

Risk Exposure to Hepatitis B Infection among Senior Secondary School Students in a Metropolitan City of North-central Nigeria

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Abstract

Background: Hepatitis B is the most prevalent chronic infectious liver disease worldwide with serious sequelae. Reduction of hepatitis B infection is a national public health priority. Despite international efforts to prevent the infection through global vaccination programs, new cases are still being reported throughout the world.

Objectives: This study aims to determine the risk exposure factors for hepatitis B infection among senior secondary school students in Ilorin East Local Government Area of Kwara state, Nigeria.

Methods: Multistage sampling technique was used to recruit 424 adolescents into the study. Pretested interviewer administered semi-structured questionnaires were used for the study. Data were analyzed using STATA version 10.1 software. A p-value of less than 0.05 was considered as statistically significant.

Results: The major risk exposure factors in the study population were contact with blood or body fluids (33.7%), family history of previous infection of HBV (30.4%) of the respondents; one sexual partner (16.5%), multiple sexual partners (15.3%) and ear or body piercing (14.9%). Majority (78.1%) of the respondents had low risk exposure, while 8.0% had medium risk exposure, only 59 (13.9%) of the respondents had high risk exposure for Hepatitis B virus infection. Significant relationships were found between risk exposure score and school type, gender, family history of the disease mothers' and fathers' educational background of the respondents ($p < 0.05$). **Conclusion:** Risk exposure was low among the respondents. There is a need for a community wide campaign on health risk awareness and perception of HBV. [*Ethiop. J. Health Dev.* 2016;30(2):96-102]

Keywords: Hepatitis B surface antigen (HBsAg), Hepatitis B virus (HBV), Risk Exposure.

Introduction

Hepatitis B virus is transmissible through several routes (1). Percutaneous-injection drug use, exposure to contaminated blood or body fluids, heterosexual or male homosexual activities; vertical transmission from mother to infant, horizontal transmission among children and household contacts, have been recognized as major risk factors associated with HBV transmission in Canada (2). Other risk factors for HBV infection include lack of awareness, socioeconomic conditions, sexual activities and sharing of razor blades, syringes and tattooing needles (3).

Blood borne diseases impose heavy burdens on national economies and individual families due to costs arising from acute and chronic morbidity and mortality (4). Reduction of hepatitis B infection is a national public health priority. Despite international efforts to prevent the infection through global vaccination programs, new cases are still being reported throughout the world.

Previous studies have demonstrated a high prevalence of the infection particularly among students. Ndako et al in a survey among secondary school students in another region from the North-central part of Nigeria reported the prevalence of Hepatitis B surface antigen among the respondents as 18.4% (5) while another study among

primary school pupils also from Northcentral Nigeria obtained a prevalence of 44.7%. Odusanya et al working in the South-west region of the country got a prevalence of 3.2% among medical students but also reported that up to 72% of their respondents were at risk of acquiring the Hepatitis B virus infection (6). Ugwuja et al from the Eastern part of the country reported a prevalence of 3.9% also among secondary school students (7).

A study explained that early exposure to social life and risk behaviours among males as well as early maturation among females may sometimes lead to increased self-consciousness resulting in increased sexual activities (8). Therefore, this needs serious consideration since early age of sexual activity increases the risk of HBV infection and could contribute to the spread of the virus (9). Success in the prevention of this disease with its fatal consequences depends to a large extent on the adolescents' level of knowledge and the risk factors that predisposes them to the infection at this age.

Vaccination and prevention of infection still remain the hallmark of activities to prevent transmission of the infection. However, adolescents are usually not targeted for vaccination programmes and coupled with their high risk behavior such as lack of awareness, increased unprotected sexual activities, sharing of razor blades for scarification (tribal markings) and circumcision/genital

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mutilation and tattooing. Thus, they are usually at high risk for Hepatitis B infection (10). Therefore, this study

the study. Those who did not need parental consent were asked to give a verbal consent. Consent in both cases was

Hepatitis B surface antigen (HBsAg), Hepatitis B virus (HBV), Risk Exposure

aimed at determining the risk exposures factors for HBV infection among

secondary school students in Ilorin North-central Nigeria.

Methods

The study area (Ilorin East) is one of the three Local Government Areas (LGA) in Ilorin, the state capital of Kwara, Nigeria. It consists of 12 wards with numerous communities. The LGA has an area of 486 km² and a population of 204,310 as at 2006. There are 40 senior secondary schools in the LGA; 24 public and 16 private which have the population of students at 10,122. Each school has fifteen arms of classes at the senior secondary levels.

