

## SERO-PREVALENCE OF HbSAg INFECTION AMONG NEWLY ADMITTED STUDENTS (2021/2022) ATTENDING COLLEGE OF HEALTH SCIENCES AND TECHNOLOGY TSAFE, ZAMFARA STATE, NIGERIA

Abdullahi Y. Alkali,<sup>1</sup> Nasmatu A. Aliyu,<sup>2</sup> Nura I. Shehu,<sup>3</sup> Saratu Ibrahim,<sup>4</sup> Hamza G. Zurmi,<sup>5</sup> Lawali Suleiman,<sup>6</sup>  
<sup>1,3,4,5,6</sup> College of Health Sciences and Technology, Tsafe. <sup>1,2,3,4,5,6</sup> Department of Medical Laboratory Sciences, CHST-Tsafe,  
<sup>1,6</sup> Dr Fatima Adamu College clinic, college of Health Sciences and Technology, Tsafe

Email; - [alkalaseeg@gmail.com](mailto:alkalaseeg@gmail.com)

Phone No. 08055350626, 08034636457

**Abstract.** Hepatitis B virus infection is among the leading public health burdens especially in developing countries. In high prevalence areas, the most common routes of HBV transmission are prenatal and horizontal transmission. Also heterosexual practices, unprotected sex, infection, blood transfusion as well as sharing of sharp objects are among possible routes of transmission. Hepatitis B virus (HBV) infection accounts for about 1 million deaths worldwide annually. This study was to determine the seroprevalence, distribution of HBV, and factors associated with infection in newly admitted students (2021/2022) attending CHST- Tsafe, Zamfara State, Nigeria. A cross-sectional clinic base study among the student was conducted employing sampling technique. Data on demographic, social, and behavioral indicators were collected using questionnaires and blood samples tested for HBV. The overall total of 799 were screened for HbSAg infection. Of the 799 Students, 628 (81.3%) were males, 171 (21.4 %) were females. Out of the 628 (78.6 %) males 70 (8.8%) had HbSAg infection and 171 (21.4%) of the 171 females 9 (1.1 %) were infected with HbSAg infection (P= 0.018), The Overall prevalence of HbSAg infection was 9.9 % (79 of 799). Statistical analysis showed that there was a highly significant association (P= 0.02). According to the age range, the distribution of HbSAg infection showed highest prevalence among patients aged 21-30 (64, 8.0%), however the lowest infection was detected among aged and 11-20 (15, 1.8%) years. Based on the educational status of the patients, frequency of HbSAg infection was higher this study has demonstrated an HbSAg prevalence rate of 9.9 %. It therefore demonstrates the gradual increase in HbSAg prevalence among newly admitted students in our environment as a result of absent of HB immunization. There is a gradual increase in the prevalence of hepatitis B surface antigen in our environment possibly due to the lack of awareness and HB immunization. There is need to for awareness campaign among newly admitted students attending CHST-Tsafe to limit the spread of the disease and the importance of Vaccine. They should be educated on the need to adhere to treatment and adequate management of HbSAg infections.

## INTRODUCTION

Hepatitis B also known as serum hepatitis is a disease of the liver cause by a double stranded DNA virus of the family Hepadnavirus, which is reported to be the main aetiological factor in over 75% of chronic liver disease worldwide (Ryan and Ray, 2004). Hepatitis B virus (HBV) is resistant to inactivation by heat and is highly infection; it is 50 – 100 times more infection than HIV and 10 times more infection than hepatitis C (Lavanchy, 2004). The virus is detected in virtually all body fluids (i.e. blood, saliva, semen, vaginal secretion, menstrual blood and to lesser extent in perspiration, breast milk, tears and urine) of infection individual (Lavanchy, 2004). Hepatitis B virus infection is among the leading public health burdens especially in developing countries (Sameul *et al.*, 2004). In high prevalence areas, the most common routes of HBV transmission are prenatal and horizontal

transmission (Gitling, 1997). Also heterosexual practices, unprotected sex, infection, blood transfusion as well as sharing of sharp objects are among possible routes of transmission. (Harry *et al.*, 1994). An estimated 50% of the global population is infected with hepatitis B Virus infection, with more than 350 million people as chronic carries and over 1 million deaths annually (WHO, 1998). The prevalence of HBV varies significantly over the globe low prevalence of 2% is reported in developed countries, while developing countries have prevalence 8.0% (Luke, 1997). Sub-Saharan Africa, hepatitis B virus hyper-endemic with 8 – 20% prevalence approximately 50 million people are chronic carries (Dronsten *et al.*, 2004). Hepatitis B Virus infection is a serious health challenges in Nigeria, seventy five (75%) percent of the total population is exposed to the infection at one time of their life, with an estimated 12% prevalence of chronic carries (Alao *et al.*, 2009). Due to the infectious and asymptomatic nature of HBV infection, poor health care facilities and inadequate monitoring of HBV infection remain a major challenge (Okoye and Samba, 2006). The prevalence of HBV infection is disproportional within the Nigerian population (Alao *et al.*, 2009).

