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Cognitive factors and preventive practices relating to hepatitis B infection among in-school adolescents in Ogun State, Nigeria

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Abstract
Background: Hepatitis B virus infection is endemic in Nigeria and constitutes a public health concern. In-School adolescents in Ogun State indulge in practices which have potentials for putting them at risk of HBV infection. However, their cognitive factors and preventive practices relating to Hepatitis B infections among them are yet to be fully explored systematically.
Methods: A descriptive cross-sectional survey was conducted among 300 students recruited through the multi-stage sampling process. The respondents were drawn from junior and senior arms in four public secondary schools in Ogun State. A pre-tested self-administered questionnaire was used to facilitate data collection. Descriptive statistics were used to analyze the data on socio-demographic characteristics, as well as data on Hepatitis B related knowledge and prevention practices. Pearson correlation coefficient was used to determine the relationship between Hepatitis B knowledge and prevention practices.
Results: The participants' mean knowledge score was 16.4±4.4, and 79.3% (238) had fair knowledge of HBV infection, while 94.7% (284) had in appropriate HBV preventive practices. Only 6.7% (20.1) had been vaccinated against HBV. No significant relationship was found between knowledge of HBV and adoption of prevention practices among the participants (r=0.06; *p*=0.30).
Conclusion: The fair knowledge of the infection implies that there are some gaps in the participants' knowledge relating to Hepatitis B infection. An appreciable proportion of the respondents were vulnerable to HBV due to poor uptake of the HBV vaccine and involvement in practices that can put them at risk of the infection. Educational interventions and advocacy are needed to address these concerns.

Keyword: *In-school Adolescents, Hepatitis B infection Cognitive factors, Preventive practices.*

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Résumé
Contexte: L'infection par le virus de l'hépatite B est endémique au Nigéria et constitue un problème de santé publique. Les adolescents scolarisés de l'État d'Ogun se livrent à des pratiques susceptibles de les exposer à un risque d'infection par le VHB. Cependant, leurs facteurs cognitifs et leurs pratiques préventives liées aux infections par l'hépatite B parmi eux doivent encore être complètement explorés de manière systématique.
Méthodes: Une enquête transversale descriptive a été menée auprès de 300 étudiants recrutés dans le cadre du processus d'échantillonnage à plusieurs degrés. Les personnes interrogées provenaient des classes juniors et seniors de quatre écoles secondaires publiques de l'État d'Ogun. Un questionnaire auto-administré pré-testé a été utilisé pour faciliter la collecte de données. Des statistiques descriptives ont été utilisées pour analyser les données sur les caractéristiques sociodémographiques, ainsi que les données sur les connaissances et les pratiques de prévention liées à l'hépatite B. Le coefficient de corrélation de Pearson a été utilisé pour déterminer la relation entre les connaissances sur l'hépatite B et les pratiques de prévention.
Résultats: Le score de connaissance moyen des participants était de 16,4 ± 4,4 et 79,3% (238) avaient une bonne connaissance de l'infection par le VHB, tandis que 94,7% (284) avaient des pratiques préventives appropriées contre le VHB. Seulement 6,7% (20,1) avaient été vaccinés contre le VHB. Aucune relation significative n'a été trouvée entre la connaissance du VHB et l'adoption de pratiques de prévention chez les participants (r = 0,06; p = 0,30).
Conclusion: la bonne connaissance de l'infection implique qu'il existe des lacunes dans les connaissances des participants concernant l'hépatite B. Une proportion appréciable des répondants étaient vulnérables au VHB en raison de la faible utilisation du vaccin contre le VHB et de leur implication dans des pratiques qui peuvent les exposer à un risque d'infection. Des interventions éducatives et un plaidoyer sont nécessaires pour répondre à ces préoccupations.

Mot clés: *Adolescents scolarisés, hépatite B, facteurs cognitifs, pratiques préventives.*

Introduction

Hepatitis B Virus (HBV) is a pathogen that causes chronic liver inflammation. It has been reported that most people fight off the infection by their immune system and 5-10% of people who are infected each year will subsequently develop chronic liver disease, liver cirrhosis, and possibly liver cancer [1]. Hepatitis accounts for approximately 1.3 million deaths annually, thus making it the seventh leading cause of death globally [2]. Over 90% of infected persons are often unaware of their status; consequently, such persons who do not seek treatment can transmit the virus to others [3].

