

Knowledge of hepatitis B virus infection and vaccination status among college of medicine students in Enugu State, south-east, Nigeria

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Background: College of Medicine students are at high risk of contracting hepatitis B since they come in contact with infected patients during their training program and are expected to have proper knowledge of the hepatitis B virus infection and know their vaccination status.

The aim of the work: To determine the level of knowledge of hepatitis B virus and the vaccination status among college of medicine students in Enugu State, South-East Nigeria.

Methods: A school-based descriptive cross-sectional study was carried out among college of medicine students at ESUT College of Medicine, Enugu State. A pretested self-administered questionnaire was used to collect information from 437 students. Data analysis was carried out using the Statistical Package for Social Sciences version (SPSS) 22 and a p-value of 0.05 was used to determine statistical significance.

Results: The mean age of the respondents was 22.3 ± 3.7 years and the majority were single (91.1%) and female (54.7%). A high proportion (68.2%) of the students had a good knowledge of HBV while a minority (20.0%) were aware of their vaccination status. Lack of vaccination programs for students (36.6%) and poor awareness of HBV vaccine for adults (32.5%) were the commoner reasons for non-vaccination. While final year students, (95% CI=1.73-28.92), respondents who consume herbal concoctions (95% CI= 0.98-2.96) and those who were at least 30 years old (95% CI=0.32-5.16) were 7.1, 1.7 and 1.3 times respectively more likely to have good knowledge of HBV disease, females (95% CI=0.30-0.83) and respondents who consumed alcohol (95% CI= 0.32-0.89) were about twice less likely to have poor knowledge of HBV than males and non-alcohol consumers.

Conclusion: Although most of the students had a good knowledge of HBV infection their vaccination status was low indicating the need for government to make a policy that would mandate that all college of medicine students should get vaccinated as part of the admission process.

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Key words: Vaccination status, Enugu state, students, HBV, Knowledge.

Contributions: OC and CO conceptualized, collected data and carried out the analysis for this work. IN, AM and TA drafted the proposal and discussion. OC, CO, IN, AM, and TA all reviewed the work and made final corrections.

Conflict of interest: The authors declare no conflict of interest.

Funding: None.

Acknowledgements: We sincerely appreciate everyone who has in one way or the other contributed immensely to the success of this study especially the students who participated, the administrative officers of both the ESUTH-P and that of ESUCOM, you will be blessed beyond measure.

Availability of data and material: This data is available with the corresponding author and will be provided on due request.

Ethics approval and consent to participate: Ethics approval was obtained from the Health Research and Ethics Committee of Enugu State University Teaching Hospital. Permission was obtained from the school authority. Written informed consents were obtained from the participants. Participation was voluntary and confidentiality was maintained.

Consent for publication: The study participants gave the necessary consent for this work to be carried out.

Received for publication: 11 June 2020.

Revision received: 1 August 2020.

Accepted for publication: 18 September 2020.

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Annals of Clinical and Biomedical Research 2020; 1:90

doi:10.4081/acbr.2020.90

Introduction

Hepatitis B infection (HBV) is the most life-threatening cause of liver disease in the world and ranked 15th among all causes of human mortality.¹ The major mode of transmission is through contact with blood or other body fluids of an infectious person.² Other modes of transmission include from infected mother to fetus, through the use of contaminated needles, syringes, razors, toothbrushes, drug-injection equipment from an infected person, exposure to blood and needle sticks or other sharp instruments from an infected person.² It is a well-known fact that HBV infection is 50 to 100 times more infectious than human immunodeficiency virus.³ Globally, more than 2 billion people are infected with HBV infection, out of which 350 million of them are already chronically infected and will become chronic carriers.⁴ Among these chronic carriers, a quarter of them will later die from complications of HBV infection while others may clear the infection after varying intervals.⁴ Furthermore, 4.5 million new HBV infections occur each year worldwide, of which a quarter of them progress to liver disease.⁵ HBV is responsible for about 44% of liver cirrhosis and