## **MATERIALS AND METHODS**

The study was cross sectional and clinic-based, The Ethical clearance was obtained from the college Ethical Committee of CHST-TSAFE Zamfara State before the commencement of the study. The Sample size was determined using the formula for cross sectional studies which was proposed by Lwanga and Lemeshaw (1991), Grad and Araoye (2006). The sample size was determined based on the estimated HbSAg prevalence of previous studies with an estimated 12% prevalence of chronic carries (Alao *et al.*, 2009). Based on a confidence interval of 95%, a 5% acceptable margin of error and the need for a sample size large enough to enable analysis by age groups, a total of 180 of newly admitted student will be used. All newly admitted students (2021 – 2022) at College of Health Sciences and Technology Tsafe, Zamfara State attending college clinic and gave consent to participate were included in the study and those who did not give consent were excluded from the study. Written consent was obtained from the subjects prior to data and sample collection. Demographic data such as age, sex, and education was collected. This was done after obtaining a prior permission from the College

management. A structured questionnaire was used for the collection of data. The information obtained include, sex, age and occupation. This mean the participation was entering voluntary and people are made aware of the study and its benefit through health education. Two milliliters (2ml) venous blood of each of the study participant was collected into a Vacutainer with Advanced Semi-separator gel (SST II), (Belliver Industrial Estate, Plymouth, PL6 7BP, United Kingdom) using standard method (CDC, 2017). This was mixed by turning it 5 times upside-down and coded with unique identifiers (known to the study investigators only). It was then centrifuged at 12000 rpm for 5 minutes to separate the serum from the whole blood (Vanhaecke *et al.*, 2016). The specimen was then dispensed in to well labelled container and was stored at -20°C until use (Vanhaecke *et al.*, 2016). HBSag Strip was used in other to test the present or absent of HbSAg in the patient serum.

## RESULTS

The overall total of 799 newly admitted students attending CHST-Tsafe (2021/2022), were screened for HbSAg infection. Of the 799 Students, 628 (81.3%) were males, 171 (21.4 %) were females. Out of the 628 (78.6 %) males 70 (8.8%) had HbSAg infection and 171 (21.4%) of the 171 females 9 (1.1 %) were infected with HbSAg infection (P= 0.018), Out of the 799 patients tested are AVT-naive 79 (9.8%) were positive for HbSAg infection, The Overall prevalence of HbSAg infection was 9.9 % (79 of 799) Out of this figure 9.9 %( 79/799) were AVT-naïve while 0 % were AVT-experienced patients (Table 4.1). Statistical analysis showed that there was a highly significant association (P= 0.02).

**Gender and AVT Status of *HbSAg* infection among newly admitted students attending CHST-Tsafe (2021/2022), Tsafe**

Parameters	<u><i>HbSAg</i> Detection ;</u>			P-Value
	No. (%) Screened	No. (%) positive	No. (%) Negative	
<b>Gender</b>				
Males	628 (78.6 %)	70 (8.7%)	558(69.8 %)	<b>0.02</b>
Females	171 (21.4%)	9 (1.1 %)	162 (20.2%)	
<b>Total</b>	<b>799 (100%)</b>	<b>79 (9.9%)</b>	<b>720 (90.1 %)</b>	
<b>AVT status</b>				
AVT-Naive	799 (100%)	79 (9.2%)	635 (90.8%)	<b>0.10</b>
AVT- Experience	00 (00%)	00 (00%)	00 (00%)	
<b>Total</b>	<b>799 (100%)</b>	<b>79 (9.9%)</b>	<b>720 (90.1%)</b>	

\*\*AVT-Antiviral therapy

**Relationship between *HbSAg* infection and *Socio*-demographic factors among newly admitted students attending CHST-Tsafe (2021/2022), Tsafe**

According to the age range, the distribution of *HbSAg* infection showed highest prevalence among patients aged 21-30 (64, 8.0%), however the lowest infection was detected among aged and 11-20 (15, 1.8%) years. Based on the educational status of the patients, frequency of *HbSAg* infection was higher and based on marital status the singles had higher percentage which account for 61(7.6%) than that of married with 18 (2.2%).

**Relationship between HbSAg infection and Socio-demographic factor among newly admitted students attending CHST-Tsafe (2021/2022), Tsafe.**

Demographic Characteristics	<u>HbSAg Detection ;</u>			p-value
	No (%). Screened	No. (%) Positive	No. (%) Negative	
<b>Gender</b>				
Males	628 (78.6 %)	70 (8.7%)	558(69.8 %)	<b>0.02</b>
Females	171 (21.4%)	9 (1.1 %)	162 (20.2%)	
<b>Total</b>	<b>799 (100%)</b>	<b>79 (9.9%)</b>	<b>720 (90.1 %)</b>	
<b>Age range(years)</b>				
11-20	217 (27.2%)	15 (1.8%)	202 (25.2%)	
21-30	582 (72.8%)	64 (8.0%)	518(65 %)	
<b>Total</b>	<b>799 (100%)</b>	<b>79 (9.9%)</b>	<b>720 (90.1%)</b>	
<b>Education status</b>				
Tertiary	799	79 (9.8%)	720 (90.2%)	
<b>Total</b>	<b>799 (100%)</b>	<b>79 (9.9%)</b>	<b>720(90.1%)</b>	
<b>Marital status</b>				
Single	670 (84 %)	61(7.6 %)	609(76.22 %)	
Married	129 (16 %)	18 (2.2 %)	111 (13.89 %)	
<b>Total</b>	<b>799 (100%)</b>	<b>79(9.9%)</b>	<b>720 (90.1%)</b>	
<b>Occupations</b>				
Students	799	79(9.9%)	720(90.1%)	
<b>Total</b>	<b>799 (100%)</b>	<b>79(9.9%)</b>	<b>720(90.1%)</b>	