The World Health Organization (WHO) has recently estimated that about 60 million persons in the African region were infected with the Hepatitis B Virus (HBV) a figure that constitutes 23% of the global Hepatitis B disease burden [4]. Nigeria accounts for 8.3% of the global burden of chronic HBV and the average prevalence rate of the infection in the country ranges from 11%-13.7% [5]. Approximately 20 million Nigerians are reported to be chronically infected and the estimated ratio of Hepatitis B infection in the country was one in every eight persons [5]. The prevalence of the disease has been reported to be 6.1% among sexually active young people aged 15 to 29 years in Abeokuta, Ogun State [6].

Hepatitis B viral infection can spread among people through infected blood, semen, vaginal fluids and mucous membranes [10]. Studies have revealed that the transmission of Hepatitis B virus occurs mostly during adolescence or young adulthood as a result of unprotected sexual activities as well as indulgence in skin piercing practices including sharing of drug injection needles and syringes [6, 10]. The majority of secondary school students in Ogun State are adolescents. This category of young person's constitutes the group with a tendency to engage in health-compromising or risky practices that could enhance their vulnerability to HBV infection [10].

The burden of HBV infection remains on the increase in Nigeria even though an effective vaccine for preventing people against infection has been in existence since the 1980s [4]. The increasing burden of the disease condition is due largely to absence or poor hepatitis management programmes at the various levels of health care delivery system in Nigeria. A number of factors put people at high risk of infection; these include cognitive factors such as general lack of awareness and inadequate knowledge of Hepatitis B virus infection and Hepatitis vaccine [8-10]. In order to address these problems posed by the infection in endemic communities, the WHO launched a programme in 2015 geared towards reducing HBV infections by 90% and increasing global vaccine coverage to 90% [4]. In Ogun State, the vaccine is expensive and not readily available to adolescents. Educational interventions targeted at In-School adolescents (ISA) remain alternative options for protecting ISA from infection. In order to facilitate the design of such interventions, however, formative researches aimed at generating baseline information relating to cognitive factors and preventive practices are needed. This accounts for why this study was designed to assess the level of knowledge and prevention practices relating to Hepatitis B infection among In-Schools Adolescents in Ogun State, Nigeria.

Materials and methods

Study design, Sampling Process and Ethical consideration

This was a descriptive, cross-sectional study carried out among ISA in four secondary schools in Ogun State Nigeria. The participants included ISAs in Odogbolu grammar school, Odogbolu, Remo secondary school, Sagamu, Adeola Odutola secondary school, Ijebu-ode and Iyakan secondary school, Isara. Participants were recruited from class three (year three of JSS) in the Junior Secondary (JSS) and classes 1-3 in the Senior Secondary School (SSS). The multi-staged sampling technique was used to select the participants as follows: the first stage was the purposive selection of one senatorial zone out of the three senatorial zones in Ogun State because it contained 45% of the Local Government Area in Ogun State. In the second stage, four out of the 9 Local Government Areas (LGAs) in Ogun East senatorial district were selected based on a simple random sampling and one school per LGA was selected by balloting. The numbers or proportions of participants recruited from each of the four schools as well as per class were determined through proportionate sampling technique. This exercise resulted in the selection of seventy-five students per school and a minimum of eighteen students per class. In the selected classroom, 18 students were selected through systematic random sampling using the class register as the sampling frame. A total of 300 students were recruited to be involved in the study. Informed consent was obtained from each participant aged >18years while assent was obtained from those aged >18years. In addition informed to obtaining assent from parents of the students > 18 years the students were properly notified and informed about the study and their permission to be involved in the study was sought. The ethical issues discussed with the

participants prior to the interview included the following: voluntary nature of participation in the study; freedom to withdraw from the study anytime, without any sanction whatsoever; the inconveniences that might be experienced; the non-invasive nature of the study and the mechanism put in place to ensure the confidentiality of the information collected. Ethical approval was also obtained from Babcock University Health Research and Ethics Committee (BUHREC) with number NHREC/24/01/2020.

Study Instrument and Measures

The study instrument was a pre-tested self-administered questionnaire designed after consulting previously published studies relating to HBV infection. The questionnaire included questions relating to the following sections: socio-demographic information; knowledge relating to HBV; and prevention practices as well as indulgence in practices that can put adolescents at risk of the infection. The socio-demographic characteristics assessed were age, sex, class, religion, and ethnic affiliation. Participants' level of knowledge was assessed using a 37-point knowledge scale. The knowledge issues measured included the following: the pathogen that causes Hepatitis B; the mode of transmission of the Hepatitis B and the means of preventing Hepatitis B Viral infection. Each correct response was allotted 1 mark while an incorrect answer attracted a score of zero (0). Any "Don't know" response earned a zero as well. Knowledge scores were categorized into poor (0-12.3), fair (12.4-24.6), and good (24.7-37.0).

