Prevalence of Hepatitis B surface antigen among pregnant women attending Odoma Clinic Idah, Kogi State, Nigeria

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ABSTRACT

Hepatitis B virus (HBV) infection is endemic in Sub-Saharan Africa with range of 8 – 20%. Prevalence of chronic carries who are at risk of developing liver cancer, cirrhosis and death. This project determined the Prevalence of Hepatitis B Surface Antigen (HB$_s$Ag) among Pregnant Women attending Odoma Clinic Idah Kogi State Nigeria. Two milliter (ml) of venous blood was collected from each of the one hundred and thirteen (113) pregnant women by venepunture into anticoagulant bottle (EDTA) to obtain plasma use to screen for HBsAg. Three blood samples were found positive out of the one hundred and thirteen blood samples screened ($\frac{2}{7}$)age group 26-30 recorded prevalence of 6.1% followed by age group 15-20, 21-25, 31-35, 36-40 which had 0.00% prevalence each. Patients married recorded the prevalence of 3.0% while single, separated, divorced, cohabiting had 0.00% prevalence each. Those from Kabba Local Government Area in Kogi State had a prevalence rate of 100.0% and those from IGBO-eze north Local Government Area in Enugu State recorded a prevalence rate of 33.3% followed by Ofu, Dekina, Ankpa, Okene, Olamaboro, Ibaji, Idah, Ogugu, Omala, Igalamela, Nsuskka, Udenu which had 0.00% prevalence each. Patients in secondary recorded a prevalence rate of 3.39% and those in tertiary had a prevalence of 0.52%. Those patient in business recorded a prevalence rate of 4.17% followed by applicant, armed forces, house wife,civil servant with a prevalence rate of 0.00% each. Those under 1st (first) wife recorded a prevalence rate of 3.13%. Patients that were Christian recorded a prevalence rate of 3.95% while Muslim recorded 0.00% prevalence. Those patient who had knowledge of the disease recorded a prevalence rate of 2.94% and those without the knowledge of the disease recorded a prevalence rate of 2.22%. Chi-square test revealed that the infection rates according to age, marital status, local government area, state, occupation, region, knowledge of the disease was not significant (p<0.05). Although the infection rate was insignificant, adequate protective measures should be put in place to further reduce the disease burden in Kogi State.
Keywords: Hepatitis B, antigen, pregnant women, and Clinic Idah.

INTRODUCTION

Hepatitis B is a liver infection which puts people at high risk of death from cirrhosis and liver cancer. It is caused by hepatitis B virus (HBV). Infection with HBV results is acute and chronic infection with four subtypes of the virus such as adw, ayw, adi and ayr [1]. Hepatitis B infection is one of the major diseases of mankind and is a serious public health problem with approximately 45% of the world's population living in area of high chronic HBV prevalence [2] Prevalence of HBV varies markedly in different geographical areas of the world as well as in different population subgroups, ranging from 10% in some Asian, western pacific and sub-Sahara African countries to about 0.5% in the united states and northern European countries [3]. The prevalence of chronic HBV infection worldwide could be

categorized as high (>8%) intermediate (2-7%) and low (<2%) endemic [4]. In Nigeria, about 20 million are presently infected and five million die of the disease annually [5]. According to [6] acute hepatitis B virus infection occurs in 1 to 2 of every 1000 pregnancies with 1 to 5% of pregnant women becoming chronic carriers of BHV. The risk of transmission causes serious risk of developing chronic liver disease such as cirrhosis and heptaocellular carcinoma in later life, with up to 25% of them dying as adults. Prevalence studies on HBsAg in Nigeria have shown that the prevalence of the infection in pregnant women ranges from 2 to 15.8% [7]. Mode of transmission include saliva, semen, vaginal secretion, menstrual blood and in smaller quantities in perspiration, breast milk, tears and urine of the infected individual which can be diagnose through serological and virological markers such as HB surface (HBsAg), HB envelope (HBeAg), HB core (HBcAg) and HBxAg [8]. Hepatitis B surface Antigen (HBsAg) is the hallmark of HBV infection and the first serological marker to appear in acute HBV infection and persistence of HBsAg for more than 6 months suggests chronic hepatitis B virus infection [9]. Symptoms of hepatitis B virus include fever, headache, muscle ache, nausea, vomiting, abdominal pain and jaundice [10]. Antiviral treatment is available and is of benefit to some people with chronic hepatitis B infection. Drug such as tenofourir or entecavir is used [10]. And the infection can be prevented by practicing safe sex, been faithful to a sex partner or abstinence which is the best, screening of blood before transfusion and vaccination [11].

