-test counseling was also carried out on all the subjects after the release of their results. The data gotten was analyzed by using SPSS version 20. The subjects had age range from 21 to 50 years old with a mean age of  $31.54 \pm 4.860$ . Sero-prevalence of HIV, HBsAg, HCV and VDRL were found to be 0.7%, 3.3%, 1.3% and 0.7% respectively. HIV, HBV, HCV and VDRL infections among pregnant women are major public health problem; future intervention to reduce the vertical transmission should include early screening of these diseases in pregnancy and provision of preventive measures.

**Keywords:** Antigen, pregnant, sero-prevalence, syphilis, transmission.

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### INTRODUCTION

Human immunodeficiency virus (HIV) is a virus that attacks cells (white blood cells which are called T-helper cells or CD4 cells) that help the body to fight infection, making a person to be more vulnerable to other infections and diseases (Uneka et al. 2007). Epidemiological data has shown that HIV remains a public health issue that persistently drains the economic sector, having claimed more than 25 million lives over the last three decades (WHO Fact sheet, 2014). HIV is transmitted through body fluids that include blood, semen, vaginal, rectal fluids and breast milk (Uneka et al. 2007). HIV infection in pregnancy is associated with adverse maternal and fetal outcomes (Oladeinde et al. 2011). The risk of HIV transmission from mother to child is approximately 45% if no safety measures have been taken. The effects of HIV among pregnant women include infectious morbidity, vertical transmission and severe anaemia (Behets et al.

2008). With early HIV testing, special precautions during delivery, prophylactic treatment and shortened breast feeding, the risk can be reduced to the barest minimum (Unicef, 2010).

Hepatitis B infection is caused by the hepatitis B virus (HBV), an enveloped DNA virus that infects the human liver and causes hepatocellular necrosis and inflammation (Ringehan et al. 2017). It is transmitted by exchange of saliva during kissing with an infected person, exposure to infectious blood or body fluids, unprotected sexual contact, blood transfusion, re-use of contaminated needles and syringes, vertical transmission from an infected mother to child (Krajden et al. 2005) during child birth, breastfeeding and through the placenta (Krajden et al. 2005). Other persons who are at high risk include persons with multiple heterosexual partners, homosexuals and health care workers (Krajden et al. 2005). Hepatitis B

virus infection generally can be detected through the 3 parts hepatitis B blood panel. These include hepatitis B surface antigen (HBsAg), hepatitis B surface antibody (HBsAb or anti-Hbs) and hepatitis B core antibody (HbcAb or anti-HBC) (Hepatitis B foundation, 2010). HBV infection can be acute or chronic, acute hepatitis B causes symptoms to appear quickly in adults (Lavanchy, 2004). Chronic hepatitis B develops slowly (Lavanchy, 2004). Acute hepatitis B infection is usually a self-limiting disease marked by acute inflammation and hepatocellular necrosis with a case fatality rate of 0.5-1% (Lavanchy, 2004). Most hepatitis B related deaths were due to liver cirrhosis, followed by primary liver cancer (hepatocellular carcinoma) (Ringehan et al. 2017). Testing for HBV infection among pregnant women is very important because of the mortality and morbidity of the host (pregnant women), its effects on the process of parturition, and the risk of vertical transmission from mother to child (Hepatitis B foundation 2010).

Hepatitis C virus (HCV) is a RNA virus which is known to infect humans. It is often transmitted parenterally but is also transmitted vertically and sexually (Owusu-Ofori et al. 2005). HCV is up to 4 times more infectious than Human Immunodeficiency Virus and it requires less exposure than HIV to cause infection (Te and Jensen, 2010). The estimated prevalence of HCV in Africa is 5.3% (Pybus et al. 2003). Egypt has the highest worldwide prevalence (17.5%) (Maheshwari and Thuluvath, 2010). The routes of transmission of HCV are blood, blood products, tissue and organs transplant, unsafe medical procedure, health care exposure e.g needle stick injury (Xia et al. 2008), intravenous drug use (Tohm and Holmberg, 2010), sexual transmission (Jafari et al. 2010), body piercings (Lam et al. 2010) and vertical transmission (Owusu-Ofori et al. 2005).

