Original Article

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Pathology Section

Knowledge and Practice of Hepatitis B and C Prevention among Seropositive and Seronegative Prospective Blood Donors in a Tertiary Care Hospital in Eastern Nigeria

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ABSTRACT

Introduction: Hepatitis B and C infections are endemic in Nigeria and the major causes of chronic liver diseases, including hepatocellular carcinoma. One of the major routes of transmission is by transfusion of infected blood or blood products. Awareness of the disease is important, and this study seeks to compare the knowledge and practice of the disease among the seropositive and seronegative prospective blood donors.

Aim: To assess the difference in the level of knowledge and preventive practice of blood borne hepatitis among hepatitis B and hepatitis C seropositive and seronegative prospective blood donors.

Materials and Methods: The present study was a descriptive survey carried out between June 2019 to January 2020 in the Blood Donor's Department of the University of Nigeria Teaching Hospital, Enugu, Nigeria. A pretested self/interviewer's administered questionnaire was used to assess the knowledge and practice among 100 hepatitis B and hepatitis C seropositive and 305 seronegative prospective blood donors. The hepatitis B and C seropositive subjects were screened using Enzyme Immunosorbent Assay (ELISA) technique. The findings and scores were analysed using IBM Corporation 2019 Statistical Package for the Social Sciences (SPSS) software version 21.0.

Results: Total of 305 respondents were seronegative while 82 and 18 were hepatitis B and C seropositive, respectively. The mean age of the study participants was 27.78±7.17 years, whereas it was 28.09±6.36 years and 27.46±7.968 years among seropositive and seronegative respondents, respectively. In the study, 98 (98%) males and 2 (2%) females were in the seropositive group while, 268 (87.9%) males and 37 (12.1%) females were in seronegative group. The overall knowledge score and practice score were 56.3% and 28.1%, respectively. In the seropositive group, the average knowledge score was 27.3% and the average practice score was 17%. While in the seronegative group, the average knowledge score was 65.7% and the average score on practice score was 31.8%. There was a significant association between seropositive and being a male (p-value=0.001), less educated (p-value=0.002), currently unmarried (p-value=0.029), knowledge above average (p-value=0.001), and practice below average (p=0.002). None of the respondents had hepatitis B vaccination.

Conclusion: Based on the results obtained from the present study, it is evident that the level of knowledge and practice among the seropositive respondent is significantly low when compared with the seronegative groups. There is a need for a serious awareness campaign on the transmission and prevention of hepatitis B and C, and the possibility of extending hepatitis B immunisation coverage in the country owing to the increasing burden of the disease.

Keywords: Chronic liver disease, Hepatitis B vaccine, Hepatitis viral screening, Hepatitis viruses, Immunisation coverage, Transfusion transmissible infection

INTRODUCTION

Over 300 million people are living with chronic hepatitis B and C disease with new cases emerging at a rapid rate [1,2]. The burden in Africa is alarming, with nearly 6% of the population infected with hepatitis B alone while hepatitis C infection prevalence is under-reported in the region [2].

Hepatitis B and C belong to different viral families but have similar modes of transmission and clinical course [3]. They are transmitted by the exchange of body fluids such as blood products, semen, and vaginal fluid. This may occur due to transfusion of unscreened blood, unsafe sexual intercourse, sharing of sharps especially among drug users. Hepatitis B and C infection can progress to chronic liver disease, cirrhosis and hepatocellular carcinoma [4-6]. For instance, a study done in Enugu by Nwokediuko SC et al., shows that almost all the patients who presented with the chronic form of the disease die because of late presentation and lack of facility for transplant [7-9]. With proper awareness, education and practice hepatitis can be prevented. World Health Organisation (WHO) has highlighted in their target to scale up a campaign to ensure the diagnosis of over 90% of people living with the disease through screening programs and reduction of new cases by 2030 [10]. Preventive measures such as safe sexual contacts, prevention of mother to child transmission and proper screening of blood donors are essential. This can be achieved through wide coverage sensitisation about the disease, screening and vaccination in case of Hepatitis B Virus (HBV) [10].

The seroprevalence of hepatitis B among blood donors has been extensively studied in Nigeria, which was between 23-27% in most facilities [11-13]. Compared to hepatitis B, hepatitis C has low prevalence (9%) reported in most studies, but was increasing these days [14-16]. This endemic picture has led to pockets of reported incidents of hepatitis B and C virus transmission following blood transfusion in Nigeria [5,17]. Although, significant efforts have been made to reduce the chances by use of sensitive detection methods. These methods are only available in the tertiary hospitals, while most

of the hospital especially those residing in the rural areas continue to rely on a low sensitive rapid test (or even outright unscreened blood) for their emergency blood services [18]. This problem is compounded with the fact that the prevalence of voluntary donors with a proven low burden of transmissible diseases has continued to remain low in the country [19].