**Discussion;** - This study has demonstrated an HbSAg prevalence rate of 9.9 %. This is higher than that of the 6.6% recorded in Enugu, Nigeria. It therefore demonstrates the gradual increase in HbSAg prevalence among newly admitted students in our environment as a result of absent of HB immunization. It is also higher than the 7.6% reported by Chukwuka *et al* in Nnewi and lower than 10.7% recorded by Jibrin, *et al* in Sokoto at the time as this study. Earlier studies have also documented lower prevalence of HBV in Northern Nigeria like Enugu 9.4% by Ashir, *et al*. The highest prevalence of HbSAg positivity was found in those students aged 20-30 years. This high prevalence Age (Years) Number of non-immunized students HBsAg Positive 54 (7.7%)

This may be because at this age most students are very active and exploring their world. However, it differs with the observations by Jibrin and Alikor who found highest prevalence rate among children 11-15 years. The difference in age group of prevalence may be because of increase in other high risk behaviors including unprotected sexual habits among students of this age group, Port Harcourt being a seaport and more cosmopolitan. Komas, *et al* had noted higher prevalence of HBV markers among adolescents and young adults in Bangui, who did not use condom and also those having more than one sexual partner. It may also be as a result of the inability of these students to lose the surface antigen due to impaired immunity. This prevalence rate in this age group may further highlight the effectiveness of HB vaccine in an endemic area like ours. Considering that Emechebe documented a prevalence rate of 9.9% among students 20-30 years in this college, this study's 9.9% among same ages range may be due to lack of vaccination in the college community.

An increasing prevalence of HbSAg with age was also observed in this study. Other studies have also noted a similar trend. This pattern still shows the predominance of horizontal transmission of HBV infection in our environment. A slightly higher prevalence of HbSAg was observed among the males. Though the prevalence rates observed in this study are higher, it is same with the finding in Enugu earlier, in Port Harcourt and in Borno who observed a higher prevalence among males. The social class of the parents in this study was not significantly associated with HbSAg positivity. This may be because of equal exposure to the risk factors of HBV among students of different social classes. However, in this study it was observed that the higher the social class, the lower the number of positive to HBsAg. This could be because people in the lower socioeconomic class are more likely to indulge in activities that may promote infection with HBV such as alternative medicine, share sharp objects and toothbrushes. This is similar to the findings of Komas, and Emechebe. In

2004, the universal HB immunization was commenced in Nigeria though it was incorporated into the National Programme of Immunization (NPI) in 1995.

However, exposure to repeated injections sometimes with contaminated therapeutic injection equipment, probably due to ignorance, parental preferences, or lack of awareness of infection control practices and resources for sterilization, are very common. Also although not statistically significant as risk factors, but as has been documented previously blood transfusion and scarification marks have odd ratios of 1.5 and 3.2 respectively, making them potent risk factors. This is true of occult hepatitis B in which there is presence of HBV DNA in the liver in the absence or undetectable serum HBsAg and measurable or immeasurable serum HBV DNA. It had been noted that history of blood transfusion was a sufficient risk factor for chronic hepatitis B infection, a major etiologic factor for primary hepatocellular carcinoma in Africa. Sharing of toothbrush among siblings/household members was found to be statistically significant while bite by playmates was not. The alkaline nature of the saliva may have been contributory in hindering transmission through bite. However, an intraoral trauma during brushing could be the source of transmission. Also the chance of transmitting the virus through this route is likely to be substantial given the fact that such sharing is likely to occur over prolonged periods. This finding is similar to that by Nwokediuko.

**Conclusion;-** There is a gradual increase in the prevalence of hepatitis B surface antigen in our environment possibly due to the lack of awareness and HB immunization. The vaccine may also be 100% protective. Sharing of sharp object, spoons, needle, nail cutter and sharing of cloth and toothbrush was found to be a significantly

## Recommendations

Its recommendations that the HbSAg sero-positive result should be confirmed by the use of PCR and Liver Function Test especially in patients with liver failure to reduce unnecessary administering of drugs to individuals that do not require therapy and There is need to for awareness campaign to limit the spread of the disease. The importance of Vaccine and AVT should be emphasized to all newly admitted students and should be educated on the need to adhere to treatment and adequate management of HbSAg infections and the Efficacy of drugs should be monitored periodically to those on treatment to regulate the emergence and spread of the drug resistance Virus particularly HbSAg infections. Future researches are recommended, including, In *vitro* analysis such as identification of different antigens that share similar epitope with HbSAg antigen that lead to the decrease in functionality of the liver.

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