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Risk factors for hepatitis B surface antigenaemia among secondary school students in Abakaliki, South Eastern Nigeria

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Abstract*: Background:* Majority of secondary school students are adolescents; an age group with a tendency to engage in health-compromising risky behaviours in order to deal with anxiety and gain admission to peer groups. This exposes them to risk of Hepatitis B virus infection which is a major public health concern globally and in Nigeria.
Objectives: This study focuses on some common risky behavioural practices that characterize the lifestyle of contemporary adolescent subculture; with a view to determining their effect on HBsAg seroprevalence.
Method: Using multi-stage sampling method, 266 students were selected from 5 secondary schools in Abakaliki. Each subject first filled a questionnaire regarding biodata and history of exposure to risk factors. Subsequently, they were screened for HBsAg using enzyme immunoassay-based chromatographic test kit.
Results: Nine students out of 266 tested positive giving a prevalence value of 3.38%.
There was no significant association between gender (p = 0.31) or socioeconomic status (p = 0.81) and the seroprevalence of HBsAg among the subjects. Similarly, none of the risk factors studied, including previous history of jaundice (p = 0.26), blood transfusion (p = 0.24), past history of surgery (p = 0.47), scarification marks (p = 0.17), sharing of sharp objects (p = 0.74), drug injections (p = 0.32), unprotected sex (p = 0.64) and family history of hepatitis (p = 0.79), was significantly associated with HBV infection.
Conclusion: None of the risk factors assessed played significant role in the transmission of HBV among secondary school students in Abakaliki.

Key words: Hepatitis B surface antigen, Risk factors, Adolescents.

Introduction

Over the years there have been massive media and public awareness campaigns on HIV/AIDS in Nigeria.[1] These efforts have resulted in an increased knowledge about HIV, positive behavioral change,[1] and a gradual decline of the national prevalence of HIV/AIDS from 5.8% in 2001[2] to 4.1% in 2010.[2,3] The routes of transmission are similar for both human immunodeficiency virus (HIV) and HBV.[4,5] However in comparison to HIV, little attention is being paid to HBV infection by government and non-governmental agencies in Nigeria.[6] Unlike HIV infection, the trend in the prevalence of HBV infection in the general population in Nigeria is not known.

Thirty two percent of Nigeria's population is made up of adolescents and young adults between 10-24 years.[7] This implies that the country has a predominantly younger population. Therefore, it is logical and of great importance to pay special attention to the health needs of this population.
Earlier studies[8-17] on the prevalence of HBsAg antigenaemia in different populations in Nigeria have shown varying prevalence rates. However, there is a dearth of studies on the prevalence of HBV infection among apparently healthy adolescents. These adolescents are at high risk of contracting HBV infection because of their tendency for risky lifestyles.[18-20] Moreover, majority in this population were delivered before the protective HB vaccine became available in Nigeria in 2004.[21] As the complications of HBV carriage often manifest decades after exposure,[4,22] the need for periodic monitoring of the trend of infection in the general population (especially in the younger population) as a necessary public health strategy for effective intervention cannot be overemphasized.

Ugwuja and Ugwu[23] in Abakaliki over 7 years ago found that the prevalence of HBsAg antigenaemia

among adolescents was 4.1%. The risk factors for HBV infection identified in that study were blood transfusion, history of jaundice and injection by a medical quack.
This present study in addition to the above also focused on some common risky behavioural practices that characterize the lifestyle of contemporary adolescent subculture; with a view to determining their effect on HBsAg seroprevalence. These practices include tattooing, body piercing, intravenous drug use, engaging in unprotected sex, and communal use of sharp objects like razor blades, nail cutters and hair clippers.
Therefore, this study was carried out to determine the current seroprevalence, the socio-demographic variables and the associated risk factors of hepatitis B surface antigen (HBsAg) among secondary school students in Abakaliki urban, South Eastern Nigeria.