Syphilis is one of the most imperative sexually transmitted infections, which is caused by spirochete *Treponema pallidum*, which is a significant public health issue (Lynn and Lightman, 2004). Studies have shown that about 10 million people are infected with syphilis worldwide (Lynn and Lightman, 2004). Annually, about 2 million pregnant women are estimated to have active syphilis infection (Arnesen et al. 2015). Syphilis is transmitted via

sexual contact or from mother to child during pregnancy or delivery (Gomez et al. 2013). Prevalence rate of syphilis infections among pregnant mother differs between countries and regions depending on a number of factors such as the national HIV prevalence and culture of the general population. Untreated syphilis is a significant cause of morbidities and mortalities in pregnant women (Arnesen et al. 2015). Maternal syphilis results in abortion, still births, non-immune hydrops, intra-uterine growth restriction, perinatal death and congenital syphilis and this remains an increasing problem in many countries of sub-saharan Africa (De Santis et al. 2012). Pregnant women who are at increased risk for syphilis infection includes sex workers, illicit drug users, and women that live in communities with high syphilis morbidity (Arnesen et al. 2015).

The aim of this study was to determine the prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus and syphilis among pregnant women living in Abule-Egba, Lagos State, South-West Nigeria.

## MATERIALS AND METHOD

### Study Area

This cross sectional study was conducted among pregnant women who live in Abule-Egba, Alimosho Local government area of Lagos State.

### Inclusion Criteria

Subjects that fulfilled the following criteria were included in this study:-

1. Subject for this study included pregnant women only
2. Those that consented to participate in the study.

### Exclusion Criteria

Subjects with the following criteria were excluded from this study:-

1. Those not pregnant.
2. Pregnant women who did not consent to the study.

### Ethical consideration

The participation of subjects in this research was voluntary, and the principle of patient confidentiality was strictly adhered to.

Each participant was duly counseled and a prepared consent form was signed by each of the subjects.

### Sample collection and preparation

5mls of venous blood sample was collected from each of the subjects and was transferred into an EDTA bottle, which was sent to the laboratory. The collected blood samples were centrifuged at 3,000rpm for 10 minutes with a macro-haematocrit centrifuge. Subsequently the plasma was transferred into a plain bottle which was used to conduct the test for HIV, HbsAg, HCV and VDRL.

### Detection of HIV

The HIV screening for all the subjects was examined by using rapid test diagnostic test kits. This was done with the use of Abbott Determine HIV-1/2 diagnostic kit, because of its high sensitivity (100%) and specificity (99.6%). Positive presumptive diagnosis test were further examined using Uni-Gold test kit and if positive at this point, the result would remain as positive but if otherwise, a confirmatory test can be carried out by using Stat-Pak as recommended by the National Agency for Control of AIDS (NACA).

### Screening for HBsAg, HCV and VDRL

Laboratory screening of HBV was carried out by using HBsAg antibody test strip produced by Abon Biopharm (Hangzhou) co., Limited. Laboratory diagnosis for HCV analysis was carried out by using HCV antibody test strip produced by Abon Biopharm (Hangzhou) co., Limited. While that of VDRL was conducted by using Acon ultra Rapid Syphilis test strip (Acon Laboratory Inc, USA). The test was carried out at room temperature and according to the manufacturer's specification. The test strip was removed from its package and then immersed vertically into the serum for 20 seconds which was later placed on a non-absorbent flat surface. It was observed for 15 minutes, the control line showed before any test was validated.

### Counseling Session

Before the commencement of the screening, there was pre-test counseling session which was handled by qualified counselors. The

subjects were sensitized, informed and enlightened about the importance of the screening test, and they were made to understand the possibly outcome of the result of the screening test. Every subject recruited for this study was made to understand that each test can have a positive or negative impact on their fetus, themselves and the family at large if the preventive and precautionary measures are not put into consideration. At the end of each test, a post –test counseling session was carried out, in which individual result was shared confidentially to every subject and those that were tested positive to any of the screening test were advised to visit any of the government hospitals for proper treatment and management.

### Statistical Analysis

All the data gotten from this study was entered into and analyzed using SPSS version 20. Data were reported as frequency table distribution, percentage, student t-test and chi-square.

## RESULTS

**Table 1.0: Age groups of Subjects.**

Age Group	Frequency (%)
21-25	12 (8)
26-30	52 (34.7)
31-35	60 (40)
36-40	19 (12.6)
41-45	4 (2.7)
46-50	3 (2)
Total	150 (100)
Mean ± STD	31.54 ± 4.860

Among the 150 subjects recruited for this study, 12(8%) of the subjects were within the ages of 21-25, 52(34.7%) of the subjects were within the ages of 26-30, 60(40%) of the subjects were within the ages of 31-35, 19(12.6%) of the subjects were within the ages of 36-40, 4(2.7%) of the subjects were within the ages of 41-45 while 3(2.7%) of the subjects were within the ages of 46-50. Subjects recruited for this study had a mean age of 31.54 and a standard deviation of 4.860. The ages of the subjects recruited for this study was statistically significant (P=0.001) (Table 1.0).