Although many studies have been done on different populations, data is lacking in the knowledge of viral hepatitis among blood donors in Nigeria. For instance, a study done among market women shows that less than half of the people knew anything about Hepatitis B and have poor preventive practice [20]. Related studies also show a similar picture even among health workers and medical students [21,22]. There is also need of knowledge on Hepatitis C Virus (HCV) which is more transmissible than Human Immunodeficiency Virus (HIV) [23].

This study was designed to assess and compare the awareness and practice of hepatitis B and C among seropositive and seronegative prospective blood donors at the University of Nigeria Teaching Hospital, Enugu. Hypothetically, good knowledge and preventive practices of hepatitis B and C will reduce the transmission of the disease. This study will help to inform the need for a concerted awareness campaign against hepatitis B and C in Enugu, Nigeria.

MATERIALS AND METHODS

This study was a descriptive survey designed to assess the knowledge and practice on blood borne viral hepatitis among blood donors in University of Nigeria Teaching Hospital, Enugu, Nigeria. The study involved assessment of the knowledge and practice on blood borne viral hepatitis among prospective donors using a pretested questionnaire and determining their viral hepatitis status using ELISA test for hepatitis B and C. The study was carried out between June 2019 to January 2020 (the sample size of the seronegative group was completed in November 2019). The purpose and objective of the study was explained to the respondents. Then, verbal consent was taken from each participant after clearly explaining the purpose of the study. Ethical clearance was obtained from the Ethical Committee of Enugu State Teaching Hospital, Nigeria.

The targeted population was prospective blood donors who visited Blood Donation Unit of University of Nigeria Teaching Hospital, Enugu, Nigeria. This hospital is a major tertiary health institution in the state. It serves the state and the entire Southeast states on referral basis. Enugu state is in the east part of Nigeria and was the capital of the old Eastern Nigeria.

Inclusion criteria: All prospective blood donors who gave consent were included in the study.

Exclusion criteria: All prospective blood donors who declined consent for the study, those who had prior knowledge of the study and who were previously interviewed were excluded from the study.

Sample size calculation: The sample size for this study was determined by using the single population proportion formula by considering the following assumptions, the proportion of knowledge and practice on hepatitis B infection prevention was 50% in both seropositive and seronegative participants since no similar study has been done in the state. By taking the prevalence of 50%, level of significance 5% (α=0.05), $Z_{\alpha/2}$=1.96, and margin of error 5% (d=0.05). However, since the number of source population for the study was 100 for seropositive and 2400 for seronegative participants, (from the hospital record) which was less than 10,000; so authors used the following formula: $N=(Z_{\alpha/2})^2 \times P(1-P)/d^2$, $N=(1.96)^2 \times 0.5(1-0.5)(0.05)^2=384$

nf=ni/(1+ni/N), nf=384/1+(384/100)=79 for seropositive

nf=ni/(1+ni/N), nf=384/1+(384/2400)=290 for seronegative

where, nf=corrected sample size, ni=uncorrected sample size, and N=total number of all the source population.

By adding 10% non response rate, authors included a total of 405 study subjects (100 seropositive and 305 seronegative).

Sampling Technique

The study participants were selected from the blood donor unit of the hospital, who came for blood donation services after obtaining consent. The questionnaires were self or interviewer administered depending on the preference of the respondent. Their blood samples were collected and analysed for hepatitis B and C using rapid diagnostic kits. Those who were positive for hepatitis B or C using this method were grouped as seropositive while those who were negative were considered seronegative group. Both groups were given questionnaire structured for the present study. The positive results were later confirmed using ELISA methods and false positives were disregarded.

Questionnaire

Data was collected from a structured questionnaire and pretested before the actual data collection was conducted [Annexure 1]. The questionnaire was composed of written consent, socio-demographic variables, knowledge and practice questions about hepatitis B and C infection prevention which were developed by adapting from different peer reviewed literature.

A 26 item self/assistant administered questionnaire, designed to measure demographics, knowledge and practice on blood borne viral hepatitis was used. The questionnaire comprised of three domain questions. The first domain contained six questions on the socio-demographic characteristics of the respondents. The second domain was designed to assess the knowledge of blood borne viral hepatitis. Fifteen questions in this domain were adapted by the authors from extensive literature review and were also critiqued and corrected by academics who were involved in viral hepatitis surveillance [24-27]. The questions focused on cause, transmission, symptoms, prevention and management of blood borne viral hepatitis. The last domain was designed to assess the practice on blood borne viral hepatitis; screening, safe sex, proper use of sharps and prevention campaign.