Statement of the Problem

Nigeria is classified among the group of HBV endemic countries with a current population of 18million infected [1] despite the existence of a safe and effective vaccine, Nigeria has remained a hyperendemic area for HBV infection with an estimated population of 12% being chronic carriers [9]. Studies have been carried out on HBV infection in different parts of Nigeria and among different sub groups of individual but the record of prevalence among pregnant women in Idah are scare. Therefore, there is need to study the prevalence of HBsAg among pregnant women in Idah and to create awareness about the infection among the study population. Therefore, this project is designed to Determine the prevalence of hepatitis B virus surface antigen among pregnant women attending Odoma clinic in Idah, Kogi state Nigeria. Determine the factors associated with the prevalence of HBV infection in the study population.

MATERIALS AND METHODS
STUDY AREA

Federal Polytechnic Idah, formally Idah College of technology is a federal government owned tertiary education institution that was established in 1977 in Idah Kogi state. It is approved by the national board for technical education and it offers national diploma and higher national diploma courses at undergraduate levels with the aim of training competitive manpower for development, with five schools which include school of business studies, school of engineering, school of environmental studies, school of technology and school of preliminary studies. Idah is a town in Kogi state Nigeria on the eastern bank of the Niger River in the middle belt region of Nigeria with $7^0 0500/N6^0 4500E/7.0833^0N$. $6.75000E$ and a local government with an area of $361km^2$ around the town and a population of 79,815 at the census 2006. Idah has commercial routes on the River Niger linking Lokoja to the north, Onitsha in Anambra state to the south and Edo state across the Niger to the west with a Guinea savanna. Its population is primarily Igala and a minority of other tribe such as Igbo, Nupe and Idoma. Idah host a federal polytechnic, college of health science and technology, government technical college. Idah is a major food supplier of Kogi state and a traditionalcity of the Igala kingdom.

Study Period

The period of study was from June to September, 2016.

Sample Collection and Preparation.

Two m1 of venous blood was collected from each of the one hundred and thirteen (113) pregnant women attending Odoma clinic in Idah by venepuncture into anticoagulant bottle (EFDA) Serum obtained was prepared and transported to microbiology laboratory on ice pack for assay of HB_sAg. Permission for the study was obtained from the Kog state ministry of health as well as the Federal Polytechnic Idah ethical committee. The aim and benefit of the study was read and also interpreted to the participant and informed consent obtained from them for enrolment in the study. Questionnaires containing information such as age, marital status, state, local government area, religion, occupation, educational status was administered to the participant to obtain their demographic data.

Assay of Hepatitis B Surface Antigen (HBsAg)

Seven garce (rapid diagnostic test) test strips with reagents made in Onitsha in step HBsAg rapid screen test were used in a step wise order for the detection of HBsAg in the blood. These methods which are immunochromatographic and qualitative in nature detect the presence of HBsAg in human blood and be read invitro. How two monoclonal antibodies are employed to identify HBsAg specifically. This one step test is very sensitive and only takes about 15-20 minutes. Test results are read usually without any instrument.

Principle of Hepatitis B Surface Antigen

Seven garce one step HBsAg test device (serum/plasma) is a qualitative, lateral flow immunoassay for the detection of HBsAg in serum or plasma. The membrane is precoated with anti HBsAg antibodies on the test line region of the test. During testing, the serum or plasma specimen reacts with the particle coated with anti HBsAg antibody. The mixture migrates upward on the membrane chromatographically by capillary action to react with anti HBsAg antibodies on the membrane and generate a coloured line. The presence of this coloured line in the test region indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a colour red line will always appear in the control line region indicating that proper volume of specimen has been added and membrane wicking has occurred.

Test Procedure

The sealed pouch was opened by tearing along the notch when ready to begin testing.

❖ Strip was immersed into the container with the narrow end pointing towards the container and the strip was not immersed past eh MAX (maximum line). The strip was taken out after 8-10seconds and laid on a lean dry, non-absorbent surface (mouth of the serum container).

❖ Result was read after 20minutes.

Interpretation of Results

Negative: Only one colour band appears on the control region. No apparent band on the test region. This indicates that there is no detectable HBsAg in the serum.

