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Sero-Prevalence, Associated Factors and Perceived Beliefs about Hepatitis B Virus among Youths in a South Western Tertiary Health Institution in Nigeria

Séro-prévalence, facteurs associés et croyances perçues sur le virus de l'hépatite B chez les jeunes dans un centre de santé tertiaire du Sud-Ouest du Nigeria

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Résumé

Contexte et objectifs. L'infection par l'hépatite B demeure une préoccupation de santé publique universelle malgré les efforts déployés pour améliorer le niveau de sensibilisation et la réduction de sa propagation. Très peu d'études sur l'hépatite virale B (HVB) ont ciblées les jeunes. La présente étude visait à déterminer la séro-prévalence, les facteurs associés, et les croyances perçues sur l'HVB.

Méthodes. Il s'agissait d'une série des sujets jeunes sélectionnés à l'Hôpital Universitaire d'État d'Ekiti au Nigeria entre mai et juillet 2023. Les données ont été collectées à l'aide d'un questionnaire structuré prétesté avec leurs échantillons de sang dépistés pour l'hépatite B.

Résultats. Deux cent vingt trois jeunes ont été enrollés. La séro-prévalence de l'Hépatite B était de 1,8 % avec une majorité d'entre eux âgés de 20 à 24 ans. Le sexe féminin était prépondérant avec un sex-ratio H/F de 1/4. Aucun facteur testé n'était associé à une séro-positivité du VHB, alors que la susceptibilité perçue était associée à la plus haute éducation de la mère (p=0,023) et au statut socioéconomique de la famille (p=0,044) ; le bénéfice perçu du dépistage (p=0,034) et la menace d'être infecté par un partenaire (p=0,032) étaient associés au statut d'étudiant. L'auto-efficacité (p=0,027) et son indice d'action (p=0,003) étaient associés respectivement, au niveau d'éducation le plus élevé des répondants et à leur groupe d'âge.

Conclusion. La séroprévalence du VHB chez les jeunes de la zone d'étude semble faible par rapport à la population générale. Cependant, leur attitude et leurs croyances perçues sur l'hépatite B les exposent à un risque continu de contracter la maladie si aucune intervention

Summary

Context and objective. Hepatitis B infection is a universal public health concern with efforts made to improve the level of awareness and reduction in its spread. Few studies are targeted towards youths with whom risk factors are predominant. This study aimed to determine the sero-prevalence, associated factors and perceived beliefs on the infection.

Methods. A study based on a series of randomly selected cases was conducted from May to July, 2023 at the Ekiti State University Teaching Hospital. Data were collected using a pretested structured questionnaire and blood samples from respondents were screened for hepatitis B.

Results. Two hundred twenty-three youths were enrolled. The sero-prevalence of Hepatitis B was 1.8% The majority of selected youths were within the 20 to 24-year age group and predominantly female with male to female sex-ratio of 0,25. None of the elements tested were associated with sero-positivity of HBV while perceived susceptibility was associated with mother's highest education (p=0.023) and family's socioeconomic status (p=0.044). Perceived benefit of screening (p=0.034) and threat of getting infected from partner (p=0.032) were associated with the status of being a student. Self-efficacy (p=0.027) and their cue to action (p=0.003) were associated with highest educational level of respondents and their age group, respectively.

Conclusion: The sero-prevalence of HBV among the youths in the study area seems low when compared to the general population. However, their attitude and perceived beliefs about hepatitis B exposes them to continual risk of contracting the disease if no urgent intervention is deployed.

Keywords: Sero-prevalence, Associated Factor, Hepatitis B, Perceived Beliefs, Youths, Ekiti State University Teaching Hospital, Nigeria

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urgente n'est déployée.
Mots-clés : Séroprévalence, facteurs associés, hépatite B, croyances perçues, jeunes, hôpital universitaire de l'État d'Ekiti, Nigeria

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Introduction

Hepatitis B virus has been reported to have universal public health concern with over 2 billion people infected worldwide and over one million death recorded annually (1-2). In sub-Saharan Africa, the prevalence of hepatitis B virus is between 0 to 28 % (3). The WHO African region is the second highest where over 80 million people are chronically infected (4).

Nigeria is endemic for Hepatitis with prevalence ranging from 2.2 % to 18% (5-8). The virus has been implicated in causing acute and chronic hepatitis, chronic carrier state, chronic liver disease, Liver cirrhosis and hepatocellular carcinoma (9). The modes of transmission of hepatitis B include sexual intercourse, transfusion of blood and other blood products and the use of contaminated needles and sharp equipment (8). Barber risk, history of injection, reuse of injection and dental risk are other risk factors that have been documented (10).

