

IJBHS 2008020/4107

Prevalence of hepatitis B surface antigen (HbsAg) among HIV positive patients attending Aminu Kano Teaching Hospital, Kano, Nigeria

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(Received February 8, 2008)

ABSTRACT: The study was to assess the percentage prevalence of Hepatitis B surface antigen (HBsAg) among HIV patients attending Aminu Kano Teaching Hospital, Kano Nigeria between August to November, 2007. The study involved the screening of 200 HIV positive patients using rapid strip test (Biotech Lab.) for the detection of HBsAg in serum samples. The results obtained were (6%) 12 are positive to HBsAg out of the 200 patients screened. Therefore, the percentage prevalence was 6%. Similarly, the incidence was found to be higher in the age group 21-30 years with (2%) 4 positive while (3.5%) 7 with highest percentage prevalence in females as compared with males (2.5%) 5 statistical analyses have shown that there was a great significance relationship between HBsAg and the patients based on sex.

Key Words: Prevalence, *Hepatitis B surface Antigen (HBsAg)*, HIV Seropositive Patients, co-infection.

Introduction:

Viral hepatitis is a systematic primarily involving the liver. Therefore an inflammation of the liver caused by a number of etiological agents such as viruses, bacteria, fungi, parasites, drugs, and chemical are called Hepatitis. (Water *et al* 1998). Hepatitis are characterized by distortion of the normal Hepatic lobular architecture due to varying degree of necrosis of individual liver cells or group of liver cell acute, (co- infection) or chronic (super infection) inflammation and Kupffer cell enlargement and proliferation (super infection) there is usually some degree of disruption of normal bile flow, which cause, jaundice. The severity of the disease is highly variable often unpredictable. (Water *et al*, 1998)

Viral hepatitis is a common infections disease that kills about 1.5 million people every year(). Although hepatitis had been recognized for centuries doctors had no idea what caused it until the 1940s- 1977 when they came to suspect that a virus carried in human blood was responsible(). It is thus, a major public health problem in all parts of the world. The disease has an enormous impact on health and national economy of many countries which are six known hepatitis viruses which are labeled as A, B, C, D, E, and G (Bauker, 2003)

Hepatitis A and E are transmitted through ingestion of contaminated food or water (called faecal oral route) (Ojo, 1992). The B, C and G viruses are transmitted mainly by blood or bodily fluids and are common mode of transmission. Patients may experience a flu-like illness, and general symptoms include; nausea, vomiting, Abdominal, pain, fever, fatigue, loss of appetite and less commonly rashes and joint pain. Some times a condition called jaundice, a yellowing of the skin and eyes- develop (Encyclopaedia Britannica, 2002). These acute symptoms result from the damage the virus inflicts on the liver cells. The acute symptomatic phase of viral hepatitis usually lasts from a few days to several weeks; period of jaundice that may follow can persist from one to three weeks. Complication of acute

viral hepatitis include fulminate which is very severe, rapidly developing form of the disease, and chronic hepatitis, which is characterized by liver cell death and inflammation that lasts longer than six months (Encyclopaedia Britannica 2002). Hepatitis B, formerly known as “serum hepatitis”, tends to be more severe than hepatitis A, causing mortality from liver failure in 1% to 10% of hospitalized cases (Eugene *et al*, 1998). Hepatitis B is caused by the hepatitis B virus (HBV). It is larger; its genome is double stranded DNA, and it is developed. HBV is a unique virus; instead of replicating its and directly, it passes through an intermediate RNA stage resembling a retrovirus (general *et al*, 2004).

HBV is classified as a *hepadna* virus and establishes chronic infections, especially in those infected as infants; it is a major factor in the eventual development of liver disease and the hepatocellular carcinoma (HCC) in those individuals (Geo *et al*, Hepatitis B is a disease of the liver caused by the hepatitis B virus (HBV); it is a member of the Hepadnavirus family (Zuckerman *et al*, 1996). And one of several unrelated viral species which causes viral hepatitis. It was originally known as “serum hepatitis” and has caused current epidemics in part of Asia and Africa (Ryan *et al*, 2004).