An 8-point practice scale was used to assess respondents' practices relating to HBV. The measured practices which can favor the transmission of HBV included the following: sharing of skin piercing instruments; (such as blade, injection needles and syringes), having of multiple sexual partners and indulgence in sexual intercourse without condom and tattooing. Then assessed Hepatitis B related: prevention practices ever adopted; screening for HBV; and uptake of the vaccination for HBV. Each practice related item was scored as follow: Yes =1; No=0 Prevention practices scores were classified into inappropriate (0-4) and appropriate (5-8) practices. Inappropriate practices were operationally defined as those that have the potential for putting people at risk of Hepatitis B infection.

Table 1: Socio-demographic Characteristics of in-school adolescent participants on Hepatitis B infection knowledge and preventive practices in Ogun State, Nigeria

Socio-demographic variables for consideration	N=300	
	N	%
Age (in years)		
10-14	166	55.3
15-19	134	44.7
Mean age (x)= 14.31 ±1.73		
Sex		
Female	155	51.7
Male	145	48.3
Class		
JSS 3	80	26.6
SS 1	72	24.0
SS 2	74	24.7
SS 3	74	24.7
Religion		
Christian	242	80.6
Islam	56	18.7
Traditionalist	2	0.7
Ethnicity		
Yoruba	255	85.0
Igbo	26	8.7
Others*	19	6.4

**Others include, Hausa, Ebira, Igala and Igede ethnic nationalities.*

Data Analysis

The questionnaires were manually coded facilitated by a coding guide and entered into the computer for analysis. The software used to facilitate data entering and analysis was the IBM Statistical Package for Service Solution (IBM SPSSTM) version 23. Descriptive statistics, t-test, f-test and correlation were the statistical tools used to analyze the data.

Results

Participants socio-demographic characteristics

The assessed socio-demographic characteristics of the participants are presented in table 1. The mean age of the participant was 14.3 ± 1.7years. Over half of them (55.3%) were aged 10-14 years. Slightly over half (51.7%) were females and 26.6% were in Junior Secondary School (JSS) Majority were Christians (80.6%) and Yoruba (85%).

Participants' hepatitis B knowledge

Table 2 highlights the participants' knowledge relating to HB infection. The knowledge variables can be differentiated to the analysis of mode of transmission, symptoms of the infection and adverse consequences of the infection. Slightly less than a quarter (24.7%) of the participants' stated correctly that HBV infection is a viral infection. The proportion of respondents who knew that HBV infection can adversely affect the liver was 90(30.0%). Over half (59.7%) of the participants correctly stated that the pathogen that causes Hepatitis B can be transmitted through unprotected sexual intercourse. The other correctly stated modes of transmission of the virus were as follows:: drawing of body tattoo 137(45.7%), from infected mother to an unborn child 163(54.3%), blood transfusion 187(63.3%), sharing of blades164 (54.7%), sharing of injection needles 173(57.7%) and sharing of toothbrushes 146(49.3%).

A number of the respondents knew that the pathogen that causes Hepatitis B cannot be transmitted through the following; sleeping on an infected person's bed (51%), by holding hands with an infected person 145(48.3%), through sweat 138(46%) and drinking alcohol 117(39%). Majority (67.7%) of the participants knew that HB is preventable by vaccination. The preventable practices correctly mentioned were having safe sex 171(57%), and not sharing injection needles (67.7%). More than half (65%) of the participants correctly stated that the infection could be present in one's body without

Table 2: Respondent's knowledge of hepatitis B infection among in-school adolescents in Ogun State, Nigeria