Young people have been found to be highly susceptible to engaging in some risk factors for contracting hepatitis B virus infection (10). These people are individuals between the ages of 15 and 24 years (11). It has been reported that 34% and about 14 % of those who were at risk of contracting this infection were those in the 21 to 30 year and 11 to 20 year age groups respectively (10). Though efforts have been made at improving the level of awareness and knowledge of Hepatitis B virus in the country (12), but few studies have been targeted towards this age group where the risk factors are predominant. For example, it was reported that the epidemiology of the virus is poorly understood among young people in Nigeria in spite of the overwhelming effort about awareness in the general population (13).

Many young people rarely go to the hospital except when they have symptoms (14). The reason for this has been explained by the fact that individuals in this age group still have an ongoing process of physiological and neuropsychological maturation which makes them to react differently when decision making, inhibitory control and planning are concerned as opposed to the way children less than 15 and adults older than 25 years will respond (15).

One of the major determinants in assessing the health behavioral response of an individual to an infection is perception (16). In order to assess the perception of the young people on the way they respond to Hepatitis B virus, the health belief model was used in this study. Rosenstock designed the Health belief model with the goal of hypothesizing why people engage in prevention, screening and controlling health condition (16). This study also aims to assess the sero-prevalence, associated factors, and perception of belief about HBV to forestall the spread of this infection.

Methods

Study Area, design and period: This was a descriptive; hospital based cross-sectional study of sero-prevalence, associated factors, perceptive beliefs about Hepatitis B infection among youths attending the adolescent and youth clinic of Ekiti State University Teaching Hospital (EKSUTH) in South Western Nigeria. This tertiary health care facility, EKSUTH, is a state government owned hospital which served health care needs of the over 3 million inhabitants of the state and referred clients from neighboring state of Osun, Ondo and Kogi states. The Family Medicine Department of

the hospital serves as the first port of call for all non-emergent cases, apart from Obstetric complaints. It runs daily clinics which are manned by specialist-led teams. One of the clinics operated by specialists is the specialized adolescent and youth clinic which cater for the health needs of young people who account for a sizeable proportion of patients seen there. The questionnaires were administered to consenting participant over a three-month period from 1st May 2023 to 31st July 2023.

Study Population: The study population included all the youths who attended the adolescent and youth clinic of the EKSUTH, Nigeria. Patients who are severely ill, those on admission and those who did not give their consent were excluded from the study.

Sample size and sampling technique: Sample size estimation was done using the Cochran's formula $Z_{\&}^2$ X p(1-p) / d^2 (17). Using the prevalence rate of 9.7% from a previous study (13), 135 respondents were required to obtain a statistically significant data at a p value of 0.05 A total of 230 participants were recruited for the study using a systematic random sampling technique with 223 responding adequately to the research instrument giving a 97% response rate.

Study Instrument and procedure: The instrument was developed from existing literature on sero-prevalence, associated factors, perception of risk and preventive measures against Hepatitis B virus among young people (12,18-19). The questionnaire had four segments: the first segment was on socio-demographical information about the patients including the history of blood transfusion. In this section, the socioeconomic status of the family of the participants was assessed with the Oyedeji classification of social class which some studies have used when the social class of a family was needed (20-21). In this classification, the socioeconomic status was assessed by summing the father's occupation and education scores plus mother's occupation and education scores divided by 4 to give the final score of the social class. The social class is scored as high when the final score is 1 to 2, middle when the score is 2.1 to 3 and low when it is 3.1 to 5.

The next segment included questions assessing the sexual health of the participants. Section C included questions regarding their sexual history and other related predisposing risk factors to contacting Hepatitis B virus while the last segment enquired about questions assessing their perceived belief about HBV using 5 constructs of Health Belie Model. The 5 construct include susceptibility, perceived benefit, self-efficacy, perceived threat and cue to action. The health beliefs/attitudes were measured with binary responses. The health belief model has been used by literatures to measure individual's perception about infectious disease (22-23).