Methods

This study was cross-sectional and was carried out in Abakaliki, the capital city of Ebonyi state in the south-eastern region of Nigeria. It is an agricultural trade centre for rice, yam and cassava and has a population of 151,723[24]. Abakaliki has 12 officially registered secondary schools: seven public schools and five private schools; the students enrollment for 2010/2011 academic year was 12, 634.[25]

The minimum sample size was determined at 230 using the formula for determining sample size in an infinite population with a prevalence of HBsAg of 18.4% among secondary school students in a previous study in North central Nigeria.[26] Making allowance for an expected attrition rate of 15%, the desired sample of 270 was derived. However, 300 students were recruited.
Multi-stage random sampling was used to select the subjects for the study. There are 12 secondary schools in the city[25]: seven public schools and five private schools. The schools were stratified into private co-educational, public co-educational, public male, public female schools. Using a simple random sampling method of the lottery variety; 2 private co-educational schools, and 1 public co-educational, 1 public male and 1 public female school were selected. The 5 schools thus selected have a combined population of 9,063.

Each of the five selected schools was stratified into 6 classes, Junior Secondary (JS) 1 to Senior Secondary (SS) 3. From each of these classes, one arm was randomly selected by balloting; that is one arm each from JS1 to SS3, making it a total of 6 arms from each school. Since the 5 schools are large and without much difference in the student populations, and in order to get a fair representation of all the strata in the selected schools, the sample size of 300 was shared equally among the 5 schools. Therefore 60 students were recruited from each school wherein 10 students were recruited from each of the 6 selected arms in each school using systematic random sampling method.

While every apparently healthy student in the selected schools was qualified to participate in the study, students who refused assent and those whose parents refused consent to participate were excluded from the study.

Social class determination was done using the social classification method described by Olusanya et al.[27]
Questionnaires were first administered to 30 students in a secondary school that was not selected for the study. The interview guide covered the name, age, father's occupation, mother's level of education and risk factors for HBV infection like blood transfusion, family history of hepatitis, injections, scarification marks and tattoos, and sexual activity.

The result of the pretest showed that some questions were not easily understood by the subjects. They were eventually rephrased in the final questionnaire that was used. Questionnaire administration was done by the PI (KNO) with the assistance of junior doctors in the Department of Paediatrics of Federal Teaching Hospital Abakaliki.

Data collection was done over a period of six weeks. Each of the five selected schools took four days-Monday to Thursday. The first two days were for making acquaintance with the school staff mandated to assist the author and his team, selecting of subjects and giving the selected subjects parental consent forms to be delivered to their parents or guardians. The remaining two days were for questionnaire administration, pre-test counseling, testing and result-notification to those students whose parents gave their consent and who also agreed to participate. Test results were individually handed directly to all the participating students in the form of sealed letters.

Two hundred and eighty two (94%) returned with parental consent given. Each of these students were given a pretested questionnaire to answer on their own, after explaining what it was all about. Information on the age, sex, mother's educational level and father's occupation, history of jaundice, blood transfusion, scarification, tattoos, additional ear piercing, sharing of sharps (like needles, razor blade or hair-clippers), and sexual activity were obtained. Sharing of ideas while filling the questionnaires was discouraged and research assistants were available to assist any respondent who sought clarification(s) on any question. After filling the questionnaire, HBsAg screening tests were carried out.

HBV screening was performed using the rapid chromatographic immunoassay test strips for the qualitative detection of HBsAg (ACON Laboratories, Incorporated San Diego, California, USA), in accordance with the manufacturer's instructions.

The HBsAg test strip is a rapid chromatographic immunoassay for the qualitative detection of Hepatitis B surface antigen in serum or plasma, with a relative sensitivity, greater than 99.8% and specificity of 99.7%.[28]

Those subjects with positive test to HBsAg were confidentially counselled by the researcher on the nature of HBV infection and the need for follow up in the Gastroenterology clinic at the Federal Teaching Hospital, Abakaliki.
The subjects with negative results were also counselled on healthy lifestyles to avoid contracting the infection; and the need to go for vaccination for those that had not been vaccinated against Hepatitis B virus.
Ethical clearance for this study was approved by the Research and Ethics Committee of Federal Teaching Hospital, Abakaliki. Approval was also obtained from Ebonyi State Ministry of Education while written consent was obtained from the schools' principals and parents or guardians of the subjects.
Statistical analysis of results was with the aid of Statistical Package for Social Science (SPSS) version 17.0. Results were presented in tables. Differences in proportions were compared using the chi square statistic. Where figures in the cells were less than five, Fisher's exact test was used instead of chi square test. p-values of <0.05 were considered statistically significant.