Hepatitis B is recognized as endemic in China and various other parts of Asia; world's population currently infected with the virus is 3 to 6%, but up to a third have been exposed (Alberts *et al*, 2004). The three (3) important HBV antigens are: Surface antigen (HBsAg), core antigen (HBcAg) and e antigen (HBe Ag) (Eugene *et al*, 2004).

HBsAg is produced during viral replication in amount per in excess of that needed for viral envelop production. It occurs in the blood stream or small spheres and filaments in quantities often 10,000 or more times greater than complete viruses (Eugene *et al*, 2004).

HBsAg is responsible for the ability of the virus to attach to and in fact it's; antibody to surface antigen (anti-HBsAg) confers immunity (Eugene *et al*, 2004). HBcAg represents the outer covering of the nucleocapsid. The presence of 1gm antibody to HBcAg indicates acute rather than chronic hepatitis B. The presence of HBeAg in the blood indicates a strong likelihood that the blood is infectious (Eugene *et al*, 1998, 2004).

Materials And Methods

Study Area.

The study was carried out among people with human immunodeficiency virus (HIV) attending Aminu Kano Teaching Hospital (AKTH).

Research Design.

The population studied, was a heterogeneous population of different age group, ethnicities and educational status. Biodata and other information's were collected via the counselor's after obtaining informed consent from each patient with the assurance that all information's obtained would be treated confidentially.

Collection of Sample.

A total of 200 samples were collected for both in-patients and out patients attending Aminu Kano Teaching hospital (AKTH), Kano. For the collection of blood samples; arms of the subject were tied with a tourniquet below the elbow joint in order to make the veins appear prominently. Cotton wool dipped in spirit was used to clean the vein for better visibility and reduction of microbial load around the area of the skin. Five (5) mls syringe at zero degrees centigrade (0) was used to pierce the prominent vein and collect 2-3 mls of blood, which was transferred aseptically into a sterile dry glass test tube, anticoagulants were added to the sample to prevent coagulation of the blood sample.

Principle.

The principle of this qualitative screening assay or a rapid immuno-chromatographic test for the visual detection of hepatitis Surface antigen (HBsAg) in serum /plasma samples. When the test device is immersed into the specimen the specimen is absorbed into the device by capillary action, mixes with antibody conjugate and flows across the pre-coated membrane.

Test procedure.

All procedures for the test were based on recommendation of the manufactures. The steps are as follows:

- Test must be at room temperature (18°C – 30°C)
- Remove the test strip from the foil pouch by tearing at the notch and place it on a level surface.
- Immerse the strip into the specimen. Take the arrow pointing towards the specimen. Take the strip out after 10 seconds and lay the strip flat on a clean dry, non absorbed surface (such as the mouth of the specimen container)
- Wait for 15 minutes and read result. Do not read results after 30 minutes.

Quality control.

Though there is an internal procedural control in the test device of control region (C), the use of external controls is strongly recommended as good laboratory testing practice to confirm the test procedure and to verify proper test performance. Positive and negative control should give the expected results. When testing the positive and negative control, the same assay procedure should be adopted.

Precautions

- This kit is for external use only. Do not swallow.
- all specimens should be treated as capable of transmitting disease
- icteric, lipemic, homolysed, heat treated and contaminated blood may cause erroneous result
- Card after first use. The test cannot be used more than once
- do not use kit beyond expiry date
- Do not use the kit if the paunch is punctured or not well sealed.
- DISPOSAL OF THE DIAGNOSTIC; the used device has the infectious risk. The process of disposing the diagnostic must follow the local infectious disposal law or laboratory regulation.

Results

Two hundred HIV positive patients were diagnosed for HBsAg out of which 6.0% (12) was the highest % prevalence as in Table 1. The related prevalence of HBsAg in the HIV infected patients was assessed and results showed that individuals of age group 50years had the lowest percentage prevalence. This was followed by other equal percentage prevalence as in (Table 2).

Table 1: Sex related % prevalence of HBsAg in HIV positive patients.