Knowledge variable	True n (%)	False n (%)
Hepatitis B is a viral infection	74(24.7)	226(75.3)
Liver is the part of the body destroyed by hepatitis B infection	90(30.0)	210(70.0)
Hepatitis B cannot be transmitted through sweat	138(46.0)	162(54.0)
Hepatitis B can be transmitted through sharing of blade	164(54.7)	136(45.3)
Hepatitis B can be transmitted through drawing of body tattoos	137(45.7)	163(54.3)
Hepatitis B cannot be transmitted through drinking of alcohol	117(39.0)	183(61.0)
Hepatitis B can be transmitted through unprotected sex	179(59.7)	121(40.3)
Hepatitis B can be transmitted through sharing of injection needles with an infected person	173(57.7)	127(42.3)
Hepatitis B cannot be transmitted through holding hands with an infected person	145(48.3)	155(51.7)
Hepatitis B can be transmitted through infected mother to an infant	163(54.3)	137(45.7)
Hepatitis B can be transmitted through blood transfusion	187(62.3)	113(37.7)
Hepatitis B cannot be transmitted through sleeping on infected person's bed	153(51.0)	147(49.0)
Hepatitis B can be transmitted through the sharing of toothbrush	148(49.3)	152(50.7)
Hepatitis B infection is preventable by vaccination	203(67.7)	97(32.3)
Hepatitis B infection is prevented by engaging in safe sex	171(57.0)	129(43.0)
Hepatitis B infection is prevented by not sharing injection needles with others	203(67.7)	97(32.3)
Some person infected with HB may not show symptoms at the acute phase	195(65.0)	105(35.0)
Jaundice is a the possible symptom of HBV infection	117(39.0)	183(61.0)
Abdominal pain is a possible symptom of HBV	53(17.7)	247(82.7)
Tiredness is a possible symptom of HBV	74(24.7)	226(75.3)
Hepatitis B infection can lead to the inflammation of the liver	80(26.6)	220(73.4)
Hepatitis B infection can lead to liver cirrhosis	56(18.7)	244(81.3)
Hepatitis B infection can lead to cancer of the liver	26(8.7)	274(91.3)

**Overall mean score = 16.36 ± 4.43.*

Table 3: Comparison of in-school adolescent participants mean knowledge scores about Hepatitis B infection prevention by socio-demographic characteristics in Ogun State, Nigeria

Socio-demographic Characteristics	Mean	SD	t/F-value	p-value
Age+				
10-14	16.75	4.42	48.76	0.000*
15-19	15.88	4.42	41.57	
Gender++				
Male	16.50	4.55	0.28	0.59
Female	16.23	4.43		
Class++				
JSS 3	16.88	4.60	0.54	0.95
SS1	16.08	4.70		
SS2	16.55	3.84		
SS3	15.87	4.55		

**Significant < 0.05*
+Compared using t-test; ++ compared using F-test

Table 4: Hepatitis B preventive practices among in-school adolescent participants in Ogun State, Nigeria

Practices variables	**Yes (%)**	**No (%)**
Ever been screened for Hepatitis B	24(8.0)+	276(92.0)
Ever received Hepatitis B vaccine	20(6.7)+	280(93.3)
Dosage of HB vaccine ever received (n=20)		
One	13(65.0)	
Two	4(20.0)	
Three	3(15.0)+	
Ever had sex (n=31)		
Male	23(15.9)	
Female	8(5.2)	
Ever used condom (n=31)	13(41.9)+	18(58.1.)
Sharing of skin piercing instruments with family members	237(79)*	63(21.0)
Sharing of skin piercing instruments with friends	206(68.7)*	94(31.3)
Categorization of practice scores (based on an 8-point rating scale)	n	%
Inappropriate practice (0-4)	284	94.7
Appropriate practice (5-8)	16	5.3

**Mean practices score: 1.9± 1.37*
*+ HB prevention practices; * Risky practices*

obvious symptoms. The correctly stated signs of HBV infection were Jaundice 117(39%), abdominal pain 53(17.7%), and tiredness 74(24.7%). The complications of HB correctly stated by the participants were as follows: inflammation of the liver 80(26.6%); liver cirrhosis 56(18.7%); and liver cancers 26(8.7%).

The participants' mean knowledge sore by socio-demographic characteristics are summarized in table 3. Participants who were aged 10-14 years had higher mean knowledge score of 16.8±4.4 compared to those ages 15-19years (15.9±4.4) with a significant difference. The mean knowledge score of the male and female participants were 16.5±4.5 and 16.2±4.5 respectively with no significant difference. Also there was no significant difference in the mean knowledge of the participants by class (p>0.05).\

Categorizations of the participants' level of knowledge are depicted in figure 1. The mean ± (SD) knowledge score was 16.4 ± 4.4. Overall, only 9(3.0%) of the participants had good knowledge regarding HBV infection. Participants with fair and poor knowledge constituted 287(79.3%), and 53(17.7%) respectively.