The perceived susceptibility was assessed using an attitudinal question asking *Currently I believe I have a high probability of contracting HBV infection.* Perceived benefit was assessed using the question '*Screening for hepatitis B is beneficial to me*' while perceived threat was assessed by their response to the question *'it is very important to get my sexual partner vaccinated against Hepatitis B virus'*. Self-efficacy and cue to action were assessed by asking the questions '*í have adequate knowledge about hepatitis B vaccine as a preventive measure against HBV* and *'I am willing to be vaccinated against HBV'* respectively. The answers were dichotomized – Yes/No. The variables include age, gender, roles/occupation, educational level, parental socioeconomic status, mother's level of education, sexual health, knowledge of HBV, hepatitis B status and attitudes towards prevention from HBV.

The participants were approached during the waiting period in the outpatient clinic and invited to participate after due explanation about the study and consent obtained. A systematic random sampling was used for the study using an interval of 4 (meaning that every fourth consenting patient was recruited for the study. The questionnaire was administered by a research assistant who was properly trained after patient's encounter with the physician. Each questionnaire administered did not take more than 15 – 20 minutes. A total of two hundred and twenty-three (223) youths aged 15 to 24 years old had their blood samples collected and the plasma was screened for hepatitis B surface antigen (HBsAg) using the first response HBsAg card. The reactive sera were confirmed with enzyme-linked immunosorbent assay. The other serological markers of hepatitis B virus were detected using the one step HBV multi-5 test kit.

Sample collection and analysis: A maximum of 5 ml of venous blood was withdrawn with 5 ml disposable needle and syringe from each of the participants and put into a 5 ml vacutainer bottle containing an anticoagulant, ethylenediaminetetraacetic acid (EDTA). The collected sample was subsequently analyzed by a laboratory scientist.

One step rapid diagnostic HBsAg test kit (Brightsun multiconcept dynamic limited, Nigeria) was used to screen all the plasma samples for HBV according to the manufacturer's instructions. This test is an *in vitro* qualitative one-step immune-chromatographic assay for the detection of HBV. The test selectively detects HBV in whole blood, serum or plasma using a two site immunometric assay in which a combination of monoclonal and polyclonal antibodies is used. The test was done by placing 25 µl of plasma in the specimen pot of the cassette and the reading was taken at 10 min. A single red/pink band at the control region was taken as a negative result while two bands each at the control and the patients region was taken a positive result. An invalid test was indicated by a single band at the patient's region and was repeated.

The HBsAg reactive samples were confirmed with enzyme-linked immunosorbent assay (Beijing Kinghawk Pharmaceutical Co., Ltd., China) according to the manufacturer's instructions. Samples that were reactive to HBsAg were further screened for other serological markers of HBV using the one-step HBV multi-5 test kit (Beijing easy sweet Biomedicine Science Tech Co., Ltd., China). The multi-5 in 1 Panel rapid test kit is a rapid test based on the principle of immunoassay combined with conjugated colloid gold technology. The HBV test kit is a diagnostic device to detect the 5 markers associated with hepatitis B infection. The markers include hepatitis B surface antigen (HBsAg), hepatitis B surface antibody (anti-HBs), hepatitis B e-antigen (HBeAg), hepatitis B e-antibody (anti-HBe), and hepatitis B core antibody (anti-HBc).

Statistical Analysis: The information obtained from the general questionnaire and results from the laboratory analysis were coded and entered using SPSS version 25. The general characteristic of the patients was analyzed using descriptive statistics. Demographic variables, which were normally distributed, were described as mean and standard deviation. The categorical variables were reported as frequency distribution and proportions with 95% confidence intervals and was compared using the chi-square test or Fisher's exact test.

Ethical Consideration: Informed consent was obtained from the patients before the questionnaire was administered. The administration of the questionnaire took place after the normal clinic consultation; hence refusal of patients to participate did not affect their normal health care. Ethical approval with protocol number EKSUTH/A67/2023/03/004 was obtained from the Ethics and Research Committee of the Ekiti State University Teaching Hospital, Ado-Ekiti.

Statement on potential conflict of interest: The authors declare that there is no conflict of interest

Results

Sociodemographic characteristics of the respondents

A total 223 respondents participated in the study. A larger proportion (77.1 %) of them were in the 20 to 24-year age group with female gender, students and those in the tertiary institution having larger proportions of 66.8 %, 78 % and 54 %, respectively. Though mothers of participants with secondary school certificate as highest education were more than the others, the families with high socioeconomic status were the largest among the participants (Table 1).