47% of hepatocellular carcinoma.⁶ Africa constituting about 12% of the world's population carries approximately 18% of the global burden of HBV infection with hepatocellular cancer and cirrhosis accounting for 2% of the continent's annual deaths.⁷ According to the World Health Organization, HBV infection affects greater than 5% of the local population in sub-Saharan Africa, with greater than 8% in West Africa and reaching up to 15% in some areas.⁸ The 2019 report of the Nigeria HIV/AIDS indicator and Impact Survey (NAIIS) revealed that the prevalence of HBV in Nigeria was 8.1%.⁹ A lower prevalence rate of 3.2% was reported in a study carried out among medical students of the Lagos State University, Nigeria.¹⁰

Medical students due to their lack of experience, limited professional skills, poor knowledge and non-adherence to universal infection control procedures, their chances of contracting infection during invasive medical procedures increases.¹¹⁻¹³

HBV infection can be prevented by adhering to the universal precautions however, post-exposure prophylaxis can be used as a means of HBV prevention after accidental exposure to contaminated blood or fluids.¹⁴⁻¹⁵ The Advisory Committee on Immunization Practices (ACIP) recommends hepatitis B vaccine for everyone above 18 years of age and below, as well as adults above 18 years of age who are at risk of HBV infection.¹⁶ Currently in Nigeria efforts aimed at controlling HBV infection remain poor and there are no policies at both National and Institutional levels on vaccination of high risk groups like healthcare workers and medical students.¹⁷

A safe and effective vaccine against hepatitis B has been available for over 20 years in Nigeria, effective in preventing HBV infection and its serious complications.¹⁸ The vaccination gives long term protection from HBV infection and possibly a lifelong immunity.¹⁹ HBV vaccine was the 1st anti-cancer medicine produced and this HBV vaccine was introduced in Nigeria in 2004 as part of the National Programme on Immunization (NPI).^{20,21} In June 2012, the pentavalent vaccine was introduced with hepatitis B vaccine as one of its five components.²² It is imperative that intending Healthcare Workers (HCWs) should have adequate and appropriate knowledge of HBV infection as well as the safety precautions to help minimize contracting the infections. The practice of observing standard precautions like hand hygiene and uptake of effective and safe vaccination for HBV could potentially save the lives of these students and prevent the spread of infections.²³ This research is aimed at ascertaining the knowledge of hepatitis B and vaccination status among college of medicine students in Enugu State, South-east Nigeria and to get a baseline assessment upon which further researches can leverage upon and possibly a national policy can be developed for the implementation of vaccination among college of medicine students.

Methodology

Study area

The study area is the Enugu State University College of Medicine (ESUCOM). The College of Medicine, Enugu State University of Science and Technology was established at Enugu in 2004 following extensive infrastructure and manpower development.²⁴ This College was accredited fully in 2010. The Faculty of medicine as at 2017 was made up of medicine and surgery, anatomy and medical laboratory sciences.²⁴

Study design and subjects

This was a descriptive cross-sectional study involving students of ESUCOM. These students are clinical students in medicine and surgery from classes II, III, IV, V and VI, anatomy students from

classes II-IV and medical laboratory students from classes II-V. Students in year one of these departments are considered pre-clinical students. All students who were not willing to participate in the study were excluded from the study. The minimum sample size for the study was determined from a similar study carried out in Borno, Nigeria using the Fisher's statistical formula.^{25,26} The study participants were stratified according to their respective years of study. The sample size was proportionally allocated according to the different study levels of the clinical students based on their population. The total number of students in all the colleges of medicine in July 2017 was 1600 and this was used as the sampling frame for the study. About 31% of the student population were sampled. Systematic sampling technique was used to select the study participants. A total of 500 questionnaires were administered, from which 475 were returned and only 437 were completely filled giving a response rate of 87.4%. The questionnaires were distributed in their classes during free lecture periods.

Data collection and analysis

Information was collected over a 2 weeks duration using a pre-tested self-administered questionnaire. Though Igbo language is the predominant language of the people in this region, the instruments were provided in English as the English language is the medium of instruction in all institutions of learning in Nigeria. The questionnaire was organized into sections three; socio-demographics, knowledge on HBV and vaccination status. Knowledge of HBV infection was assessed using questions, which include basic knowledge of HBV, mode of transmission, common complications, population at risk, and standard preventive precautions. A score of one was given for every correct answer, and a zero score was given to a false or missing answer. The knowledge level of HBV was then graded into good and poor knowledge using the 50th percentile (median) as the cut off. Participants who scored 50% and above were classified as having good knowledge and those who had less than 50% were said to have poor knowledge. The self-administered questionnaires were distributed by trained community medicine resident doctors and collected immediately.