Pilot study was done on 34 blood donors to ensure face validity. This also helped to assess the feasibility of the studies and validate the questionnaire in terms of the logistic of the data collection, the clarity of the questions and the time taken (8 to 10 minutes) to complete the questionnaire. The questionnaire was analysed by community physician consultant to ensure the validity of the questions; five question Likert scale was collapsed to Yes or No by considering the strongly agreed and agreed to be Yes while, disagree and strongly disagreed were regarded as No. Some questions were removed such as the question to assess the income per month of the respondents. This became necessary as all respondents were reluctant to supply the answer. Cronbach's alpha showed the questionnaire to reach acceptable reliability, α=0.78.

The questionnaire was translated to Igbo language and back-translated to ensure that the original meaning of the questions was retained. To ensure data quality, training was given for data collectors and supervisors. The data collection process was strictly followed-up by the supervisor and principal investigators and the quality of the collected data was assessed by the principal investigators.

Scores on knowledge and practice was calculated by scoring correct response as 1 and scoring incorrect as 0. All 'I don't know' responses were regarded as negative answer. Total of 12 responses were incomplete and in either one or more question and they were all removed bringing the total number of valid participants to 405. A scale cut-off less than 50% correct responses was regarded less than average, and 50% or more correct responses was regarded as above average.

STATISTICAL ANALYSIS

The findings and scores were analysed using IBM SPSS software version 21.0 (IBM Corp. 2019). Descriptive statistics were used to analyse socio-demographic details of all participants and presented in a table. Positive results for hepatitis B and C was grouped together as positive viral screening for blood borne viral hepatitis and considered dependent variable. Chi-square and t-test were used for qualitative and quantitative variables, respectively. Binary logistic regression analysis was conducted to assess the crude association between dependent and independent variables. Finally, significant factors were identified based on adjusted odds ratio of 95% confidence level and a p-value less than 0.05.

RESULTS

Questionnaire was sent to a total of 417 subjects, of which 405 completed survey and results were used for the analysis with a response rate of 97.1%. Twelve (2.9%) of the total respondents did not complete their interviews or questions and therefore were not included in the analysis.

Socio-demographic characteristics of the participants were given in [Table/Fig-1].

Characteristic	Negative for hepatitis viruses N (%)	Positive for blood borne hepatitis viruses (%) N=100		Total N (%)
		Hepatitis B positive N (%)	Hepatitis C positive N (%)	
Age (Years)				
18 to 29	223 (77.4)	50 (17.4)	15 (5.2)	288 (100)
≥30	82 (70)	32 (27.4)	3 (2.6)	117 (100)
Sex				
Males	268 (73.2)	80 (21.9)	18 (4.9)	366 (100)
Females	37 (94.9)	2 (5.1)	0 (0)	39 (100)
Marital status				
Single	237 (72.9)	72 (22.2)	16 (4.9)	325 (100)
Married	64 (84.2)	10 (13.2)	2 (2.6)	76 (100)
Divorced	4 (100)	0 (0)	0 (0)	4 (100)
Educational status				
No formal education	7 (100)	0 (0)	0 (0)	7 (100)
Primary school	18 (81.8)	4 (18.2)	0 (0)	22 (100)
Secondary school	123 (66.5)	47 (25.4)	15 (8.1)	185 (100)
Tertiary education	145 (82.4)	28 (15.9)	3 (1.7)	176 (100)
Masters/PhD	12 (80)	3 (20)	0 (0)	15 (100)
Religion				
Roman Catholic	166 (71.3)	56 (24)	11 (4.7)	233 (100)
Protestant	128 (80.5)	25 (15.7)	6 (3.8)	159 (100)
Muslim	4 (100)	0 (0)	0 (0)	4 (100)
Traditional religion	7 (77.8)	1 (11.1)	1 (11.1)	9 (100)
Occupation				
Farmer	11 (64.7)	5 (29.4)	1 (5.9)	17 (100)
Trader	113 (71)	37 (23.3)	9 (5.7)	159 (100)
Civil servants	85 (78.7)	19 (17.6)	4 (3.7)	108 (100)
Students	96 (79.3)	21 (17.4)	4 (3.3)	121 (100)

[Table/Fig-1]: Characteristics of study participants.
The participant's responses to knowledge and practice of hepatitis B and C questions

The mean age of the study participants were 27.78±7.17 years. Among the positive test group, 80 (21.9%) and 18 (4.9%) of the males were seropositive for hepatitis B and hepatitis C viral infection, respectively, while only 2 (5.1%) out of 37 (94.9%) females were positive for hepatitis B. Also, in the seropositive group, the age 18 to 29 years were 288 (71.1%) while ≥30 years were 117 (28.9%) with mean of 28.09 years and standard deviation of 6.36 years. There was no significant difference between this mean and the mean (27.46 and standard deviation of 7.968) of the seronegative group (p-value=0.467). In the later, the proportion of males and females was 268 (73.2%) and 37 (94.9), respectively.