Table 1: Demographic variables of respondents studied

Variables		N = 223	Percentage (%)
Age (Years)	15 - 19	51	22.9
	20 - 24	172	77.1
Mean 21.23 +/- 2.02			
Gender	Male	74	33.2
	Female	149	66.8
Occupation	Student	174	78.0
	Government worker	7	3.0
	Self employed	33	14.8
	Unemployed	9	4.0
Highest education attained	Primary School	16	7.2
	Secondary School	38	17.0
	Tertiary institution	121	54.3
	Post Graduate	48	21.5
Mother's Highest Education	University Graduate	67	30.0
	*HND/NCE	59	26.5
	Secondary School	76	34.1
	Primary school	7	3.1
	No formal Education	14	6.3
Socioeconomic status	High Social Class	118	52.9
	Middle Social Class	53	23.8
	Low Social Class	52	23.3

*HND/NCE – Higher National Diploma/ Nigerian Certificate of Education

Sero-prevalence of HBV

Out of all the participants that were screened, four of them (1.8 %) tested positive for HepBsAg. (fig 1).

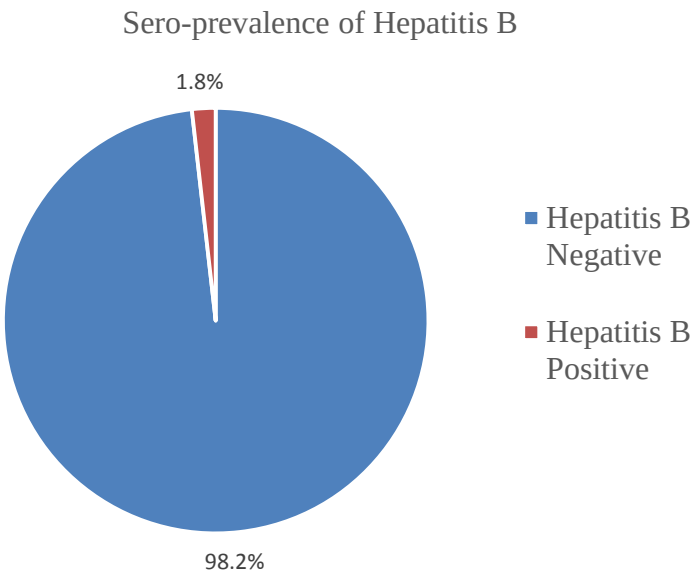

Fig 1 Sero-prevalence of Hepatitis B among the respondents

None of them had the hepatitis B surface antibody and hepatitis B envelope antigene, one of the sero-positive respondents (25%) had developed the anti-HBc, and two (50%) had developed the envelop antibody (anti-HBe). Out of all those that were seropositive for HBV, three of them were females with one male. The four positive participants were in the age group of 20 to 24 years old though this was not statistically significant (Table 2).

Table 2: Hepatitis B panel of seropositive participants

	Seropositive HepBsAg n (%)	HepBsab n (%)	HepBeAg n (%)	Anti-HBC n (%)	Anti-HBe n (%)
Gender					
Male	1 (25)	0	0	0	1 (25)
Female	3 (75)	0	0	1 (25)	1 (25)
Age Group					
18 – 19	0	0	0	0	0
20 -24	4 (100)	0	0	1 (25)	2 (50)

Risk factors of Hepatitis B among participants studied

Less than 5% of the participants had positive history of blood transfusion with less than 3% of the participants with injection of drugs. A larger proportion of the respondents had initiated sexual intercourse with about 30% with history of multiple sexual partners in the previous year prior to the study. Less than 20% of them had positive history of sexually transmitted infection prior to the study (Table 3).

Table 3. Risk factors to Hepatitis B among participants

Variables	Category	N = 223	Percentage (%)
History of Blood transfusion	Yes	10	4.5
	No	213	95.5
History of injection of drugs	Yes	4	2.9
	No	135	97.1
Sexual partner ever injected drugs	Yes	6	4.3
	No	73	52.5
	I don't know	60	43.2
Sexual exposure	Yes	139	62.3
	No	84	37.7
Multiple sexual partner in past year	Yes	42	30.2
	Only one partner	81	58.3
	No sex in the past year	16	11.5
History of Sexually transmitted disease	Yes	23	16.5
	No	116	83.5
Sexual partner had other partners	Yes	11	7.9
	No	56	40.3
	I don't know	72	51.8

Preventive measures against sexually transmissible infection

In table 4 below, a larger proportion of the male gender use protective measures to prevent sexually transmitted/transmissible infection when compared to their female counterpart (Table 3).