A descriptive cross-sectional study design was employed for this survey. The sample size was determined using Fischer's formula and a prevalence of 18.4% from a previous study (5). This gave a minimum sample size of 231 to be recruited. However, to improve the power of the study, a total of 424 students were recruited using multistage sampling technique with the following stages. Simple random sampling technique by balloting was used to select 6 public and 4 private schools into the study. The total eligible student population of each school was obtained from the respective schools which were used to proportionally designate the number of questionnaires to be distributed in each of the 10 participating schools. 2 arms of classes were selected using simple random sampling by balloting to participate in the study at each of the schools making 20 arms of classes in all. Finally at the class level, systematic random sampling technique was used to select which student will participate in the survey using their class register as the sampling frame. If a student declines to participate in the study, the next student on the sampling frame was recruited. The final respondents were senior secondary school students irrespective of their age or social status. Students who were less than 18 years of age were asked to obtain parental consent to participate in

obtained after explaining the purpose and benefits of the study to the respondents. Personal identifiers were not included on the questionnaires to ensure confidentiality. Collection of data took place with the aid of semi-structured interviewer-administered and pretested questionnaires which are divided into two sections; Socio Demographic data of the respondents and a section on risk exposure factors. The study was carried out between June and August 2015.

The exposure to a risk factor was determined based on scores: An answer that indicates exposure to a risk factor was scored one, while an answer that indicates non exposure was scored zero. There are a total of 16 scores on exposure to risk factors and a score between 12 and 16 indicates a high risk, while a score between 6 and 11 indicates a medium risk and a score between 0 and 5 indicates a low risk.

The data was analysed using STATA version 10.1 software package. Statistical significance of $p < 0.05$ and confidence limit of 95% was used. Descriptive statistics such as median, frequency and percentages were used in the presentation of results. Bivariate analysis using cross tabulations to infer relationships between relevant variables were also carried out.

Results

The age range of respondents is 10-20years with mean age of 15.4 years. The age range 13-15years accounts for the majority of the respondents (52.4%), while majority of the respondents (52%) were males. Islam constitutes majority (50.9%) of the religion distribution of the respondents (Table 1).

Most (57.1%) of the respondents were from government/public owned schools, while 52.0% of respondents were from the science classes. Both parents of the respondents at 298 (70.3%) for fathers and 267 (63.0%) for mothers completed tertiary level education (Table 1). Majority of the respondents (89.2%) reported to have heard about hepatitis B of whom 38.1% reported to have heard from their parents/relatives.

Table 1: Socio demographic characteristics of respondents**Respondents variables (n=424) Frequency(424) Percent (100)**

Respondents variables	Frequency(424)	Percent (100)
Age		
12yrs below	9	2.1
13-15	222	52.4
16-18	184	43.4
19 yrs above	9	2.1
Sex		
Male	223	52.6
Female	201	47.4
Tribe		
Yoruba	329	77.6
Hausa	10	2.4
Igbo	16	3.8
Others		
Religion		
Islam	216	50.9
Christianity	205	48.3
Others	3	0.8
School type		
Government/Public	242	57.1
Private	182	42.9
Class type		
Arts	147	34.7
Commercial	54	12.7
Science	223	52.6
Class level		
SS1	91	21.5
SS2	153	36.1
SS3	180	42.5
Fathers Education		
Primary	7	1.7
Secondary	100	23.6
Tertiary	298	70.28
None	19	4.5
Mothers Education		
Primary	27	6.4
Secondary	111	26.2
Tertiary	267	63.0
None	19	4.5

A number of the respondents are exposed to the risk exposure factors for Hepatitis B: Less than one quarter (12.7%) of the respondents have had a sharp object prick in time past, another 12.0% reported to have used an unsterilized barbers shaving and hair dresser's instruments, while 16.5% have one sexual partner, another 15.3% have had a minimum of two sexual partners (Table 2). History of previous infection in the family however had 30.4% of respondents who reported to have the family history. A few number of respondents (7.8%) reported to have had an abortion, while 8.0% have scarification/tribal marks on their bodies. Few respondents (6.4%) reported to have injected themselves with hard drugs, while another 9.4% said they have had a sexually transmitted infection. A few (10.4%) also reported to have either had a dental surgery or removed a tooth. A total of 37.8% of respondents had had blood/body fluid contact with open wounds while 62.2% had never had such contacts (Table 2). In total, majority (78.1%) of the respondents had a low risk exposure, while 8.0% had a medium risk exposure, only 59 (13.9%) of the respondents had a high risk exposure for hepatitis B virus infection (Table 3).