SEX	NO. OF HIV POSITIVE PATIENTS	NO OF HBsAg POSITIVE	%	NO. OF HBsAg –VE	%
MALE	93	5	5 (2.5%)	88	(44%)
FEMALE	107	7	7 (3.5%)	100	(50%)
TOTAL	200	12	12 (6%)	188%	94%

Table 2: Age related % prevalence of HBsAg in HIV positive patients.

AGE	NO. OF HIV POSITIVE PATIENTS	MALE POSITIVE	%	FEMALE POSITIVE	%	TOTAL POSITIVE	TOTAL NEGATIVE
1 – 10	4	-	-	-	-	-	4
11 – 20	6	-	-	-	-	-	6
21 – 30	72	1	0.5	4	4(2%)	5	67
31 – 40	68	3	1.5	2	2(1%)	5	63
41 – 50	39	1	0.5	1	1(0.5%)	2	37
51 – 60	10	-	-	-	-	-	10
61 – 70	1	-	-	-	-	-	1
TOTAL	200	5	2.5	7	7(3.5%)	12	188

Table 3: Null hypothesis.

SEX	SCREEN POSITIVE	SCREEN NEGATIVE	TOTAL
MALE	5 (a)	88 (b)	93 (a + b)
FEMALE	7 (c)	100 (d)	107 (c + d)
TOTAL	<u>12(a + b)</u>	188 (b + d)	200 (N)

Key:

a = HBsAg positive for male

b = HBsAg negative for male

c = HBsAg positive for female

d = HBsAg positive for female

N = Total number of HIV-positive patents

$$X^2 = \frac{N(ad - cd)^2}{(a + d)(a + c)(b + d)(c + d)}$$

$$X^2 = \frac{200(500 - 616)^2}{(93)(12)(188)(107)}$$

$$X^2 = \frac{200(-166)^2}{22449456} = \frac{200 \times 13456}{2249456}$$

$$X^2 = \frac{2691200}{2249456}$$

$$= 0.119878183$$

$$\cong X^2 = 0.1199$$

For degree of freedom

$$\frac{d.c}{(2-1)(2-1)} = 1$$

From the X^2 analysis the calculated value is (0.1199) which is less than the theoretical value (3.841) under 5% degree of freedom. Since the calculated value is less than the theoretical value, the null hypothesis will be accepted therefore there is a great significant relationship between the HBsAg and the sex of the subject which is very noticeable in females than males.