Married participants in the seropositive group were 12. Total 10 (13.2%) of them were positive for hepatitis B while 2 (2.6%) of them were positive for hepatitis C. None of the participants in this group was divorced. Majority of the participants 325 (100%) were single in both seropositive and seronegative groups. On their educational qualification, 82 participants with hepatitis had positive result for hepatitis B, 47 (25.4%), 28 (15.9%), 3 (20%) of them had secondary, tertiary and postgraduate education, respectively. Among the seronegative participants, 123 (66.5%) and 145 (82.4%) had secondary and tertiary education, and only seven had no formal education.

Majority of the participants in both groups were Christians of Roman Catholic denomination. They compromised of 166 (71.3%), 56 (24%) and 11 (4.7%) for seronegative, hepatitis B and hepatitis C, respectively. Only four participants were muslims and they were seronegative. Regarding the occupation of the participants, 121 of the participants were students of either secondary or tertiary education i.e., 96 (79.3%), 21 (17.4%), and 4 (3.3%) of the students were seronegative, positive for hepatitis B and hepatitis C, respectively. The traders and civil servants comprised of 113 (71%) and 85 (78.7%) in the seronegative groups. However, among the seropositive group 19 (17.6) and 37 (23.3%) were civil servants and traders respectively, who were positive for hepatitis B. Only 4 (3.7%) and 19 (17.6%) civil servants had hepatitis C and B respectively. Seventeen farmers participated in the study with 11 (64.7%), 5 (29.4%), 1 (5.9%) of them were seronegative, positive for hepatitis B and C, respectively.

[Table/Fig-2] shows the responses of both seropositive and seronegative of participants to specific questions in the knowledge and practice domain. The differences in their responses were all significant as shown by their respective p-values except the question; 'Can HBV/HCV be transmitted by contaminated water/food prepared by person suffering with these infections'. This shows that the seropositive respondents had poor knowledge and practice of hepatitis B and C when compared with the seronegative group.

Bivariate association between socio-demographic factors of participants, and their knowledge and practice on hepatitis B and C: [Table/Fig-3] shows the bivariate association between potential determinants for knowledge and practice of hepatitis B and C among seropositive and seronegative potential donors. Educational status was significantly associated with the level of knowledge and practice in both groups. Participants who were more educated (above secondary school) were more than twice likely to have knowledge and practice above average in both seropositive and seronegative groups. In addition, students in the seropositive groups were more likely to have knowledge and practice above average when compared to non students. In the seronegative groups, males and unmarried participants were likely

S. No.	Items	Participant's response	Negative for hepatitis viruses N (%)	Positive for blood borne hepatitis viruses		Total N (%)	p-value*
				Hepatitis B positive N (%)	Hepatitis C positive N (%)		
1	HBV and HCV are the most common viral borne hepatitis	Yes	182 (87.1)	23 (11.0)	4 (1.9)	209 (100)	0.001
		No	123 (62.8)	59 (30.1)	14 (7.1)	196 (100)	

