SEROLOGICAL EVIDENCE OF HEPATITIS B VIRUS SURFACE ANTIGEN (HBsAg) AMONG YOUNG ADULTS.

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ABSTRACT: Hepatitis B virus (HBV) is one of the major global public health problems, with its attendant risks especially among the young adults. Worldwide an estimated two billion people are infected with Hepatitis B virus out of which more than 350 million ends up with chronic infection; life style among young adults further predisposes them to infection. As a result the prevalence of HBV infection was carried out among adolescents using four secondary schools in a Community. Two hundred (200) sera samples were screened using the standard ELISA Techniques. Overall result showed that 59 (30%) were Seropositive for the HBsAg. Gender distribution showed that male volunteers recorded 27(13.5%)positivity compared to 32(16%) in female subjects. Considering age group, male subjects aged 15-17years recorded 8% Seropositivity compared to Females with 11%. Considering risks factors, based on lifestyle subjects with history of sharing sharp instruments recorded a prevalence of 5% compared to those with history of cuts from shared razor blade with 23% Seropositivity, lack of awareness among the subjects studied recorded 21%.The Alaninaminotransferase (ALT) result obtained showed that 4 (6.8%) of positive subjects had elevated ALT. This study therefore emphasizes the public health importance of HBV in the Community and suggests a prompt public awareness among the youths in these localities, while a well designed vaccination schedule is promptly advocated.
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KEY WORD: Prevalence, HBsAg, Young adults**.**

1. INTRODUCTION

Hepatitis B virus (HBV) infection represents a major health problem, with 2 billion people infected worldwide and more than 400 million chronic carriers of HBV. Globally it causes about 1.2 million deaths per year due to various complications including chronic hepatitis, cirrhosis, and liver cancer, (Hou,2005, Lavanchy 2004) The transmission of this disease is believed to be mainly by sexual, vertical and intrafamilial routes Bélec et al,1988. Previous study on young sexually active adults, examined in a Public health clinic for sexually transmitted disease in Central African Republic, has shown a high prevalence of HBsAg (14%) with a prevalence of anti-HBc antibodies at 89%, Pawlotsky et al, 1995. Prevalence is low in persons younger than 12 years, but it increases in those older than 12 years (Goldstein et al., 2002) Hepatitis B virus (HBV) is a common cause of liver disease throughout the world. An estimated one third of the world's population has serologic evidence of past infection, and the virus causes more than 1 million deaths annually..HBV accounts for 5-10% of cases of chronic end-stage liver disease and 10-15% of cases of Hepatocellular carcinoma.

Hepatitis B is much more prevalent in other areas of the world such as part of Asia including Southeast Asia, sub-Saharan Africa and some of the Mediterranean countries (Coleman et al., 2005). In surveillance study of adolescent life behavior, (Kann et al., 2000) reported on HBV among youths where it was observed that most of them are involved in alcoholic consumption as a possible risk factors for infection with the HBV.. The economic burden of HBV infection is substantial because of high morbidity and mortality associated with end-stage liver disease, cirrhosis, and hepatocellular carcinoma (HCC) Michielsen, 2005.Hepatitis B virus gains entrance into the body through a break or mucous membrane or by injection into the blood. The virus is transported to the hepatocytes where the core protein alone enters the cell nucleus initiating self multiplication of the viral genome. The most remarkable epidemiological features of HBV infection in man is the incubation period which extends from 2 to 6 months before the development of clinical disease. Identified risks, factors for HBV infection include intravenous (IV) drug use, exposure to infected blood products and intranasal drug use (Alter et al., 1999).High risk factors includes sexual activity, multiple sexual partners, history of sexually transmitted disease (STD), tattoo and skin piercing have also been suggested to be associated with increased risk for HBV, (Alter et al., 1999).

In low-endemicity areas, most HBV infections occur in adolescents and young adults, and the majority of infections are acquired sexually or through percutaneous exposure. In high-endemicity areas of Africa and Asia, most HBV infections occur in the first 5 years of life. Perinatal transmission predominates in East and Southeast Asia; in Africa, most HBV transmission occurs before the age of 5 years, through close contact within households, medical procedures, traditional scarification, and, possibly, additional unidentified mechanisms Merican,et al 2000; Vardas et al,1999. The vertical transmission rate may be lower in Africa than in Asia partly because of a lower prevalence of hepatitis B e antigen (HBeAg) in Africa, a major determinant of perinatal transmission Roingeard,et al 1993.