Positive: Distinct colour bands appears on the control region test both test line and control line indicates that the specimen contains detectable amount of HBsAg.

Invalid: No visible band at all or only one coloured band appears on test region, this is an indication of a possible error in performing the test. The test should be r repeated using a new device.

Performance Characteristics

Sensitivity: The HBsAg one step hepatitis B surface antigen test strip (serum/plasma) was been tested for its sensitivity by running a negative control test by dipping the strips into the EDTA bottle containing normal saline. They all yielded negative result.

Specificity: Specificity of the HBsAg one step hepatitis B surface antigen test strip (serum/plasma) was tested with confirmed laboratory strains of hepatitis B they all yielded positive results.

Statistical Analysis

The Chi-square (x^2) test with rates correction for small numbers was used to analyze the data and the level of significance was determined at $p<0.-5$ and the prevalence of HBsAg was calculated by using patients with positive samples as the numerator and the total number of patients enrolled in this study as the denominator.

Hypotheses
Prevalence of HBV Infection

Null-H_0 – There is no HBV infection
Alternative- H_A- There is HBV infection

Effect of Age on HBV Infection

H_0 – There is no effect of age on HBV infection
H_A – There is effect of age on HBV infection

Effect of Sex on HBV Infection.

H_0 – There is no effect of sex on HBV infection
H_A – There is effect of sex on HBV infection

Effect of Occupation on HBV infection

H_0 – There is no effect of occupation on HBV infection.
H_A – There is effect of occupation on HBV infection.

RESULTS

Age Distribution of HBsAg among pregnant women attending Odoma clinic in Idah kogi state

Pregnant women screened for the detection of HBsAg, prevalence rate for the age groups 26-30years was 6.12% followed by age groups 15-29=0, 21-25, 31-35, and 36-40years with no positive cases giving 0.00% each (Table 1) and the overall prevalence of 2.7% (Table 1).

Table 1: Distribution of HBsAg among pregnant women attending Odoma clinic in Idah kogi state in relation to age

S/N	Age group Years	No tested	No. positive for HBsAg	No. Negative for HBsAg	prevalence %
1	15-20	10	0	10	0
2	21-25	24	0	24	0
3	26-30	49	3	46	6.12
4	31-35	22	0	22	0
5	36-40	8	0	8	0
	Total	113	3	110	2.7
x^2_{cal} = 84.87 at P < 0.05					
X^2_{tab} = 9.488					

Distribution based on marital status of the one hundred and thirteen (113) pregnant women screened for the detection of the virus. Ninety nine (99) married were tested, three (3) were positive with 3.00% prevalence followed by singles, separated, divorced, cohabiting with no positive cases giving 0.00% each, with the overall prevalence of 2.7% (Table 2).

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Table 2: Distribution of HBsAg among pregnant women attending Odoma clinic in Idah kogi state in relation to marital status

Marital status	No. tested	No. positive	No. negative	Prevalence
		For HBsAg	for HBsAg	%
Single	5	0	5	0
Married	99	3	96	3.00
Separated	4	0	4	0.00
Divorced	3	0	3	0.00
Cohabiting	2	0	2	0.00
Total	**113**	**3**	**110**	**3.00%**

X^2_{cal} = 39.2 at p < 0.05

X^2_{tab} = 9.488

Distribution based on state and local government are of pregnant women was screened for the detection of HBsAg.

One hundred and thirteen (113) were tested from kogi state and recorded 2 (two) positive with prevalence rate of 100.0 from Kabba local government are and 1(one) positive from Enugu state under Igbo-eze north local government are. Followed by Ofu, Dekina, Ankapa, Okene, Amaboro, Ibaj, Idah, Ogugu, Omala, Igalamela, Nsukka, Udenu with the prevalence rate of 0.00% each, the overall prevalence to be 2.7% for the 113 pregnant women (Table 3).