2	Can HBV and HCV affect all age groups?	Yes	188 (87)	24 (11.1)	4 (1.9)	216 (100)	0.001
		No	117 (61.9)	58 (30.7)	14 (7.4)	189 (100)	
3	Do you think that HBV and HCV can affect the Liver?	Yes	153 (82.7)	28 (15.1)	4 (2.2)	185 (100)	0.001
		No	152 (69.1)	54 (24.5)	14 (6.4)	220 (100)	
4	Is jaundice one of the most common symptoms of HBV/HCV?	Yes	118 (86.8)	16 (11.7)	2 (1.5)	136 (100)	0.001
		No	187 (69.5)	66 (24.5)	16 (6)	269 (100)	
5	Can HBV/HCV infection be symptomless?	Yes	104 (83.9)	16 (12.9)	4 (3.2)	124 (100)	0.005
		No	201 (71.5)	66 (23.5)	14 (5)	281 (100)	
6	Can HBV/HCV be transmitted by contaminated blood and blood products?	Yes	194 (80.8)	40 (16.7)	6 (2.5)	240 (100)	0.001
		No	111 (67.3)	42 (25.4)	12 (7.3)	165 (100)	
7	Can HBV/HCV be transmitted by unsterilised syringe, needles, and surgical instruments?	Yes	195 (86.7)	25 (11.1)	5 (2.2)	225 (100)	0.001
		No	110 (61.1)	57 (31.7)	13 (7.2)	180 (100)	
8	Can HBV/HCV be transmitted by unsafe sex?	Yes	184 (86.4)	25 (11.7)	4 (1.9)	213 (100)	0.001
		No	121 (63)	57 (29.7)	14 (7.3)	192 (100)	
9	Can HBV/HCV be transmitted from mother to child?	Yes	180 (85.7)	24 (11.4)	6 (2.9)	210 (100)	0.001
		No	125 (64.1)	58 (29.7)	12 (6.2)	195 (100)	
10	Can HBV/HCV be transmitted by contaminated water/food prepared by person suffering with these infections?	Yes	111 (80.5)	22 (15.9)	5 (3.6)	138 (100)	0.054
		No	194 (72.6)	60 (22.5)	13 (4.9)	267 (100)	
11	Can HBV/HCV be transmitted through skin contact?	Yes	94 (88.7)	10 (9.4)	2 (1.9)	106 (100)	0.001
		No	211 (70.5)	72 (24.1)	16 (5.4)	299 (100)	
12	Do you think HBV/HCV has laboratory test?	Yes	225 (84.3)	36 (13.5)	6 (2.2)	267 (100)	0.001
		No	80 (58)	46 (33.3)	12 (8.7)	138 (100)	
13	Is HBV/HCV infection curable/ treatable?	Yes	195 (83.3)	32 (13.7)	7 (3.0)	234 (100)	0.001
		No	110 (64.3)	50 (29.2)	11 (6.5)	171 (100)	
14	Is vaccination available for hepatitis B?	Yes	191 (90.1)	17 (8)	4 (1.9)	212 (100)	0.001
		No	114 (59)	65 (33.7)	14 (3)	193 (100)	
15	Do you think that HBV has post exposure prophylaxis?	Yes	112 (91.8)	9 (7.4)	1 (0.8)	122 (100)	0.001
		No	193 (68.2)	73 (25.8)	17 (6)	283 (100)	
Practice							
1	Have you done HBV and HCV screening?	Yes	100 (86.2)	13 (11.2)	3 (2.6)	116 (100)	0.001
		No	205 (70.9)	69 (23.9)	15 (5.2)	289 (100)	
2	Do you use condom all the time you want to have sexual intercourse?	Yes	192 (83.5)	33 (14.3)	5 (2.2)	230 (100)	0.001
		No	113 (64.6)	49 (28)	13 (7.4)	175 (100)	
3	Do you ask for new syringe before use?	Yes	249 (78.1)	62 (19.4)	8 (2.5)	319 (100)	0.006
		No	58 (67.4)	19 (22.1)	9 (10.5)	86 (100)	
4	Have you ever participated in health education program related to hepatitis?	Yes	65 (89)	7 (9.6)	1 (1.4)	73 (100)	0.001
		No	240 (72.3)	75 (22.6)	17 (5.1)	332 (100)	
5	Have you ever received hepatitis B vaccination (apart from during childhood)?	Yes	0 (0)	0 (0)	0 (0)	0 (0)	Not Applied
		No	305 (75.3)	82 (20.2)	18 (4.5)	405 (100)	

[Table/Fig-2]: Knowledge and practice of participants on blood borne viral hepatitis.
*All p-values less than 0.05 are statistically significant

Item	Knowledge				Practice			
	Above average N (%)	Below average N (%)	Unadjusted odd ratio (95% CI)	Adjusted odd ratio (95% CI)	Above average N (%)	Below average N (%)	Unadjusted odd ratio (95% CI)	Adjusted odd ratio (95% CI)
Seropositive group								
Sex								
Male	27 (100)	71 (97.2)	0.722 (0.628-0.817)	6.231 (1.230-0.00)	17 (100)	81 (97.6)	0.827 (0.755-0.905)	3.390 (5.02-0.00)
Female	0 (0)	2 (2.8)			0 (0)	2 (2.4)		
Age (Years)								
18 to 29	21 (42)	44 (86.3)	0.424 (0.152-1.177)	2.36 (0.84-6.561)	12 (70.6)	53 (63.9)	0.736 (0.237-2.291)	1.358 (0.437-4.228)
≥30	29 (58)	6 (13.7)			5 (29.4)	30 (36.1)		
Marital status								
Currently married	4 (7.70)	8 (16.7)	2.110 (0.607-7.331)	0.474 (0.136-1.646)	0 (0.0)	12 (14.5)	0.807 (0.728-0.894)	3.868 (0.377-0.00)
Currently unmarried	48 (92.3)	40 (83.3)			17 (100)	71 (85.5)		