Results

In this study, out of 300 students selected and given consent forms for their parents or guardians, 282 (94%) returned the consent forms. Thirteen of these opted out of the study for fear of finger-prick and consequently were excluded from the study. Another 3 students were excluded because the information provided in the questionnaire was considered too scanty for analysis. The remaining 266 students were used as the subjects for the study.
Nine out of 266 respondents were seropositive for HBsAg in this study. Thus the seroprevalence of hepatitis B surface antigen among secondary school students in this study is 3.38%.

Demographic characteristics of the subjects

The ages of the students ranged from 9 to 23 years, with a mean age of 15.56 ± 2.25 years (95% C.I:15.28-15.84). One hundred and twenty three respondents (46.24%) were males while 143 (53.76%) were females. Male: female ratio was 1:1.2.
Of the 266 students in this study, 155(58.27%) belong to the upper socioeconomic class; 55 (20.68%) belong to the middle socioeconomic class; and 56 (21.05%) were from lower socioeconomic background.

The prevalence of HBsAg among respondents

Nine out of 266 students tested positive for HBsAg, giving a prevalence of 3.38%.

Association between HbsAg and sociodemographic variables

Gender: Six (4.88%) male students tested positive while 3 (2.10%) female students tested positive. Fisher's exact test = 1.56, df = 1, p = 0.31 (Table 1).

Table 1: Gender distribution of respondents and HBSAG test results

Sex	Neg. (%)	Pos. (%)	Total (%)
Male	117 (95.12)	6 (4.88)	123
Female	140 (97.90)	3 (2.10)	143
Total	257 (96.62)	9 (3.38)	266

Fisher's exact test = 1.56, df = 1, p = 0.31

Age: The age group of 12-14 yr has the lowest prevalence (1.27%), followed by 15-17 yr (4.03%) and 18-20 yr (5.37%), in an increasing order. However, the difference is not statistically significant (Fisher's exact test = 3.36, df = 4, p = 0.53; Table 2).

Table 2: Age distribution of respondents and HBSAG test results

Age (yr)	Negative (%)	Positive (%)	Total
9-11	5 (100.00)	0 (0.00)	5
12-14	78 (98.73)	1 (1.27)	79
15-17	119 (95.97)	5 (4.03)	124
18-20	53 (94.64)	3 (5.36)	56
21-23	2 (100.00)	0 (0.00)	2
Total	257 (96.62)	9 (3.38)	266

Fischer's exact test =3.36, df = 4, p = 0.53

Socioeconomic status: 6 (3.87%) subjects whose parents are of upper socio-economic status tested positive to HBsAg compared to 2 (3.64%) from middle socioeconomic background and 1(1.79%) from lower socioeconomic background. The difference is not statistically significant (Fisher's exact test =0.48, df = 2, p=0.81; Table 3).

Table 3: Effect of socioeconomic status (SES) on HBSAG seroprevalence

SES	Neg. (%)	Pos. (%)	Total
Upper	149 (96.13)	6 (3.87)	155
Middle	53 (96.36)	2 (3.64)	55
Lower	55 (98.21)	1 (1.79)	56
Total	257(96.62)	9 (3.38)	266

Fisher's exact test =0.48, df = 2, p=0.81

Association between HBsAg and risk factors

The association between the various risk factors based on clinical history and lifestyle of the subjects and hepatitis B surface antigen status were assessed.
Past history of jaundice: Forty three out of 266 (16.17%) respondents had a previous history of jaundice. One hundred and seventy five (65.79%) had no history of jaundice, while the remaining 48 (18.05%) respondents were uncertain. Two (4.65%) of the subjects with past history of jaundice tested positive to HBsAg. Among those with no past history of jaundice, 3 (1.71%) subjects tested positive for HBsAg. Forty eight

(18.05%) did not know whether they had jaundice in the past; four (8.33%) of them were seropositive for HBsAg. There is no statistically significant difference in HBsAg seropositivity between students with past history of jaundice and those without. Fisher's exact test = 1.33, df = 1, p = 0.26 {Table 4 (A)}.

Family history of hepatitis: There was a positive family history of hepatitis among 11 (4.14%) of the respondents, none of them (0.00%) tested positive to HBsAg. Of the 180 (67.67%) subjects with no history of a family member who had been diagnosed of hepatitis, four (2.22%) tested positive for HBsAg. The remaining 71 (26.69%) subjects were uncertain of this and five (7.04%) tested positive for HBsAg. The difference is not significant {Fisher's exact test = 0.24, df = 1, p = 0.79; Table 4 (A)}.