The median risk exposure factor scores for age, tribe, religion, class and class type of respondents were not statistically significant ($p>0.05$) while gender, school type, mothers and fathers' educational background as well as family history of the disease were statistically significant when compared with the median risk exposure factor score ($p<0.05$) (Table 4).

Table 2: Risk Exposure for Hepatitis B among respondents

Hepatitis B surface antigen (HBsAg), Hepatitis B virus (HBV), Risk Exposure

Risk factors (n=424)	Yes	No
Needle prick or any other sharp object injury	54 (12.7%)	370 (87.30%)
Scarification marks/Tribal marks on any part of the body	34 (8.0%)	390 (92.00%)
History of blood transfusion	43 (10.1%)	381 (89.90%)
Tattoos on any part of the body	47 (11.1%)	377(88.90%)
History of surgery	45 (10.6%)	379 (89.40%)
History of pregnancy termination (abortion)	33 (7.8%)	391 (92.20%)
History of sexually transmitted disease/infection (STI/STDs)	40 (9.4%)	384 (90.60%)
History of unsterilized Barbers shaving instruments or Hair dresser's instruments usage	51 (12.0%)	373 (88.00%)
Injection of hard drugs	27 (6.4%)	397 (93.60%)
Male homosexuality	46 (10.8%)	378 (89.20%)
One (1) sexual partner	70 (16.5%)	354 (83.50%)
Two (2) or more sexual Partners	65 (15.3%)	359 (84.70%)
Ear or body piercing	63 (14.9%)	361 (85.10%)
Dental surgery or tooth removal	44 (10.4%)	380 (89.60%)
Household member with history of hepatitis B infection	129 (30.4%)	295 (69.60%)
Contact with blood or body fluids in the mouth, eyes, nose or any unprotected skin which had wounds or rashes in the past year(s)	143 (33.7%)	281 (66.3%)

Table 3: Score for risk exposure

Level of Risk Exposure (n=424)	Frequency	Percent
High (≥ 12)	53	12.5
Medium (6-11)	34	8.0
Low (≤ 5)	331	78.1
Total	424	100.0

Table 4: Comparison of Risk Exposure score with socio-demographic variables

Variables	N (%)	Median(IQR)	Test statistics	p-value	
Age					
12 yrs below	9 (2.1%)		1 (4)	0.595	0.8975
13-15yrs	222 (52.4%)		1 (3)		
16-18yrs	184 (43.4%)		1 (3)		
19 yrs above	9 (2.1%)		1 (1)		
Total	424				
Gender					
Male	223 (52.6%)		1 (3)	3.175 ^a	0.0015*
Female	201 (47.4%)		1 (2)		
Total	424				
Tribe					
Yoruba	329 (77.6%)		1 (3)	2.275	0.5174
Hausa	10 (2.4%)		1 (2)		
Igbo	16 (3.8%)		0.5 (2)		
Others	69 (16.2%)		1 (3)		
Total	424				
Religion					
Islam	216 (50.9%)		1 (2)	2.683	0.2615
Christianity	205 (48.3%)		1 (3)		
Others	3 (0.8%)		1 (2)		
Total	424				
Father's education					
Primary	7 (1.7%)		0 (8)	13.380	0.0039*
Secondary	100 (23.6%)		2 (3)		
Tertiary	298 (70.28%)		1 (2)		
None	19 (4.5%)		2 (2)		
Total	424				
Mother's education					
Primary	27 (6.4%)		1 (2)	8.125	0.0435*
Secondary	111 (26.2%)		1 (3)		
Tertiary	267 (63.0%)		1 (2)		
None	19 (4.5%)		2 (2)		
Total	424				
School type					
Public owned	242 (57.1%)		1 (3)	2.36	0.0179*
Private owned	182 (42.9%)		1 (2)	7 _a	
Total	424				
Class					
SS1	91 (21.5%)		1 (2)	1.518	0.4681
SS2	153 (36.1%)		1 (2)		
SS3	180 (42.5%)		1 (3)		
Total	424				

Class type						*Significant at p < 0.05
Arts	147 (34.7%)	1 (3)	4.526	0.1041	*Two-sample Mann-Whitney test reported to be more promiscuous than their female counterpart (11).	
Commercial	54 (12.7%)	1 (2)				
Science	223 (52.6%)	1 (2)				
Total	424					
Family history of HBV						
Yes	129 (30.4%)	3 (2)	10.7	0.0000*	From this study, it was shown that attending a public school confers a	
No	295 (69.6%)	3 (0)	50a			
Total	424					