2. Materials and method

Study area: This study was a community impact assessment research, hence the use of selected Secondary Schools in Mangu Community, Mangu Local Government Area Plateau State namely: Mwansat, COCIN, Mangu and Hauwa Memorial secondary schools. Mangu community where these study locations are situated is is about 80 kilometers away from the state capital.

Subject: Two hundred (200) blood samples were collected from volunteer subjects within the schools, aged between 12-30 years of age, involving both sexes. Well detailed and structured questionnaires were used to obtain demographic and other relevant data from the subjects.

Ethical clearance /consent: Ethical clearance was sought and granted after fulfilling all the ethical requirements for using humans as study subjects while Informed consent was obtained as a response to the consent form issued to each subject recruited for the study.

Collection of samples: About 3-5ml of blood was collected by venous puncture from each subject via the anticubitel vein after sterilization with 70% alcohol soaked in absorbent cotton wool. The sera samples obtained were dispensed into a 5ml cryovial and stored at -20^{O}c prior use.

Processing of sample: The sera samples obtained from subjects were dispensed into prelabelled cryovials aseptically. The samples were transported to Virology laboratory (FCVMLT), VOM and stored at- 20^{0}c prior use.

Detection of HBsAg: HBsAg Monolisa (ELISA) "HBsAg ULTRA assay is one step enzyme immune assay based on the principle of the "Sandwich'' type using monoclonal antibodies selected for their ability to bind themselves to the various subtypes of HBsAg now recognized by the WHO and the most part of variant HBV strains.

Principle: The monolisa HBsAg ULTRA solid phase is coated with monoclonal antibodies.The"HBsAg ULTRA conjugate are based on the use of monoclonal antibodies from mouse and polyclonal antibody from goat against the HBsAg. These antibodies are bound to the peroxidase Samples with ratio values equal to or greater than 1 are considered to be initially positive by the monolisa HBsAg ULTRA,which should be retested in duplicate before final interpretation.If after retesting of a sample, the ratio values of the 2 duplicates are less than 1, the initial result is non repeatable and the sample is declared to be negative with the monolisa "HBsAg ULTRA.

3. RESULTS:

Out of the 200 samples from (n-200) students aged 15-25 years screened for HBsAg status, 59 subjects were positive giving a prevalence of 30%. The result in table I from cross tabulation showed that 27(13.5%) and 32(16%) females tested positive out of 86 males and 114 females screened respectively.

Table II is a representation of the age groups in relation to the number of positive subjects screened for HBsAg of the total number of students screened. Prevalence rates of 19% and 9% were observed within the age groups 15-17 and 18-20years of age respectively. Among the different age groups screened, subjects aged 15-17 recorded a higher prevalence of 19% while those aged 18-20 showed 9% seropositivity.

TableIII showed risk factors assessment based on clinical history among positive male and female subjects to HBsAg. These include history of vaccination showing (males 1% females 0.5% positivity), family history of HBV infection among males recorded 0%,and females 1%, history of sexually transmitted diseases showed that (males had 0.5% compared to females 1%), history of surgery recorded 0.5% among male subjects, compared to females with 0%) history liver disease showed that (males had 0.5% positive response with females 0%) and those who had the knowledge of HBV infection (males 3% females 3% respectively. This showed no significant difference among the different subjects in the risk behaviors with respect to male and female status.

Table IV : showed risk factors based on life style among positive subjects to HBsAg such as sharing of manicure/pedicure instruments, multiple sex partners, alcoholics those with accidental cuts and those who share blades such as razors and clippers with prevalence of 9% and 12.5% among males and females.

Table V: shows the result of serum Alaninaminotransferase level (ALT) on positive subjects out of 59(100%), showed that 55 (93.2%) had normal ALT level and 4 (7%) had evelated ALT level.

Table I: Prevalence based on sex distribution of HBsAg among the subjects screened.