Data entry and analysis

This was done using Statistical Package for Social Sciences (SPSS) version 22 software. A test of association was carried out. The level of significance was set at a p value of less than 0.05. Variables with a cut-off p value of 0.2 on bivariate analysis were included in multivariate analysis and a binary logistic regression was carried out with six variables namely: age, gender, departments, year of study, alcohol and traditional medicine intake. Results were presented as frequencies, percentages, odds ratio and 95% confidence intervals as appropriate.

Ethics approval

This was obtained from the Health Research and Ethics Committee of Enugu State University Teaching Hospital. Permission was obtained from the school authority. Written informed consents, giving a detailed account of the study objectives, were obtained from the participants. Participation was voluntary and confidentiality was maintained by requesting the participants not to write their names nor school matriculation numbers on the questionnaires.

Results

Table 1 shows the sociodemographic characteristics of the participants. The mean age of the respondents was 22.3±3.7 years. The majority were females (54.7%), single (91.1%) and were undergraduates of the department of medicine and surgery (50.1%). While about a third of the participants (38.0%) consumed alcoholic beverages, a lower proportion took (21.7%) traditional medicines.

Table 2 shows that the majority (66.8%) of the respondents knew that HBV was not curable. Blood transfusion (88.3%) was the commonest identified route of transmission. Majority of respondents identified sex workers (81.7%) and healthcare workers (72.8%) as the population with the greatest risk of disease transmission. A high proportion of the participants identified injection safety (80.1%) as the most commonly known standard precaution measure against HBV.

Figure 1 reveals that when knowledge of HBV was computed and graded a majority (68.2%) of the participants had a good knowledge of HBV.

Table 3 shows the factors that affect knowledge of HBV among the participants. Older participants above 30 years of age were about 1.2 times more likely to have a better knowledge of HBV infection when compared with other age groups (AOR=1.2, 95% CI = 0.315-5.155). Participants in the 600 level were about 7 times more likely to have better knowledge than other levels of students (AOR=7.062, 95% CI =1.725-28.917), while those who take traditional medicine were 1.7 times more likely to have better knowledge of HBV infection than those who do not take traditional medicine (AOR=1.704, 95% CI=0.982-2.957). These results were all found to be statistically significant at bivariate analysis.

Figure 2 reveals that only 20.1% of the students were aware of their vaccination status (in adulthood).

Table 4 reveals that slightly more than a third of the respondents 160 (36.6%) attributed that lack of vaccination program for students was the main reason for not being vaccinated while the lowest proportion (3.2%) reported that participants did not perceive any risk to them.

Discussion

In this study, 68.2% of the students had a good knowledge of HBV infection. Our finding was in concordance with a study done

among HCWs in Sokoto, North West Region of Nigeria, which showed that majority (78.2%) of the respondents had good knowledge of hepatitis B infection.²⁷ This report is similar to findings from two other studies carried out in India among medical students where the level of knowledge of HBV infection was 72% and 79.1% respectively but in contrast to another study done in Erbil,

Table 1. Sociodemographic of the respondents.

Variable	Frequency N=437	Percentage (%)
Age of respondents (years)		
Mean ±(SD)	22.3 ± 3.7	
Age in groups		
<20 years	76	17.4
20 – 24 years	272	62.2
25 – 29 years	68	15.6
≥30 years	21	4.8
Gender		
Male	198	45.3
Female	239	54.7
Marital status		
Single	398	91.1
Married	39	8.9
Department		
Anatomy	117	26.8
Medical laboratory sciences	101	23.1
Medicine and surgery	219	50.1
Religion		
Christian	420	96.1
Moslem	12	2.7
Traditional religion	5	1.1
Year of Study		
200L	174	39.8
300L	57	13.0
400L	64	14.6
500L	115	26.3
600L	27	6.2
Tribe		
Igbo	403	92.2
Others	34	7.8
Do you take alcohol	166	38.0
Do you smoke	26	5.9
Do you take traditional medicine	95	21.7