Prevention of hepatitis B

The mean (SD) practice score was 1.9 ± 1.37. Overall, only 16 (5.3%) of the participants had

appropriate prevention practices relating to HBV infection. The proportion of participants who had ever been screened for HBV was 24(8.0%), while only 20(6.7%) of the participants had ever been vaccinated against hepatitis B infection. Among those who had ever been vaccinated only 3(15%) had received the required three doses of HBV vaccine. The participants' who were sexually experienced consisted of 23(15.9%) boys and 8(5.2%) girls. Of those participants who were sexually experienced 13(41.9%) had ever used condom during sexual intercourse. Majority (79%) of the participants had ever shared skin piercing instruments with their families, while 206(68.7%) of the participants shared skin piercing instruments with friends. The correlation between participant's knowledge and their prevention practices revealed no significant relationship (r=0.06 p=0.30) (See table 5).

Table 5: Relationship between Knowledge of Hepatitis B infection and Preventive Practices among in-school Respondents in Ogun State, Nigeria

Variable	Knowledge of Hepatitis B infection N=300 R	p value
Prevention practices	0.06	0.30

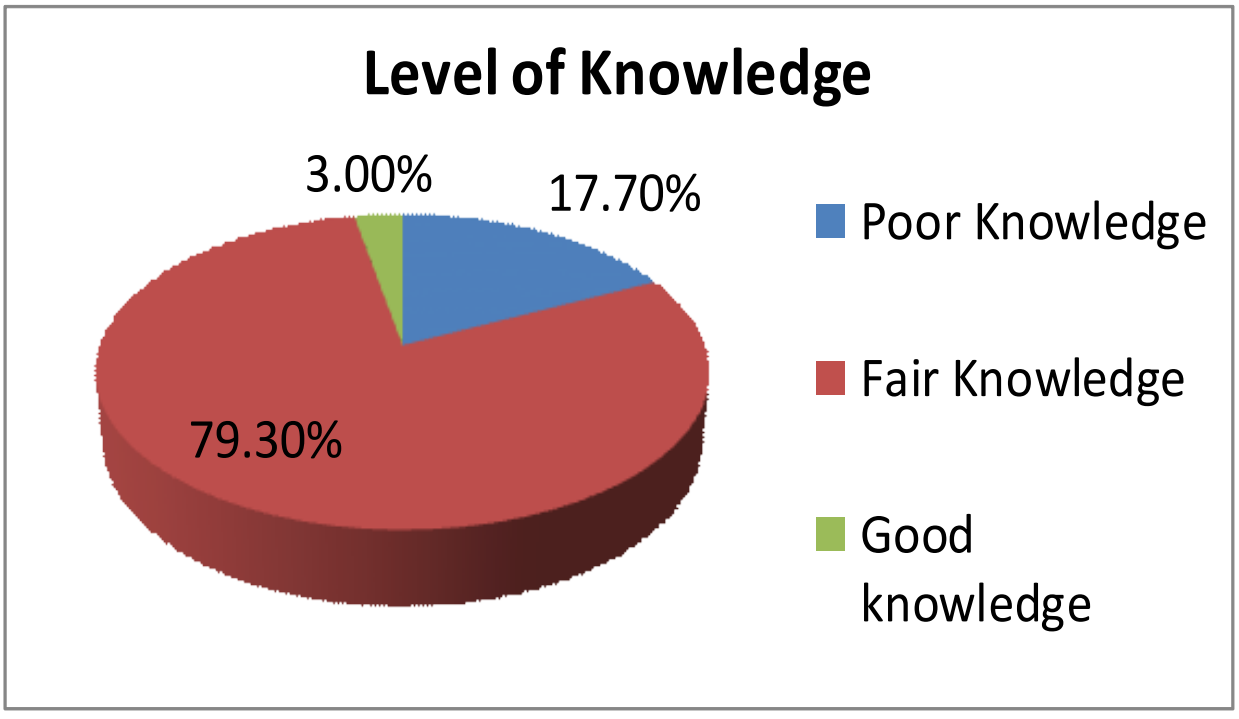

Fig. 1: Categorization of participants level of knowledge relating to hepatitis B infection among in-school adolescents in Ogun State, Nigeria

Discussion

This study was designed to determine the level of knowledge and preventive practices towards Hepatitis B infection among in-school adolescents in Ogun State, Nigeria, using mixed sequential explanatory method that included knowledge scoring scale. Generally, the participants had fair knowledge of Hepatitis B infection. A similar result was reported by Joseph *et al*., among young adult in south west Nigeria which showed that respondents had average knowledge of HBV infection [11]. Roushan *et al.*, found in a study among Iranian adolescents that most adolescents were knowledgeable about Hepatitis B infection [12]. The fair level of knowledge here found among in-school adolescents in Ogun State appears to be relatively better than the poor knowledge of HBV found in similar study in Egypt [13]. The difference in findings may be attributed to the difference in the various study location as well as

differences in pattern of access to health information. Several participants in our study had wrong information about HBV. For instance a 40.3% of the participants did not know that Hepatitis B infection could be contracted through sexual intercourse and 45.7% of the participants did not know that Hepatitis B infection could be transmitted from an infected mother to her unborn child. Also, a quarter of them did not know that the infection could be transmitted through the sharing of needles and syringes. The various misconceptions of the infection among the participants are a reflection of the gaps in their knowledge of the infection including its transmission processes.