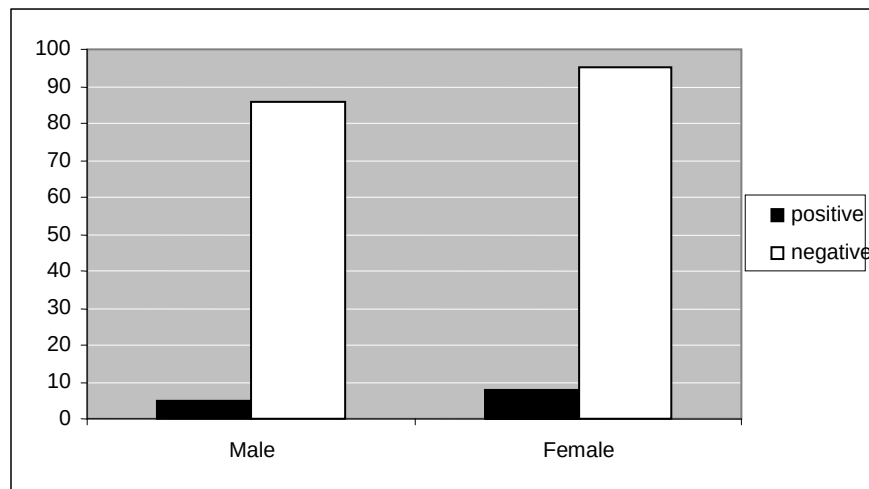


Figure 1: Sex related % prevalence of HBsAg

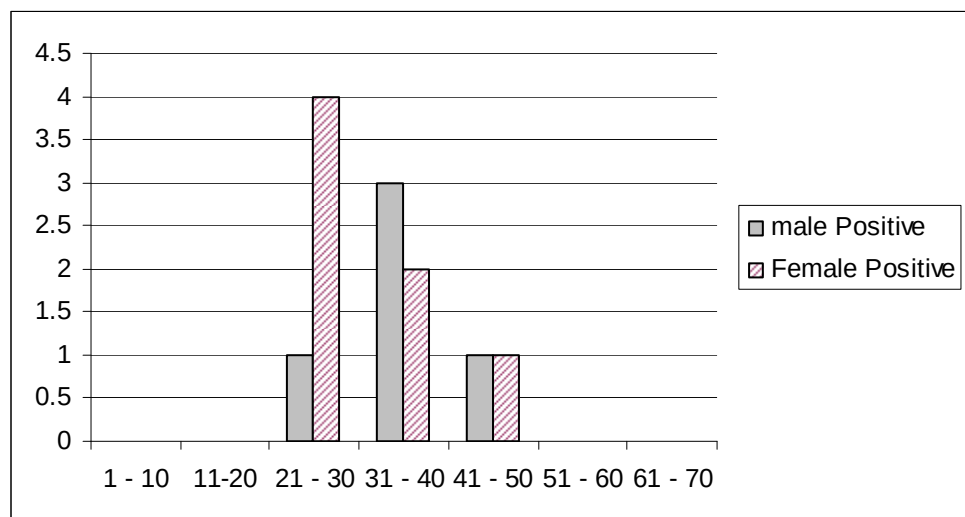


Figure 2 Age related % prevalence of HBsAg

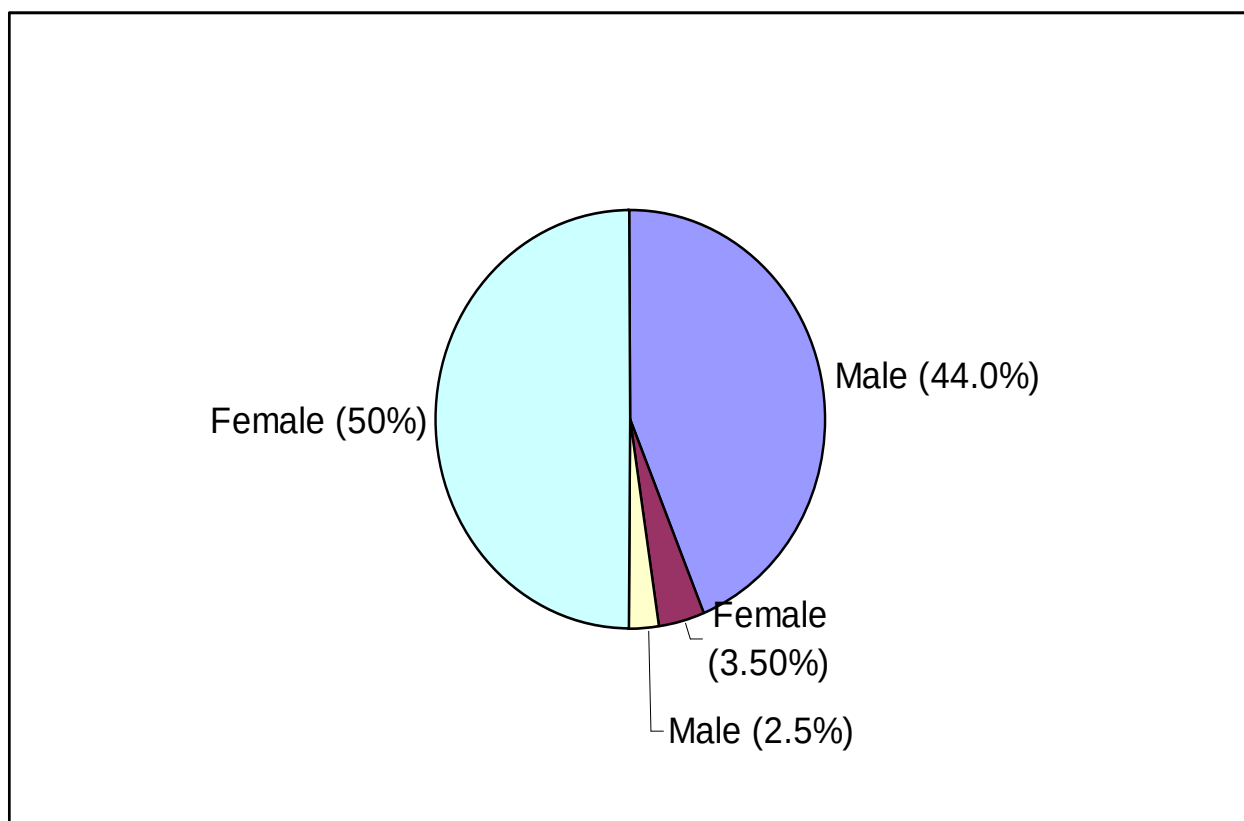


Fig. 3: Percentage distribution of HBsAg positive and negative in relation to sex.

Discussion

Many HIV-positive individual have also been exposed to hepatitis virus (HBV). Studies suggest that as many as 70% - 90% HIV positive people have evidence of past or current HBV infection (piroth *et al*, 2007). Since a majority of patients spontaneously clear HBV without treatment, however the rate of active infection is much lower. From the study the result obtained showed a percentage prevalence of 12 (6%) HBsAg among the patients attending Aminu Kano Teaching hospital (AKTH), Kano. This is low percentage prevalence when compared to those reported by (labdelkader *et al*, 2007) in HIV infected patient in Australia (6.3%), this is also low percentage prevalence compared to another one reported by Italian researchers by (pfillipini *et al*, 2006) where they obtained a percentage prevalence of (19.8%), similarly, the result in this study is very low compared to those reported by French researchers (L piroth *et al*, 2007) where they obtained a percentage prevalence of (25.5%).

Therefore, the low percentage prevalence in this study compared to other could be attributed to the fact that the risk factor for HBsAg infection in almost all studies is a history of injection drug use Risk of acquiring infection increase with duration of injection drug use. (Luo *et al*, 1993). Based on the result obtained from this study, the percentage prevalence of HBsAg among patients attending AKTH showed that, considering the percentage prevalence based on sex, it is observed that females are more infected with HBsAg 7(3.5%) than males 5(2.5%). The reason may be due to the fact that females are more prone to risk like; parental period or tran-placental