Sex	No of positive	No of negative subjects	Total %
Male	27(13.5%)	59(30%)	86(43%)
Female	32(16%)	82(41)	114(71%)
Total	**59 (30%)**	**141(71%)**	**200(100%)**

Table II: Distribution based on age group among subjects screened.

Age group	No of positive subjects	No of negative subjects
15-17	38(19%)	105(52.5%)
18-20	17(9%)	34(17%)
21-23	0(0.%)	1(0.5%)
24-25	1(0.5%)	1(0.5%)
Total	**59(29.5%)**	**141(29.5%)**

Table III: Risk factors based on clinical history amongst subjects screened.

Risk factors	No. of samples		No. Positive (%)		No. Negative %	
	Males	**Females**	**Males**	**Females**	**Males**	**Females**
History vaccination	7	5	2(1%)	1(0.5%)	5(2.5%)	4(2%)
Family history of HBV infection	3	6	0(0%)	2(1%)	3(1.5%)	4(2%)
History of sexually transmitted diseases	3	8	1(0.5%)	2(1%)	2(1%)	6(3%)
History of surgery	1	4	1(0.5%)	2(1%)	0(0%)	2(1%)
History of blood transfusion	2	4	0(0%)	2(1%)	2(1%)	2(1%)
History of those diagnosed with liver disease	1	1	1(0.5)	0(0%)	0(0%)	1(0.5%)
Those who had the knowledge of HBV infection	13	20	6(3%)	6(3%)	7(3.5%)	14(14%)
TOTAL	**30**	**48**	**11(5.5%**	**15(6.5%)**	**19/9.5%)**	**33(16.5%)**

Table IV: Risk factors based on life style among subjects screened.

Risk factors	No. of samples		N0. Positive (%)		N0. Negative %	
	Males	**Females**	**Males**	**Females**	**Males**	**Females**
Those with history of sharing pedicures/ Medicures	13	29	3(1.5%)	7(3.5%)	10(5%)	22(6%)
Those with multiple sex partners	1	3	0(0%)	2(1%)	1(0.5%)	1(0.5%)
Those with history of alcoholism	6	2	1(0.5%0)	0(0%)	5(2.5%)	2(1%)
Those with previous history of cuts with sharp objects	15	16	4(2%)	3(1.5%)	11(5.5%)	13(6.5%)
Those who share objects such as razor blades and clippers	28	44	10(5%)	13(6.5%)	18(7.5%)	31(15.5%)
Total	**63**	**94**	**18(9%)**	**25(12.5%)**	**45(21%)**	**69(29.5%)**

Table V: Determination of serum Alaninaminotransferase level (ALT) on HBsAg positive subjects

Age group	Sex	Total no of positive subjects	ALT Normal	ALT Abnormal
15-17	M	16(8%)	15(25.4)	1(1.7)
	F	22(11%)	19(32.2)	2(3.4)
18-20	M	10(5%)	10(17)	1(1.7)
	F	7(3.5%)	7(12.6)	0.(0.0)
21-23	M	0(0.5%)	0(0.0)	0(0.0)
	F	1(0.5%)	1(1.7)	0(0.0)
24-25	M	1(0.5%)	1(1.7)	0.(0.0)
	F	2(1%)	2(3.4)	0(0.0)
TOTAL		**59(100)**	**55(93.2)**	**4(6.8)**

4. **Discussion**:

Worldwide an estimated two billion people have been infected with Hepatitis B virus (HBV) and more than 350million have chronic (long-time) liver infection (WHO 2011).There are little consistent information on the risk behavior and risk factors on HBV among youths in Nigeria (Coleman *et al.,* 2005). It is believed that 25% of young children are infected at 1-5 years of age and about 1-5% of persons infected as older children (Lachaux 1995) and they end up as carriers. The danger is that these carriers, though asymptomatic might serve as reservoir of the virus and a medium for spreading infection among other children.

The role of age in contracting hepatitis B virus infection has been stressed by Jun, *et al.,* (2001). Age at infection is also one of the most important factor in-influencing the probability of developing chronic HBV infection. The risk of subsequent chronic HBV infection is about 90% for infants, 25% to 50% for children aged one to five years, 5% to 10% for adolescents and 1% to 5% for adults. This corelates with the result obtained in this study with subjects aged 15-18 and 18-20 years recording prevalence of 19% and 9% respectively. In the United Nations majority of acute HBV infection occur in teenagers and young adults. Half of these youths never develop symptoms. In a similar study conducted by Ndako et al ,2011 it was found that subjects aged 15-19 a recorded Prevalence of 18.1% a within the age group where the highest number of positivity occurred.