There were age differences in the level of knowledge of the participants. It is not clear why younger in-school adolescents aged 10-14 years were more knowledgeable about the infection compared with their counterparts aged 15-19years; a qualitative study may help to throw light on this manifestation. A study conducted in Colombia showed that related knowledge of HBV was significantly higher with those older having higher knowledge of the infection was significantly associated with increasing age ($p < 0.001$) [14]. Similarly, there was no gender difference in the level of knowledge of the participants in this study. A study conducted in Karachi among males and female attending family medicine clinic showed that more females knew about HBV compared to males [15]. However, gender was not found to be a significant factor relating to knowledge of Hepatitis in a study carried out in the United States [16]. This study revealed no significant relationship between participant's knowledge and prevention practices of hepatitis B. This finding is at variance with Akanksha *et al.*, [17] reports in their study among medical students, this may be because their study population who were medical students was taught various kinds of diseases including HBV.

The proportion of participants that indicated they complied with the prevention practices was abysmally low despite the fact that majority had fair knowledge of the infection. This is so because to be health informed does not necessarily translate to putting into practices what one has learnt or be informed about. Barrier or behavioral antecedent factors which may have led to this among the participants need to be addressed with a view to promoting HBV related preventive practices among them.

Majority of the participants in this study reported that they had never had sexual intercourse; more females than males disclosed this. This result may not be a reflection of a reality as a result of cultural influence. It is to be noted that among the Yoruba in the study setting issues about sexual intercourse are not often discussed or revealed discretely [18]. Involvement in sexual intercourse is culturally reserved for adults who are married. Most yorubas view sexual intercourse involving adolescents as sexual promiscuity which should not be encouraged. Within the cultural context, therefore, adolescents feel uncomfortable sharing information about their indulgence in sexual activities especially for persons outside their peers. While sharing information relating to their sexual experience male adolescents tend to exaggerate while female downplay their sexual experience in terms of number of sexual partners that have and their pattern of involvement in sexual relationships.

Three notable HBV related risky practices were documented in this study; these were unsafe sex, poor intake of HBV screening test and poor adoption of HBV vaccine. With respect to condom use, only13 out of 31 adolescents who had ever had sexual intercourse used condom; this implies that the others were involved in unsafe sex. It should be noted that the adoption of condom is poor among several segment of the Nigeria population [19]. The low uptake of HBV screening test is a source of concern; is a risky practice. Previous studies conducted elsewhere among adult population have similarly revealed poor uptake of HBV screening test. For instance a study conducted among pregnant women in Ethiopia showed that only 20% had ever been screened for HBV [20]. A study conducted among 9,014 adults selected from the general population in France similarly revealed that only 27% reported to had ever been screened for HBV [21]. In the absence of an effective treatment or cure vaccination remains the only medical intervention for protecting people against the virus. The poor adoption of HBV vaccine cannot be unconnected with limited financial access to the vaccines, lack of readily availability of the vaccine as well as the inadequate promotion or social marketing of the health technology especially among adolescents. In Nigeria the vaccine is made available to infants, where it is available. Persons who are not infants pay to receive the vaccine. In depressed economy such as this, payment for HBV screening test or payment for the HBV vaccine or both may not be given high priority.

Conclusion and recommendations

The findings of the study showed that the majority of students had fair knowledge of HBV but had several

misconceptions relating to the infection that can negatively affect their prevention practices, promote their risk of infection and serve as barriers to the uptake of the HBV vaccine. In addition the participants had inappropriate prevention practices which can put them at risk of infection. The results of this study constitute baseline information for designing evidence based advocacy, social marketing, training, and other appropriate educational interventions aimed at improving their knowledge of the infection, promoting the adoption of HBV vaccine and discouraging practices among them which have potential for putting them at risk of HBV infection. Lastly, the results can be used to facilitate the formulation of national policies on HBV with special reference to In-school adolescent populations.

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