History of blood transfusion: Nineteen subjects (7.1%) had been transfused in the past and none (0.0%) of them tested positive for HBsAg. Of the 210 respondents who had never received blood transfusion, six (2.9%) tested positive for HBsAg. The remaining 37 (13.9%) respondents did not know if they had been transfused in the past and 3 (8.1%) of them tested positive for HBsAg. {Fisher's exact test = 2. 694, df = 2, p = 0.235; Table 4 (A)}.

Injection from medical quacks: Eighty five (32.95%) of the respondents reported that they had received injections from quacks, while 145 (54.51%) reported that they had not. The remaining 36 (13.53%) did not know if they had been injected by a medical quack in the past. Two (2.35%) of those with a history of being injected by quacks tested positive for HBsAg. Among those that reported that they had not been injected by a quack, four (2.8%) tested positive while 3 (8.3%) of those who were not sure if they had been injected by a quack tested positive for HBsAg. {Fisher's exact test = 2.89, df = 2, p = 0.20; Table 4 (A)}.

Self-injection: Thirty four (12.78%) respondents reported that they had indulged in self-injection; among them, two (5.9%) tested positive for HBsAg, compared to 7 (3.0%) of the remaining 232 who had never performed self-injection. Fisher's exact test = 0.75, p = 0.32; {Table 4 (A)}.

Sharing of sharp objects: One hundred and forty four (54.14%) of the respondents share sharp objects (like hair clippers, nail cutters, razor blades, etc.) with others. Four of them (2.78%) tested positive for HBsAg. Of the 122 respondents who did not share sharp objects, five (4.1%) tested positive for HBsAg. {Fisher's exact test= 0.35, df = 1, p = 0.74; Table 4 (A)}.

Scarification/ tribal marks: Forty four students (16.54%) have scarification/ tribal marks. Amongst them, three (6.82%) tested positive for HBsAg while 6 (2.70%) of the remaining 222 students who had no scarification marks/ tribal marks tested positive.{Fisher's exact test = 1.90, df = 1, p = 0.17; Table 4 (A)}.

Table 4(A): Association between risk factors and the sero-prevalence of HBsAg

Risk Factors	Neg (%)	Pos (%)	Total	Fishers test	p-value
History of Jaundice					
Yes	41(95.35)	2(4.65)	43	1.33	0.26
No	172(98.29)	3(1.71)	175		
Don't know	44(91.66)	4(8.33)	48		
Family history of hepatitis					
Yes	11(100)	0(0.00)	11	0.24	0.79
No	180(97.82)	4(2.18)	184		
Don't know	66(92.96)	5(7.04)	71		
Blood transfusion					
Yes	19(100)	0(0.00)	19	2.69	0.24
No	204(97.14)	6(2.86)	210		
Don't know	34(91.89)	3(8.11)			
Injection by a quack					
Yes	83(97.65)	2 (2.35)	85	2.89	0.20
No	141(97.24)	4 (2.76)	145		
Don't know	33(91.67)	3 (8.33)	36		
Self injection					
Yes	32(94.12)	2 (5.88)	34	0.75	0.32
No	225(96.98)	7 (3.02)	232		
Sharing of sharps					
Yes	140(97.20)	4(2.78)	144	0.35	0.74
No	117(95.90)	5(4.10)	122		
Scarification/tribal marks					
Yes	41(93.18)	3(6.82)	44	1.90	0.17
No	216(97.30)	6(2.70)	222		

Body Tattooing: Ten (3.76%) respondents had body tattoos; none of them (0.00%) tested positive to HBsAg. Out of the remaining 256 respondents who had no body tattoos, nine (3.52%) were seropositive for HBsAg. The difference is not significant. Fisher's exact test= 0.36, df = 1, p = 0.70; {Table 4 (B)}.

Body piercing: Twenty one (7.89%) of the respondents had their bodies pierced for ornaments. Ten (47.62%) of these were males while 11 (52.68%) were females. None (0.00%) of those with body piercing was seropositive for HBsAg; and nine (3.67%) of the remaining 245 respondents without body piercing tested positive for HBsAg. The difference is not significant: p > 0.05. {Table 4 (B)}.

History of surgery: twenty one (7.89%) students had undergone surgical operations in the past. None (0.00%) of them was seroopositive for HBsAg. Of the remaining 245 subjects without a surgical history, nine (3.67%) were seropositive for HBsAg. This is shown in Table 4 (B).