Table 3: Distribution of HBsAg among pregnant women attending Odoma clinc in Idah kogi state in relation to state and local government area

State	L.G.A	No. tested	No. positive for HBsAg	No. negative for HBsAg	Prevalence
Kogi	Ofu	1	0	1	0.00
	Dekina	0	0	0	0.00
	Ankpa	3	0	3	0.00
	Kabba	2	2	0	100.0
	Okene	2	0	2	0.00
	Olamaboro	5	0	5	0.00
	Ibaji	13	0	13	0.00
	Idah	70	0	70	0.00
	Ogugu	2	0	2	0.00
	Omala	5	0	5	0.00
	Igalamela	3	0	3	0.00
Enugu	Nsukka	3	0	3	0.00
	Igbo-eze north	3	1	2	33.3
	Udenu	1	0	1	0.00
	Total	**113**	**3**	**110**	**2.7**

X^2_{cal} = 156.2 at p< 0.05

X^2_{tab} = 22.362

Distribution of HBsAg among pregnant women attending Odoma clinic in Idah kogi state in relation to educational status

Distribution based on educational status of the one hundred and thirteen (113) pregnant women screened for the detection of HBsAg. Fifty nine (59) secondary were tested, 2 were positive with 3.39 prevalence, fifty two (52) tertiary were tested, one (1) positive with prevalence rate of 0.52 and primary with no positive case giving 0.00% prevalence 0.00%, and the overall prevalence to be 2.7% (Table 4).

Table 4: Distribution of HBsAg among pregnant women attending Odoma clinic in Idah kogi state in relation to educational status.

Educational Status	No. tested	No. positive for HBsAg	No. negative for HBsAg	Prevalence %
Secondary	59	2	57	3.39
Tertiary	52	1	51	0.52
Primary	2	0	2	0.00
Total	**113**	**3**	**110**	**2.7**

X^2_{cal} = 28.50 at $p < 0.05$

X^2_{tab} = 5.991

Distribution based on occupation of the one hundred and thirteen (113) pregnant women screened for the detection of HBsAg. Seventy two (72) business women were tested, 3 were positive with 4.17% prevalence, followed by health care worker, applicant, armed forces, civil servant, housewife with a prevalence rate of 0.00% each, giving the overall prevalence to be 2.7% (Table 5).

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Table 5: Distribution of HBsAg among pregnant wom3en attending Odoma clinic in Idah kogi state in relation to occupation.

Occupation	No. tested	No. positive For HBsAg	No. negative for HBsAg	Prevalence %
Business	72	3	69	4.17
Health care Workers	4	0	4	0.00
Applicant	11	0	11	0.00
Armed forces	3	0	3	0.00
Civil servant	12	0	12	0.00
House wife	11	0	11	0.00
Total	**113**	**3**	**110**	**2.7**

X^2_{cal} = 95.95 at p < 0.05

X^2_{tab} = 11.071

DISTRIBUTION OF HBSAG AMONG PREGNANT WOMEN ATTENDING ODOMA CLINIC IN IDAH KOGI STATE IN RELATION TO NUMBER IN HUSBAND HOUSE

Distribution based on number in husband house of the one hundred and thirteen (113) pregnant women screened for the detection of HBsAg. Ninety six (96) first list wives were tested, 3 were positive with 3.135 prevalence, both 2nd and 3rd wives has no positive cases giving 0.00% prevalence each table 6.

Table 6: Distribution of HBsAg among pregnant women attending Odoma clinic in idah kogi state in relation to number in husband house

No. in husband House	No. tested for HBsAg	No. positive for HBsAg	No. negative %	Prevalence
1st	96	3	93	3.13
2nd	13	0	13	0.00
3rd	4	0	4	0.00
Total	**113**	**3**	**110**	**2.7**

X^2_{cal} = 23.76 at $p < 0.05$

X^2_{tab} = 5.991

Distribution of HBsAg among pregnant women attending Odoma clinic in Idah, Kogi State in relation to religion

Distribution based on religion of the one hundred and thirteen (113) pregnant women screened for the detection of the virus. Seventy six (76) Christian women were tested, 3 were positive with 3.95% prevalence and thirty seven (37) Muslim were tested with no positive case giving a prevalence of 0.00% (Table 7).

Table 7: Distribution of HBsAg among pregnant women attending Odoma clinic in idha, kogi state in relation to religion

Religion	No. tested	No. positive For HBsAg	No. negative for HBsAg	Prevalence %
Christian	76	3	73	3.95
Muslim	37	0	37	0.00
Total	**113**	**3**	**110**	**2.7**

X^2_{cal} = 23.80 at p < 0.05

X^2_{tab} = 3.841

Distribution of HBsAg among pregnant women attending Odoma clinic in idah kogi state in relation to previous knowledge of the virus

Distribution based on previous knowledge of the virus of the one hundred and thirty (113) pregnant women screened for the detection of the virus. Sixty eight (68) yes were tested, 2 were positive with 2.945 prevalence and 45 No were tested with 1 positive giving a prevalence rate of 2.22% (table 8).