Similarly,when gender was considered,males recorded 13.5% seropositivity compared to females with 16% which is at variance with the result obtained by Ndako,et al 2011 in a study conducted amond students where males had a prevalence of 25.5% compared to females with 10.9%. An interesting observation in this study (Table 1) was that more females (16.0%) were infected with HBV than males (13.5%) was no obvious explanation for the difference in gender as a risk factor for these viral infections, similarly Bwogi et al. (2009) reported a lower prevalence of HBV in men than in female and suggested the interplay of circumcision as protective. This was not the case in this study even though it was in an area that male circumcision is mandatory. However, the male volunteers were very few. This observation is a basis for further studies.

Considering possible risk factors among the youths screened based on their life styles result obtained showed that HBV is transmitted through several routes (Shulman, 1997: Roy *et al*., 1999) sharing of manicure /pedicure instruments, exposure to contaminated blood or bodily fluids, heterosexual activity and others this study showed that males had 1.5% while females had 3.5% also those who had multiple sex partners had 0% positivity for males and 1% for females.

This study correlates with studies from mexico where it was showed that early age of sexual activity increases the risk of HBV infection (Vazquez-Martinez *et al.,* 2003). Alcohol consumption recorded 0.5% for males and 0% for females this shows that alcohol consumption may not be one of the leading causes of Hepatitis infection in this study area. Other risk behaviours observed among these subjects include sharing of sharps such as razor blades, clippers for shaving which had the following positivity among males 2% and females 1.5%. In this present study, sharing of sharp objects, blood transfusion and sexual exposure were possible predisposing factors observed in the population investigated. Roy *et al.* (1999) found that HBV is transmitted in young adults and adolescents mainly through unprotected sexual intercourse.

In comparing risk behaviors based on clinical history among males and females, no significant difference, among the two groups was recorded. This correlates with a similar work carried out among students in Jagindi Tasha Jema'a Local government Area Kaduna State by Ndako et al, 2011.

The high prevalence observed may be due to contact through other risk factors. This study generally has given an over view of HBV activity in my location of study.However, acute HBV infection occur in individuals with no identifiable risk factors

in which the mode of transmission is unknown among one third of new cases reported (Hollinger, 1996), which is similar to my observation in this work. According to a report by (Syed), HBV prevalence among those involved in transfusion was 10% of the population screened, which is attributed to transfusion from earlier infected subjects (Syed; 1998).

Liver enzyme analysis on HBsAg seropositive subjects 59 (100%), showed that 55 (93.2%) had normal; ALT level and 4(7%) had elevated ALT levels. This indicates the risk of HBV-related liver disease such as hepatocellular carcinoma or eventual liver cancer if no prompt attention is sought by these positive subjects. in the nearest future as elevated ALT levels are believed to be caused by a sudden increase in immune mediated lysis of infected hepatocytes (Vandamme and Van, 2007).World health organization (WHO 2008) stated that about 25% of adults who become chronically infected during child hood die from HBV-related liver cancer or cirrhosis.This may suggest the beginning of the disease from the stage of active liver disease (Immune clearance), to

the stage of non replication as the infected subjects get older, in agreement with the work of Ogbu and Uneke (2009) which states that in the stage of non-replication the third stage of the disease, ALT levels are within the reference range and HBsAg is still actively replicating.

Conclusion

In this study, it was discovered that most of the subjects screened had no knowledge of

hepatitis B virus (HBV). Since the subjects in this area live a communal life of sharing things in common, the prevalence recorded is alarming considering the mode of lifestyle and predisposing risks outlined which calls for enlightenement on the various risk factors that can predispose these youths to HBV infections also of equal importance is the need for routine screening and management of infected individuals which would l help reduce the cycle of transmission.Finally,mass immunization of children and adolescents against HBV should be embarked upon by the Nigerian Government and Non-governmental organizations (NGOs).

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