transmission, contaminated surgical instruments and utensils being other possible hazards house hold contact ear piercing, tattooing, acupuncture contact with potentially infected blood and blood product which makes them vulnerable to the infection. When we consider the percentage prevalence based on age group distribution; people with age group 21 – 30 are those with high % prevalence (2%) the reason may be due to sexual transmission among member of age group.

For a long time, homosexual men have been considered to be at the highest risk of infection due to sexual contact (70% of homosexual men were infected after 5-years of sexual activity (Alter *et al*,

2003). However, heterosexual transmission accounts for an increasing proportion of HBsAg. The factors associated with increased risk include; duration of sexual activity, number of sexual partner and clients of prostitute are at particularly high risk for infection among this group (21 -30).

Conclusion

Hepatitis B is a serious public health problem world wide and one of the most common infectious disease globally. (Mcquillan *et al*, 1989). It may occur as acute diseases of short duration, the liver damage. Symptoms of HBsAg usually appear from 40 days to 6 monthly after exposure. People at high risk of infection include ; those requiring frequent transmission or healthcare workers, laboratory technicians, intravenous drug users, police, firemen, laundry worker and other who are likely to come in to contact with potentially infected blood and blood product. In conclusion, the best way to protect hepatitis is to get immunization (WHO, 1991) hepatitis immunization are common in united state and last for a life time for certain type of hepatitis, the high percentage prevalence of HBsAg in Aminu Kano Teaching Hospital among patient may likely decreased if adequate health care is given, good immunization delivery infrastructure as well as precaution is taken.

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