Table 4. Preventive measures against sexually transmissible infection among sexually active respondents (N=139)

		Use of condom only		
		Yes	No	P value
Age / years	18 – 19	7 (9.2)	12 (19.0)	0.093
	20 - 24	69 (90.8)	51 81.0)	
Gender	Male	40 (52.6)	12 (19.0)	**<0.0001**
	Female	36 (47.4)	51 (81.0)	
Occupation	Student	57 (75.0)	50 (79.4)	0.429
	Government worker	7 (3.9)	1.0 (1.6)	

	Self employed	15 (19.7)	9 (14.3)	
	Unemployed	1 (1.3)	3.0 (4.8)	
Highest Educational Status	Primary School	6 (7.9)	4 (6.3)	0.945
	Secondary School	13 (17.1)	9 (14.3)	
	Tertiary institution	39 (51.3)	34 (54.0)	
	Post Graduate	18 (23.7)	16 (25.4)	
Mother's Highest Education	University Graduate	19 (25.0)	16 (25.4)	0.367
	*HND/NCE	20 (26.3)	14 (22.2)	
	Secondary School	31 (40.0)	24 (38.1)	
	Primary school	3 (3.9)	1 (1.6)	
	No formal Education	3 (3.9)	8 (12.7)	
Socioeconomic status	High	35 (46.1)	27 (42.9)	0.884
	Middle	19 (25.0)	18 (28.6)	
	Low	22 (28.9)	18 (28.6)	

*HND/NCE – Higher National Diploma/ Nigerian Certificate of Education

Relationship between demographic characteristics and perception of belief

In table 5 below, the relationship between the demographic characteristics that were significant with respondents' disease perception were displayed. More respondents in the 20 – 24 age group were more willing to get vaccinated when compared to their counterpart in the 15 – 19-year-old (P = 0.003). Only the status of being a student was significantly associated with perceived benefit of getting screened for hepatitis B (p = 0.034). More of those who were students agreed to the statement that there was a need for their partner to get vaccinated (P = 0.032). The respondents whose highest educational was the tertiary level had significant relationship with adequate knowledge of Hepatitis B vaccine (p = 0.027). The mothers' highest educational level and socioeconomic status has a significant association with the probability of contracting the disease among the respondents with p values of 0.023 and 0.044 respectively (Table 5).

Table 5. Relationship between demographic characteristics and the respondents' perception of belief

Variable		True	False		P value
**Mother's Highest Educational	University Graduate	13 (28.9)	54 (30.3)		**0.023**
	*HND/NCE	9 (20.0)	50 (28.1)		
	Secondary School	13 (28.9)	63 (35.4)		
	Primary School	3 (6.7)	4 (2.2)		
	No formal education	7 (15.6)	7 (3.9)		
**Socioeconomic Status	High SES	17 (37.8)	101 (56.7)		**0.044**
	Middle SES	12 (26.7)	41 (23.0)		
	Low SES	16 (35.6)	36 (20.2)		
**Occupation	Student		157 (79.3)	17 (68.8)	**0.034**
	Government worker		4 (2.0)	3 (12.0)	
	Self employed		30 (15.2)	3 (12.0)	
	Unemployed		7 (3.5)	2 (8.0)	
**Occupation	Student		43 (75.4)	130 (77.9)	**0.032**
	Government worker		1 (1.8)	6 (3.6)	
	Self employed		7 (12.3)	26 (15.8)	
	Unemployed		6 (10.5)	3 (1.8)	
**Highest Educational Level	Primary School		10 (14.9)	6 (3.8)	**0.027**
	Secondary School		12 (17.9)	26 (16.7)	
	Tertiary Institution		31 (46.3)	90 (57.7)	
	Post Graduate		14 (20.9)	34 (21.6)	

**Age Group	18 - 19	34 (18.8)	17 (40.5)	**0.003**
	20 - 24	147 (81.2)	25 (59.5)	

*HND/NCE – Higher National Diploma/ Nigerian Certificate of Education
**Variables significantly associated with health belief model have been displayed

Discussion

In this present study, the sero-prevalence of hepatitis B among young people was 1.8 %. This is lower than what was reported by studies done in some parts of the country (5-6,8). The lower rate in this study might be due to difference in the location and age range of participants when compared to these previous studies. One (25%) of those who were sero-positive had developed the anti-HBc, hepatitis B core antibody and 2 (50%) had developed the envelop antibody (anti-HBe). The hepatitis B core antibody (anti-HBc) do not signify any immunity but rather the presence of antibody to the hepatitis B virus. However, those who had developed anti-HBe were infective and can transmit the disease to other people (24). The absence of Hepatitis B surface antibody among those who were sero - positive showed that none of those who were reactive had developed any immunity to the disease. This signified the possibility of developing complications from the disease (6,24).