Table 8: Distribution of HBsAg among pregnant women attending Odoma clinic in idah kogi state in relation to previous knowledge of the virus

Previous knowledge of the virus	No. tested	No. positive for HBsAg	No. negative for HBsAg	Prevalence %
Yes	68	2	66	2.94
No	45	1	44	2.22
Total	**113**	**3**	**110**	**2.7**

X^2_{cal} = 17.81 at p < 0.05

X^2_{tab} = 3.841

DISCUSSION

In this result, the prevalence of hepatitis B (HBV) infection among pregnant women attending Odoma clinic in Idah, Kogi State Nigeria was determined. The prevalence was found to be 2.7% ($\frac{x}{y}$) out of the one hundred and thirteen (113) blood samples, screened which show a lower prevalence in the clinic. The prevalence of HBsAg among pregnant women attending antenatal at godo health clinic Maiduguri was 2.7% among two hundred patients. Prevalence of hepatitis B surface antigen in Jos was 14.3% among three hundred and fifty patients [12]. 11.0% among farming and non-farming individuals in Anyigba kogi

state Nigeria [13]. 14% among hepatitis B 4.3% reported by [14] among pregnant women in port Harcourt Nigeria, 1.1% recorded by [15] among pregnant woman attending antenatal at central clinic in Niger Delta Nigeria, 12.0% was reported among three hundred pregnant women in war, delta state [3]. [12], went forward to classify high endemicity in HBV infection dn defined it as HBsAg greater than 7% in an adult population (Table 1). Age distribution showed that prevalence rate was 6.10% ($^3/_{49}$) for age-group 26 – 30 years (the most sexually active age group) infection drug users, having sex with unvaccinated men, multiple sex partner, tattooing, reuse of needles and syringes either in health care setting or among persons who inject drugs and other risk factors. Age groups 15 – 25 and 40 above recorded a prevalence of 0.00% each statistically age was not significantly associated with HB_sAg seropositivity ($p < 0.05$). This study is similar to that of Kuta *et al.,* 2014 which showed a higher prevalence among age groups 21 – 30 years. The result also disagreed with report from [5] which reported a higher prevalence in age groups 1 – 10 years which indicates early transmission by material infant transmission leading to the acquisition of HB_sAg chronic carrier status. This result correlates with peak age of highest sexual activity in the society and supports the role of sexual intercourse in transmission of HBV. These could be explained by the relationship between hepatitis infection and high risk sexual practices which is noted to be higher among the younger age group. In view of this multiple sex partner, having unprotected sex should be discouraged since hepatitis can be found in anybody irrespective of the age.

Marital status distribution (table 2) showed a prevalence rate of 3.00% ($^3/_{99}$) among the married than the singles, Divorced, co-habiting having 0.00% each statistically, marital status was not significantly associated with HB_sAg seropositivity ($P < 0.05$). The result agrees with [13] who reported a higher prevalence of HB_sAg among married groups (3.2%) attending antenatal at Grimard Hospital Anyigba, Kogi state, Nigeria. This result may be as a result of more married patients attending Odoma clinic in Idah Kogi state, Nigeria compared t the rest of the study population because of the economic recession in the country at the time this study was been carried out. Therefore there is need to make the antenatal service affordable to all the patient and to create more awareness on the virus. State distribution (Table 3) showed a prevalence rate of 100.0% ($^2/_2$) among pregnant women attending Odoma clinic in Idah from Kabba local government area Kogi state. This result agrees with [13] which showed a higher prevalence among pregnant women attending Grimard Hospital Anyigba Kogi state with (3.5%) Enugu state recorded a prevalence of 33.3% ($^1/_3$) in this result. This result disagree with [14] who reported a prevalence of 4.3% in Port Harcourt Nigeria. [7], in north eastern Nigeria recorded 1.2% among the catholic women attending antenatal at central hospital. A higher prevalence was recorded in Kogi state due to the lack of awareness of this virus in some part of the local government area in Kogi state. Hence the need for more enlightment on the virus especially among pregnant women in the state to prevent the vertical transmission of this virus. Educational status (table 4) showed a prevalence rate of 3.39% ($^2/_{59}$) among the patient with secondary certificate while a prevalence rate of 3.5% was recorded among those with tertiary certificate. This result agree with [6] which had a prevalence rate of 3.5% among patient in a low resource setting in Maidguri statistically educational status was not significantly associated with HB_sAg ($p < 0.05$). However in this result, it was noted that educational attainment did not reduce the risk factors such as tattooing, blood transfusion, aroumsion, multiple sex partner and others as route of transmission this infection. This brings to light the need for focused education at all level of education on prevention of high risk behaviours that can lead to the transmission of this infection. Distribution based on occupation (Table 5) showed a prevalence rate of 4.17 ($^3/_{12}$) among the business women. This result is similar to that of [13] which recorded 11.0% among farming and non-farming individual in