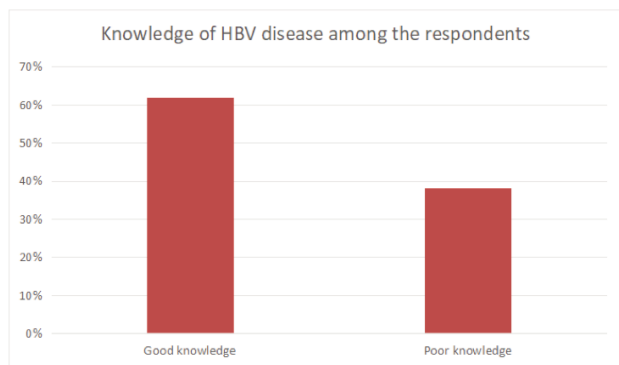


Figure 1. Knowledge of HBV disease among the respondents.

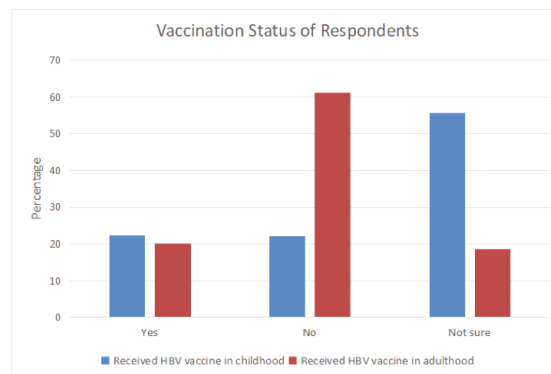


Figure 2. Vaccination status of undergraduate college of medicine students.

Iraq where only 14% of the students had good knowledge about HBV infection.^{23,28,29} The low level of knowledge among the Iraq students could be as a result of the high proportion of the students who were still in the preclinical classes with limited exposure to clinical practice.²³ Our study participants also had a good knowledge of the main routes of HBV transmission which includes blood transfusion (88.3%) and vertical transmission (77.8%). A similar study done in Ahmadabad, Western India among medical students supports our findings, which reported that about 87% agreed that HBV can be transmitted via blood and 78% from mother to child.³⁰

In this study, over 70% of the participants recognized that hepatitis B infection affects the liver, while less than 59% agreed that it was more infectious than HIV. Similar studies done at Rajasthan, India showed that 99.2% of the medical students revealed that HBV targets the liver while another study done among medical students at Aljuf University, Saudi Arabia, showed 51.7% were aware that HBV was more infectious than HIV.^{31,32} The excellent level of knowledge about the basic information regarding HBV infection in the different countries may be attributed to the adequate coverage of topic in the undergraduate curriculum. However, the finding that the students were not aware that HBV infection was more infectious than HIV is a worrisome development, which requires updating of the curriculum to include more comprehensive training of the students or exposing the students to other practical avenues of learning including attending medical conferences.³³

The result of this study revealed that only 20.1% of the students were aware of their vaccination status. This finding is similar to a study carried out among HCWs in Enugu, South-East Region of Nigeria, which reported a low (28.5%) vaccination status rate.³⁴ Likewise, another study done in Jos, Nigeria reported a poor (22.4%) vaccination status rate among the medical students.³⁵ In contrast, a study carried out among HCWs in Edo, in the South-South Region of Nigeria revealed a high (70.2%) vaccination rate. The disparity in vaccination rate among HCWs and college of medicine students could be due to the fact that the HCWs were now acutely aware of the inherent risk and complications associated with lack of HBV vaccination.³⁶ Findings from studies done outside Nigeria include Pakistan and Iraq were 42.2% and 45% of which all the clinical students were vaccinated.^{23,37} However our result is dissimilar to findings from studies carried out in developed countries where over 95% and 86% of all Australian and German medical and dental students were documented to have known and reported their vaccination status.^{38,39} This disparity in findings seen may be due to the fact that the 3 doses of vaccine required for protection have to be procured at a high cost and without subsidization by Nigerian students unlike in developed countries.³⁵