Discussion

In this study, the major risk exposures for HBV infection were found to be contact with blood or body fluids, family history of previous infection with HBV, sexual exposure and body piercing activities including circumcision. This is in consonance with factors reported by other authors from other parts of the country. For example, Ndako et al reported risk factors for HBV infection among their respondents as sharing of sharp objects, blood transfusion and sexual exposure (5) while Ugwuja et al reported factors such as unsafe injection, tribal marks/circumcision/scarification and blood/blood products transfusions as the major risk factors for HBV infection among their respondents (7).

It is noteworthy that almost all the studies reported sexual contact as a risky exposure factor for contacting HBV infection. This is particularly important because of the population under study. Adolescents are known to have risky sexual exposure patterns and are hence prone to contacting HBV infection (9,11). Ndako et al went further to report that the presence of a STI further increases the risk for Hepatitis B infection in their respondents. Though STIs was not a major risk exposure factor in our study, it however accounted for about 9% of the exposure factors identified and coupled with the

higher risk exposure than is the case for those attending private schools. This suggests that students from lower socio-economic homes who often attend public schools have a higher risk exposure level for HBV infection than their private school counterparts who usually are from high socio economic homes. This is supported by findings from a study in Abidjan where there was a significant association between school type and risk for hepatitis B virus infection (16). Mothers' educational background was also found to be a significant risk exposure factor in this study with mothers who had no education at all, having the highest risk exposure level. This finding is however not surprising as an educated mother/woman is expected to be more involved in the care of her family and the children. The implication of this is that mothers are the bedrock of the health of their children and the education of a girl child who grows up to become a mother is paramount. This is confirmed by the fact that about a third of the respondents who have heard of hepatitis B virus in this study reported to have actually heard it from their parents and relatives. The significant association found between family history of the disease and risk exposure was not surprising because 30.4% of respondents in the present study have had a household member with the disease. Eke et al in their study also found that history of contact with previously

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fact that having multiple sexual partners was also predominant in this study, it should

be a cause for concern as a major risk exposure factor for HBV infection. About 14% of the respondents in this study were found to have a high risk exposure for contracting hepatitis B virus infection. This finding supports the claim that Nigeria is a holo-endemic area for hepatitis B virus infection, with asymptomatic carrier rate of about 15-37% (12).

Risk exposure was higher among males when compared to females from this study. This result is in tandem with a prevalence survey carried out in Bahrain where prevalence of hepatitis B surface antigen was significantly higher in males (13). This is also supported by another study in Anhui Province of China where being a male alone is a risk factor for HBV infection (14). A study in Northern Nigeria also corroborates this finding (5). Our finding is also in congruence with the result of a study in Karachi (15) These findings may probably be due to the fact that males are generally

infected HBV patients was a strong predictor for HBV infection (17).

There are some limitations to our study. Firstly, the study only measured the risk exposure of the respondents and could not evaluate the actual risk factors for HBV infection. It would have been more informative to carry out a laboratory testing of the respondents to know the prevalence level of HBV surface antigen among them and hence to also determine the risk factors for acquiring the infection among those who would have tested positive. Secondly, only senior secondary school

students were used in this study. However, it is known that HBV infection can affect all age groups and class levels. Hence, the risk exposure levels obtained may have been under estimated. The strength of our study however is in the fact that such a study had not been done among secondary school students in the study area and it was done in an area where the cultural practices of the populace constitute a high risk exposure for HBV infection.

The results of this study highlighted major risk exposure for hepatitis B virus infection in the study population as contact with blood or body fluids, family history of previous infection of HBV, sexual exposure and ear or body piercing. The overall risk exposure level for HBV infection was however low. The major factors found to be influencing the exposure factors are family history of the infection, school type of respondents, gender, family history of the infection, mothers' educational background as well as fathers' educational background. Prevention is the only safeguard against spread of viral hepatitis infection through avoiding the practices that increase the risk of exposure to infection. Therefore, including health education on viral diseases into

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Authorship:

	Concept & Design	Data Analysis	Interpretation of Data	Drafting the article or revising it critically for important intellectual content	Final approval of the version to be published.
ASA	X		X		X
AD	X	X	X	X	X
AHA		X	X		X
OSK		X	X		X
A-MB			X	X	X
OGK			X	X	X

students' academic curriculum and policy on compulsory HBV vaccination in secondary schools is hereby advocated.