One of the major risk factors to getting infected with hepatitis B is blood transfusion (25). In this study, less than 5% of the participants had positive history of blood transfusion. This is lower than what was reported in Calabar where over 10% of young adult had similar history (26). This difference might be attributable to the fact that in Calabar, the blood bank registers of the tertiary institution was used for sample collation whereas in this study, participants from the adolescent and young adult clinic of the tertiary institution were the ones recruited.

It is however worth noting that majority of those who were reactive in the study were females. This is similar to what was reported by Vedavati BI *et al*. at Kodagu district hospital (27). This is however contrary to Aminu *et al's* findings among similar age of students who reported more male preponderance (28). The males were found in this study to use condom only for the prevention of hepatitis B and other sexually transmitted infection when compared to their female counterpart (P= <0.0001). This might explain why there was lower male preponderance of getting infected with the disease in the study area. Barrier method of protection have been advocated to be the preventive method against the disease (29). Perhaps the reason why more males use the condom only is because the females are more exposed to other methods of contraception which is not useful in protection against Hepatitis B infection (29-30).

Age range of 20 to 24 was found to be related significantly to willingness to take action in order to prevent getting infected with Hepatitis B when compared to those less than 20 years (P = 0.003). It has been reported that there is an ongoing physiological and neuropsychological maturation process in individuals who are in the adolescent age group (15). This yet to be completed process makes them to react differently when decision making, inhibitory control and planning are concerned. These ongoing developmental changes also include their cognitive activities and might be responsible for their poor responses in their willingness to take action towards prevention from getting infected with Hepatitis B (31-32). When their perception of the beneficial impact of screening for the disease was assessed, only their role as student was significant when compared to others who were employed or unemployed. Education has been reported to be instrumental in health seeking behavior (33). However, a study among similar age group has reported that risk assessment and disease prevention efforts are lacking among students (34). This difference might be linked to the level of education that majority of the participants in our study have attained and their exposure to various media about health seeking attitude**.** It is however worth of note that highest educational status of our participants was not significantly related with the perceived benefit of screening for Hepatitis B.

More of the participants who were students perceived the need to get their partner vaccinated as important. Vaccine discordancy has been reported among vaccine preventable disease (35). Perhaps the reason why students agreed more to the necessity of partners getting vaccinated is the rampant prevalence of multiple sexual partners among tertiary students (36–38). Tertiary education was more likely to influence the self-efficacy of an individual when the perception of disease prevention is considered. The influence of higher level of education might be responsible for this finding (33,39-40). Mother's highest educational status and high socioeconomic status were found to be significantly related to perceived

belief about participants' susceptibility to contracting Hepatitis B. It has been reported that mother's perception about health have a high influence of perceived belief on contracting a disease (41). The higher the socioeconomic status the more likely the members of the family be able to afford the means of taking precautionary measures against an infective disease.

The limitation to this study included the inability to differentiate the participant with current acute infection and those with chronic infection. IgM serology and polymerase chain reaction were not carried out so those with occult HBV infection were also not identified. However, the validity of our findings is supported by the use of quality controlled ELISA kits with high specificity and sensitivity. This was a hospital based cross sectional study, thus generalizing the findings need to be done with caution.

Conclusion

The sero-prevalence of HBV among the youths in the study area was low when compared to the general population. However, their attitude and perceived beliefs about hepatitis B exposes them to continual risk of contracting the disease if no urgent intervention is deployed. While a secondary school certificate as the minimum educational level in mothers influenced the youths in assessing screening as beneficial, the higher educational level of the participants improved their knowledge of Hepatitis. While further studies are needed in the risk factor of HBV, the government needs to encourage female education at least to the level of secondary schools in Nigeria.

Conflict of interest

None

Author's contribution

ATA – Conceptualization, Original draft, Review, Editing, Data Curation, Formal Analysis, Fund acquisition, Investigation, Project Administration, Methodology, validation, visualization and supervision

AFO - Review of manuscript, Editing and reconstruction of the manuscript.

IAO - Editing, Fund acquisition, Investigation, Project Administration, validation, visualization and supervision

SOA - Review of manuscript, Editing and reconstruction of the manuscript.

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