HBV vaccine is one of those vaccines that is safe and effective for use from birth. Currently, it is given in Nigeria as part of the pentavalent vaccine given to babies at 6, 10 and 14 weeks. Children can receive another booster dose at 6 years of age. Generally, HCWs and college of medicine students are encouraged to receive 3 doses of HBV vaccine at 0, 4 and 24 weeks to produce the required immunity to prevent infection and its transmission. In this study, 87.9% of the students concurred that vaccines can be used to prevent HBV infection. This finding is similar to studies carried out in two different cities in India, Rajasthan and Kochi where 93% and 98.6% of the students agreed that the vaccine can be protective against contracting HBV infection.²⁹⁻³¹

This study reveals that the participants agree that the main reasons for low vaccination was lack of vaccination programmes and poor awareness of HBV vaccine among the students. This finding

is consistent with reports from a similar study carried out at Nishtar, Pakistan among medical students where majority attributed reasons for non-vaccination as casual behavior of students (36.0%) and lack of knowledge about consequences of non or incomplete vaccination (15.5%).⁴⁰ Another study carried out among medical students in another city (Mirpurkhas) in Pakistan reported that the major reasons for non-vaccination were due to lack of motivation (29.2%) and their lack of belief in vaccination (24.8%). The similarity in these countries maybe as a result of the government policies that do not support mandatory vaccination.

In our study, the predictors of good HBV knowledge include participants in the older age group (>30yrs), 600 level year students and those that took traditional medicine. A similar study done in Nadu and Delhi, India showed that good knowledge score was significantly higher among students aged >20yrs and students in the clinical years.^{28,30} This finding is consistent with another study carried out in Ebril, Iraq which revealed that good knowledge was significantly higher among the older students (≥ 23 yrs) and those in the clinical classes ($p= 0.001$).²³ Yet another study done in Pakistan indicated also that students >21yrs of age showed signif-

Table 2. Correct knowledge of hepatitis B virus disease.

Variables	Frequency (n=437)	
	Yes	No
Hepatitis affects the liver	422 (96.6)	15 (3.4)
HBV is curable	145 (33.2)	292 (66.8)
HBV transmission is preventable	395 (90.4)	42 (9.6)
HBV is more infectious than HIV	183 (41.9)	254 (58.1)
HBV infected persons can be easily identified	71 (16.2)	366 (83.8)
Is vaccination available for HBV disease	384 (87.9)	53 (12.1)
HBV can be transmitted from:		
Mother to child	340 (77.8)	97 (22.2)
Insect bite	30 (6.9)	407 (93.1)
Blood transfusion	386 (88.3)	51 (11.7)
Inhalation/air	79 (18.1)	358 (81.9)
Sharing toothbrush	151 (34.6)	286 (65.4)
Unprotected sex	113 (25.9)	324 (74.1)
Using sharps of barbers	276 (63.2)	161 (36.8)
Unsterilized syringes	335 (76.7)	102 (23.3)
Shaking hands with infected persons	28 (6.4)	409 (93.6)
Eating contaminated food	52 (11.9)	385 (88.1)
Sharing toilets	57 (13.0)	380 (87.0)
Common complications of HBV include:		
Infertility	88 (20.1)	349 (79.9)
Cirrhosis	322 (73.7)	115 (26.3)
hepatocellular carcinoma	317 (72.5)	120 (27.5)
Hypertension	140 (32.0)	297 (68.0)
Population at greatest risk of infection:		
Traders	45 (10.3)	392 (89.7)
Sex workers	357 (81.7)	80 (18.3)
Healthcare workers	318 (72.8)	119 (27.2)
Long distance drivers	147 (33.6)	290 (66.4)
Food vendors	41 (9.4)	396 (90.6)
Military/paramilitary	145 (33.2)	292 (66.8)
Standard precautions include:		
Hand hygiene	171 (39.1)	266 (60.9)
Use of gloves	288 (65.9)	149 (34.1)
Use of face mask	71 (16.2)	366 (83.8)
Use of gowns	117 (26.8)	320 (73.2)
Prevention of sharps	350 (80.1)	87 (19.9)
Cough etiquette	104 (23.8)	333 (76.2)
Vaccination	355 (81.2)	82 (18.8)
Proper waste disposal	169 (38.7)	268 (61.3)

Table 3. Factors affecting HBV knowledge among respondents.