Educational status								
Secondary and below	5 (26.3)	61 (75.3)	**2.800 (1.122-6.986)**	**0.357 (0.143-0.891)**	5 (29.4)	61 (73.5)	**6.655 (2.104-21.048)**	**0.150 (0.048-0.475)**
Above secondary	14 (73.7)	20 (24.7)			12 (70.6)	22 (26.5)		
Occupation								
Student	11 (40.7)	15 (19.4)	**2.848 (1.086-7.471)**	**0.351 (0.134-0.921)**	9 (52.9)	16 (19.3)	**4.711 (1.572-14.117)**	**0.212 (0.071-0.636)**
Non student	16 (59.3)	58 (80.6)			8 (47.1)	67 (80.7)		
Seronegative group								
Sex								
Male	170 (84.6)	97 (93.3)	**2.948 (1.188-7.317)**	**0.339 (0.137-0.842)**	84 (86.6)	184 (88.5)	1.187 (0.576-2.444)	0.843 (0.409-1.736)
Female	31 (15.4)	7 (6.7)			13 (13.4)	24 (11.5)		
Age (Years)								
18 to 29	143 (71.1)	79 (76.0)	1.335 (0.771-2.313)	0.749 (0.432-1.297)	59 (60.8)	164 (78.8)	**2.401 (1.418-4.063)**	**0.417 (0.246-0.705)**
≥30	58 (28.9)	25 (24.0			38 (39.2)	44 (21.2)		
Marital status								
Currently married	51 (25.4)	13 (12.6)	**2.354 (1.213-4.566)**	**0.425 (0.219-0.824)**	31 (32)	33 (15.9)	0.797 (0.728-0.894)	0.303 (0.134-0.833)
Currently unmarried	150 (74.6)	91 (87.4)			66 (68)	175 (84.1)		
Educational status								
Secondary and below	80 (39.8)	69 (66)	**2.935 (1.789-4.826)**	**0.340 (0.207-0.559)**	25 (25.8)	123 (59.1)	**4.168 (2.447-7.097)**	**0.240 (0.141-0.409)**
Above secondary	121 (60.2)	35 (34)			72 (74.2)	85 (40.9)		
Occupation								
Student	69 (34.3)	28 (26.2)	1.471 (0.869-2.492)	0.680 (0.401-1.151)	38 (39.2)	58 (27.9)	**1.666 (1.002-2.768)**	**0.600 (0.361-0.998)**
Non student	131 (65.7)	77 (73.8)			59 (60.8)	150 (72.1)		

[Table/Fig-3]: Association between socio-demographic factors of participants and their knowledge and practice on blood borne viral hepatitis in seropositive and seronegative groups.
All odd ratios in bold text are statistically significant; Association between the outcome of hepatitis B and C screening, and potential determinants

to have knowledge below average. Similar phenomenon was observed among currently unmarried in the practice domain. Still in the seronegative groups, participants less than 30 years old and students were likely to have practice less than average.

[Table/Fig-4] shows association between the outcome of hepatitis B and C screening, and socio-demographic factor, total score on knowledge, total score of practice and knowledge on symptoms, transmission, management of blood borne hepatitis viruses. Apart from being less than 30-year-old and being student, other factors were significantly associated with the hepatitis B and/or C status of the participants: male, currently unmarried and less educated were likely to be seropostive for hepatitis B and/or C. Also, likely to be serpositive include donors with knowledge below average on hepatitis B/C causes, symptoms, transmission and management. Donors whose responses were below average in the total score of knowledge and practice were more likely to be seropositive than those with scores above average.