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Anyigba, Kogi state. Health care worker, applicant, armed forces and civil servant recorded a prevalence rate of 0.00% each statistically occupation was not significantly associated with HB$_s$Ag seropositivity (p < 0.05). This result shows a higher prevalence among those engaged in business than the rest of the study population because of the ignorance of the virus on their part. Most of the business women in Idah specifically are uneducated, who mingle with different people on daily basis, traveling to countries where the infection rate is high which are route of transmission of this virus. Hepatitis B can be found among all the occupation but at a lower rate because of the exposure and experience of the remaining study population. Hence the need to create awareness among women attending antenatal to prevent the vertical transmission. Distribution in relation to position in husband house (table 6) showed a prevalence rate of 3.13 ($^3/_{96}$) among the 1st wives and a prevalence of 0.00% among the second and third wives each statistically position in husband house was not significantly associated with HB$_s$Ag seropositivity (p < 0.005) no data was found to compare at the time of this study. This result shows a higher incidence among the first wives which are associated with risk factors such as multiple sex partners, having sex with unvaccinated men or contact with sex workers. A lower prevalence was recorded among the second and third wives because of their low turnout at the antenatal. In view of this multiple sex partner should be discouraged and wives should be educated on how to protect their selves and their unborn child by proper examination and

enrolment in the antenatal service been provided by the clinic. Distribution based on religion showed a higher prevalence of 3.95 ($^3/_{76}$) among the Christian and a prevalence rate of 0.00% was recorded among the Muslim. This result agree with of [13] with a prevalence of 3.5% among pregnant women attending antenatal at Grimard Hospital Anyigba statistically religion was not significantly associated with HB$_s$Ag seropositivity (p < 0.005). This result recorded a higher incidence of HB$_s$Ag among the Christian due to the fact that in Kogi state, Muslin prefer to take herb during pregnancy than going for antenatal at the clinic which saves more money for them considering the economic recession during the period that this project was carried out hence leading to low record on Muslim attending this clinic. Therefore, irrespective of the religion, women should endeavour to know their status regarding hepatitis so that proper treatment can be giving to avoid becoming a chronic carrier of the virus. Distribution based on previous knowledge of the infection showed a higher prevalence among the yes having the prevalence of 2.94% (2/68) and a lower prevalence of 2.22% ($^1/_{45}$) among those with no previous knowledge of the virus was recorded. Statistically previous knowledge of the infection was not significantly associated with HB$_s$Ag seropositivity (p < 0.05). This result shows a higher prevalence among those who have previous knowledge of the virus, therefore previous knowledge is not a determinant use in considering those who can have the virus or not. Hence the need to create more awareness to reduce the incidence of this virus to the lowest level in Kogi state.

CONCLUSION

The prevalence rate of Hepatitis B surface antigen among pregnant women attending Odoma clinic in Idah, Kogi state Nigeria is 2.7% prevalence rate of 6.12% was recoded among 26 – 30 age group (the most sexually active group or age) risk factors such as multiple sex, having sex with unvaccinated men can lead to the transmission. It can also occur through the re-use of needles and syringes either in health care settings or among persons who

inject drug in addition infection can occur through medical surgical and dental procedures, tattooing or through the use of razors and similar objects that are contaminated with infected blood. Therefore preventive measures should be taken against unwanted pregnancies, sexually transmitted infection and multiple sexual partners as these are all routes of transmission of the virus.

RECOMMENDATION

Mass vaccination of young children against HBV should be carried out. Availability and accessibility of hepatitis B immunoglobulin to babies born to HB$_s$Ag positive mothers by Government. Free screening and immunization against HB$_s$Ag of all pregnant women and their infants should be incorporated into the antenatal and postnatal programmes in hospital so that HB$_s$Ag positive mothers will receive prompt intervention.

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