**Table 2.0. Different screening parameters and their prevalence**

Parameters	Results		Total (%)	P-value
	Negative (%)	Positive (%)		
HIV	149 (99.3)	01 (0.7)	150 (100)	0.183
HbsAg	145 (96.7)	05 (3.3)	150 (100)	
HCV	148 (98.7)	02 (1.3)	150 (100)	
VDRL	149 (99.3)	01 (0.7)	150 (100)	

Among the 150 subjects recruited for this study, 149(99.3%) tested negative to HIV while 1(0.7%) tested positive to HIV; 145(96.7%) tested negative to HbsAg while 05(3.3%) tested positive to HbsAg, 148(98.7%) tested negative to HCV while 2(1.3%) tested positive to HCV.

149(99.3%) tested negative to VDRL while 01(0.7%) tested positive to VDRL. Among the 150 subjects recruited for this study, the numbers of subjects that tested positive to HIV, HbsAg, HCV and VDRL was not statistically significant when compared to the numbers of subjects that

**Table 3.0: HIV, HBsAg, HCV and VDRL results among pregnant women in various age groups**

Age(Yrs)	21-25	26-30	31-35	36-40	41-45	46-50	Total	P -Value
<b>HIV</b>	NEG=12	NEG=51	NEG=60	NEG=19	NEG=4	NEG=3	149	0.863
	POS=0	POS=1	POS=0	POS=0	POS=0	POS=0	1	
	Total=12	Total= 52	Total=60	Total=19	Total= 4	Total=3	150	
<b>HbsAg</b>	NEG=12	NEG=49	NEG=58	NEG=19	NEG=4	NEG=3	145	0.218
	POS=0	POS=3	POS=2	POS=0	POS=0	POS=0	05	
	Total=12	Total=52	Total=60	Total=19	Total=4	Total=3	150	
<b>HCV</b>	NEG=12	NEG=52	NEG=59	NEG=18	NEG=4	NEG=3	148	0.663
	POS=0	POS=0	POS=1	POS=1	POS=0	POS=0	02	
	Total=12	Total=52	Total=60	Total=19	Total=4	Total=3	150	
<b>VDRL</b>	NEG=12	NEG=51	NEG=60	NEG=19	NEG=4	NEG=3	149	0.863
	POS=0	POS=1	POS=0	POS=0	POS=0	POS=0	01	
	Total=12	Total=52	Total=60	Total=19	Total=04	Total=3	150	

NEG = NEGATIVE POS = POSITIVE

Subjects recruited for this study were arranged based on their age group with their corresponding results of the screening test carried out. The result revealed that only one subjects within the age group of 26-30 years old was positive to HIV. Three (3) subjects who were in the age group of 26-30 years old and two (2) subjects who are in the age group of 31-35 years old tested positive to HbsAg. One (1) subjects in the age group of 31-35 years old and one(1) subject in the age group of 36-40 years old tested positive to HCV. Only one (1) subject in the age group of 26-30 years old tested positive to VDRL. The numbers of subjects across the

various age groups who tested positive to HIV, HbsAg, HCV and HIV was significantly low when compared with the numbers of subjects that tested negative to HIV, HbsAg, HCV and HIV across the various age groups ( $P < 0.05$ ) (Table 3.0).

## DISCUSSION

An epidemiological assessment of HIV, HbsAg, HCV and VDRL studies were carried out among 150 pregnant women living in Abule-Egba, Alimosho Local Government area, Lagos state. The ages of the subjects ranged from 21 - 50 years old with a mean age of  $31.54 \pm 4.860$ .

According to this study, 12(8%) of the subjects ranged in ages between 21-25 years old, 52(34.7%) ranged in ages between 26-30 years old; 60(40%) ranged in ages between 31-35 years old; 19(12.6%) ranged in ages between 36-40 years old; 4(2.7%) ranged in ages between 41-45 years old while 3(2%) ranged in ages between 46-50 years old.

HIV, HBV, HCV and VDRL infections are still seen as major public health concerns in Lagos state and Nigeria at large, not because Lagos state is over populated nor because Lagos State is a hyper endemic region, but because individuals that are infected with these diseases can remain asymptomatic for many years and can also serve as reservoir of infection during this period. Also the rate of migration of people from rural areas to Lagos state is of the increase and some of these immigrants do not have any source of livelihood nor good accommodations.