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References

- World Health Organisation. Hepatitis B [Internet]. [cited 2016 Dec 31]. Available from: <http://www.who.int/mediacentre/factsheets/fs204/en/>
- Zou S, Zhang J, Tepper M, Giulivi A, Baptiste B, Predy G, et al. Enhanced surveillance of acute hepatitis B and C in four health regions in Canada, 1998 to 1999. *Can J Infect Dis.* 2001;12(6):357–63.
- Khan F, Akbar H, Idrees M, Khan H, Shahzad K, Kayani MA. The prevalence of HBV infection in the cohort of IDPs of war against terrorism in Malakand Division of Northern Pakistan. *BMC Infect Dis.* 2011 Jun 20;11:176.
- Shalaby S, Kabbash IA, El Saleet G, Mansour N, Omar A, El Nawawy A. Hepatitis B and C viral infection: prevalence, knowledge, attitude and practice among barbers and clients in Gharbia governorate, Egypt. *East Mediterr Health J Rev Santé Méditerranée Orient Al-Majallah Al-Sihhiyah Li-Sharq Al-Mutawassit.* 2010;16(1):10–7.
- Ndako JA, Nwankiti OO, Echeonwu GON, Junaid SA, Anaele O, Anthony TJ. Studies on Prevalence and Risk Factors for Hepatitis B Surface Antigen among Secondary School Students in Northcentral, Nigeria. *Sierra Leone J Biomed Res.* 2011;3(3):163–8.
- Odusanya OO, Meurice FP, Hoet B. Nigerian medical students are at risk for hepatitis B infection. *Trans R Soc Trop Med Hyg.* 2007;101(5):465–8.
- Ugwu E, Ugwu N. Seroprevalence of Hepatitis B Surface Antigen and Liver Function Tests among Adolescents in Abakaliki, South eastern Nigeria. *Internet J Trop Med [Internet].* 2008;6(1). Available from: <http://www.ispub.com>
- Susman E, Dorn L, Schiefelbein V. Puberty, Sexuality and Health. In: *Comprehensive Handbook of Psychology.*
- Vázquez-Martínez JL, Coreño-Juárez MO, Montaña-Estrada LF, Atlan M, Gómez-Dantés H. Seroprevalence of hepatitis B in pregnant women in Mexico. *Salud Pública México.*

- 2003;45(3):165–70.
10. Olokoba A, Aderibigbe S, Kayode O. A Community Survey of Practices Related to Risk Factors for Liver Diseases among Adults in Ilorin Metropolis. *Am J Sci Ind Res*. 2010;1(2):118 – 121.
 11. Uneke CJ, Ogbu O, Inyama PU, Anyanwu GI, Njoku MO, Idoko JH. Prevalence of hepatitis-B surface antigen among blood donors and human immunodeficiency virus-infected patients in Jos, Nigeria. *Mem Inst Oswaldo Cruz*. 2005;100(1):13–6.
 12. Bojuwoye BJ. The burden of viral hepatitis in Africa. *West Afr J Med*. 1997;16(4):198–203.
 13. Janahi EM. Prevalence and risk factors of hepatitis B virus infection in Bahrain, 2000 through 2010. *PloS One*. 2014;9(2):e87599.
 14. Li X, Zheng Y, Liao A, Cai B, Ye D, Huang F, et al. Hepatitis B virus infections and risk factors among the general population in Anhui Province, China: an epidemiological study. *BMC Public Health*. 2012;12:272.
 15. Mustufa MA, Memon AA, Nasim S, Shahid A, Omar SM. Exposure to risk factors for hepatitis B and C viruses among primary school teachers in Karachi. *J Infect Dev Ctries*. 2010;4(10):616–20.
 16. Lohouès-Kouacou M-J, Assi C, Simen-Kapeu A, Badje AD, Koné S, Ouattara A, et al. Prevalence of HBV Sero-markers in two Different Socioeconomic Groups of Schoolchildren from Abidjan, Côte d' Ivoire. *J Gastroenterol Hepatol Res [Internet]*. 2013 Sep 21 [cited 2016 Mar 3];2(9). Available from: <http://www.ghrnet.org/index.php/joghr/article/view/486>.
 17. Eke AC, Eke UA, Okafor CI, Ezebialu IU, Ogbuagu C. Prevalence, correlates and pattern of hepatitis B surface antigen in a low resource setting. *Virol J*. 2011;8:12.