History of dental procedure: thirty five (13.16%) of the respondents had undergone dental procedures in the past. None (0.00%) tested positive for HBsAg. Two hundred and thirty one (86.84%) had never undergone any dental procedure and 9 (3.90%) were seropositive for HBsAg. {Table 4 (B)}.

Sexual activity: Thirty eight (14.28%) respondents reported that they were sexually active. Of these, 2

(5.26%) tested positive for HBsAg; while 7 (3.1%) of the remaining 228 tested positive for HBsAg. Fisher's exact test = 0.479, df = 1, p = 0.621. Table 4 (B).

Of the 38 sexually active respondents, 23 (60.53%) had had unprotected sex; one (4.35%) was seropositive for HBsAg. Fifteen (39.47%) respondents used some form of protection; one (6.67%) tested positive to HBsAg. Fisher's exact test = 0.10, df = 1, p = 0.64{Table 4 (B)}.

Twenty (52.63%) of the sexually active students had one sexual partner, of these, 2 (10.00%) tested positive for HBsAg. Ten (26.32%) had two sexual partners while eight (21.05%) students had three or more sexual partners. None of these students with more than one sexual partner tested positive to HbsAg. The difference is not significant: p = 0.72 {Table 4 (B)}.

Table 4(b): Association between risk factors and the seroprevalence of HBsAg

Risk Factor	Neg (%)	Pos (%)	Total	Fishers test	p-value
Body tattooing					
Yes	10(100.00)	0(0.00)	10	0.36	0.70
No	247(96.48)	9(3.52)	256		
Body piercing					
Yes	21(100)	0 (0.00)	21	0.80	0.47
No	236(96.33)	9 (3.67)	245		
Surgery					
Yes	21 (100.00)	0 (0.00)	21	0.80	0.47
No	236 (96.33)	9 (3.67)	245		
Dental procedure					
Yes	35 (100.00)	0 (0.00)	35	1.41	0.38
No	222 (96.1)	9 (3.90)	231		
Sexual activity					
Yes	36 (94.7)	2 (5.26)	38	0.48	0.62
No	221 (96.93)	7 (3.07)	228		
Unprotected sex					
Yes	22 (95.7)	1 (4.35)	23	0.01	0.64
No	14 (93.3)	1(6.67)	15		
Sexual partners					
One	18 (90.00)	2 (10.00)	20	1.20	0.72
Two	10 (100.00)	0 (0.00)	10		
Three or more	8 (100.00)	0 (0.00)	8		

Discussion

In this study, 3.38% of secondary school students in Abakaliki tested positive to HBsAg. This value falls within the HBsAg prevalence range of 2-7% which is the definition of intermediate endemicity for HBV infection by the Centre for Disease Control and Prevention (CDC).[29]

HBsAg prevalence of 3.38% found in this study is also considerably lower than the 18.4% reported by Ndako et al[30] among secondary school students in a rural community in Kaduna State. The higher value reported by Ndako et al[30] may be attributable to the difference in sample populations. The subjects used in that study were relatively much older than the subjects in this study as over 51% of the subjects in that study were above 20 years old compared to 3% of the subjects in this study that were above 20 years old. Therefore the higher prevalence reported by Ndako et al[30] is not surprising as the older subjects used in that study could have been more exposed to risk factors for HBV transmission such as injections from medical quacks and unprotected sex. Another possible explanation for the difference is that while this study was carried out among subjects living in an urban area, Ndako's study was among subjects in a rural area. Several studies in Nigeria and other African countries have reported higher HBsAg seroprevalence in rural areas compared to urban areas.[31-34] This is because rural dwellers are more likely to patronize quacks and patent medicine vendors who may not observe safe injection practices. Moreover, skin incisions for various purposes including herbal treatment and tribal marks are more likely to occur in rural than in urban settings.[35]

This study did not find a significant association between age and HBV transmission; however, it was observed that the prevalence of HBsAg increased with age. Other researchers[4,30] in Nigeria have found similar pattern. This trend of increasing prevalence with age suggests that the predominant mode of transmission may be horizontal. In this study, the increasing HBsAg prevalence with age may also be as a result of increased sexual activity in this age group; thus supporting the observation that sexual activity may be an important risk factor for the acquisition of HBV infection.[30, 36, 37]