Variables	Knowledge of HBV among students (N = 437)		P value	AOR (95% CI) on multivariate analysis
	Poor knowledge N (%)	Good knowledge N (%)		
Age in groups				
<20 years	39 (51.3)	37 (48.7)	<0.001	1
20 – 24 years	84 (30.9)	188 (69.1)		0.668 (0.185-2.419)
25 – 29 years	10 (14.7)	58 (85.3)		0.839 (0.249-2.822)
≥30 years	6 (28.6)	15 (71.4)		1.274 (0.315-5.155)
Gender				
Male	71 (35.9)	127 (64.1)	0.098	1
Female	68 (28.5)	171 (71.5)		0.500 (0.300-0.833)
Marital status				
Single	126 (31.7)	272 (68.3)	0.830	NA
Married	13 (33.3)	26 (66.7)		
Department				
Anatomy	69 (59.0)	48 (41.0)	<0.001	1
Medical laboratory sciences	42 (41.6)	59 (58.4)		0.199 (0.103-0.383)
Medicine and surgery	28 (12.8)	191 (87.2)		0.515 (0.262-1.015)
Religion				
Christian	133 (31.7)	287 (68.3)	0.918	NA
Moslem	4 (33.3)	8 (66.7)		
Traditional religion	2 (40.0)	3 (60.0)		
Year of study				
200L	91 (52.3)	83 (47.7)	<0.001	1
300L	21 (36.8)	36 (63.2)		0.741 (0.304-1.805)
400L	11 (17.2)	53 (82.8)		1.233 (0.445-3.416)
500L	4 (3.5)	111 (96.5)		2.194 (0.705-6.824)
600L	12 (44.4)	15 (55.6)		7.062 (1.725-28.917)
Tribe				
Igbo	127 (31.5)	276 (68.5)	0.649	NA
Others	12 (35.3)	22 (64.7)		
Do you take alcohol				
No	95 (35.1)	176 (64.9)	0.063	1
Yes	44 (26.5)	122 (73.5)		0.531 (0.316-0.894)
Do you smoke				
No	131 (31.9)	280 (68.1)	0.907	NA
Yes	8 (30.8)	18 (69.2)		
Do you take traditional medicine				
No	92 (26.9)	250 (73.1)	<0.001	1
Yes	47 (49.5)	48 (50.5)		1.704 (0.982-2.957)

Table 4. Reasons given by the respondents for HBV non-vaccination.

Variable	Frequency (n=437)	Percentage (%)
Reasons for non-vaccination		
Vaccine not readily available	88	20.1
Lack of vaccination program for students	160	36.6
Not aware of HBV vaccine for adults	142	32.5
High cost of vaccination	98	22.4
Students not at risk of infection	14	3.2
No need for the vaccine	20	4.6

icantly better knowledge than the younger students ($P=0.001$).⁴⁰ The older students are more knowledgeable about HBV infection because as they advance in their years of study, the more likely these students may have encountered a client who had the infection or through other areas like in seminars, conferences and journal clubs.⁴¹ Although this study reported that people who took traditional medicine were 1.7 times more likely to have good knowledge than people who did not, we could not find any supportive literature that supported this result.

Conclusions

In our study, we found that the HBV knowledge of medical students was good but their vaccination status was poor. Although HBV vaccination is included in the National Immunization Program for children in Nigeria, more efforts should be made by government to develop and implement policies that will guarantee that all healthcare workers, including medical students, will compulsorily receive vaccination on entry into their medical program in order to protect themselves and others from the infection. In addition, awareness programs and campaigns can be routinely conducted by pharmaceutical companies in health institutions to help increase overall awareness and prevention of the disease. We also propose that more research may be conducted to establish if there is a true relationship between traditional medicine usage and knowledge of HBV infection.

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