Items	Blood borne viral hepatitis screening status		Total N (%)	p-value
	Positive N (%)	Negative N (%)		
Sex				
Male	98 (98)	268 (87.9)	366 (90.4)	0.001
Female	2 (2)	37 (12.1)	39 (9.6)	
Age				
18 to 29	65 (65)	223 (73.1)	288 (71.1)	0.078
≥30	35 (35)	82 (26.9)	117 (28.9)	
Marital status				
Currently married	12 (12)	64 (21)	76 (18.8)	0.029
Currently unmarried	88 (88)	241 (79)	329 (81.2)	
Educational status				
Secondary and below	66 (66)	148 (48.5)	214 (52.8)	0.002
Above secondary	34 (34)	157 (51.5)	191 (47.2)	
Occupation				
Student	25 (25)	96 (31.5)	121 (29.9)	0.135
Non student	75 (75)	209 (68.5)	284 (70.1)	
Scores on cause				
Above average	26 (26)	179 (58.7)	205 (50.6)	0.001
Below average	74 (74)	126 (41.3)	200 (49.4)	
Scores on symptoms				
Above average	29 (29)	153 (50.2)	182 (44.9)	0.01
Below average	71 (71)	152 (49.8)	223 (55.1)	
Scores on transmission				
Above average	46 (46)	215 (70.5)	261 (64.4)	0.001
Below average	54 (54)	90 (29.5)	144 (39.6)	
Scores on management				
Above average	45 (45.5)	224 (73.2)	269 (66.4)	0.001
Below average	54 (54.5)	82 (26.8)	136 (33.6)	
Total score on knowledge				
Above average	27 (27.3)	201 (65.7)	228 (56.3)	0.001
Below average	72 (72.7)	105 (34.3)	177 (43.7)	
Total score on practice				
Above average	17 (17)	97 (31.8)	114 (28.1)	0.002
Below average	83 (83)	208 (68.2)	291 (71.9)	

[Table/Fig-4]: Association between the outcome of hepatitis B and C screening, and socio-demographic factor, total score on knowledge, total score of practice, knowledge on symptoms, transmission, management of blood borne hepatitis viruses.
p-value less than 0.05 are statistically significant

DISCUSSION

Hepatitis B and C are endemic in Nigeria and are the most common causes of chronic liver diseases. The transmission has been noted significantly in blood transfusion services especially in emergency and rural settings where donors are not properly screened before transfusion. There is low knowledge among the public and prospective donors hence the high prevalence of the disease. This study substantiated this hypothesis by comparing the knowledge

and practice of the disease among those who are seropositive and seronegative for hepatitis B and C.

The predominance of male gender supports the gender distribution of blood donors by countries as outlined by WHO [28]. They observed that in Nigeria, the male gender contributed to approximately 80% of blood donors in 2011. The reason for this wide disparity as reported by some studies includes lack of knowledge, anaemia, pregnancy and lactation [29]. Also, in a study in Enugu, females were unlikely to be voluntary donors than males due to lack of adequate knowledge on their equal chance with the male counterpart on blood donation [30]. Despite poor representation of the female gender in blood donation, this study shows a better knowledge of hepatitis B and C among female participants than males. They were also unlikely to be seropositive for the diseases than the male population. This could be due to their better exposure to health related informal and formal events such as antenatal, immunisation and reproductive health services [31].

The age group of the donors as observed in this study is similar to most local and international studies. For instance, in the study by Ugwu AO et al., in Enugu, and Bhasker B et al., in India, the mean age of blood donors were 28.8±8.5 years and 25.12±8.43 years, respectively [30,32]. Prospective donors of this age group usually met the eligibility criteria such as the absence of co-morbidity and adequate level of packed cell volume. This group is also targeted in the donors' campaign in schools and churches frequently organised by many blood donation units in Nigeria [32]. This study like most of the similar studies among donors in Nigeria shows that most of the respondents are students and single [30,33]. The occupation of the respondents apart from students is mainly trading which is the major occupation of the Easterns in Nigeria [34]. Also, in the region, most of the people are Christian of Roman Catholic denomination as observed in this study [34].

About 56.3% of the participants showed knowledge on hepatitis B and C above average. There was no similar literature among donors in the region for comparison. However, a couple of studies done among students and the public shows similar findings in the range of 45% to 57% depending on the population studied [35-37]. For instance, in a study by Deji A et al., in Southwest Nigeria with 3% hepatitis B prevalence, only 45% students had good knowledge [35]. A similar finding of the prevalence of 2.5% was observed in the present study facility [30]. Among the seropositive group, knowledge is low in all the domains; the cause of the disease, transmission, and management of the disease in terms of knowledge of the prevention and treatment. This is common among the less educated and non student population, which has been reported by some studies [35,37]. According to WHO, the first line of prevention of viral hepatitis is creating awareness of the disease, transmission and prevention through coordinated community based campaigns. Those who have low knowledge of the disease are likely to be infected as shown in this study.

The study shows that safe practice towards the prevention of hepatitis B and C was poor. For instance, only 13.8% of the participants had a screening test for the virus. This is similar in most of the studies conducted even among health workers. For instance, in one of the studies, only about 39% of the health workers had a screening test for hepatitis B and C [38]. This finding, however, contradicts the effort on "Global health sector strategy on viral hepatitis, 2016-2020" lunched by WHO in May 2016: The strategy highlights the critical role of universal health coverage and sets targets that align with those of the Sustainable Development Goals toward the elimination of hepatitis B and C through scale-up screening, care and treatment services [10]. Screening is very cardinal for early diagnosis and prevention of chronicity and transmission.