This study revealed a non-significant association between the gender of the students and HBV transmission. This contrasts with earlier studies that reported gender difference. The non-significant association between gender and HBV transmission in this study suggests that both sexes were equally exposed to the same environmental risk factors HBV infection. However, this study corroborates with studies that found non-significant gender association.[8, 15,38]

In this study, parental socioeconomic status is not significantly associated with HBs antigenaemia. This is in agreement with earlier studies.[38] However, this finding is in contrast with other studies which reported a significant association between lower socioeconomic status and HBV transmission.[23] The lack of association between socioeconomic status and HBsAg seropositivity in this study is not very clear. The higher HBsAg seroprevalence found among the respondents of upper socioeconomic background, though not statistically significant, could be a reflection of the fact that the adolescents' behaviour is more influenced by peer pressure than societal norms and parental influence.[39,40]

Past history of jaundice was not found to be a significant risk factor in this study. This finding was corroborated by Agbede *et al*[8]. However, this finding contrasts with that of Ashraf *et al*[41] who found a significant association of past history of jaundice and HBsAg seroprevalence. The precise cause of jaundice was not determined in this study and could have been from aetiologies other than viral hepatitis. This may explain the finding of history of jaundice as a non-significant risk factor for HBsAg seroprevalence in this study

This study did not find any significant association be-

tween family history of hepatitis or liver disease and HbsAg seropositivity. This is similar to the findings of Chang et al.[42] However, this finding contrasts with that of Zhang et al[43] who reported a significant association between family history of HBV and HBsAg seropositivity in an adult population in Northeast China. This finding could be attributed to poor history recall by the respondents and their ignorance about the clinical manifestations of hepatitis and liver disease.

History of blood transfusion did not contribute significantly to HBV transmission in this study. This finding is similar to what was documented in previous studies across Nigeria;[44,45] but contrasts with some other studies[8, 23], which demonstrated higher prevalence among subjects with previous history of blood transfusion. This was attributed to exposure to unscreened blood or blood products. The increased awareness of the risk of transfusion transmitted infections with consequent routine screening of blood prior to transfusion may also have accounted for the zero prevalence of HBsAg among the subjects with history of blood transfusion in this study.
Self-injection and injection from medical quacks were not significantly associated with HBV transmission in this study. This study was conducted in a naïve community not exposed to intravenous drug abuse. A higher percentage of the respondents in this study were from upper socioeconomic background not visiting quacks for injections.

In this study, sharing of sharp objects such as hair clippers, razor blades and nail cutters were not found to be associated with HBV infection. But it was observed that 53% of the respondents agreed to have shared such sharp objects with family members or friends. This observation is important considering the role of contaminated sharp objects in the transmission of HBV as earlier reported.[23] Traditional scarification/tribal marks have been previously implicated in the transmission of HBV.[10,45] The lack of strong association between traditional scarification/tribal marks and HBsAg seroprevalence in this study in corroboration with earlier studies,[4,23] is possibly due to high proportion of the respondents who belong to upper socioeconomic background; with fewer tendencies to subscribe to the cultural practice of giving skin incisions for some ailments and for tribal marks.

This study also shows that the HBsAg test result is negative among the respondents who had had body tattoo, body piercing, surgery or dental procedure. The reason for this finding may be because of the small percentage of respondents who have been exposed to those risk factors: 3.4%, 7.9%, 8.3%, and 12.5% respectively. In this part of the country, it is not culturally and socially acceptable for people to wear body tattoos or have their bodies pierced for ornaments. Therefore it is not surprising that these practices are not common among the subjects in this study.
In this study, there is higher prevalence of HBsAg among sexually active students (5.0%) than among those not sexually active (3.1%), though this difference is not statistically significant. This trend has been previously reported.[46] This underscores the important role of unprotected sexual intercourse as a mode of transmission of HBV.
Among the sexually active students, unprotected sexual practice and multiple sexual partners did not appear to increase the risk of Hepatitis B infection. The reason for this finding is not clear as it has been severally reported that condom use protects against sexually transmitted diseases including HBV.[47,48] However the respondents' knowledge of proper condom use was not sought for in this study.

Conclusion

In conclusion, the prevalence of HBsAg carriage among secondary school students in Abakaliki is relatively low at 3.38%. Risk factors like socio-economic status, past history of jaundice, blood transfusion, tattoos, past history of surgery or dental procedure and sexual activity played insignificant roles in the transmission of HBV among secondary school students in Abakaliki.

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