Pregnant women remain the most vulnerable high risk population to the devastating impact of HIV generalized epidemic in Nigeria. Over the past 5 decades, studies have revealed that pregnant women have been particularly vulnerable and severely affected with HIV; this can be due to the compromised state of their immunity, risk of transmission from most recent partners and onward transmission to unborn child (Awofala and Ogundele, 2016). The number of pregnant woman in Abule-Egbe, Lagos State, who tested positive to HIV was not significantly raised ( $P=0.863$ ). According to our study, the overall prevalence estimate of HIV among pregnant women in Abule-egba, Lagos State was 0.7%. When compared to a similar study conducted of recent by National HIV prevalence among pregnant women in Lagos State, they recorded a prevalence of 2.9% (CIA world factbook, 2018) which was higher than ours. Another recent study by Glory et al. 2018 recorded an overall prevalence of 5.2% among pregnant women in Lagos and its environs. HIV prevalence in our study was lower than the 2010 "National ANC average HIV prevalence rate of 4.1% in pregnant women (Bashorun et al. 2014) and this could be due to the increased level of awareness among pregnant women in Abule-Egbe and its environs on the prevention of mother to child Transmission (PMTCT) of HIV/AIDS as well as the functional PMTCT program introduced to all primary health centres" in Lagos State,

thereby attracting more HIV-positive pregnant women to book at various primary health centres in Abule-Egba, Lagos State.

The prevention of HBV infection among pregnant women should be a major concern to every Nation. Centres for disease control (CDC) and many others important health agencies have all strongly recommended universal HBsAg screening for pregnant women to prevent perinatal HBV transmission and mother-to-child infection of HBV (Utoo, 2013). In this study, HBsAg did not reveal statistical significant seropositivity ( $P=0.218$ ) among the pregnant women studied. The seroprevalence rate of HBV infection in this study was 3.3% which is comparable with a similar study carried out by other researchers, who recorded a prevalence of 4.6% in Enugu; 4.3% in Port-harcourt city (Akani et al. 2005) and a prevalence of 2.2% reported in Benin City but lower than a prevalence of 6.08% reported in Lagos State, Nigeria. These variations may be due to the differences in the modes of transmission, which can be influenced by socio-cultural practices and environmental factors (Buseri et al. 2010).

An important concern demonstrated in this study was that subjects that tested positive to HBsAg were within the age range of 26-30 years old and 31-35 years old which are within the youthful age. This can be as a result of their refusal to take HBV vaccine prior to when they were exposed to the virus. Immunization has been found to be the most effective way of controlling the virus (Emechebe et al. 2009).

The prevalence of HCV (1.3%) in this study did not reveal statistical significant seropositivity ( $P=0.663$ ) among pregnant women studied when compared with similar studies carried out by Buseri et al. 2010, who revealed the prevalence of 0.5% among pregnant women in Yenagoa, Bayelsa State and 1.5% among pregnant women attending the University of Abuja Teaching Hospital, Gwagwalada, Nigeria (Buseri et al. 2010). In this study, it was observed that Subjects that tested positive to HCV were within the age range of 31- 35 and 36-40 years old.

Syphilis is one of the sexually transmitted diseases that is prevalent in developing countries and is of public health importance and can cause fetal defects if not treated. Pregnant women who are at high risk of syphilis infection include

women living in poverty, drug users, sex workers, uninsured women and women in communities with high syphilis morbidity. Studies have shown that screening test can detect syphilis infection (Aboyeji and Nwabuisi, 2003). Studies have revealed that it can cause fetal defects if not treated. The prevalence of Syphilis (0.7%) in this study did not reveal statistical significant sero-positivity ( $P=0.863$ ) among the pregnant women studied, which is lower than a prevalence of 2.28% recorded by Azuonwu, (2020), who carried out a similar study among pregnant women visiting a health facility in Rivers State. Opone et al. (2019) also recorded a prevalence of 1.98% among pregnant women in Akwa Ibom State, Southern Nigeria. Similarly, at the University of Ilorin Teaching Hospital, in North Central Nigeria, a prevalence of 1.76% was recorded among ante-natal clinic attendees (Aboyeji and Nwabuisi, 2003). The variation in the seroprevalence of syphilis among pregnant women could be attributed to the differences in sexual practices and behavior. Also the low prevalence of syphilis among pregnant women living in Abule-Egba, Lagos State can be attributed to the over the counter use of antibiotics for minor or major complaints and easy access to the drugs (Mulu et al. 2007).

## CONCLUSION

According to this study, the prevalence of HIV was 0.7%, HBsAg was 3.3%, HCV was 1.3% and VDRL was 0.7. This shows that these infections (HIV, HBsAg, HCV and VDRL) still remain significant public health problems in our society. Therefore there should be more health education about these infection and its risk factors.

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