The practice of the use of condoms during sexual intercourse is generally low in the region and was also observed in this study especially among the seropositive respondents [39,40]. Safe sex practice is major means of preventing most sexually transmitted diseases, not only HIV and gonorrhea. As observed, most participants were not aware that hepatitis B and C can be transmitted through unsafe sex. All the participants had no hepatitis vaccination. This could be due to lack of consensus on the immunisation of the public against hepatitis B in the country. The available recommendation is on the adults who are at risk of the disease. The Centers for Disease Control and Prevention (CDC) however recommended that the following groups should be vaccinated; sex partners of Hepatitis B surface Antigen (HBsAg) positive persons, sexually active persons who are not in a long-term, mutually monogamous relationship (e.g., persons with more than one sex partner during the previous six months), persons seeking evaluation or treatment for a sexually transmitted infection, all other persons seeking protection from HBV infection, etc. Although authors were unable to assess the above factors in the present study, in an endemic region where the rate of screening test among the public is low, poor practice on the prevention of the disease, improperly screened blood before transfusion and no posttransfusion vaccination policy for blood recipients, there is need to broaden the coverage of vaccination for hepatitis B to include all those seeking protection from the disease as recommended by CDC.

Limitation(s)

Like other cross-sectional studies, authors can only describe associations between the outcome and determinants and could not draw final conclusions about aetiology. Authors did not collect information about the source of their knowledge on the questions in the questionnaire. And also questions were not included to assess their reasons for not been screened, immunised etc., in the practice domain. The findings in this study will be helpful and strengthen further studies in this area.

CONCLUSION(S)

This study revealed poor knowledge on the transmission and prevention of hepatitis B and C and poor practice towards the prevention of the disease among prospective donors. This finding is significant among the seropositive respondents. None of the respondents had hepatitis B vaccination. It is therefore important to increase the awareness campaigns of the disease to the public especially non students, males and the less educated people. In this campaign, emphasis should be made on the possibility of contracting the infection through unsafe sexual intercourse and the need for the routine screening exercise. Females should be encouraged to donate blood because they are less likely to have hepatitis B and C. There is also a need to review hepatitis B immunisation policy in the country with a view of extending the coverage to involve the general adult population.

Authors' contributions: NCC supported the study design, led the analysis and drafted the paper; ONS participated in the data collection and helped with analysis; OCP participated in the data collection and helped with analysis; AEC participated in data collection, analysis; IOE assisted in analysis and reviewed the draft paper; All authors read and approved the final manuscript.

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ANNEXURE 1

Questionnaire

Comparative analysis on the knowledge and practice of hepatitis B and C among seropositive and seronegative prospective blood donors in a tertiary hospital in Eastern Nigeria.

Personal Data Serial number…….

Age ------

Sex ------

Marital status: (A) Single (B) Married (C) Divorced (E) Others specify

Educational status: (A) No formal education (B) Primary school (C) Secondary (D) Tertiary (E) Master/PhD

Occupation: (A) Farmer (B) Trader (B) Civil Servant (D) Housewife

Religion: (A) Roman Catholic (B) Protestants (C) Muslim (D) Tradition

A	Knowledge blood borne viral hepatitis	Yes	No	I don't know
1	HBV and HCV are the most common viral borne hepatitis			
2	Can HBV and HCV affect any age group?			
3	Do you think that HBV or HCV can affect the liver?			
4	Is jaundice one of the common symptoms of HBV/HCV?			
5	Can hepatitis B/C infection be symptomless?			
6	Can hepatitis B/C be transmitted by contaminated blood and blood products?			
7	Can hepatitis B/C be transmitted by unsterilised syringes, needles and surgical instruments?			
8	Can hepatitis B/C be transmitted by unsafe sex?			
9	Can hepatitis B/C be transmitted from mother to child?			
10	Can hepatitis B/C be transmitted by contaminated water/ food prepared by person suffering with these infections?			
11	Can hepatitis B/C are transmitted through skin contact?			
12	Do you think HBV/HCV has laboratory test?			
13	Is hepatitis B/C curable/treatable?			
14	Is vaccination available for hepatitis B?			
15	Do you think that HBV has post exposure prophylaxis?			
B	**Practice**			
1	Have you done screening for hepatitis B/C?			
2	Do you ask for screening of blood before transfusion?			
3	Do you ask for a new syringe before use?			
4	Do you use condom all the time you want to have sexual intercourse?			
5	Have you ever participated in health education program related to hepatitis?			