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# Prevalence and risk factors for hepatitis B and C among sexually active undergraduates in southwestern Nigeria

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## ABSTRACT

**Introduction:** Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are sources of mortality and morbidity, threatening global public health. Numerous social activities of youths, which are not perceived as risky, put them at risk of contracting these infections. The objective of this study was to assess the prevalence and risk factors for hepatitis B and C among sexually active female undergraduates in southwestern Nigeria. **Materials and Methods:** A descriptive cross-sectional study was carried out among 306 sexually active female undergraduates of a university in southwestern Nigeria who were selected using multistage sampling method. Research instruments were self-administered, semi-structured pretested questionnaires. Data were analyzed using the SPSS software. **Results:** The mean age of the respondents was  $22.0 \pm 2.7$  years. Two hundred and fifty one (82.0%) respondents were aware of hepatitis, with 27.6% and 72.4% having “good” and “poor” knowledge, respectively, of the risk factors of hepatitis. Nineteen (6.2%) respondents were reactive to hepatitis B, seven (2.3%) were reactive to hepatitis C while two (1.6%) showed coinfection by both viruses. Based on the grouping of the identified risk factors to hepatitis, 190 (62.1%) had a single risk, 77 (25.2%) had double risk while 39 (12.7%) had multiple risk factors for hepatitis infections. Knowledge of risk factors does not have any statistically significant association with the occurrence of risk factors ( $P < 0.05$ ). The occurrence of multiple risk factors was 7 and 11 times more likely to be a predictor of hepatitis B and C, respectively, compared to having sexual intercourse alone that is a single risk factor. **Conclusion:** University undergraduates are at a risk of contracting hepatitis infections. High awareness but poor knowledge of hepatitis and a significant seroprevalence rate underscores the need for awareness and more efforts on the part of university health services.

**Key words:** Hepatitis B and C, knowledge score, seroprevalence, sexually active undergraduates

## Introduction

Infections with hepatitis B virus (HBV) and hepatitis C virus (HCV) are problems that are important for global public health and cause significant morbidity and mortality worldwide.<sup>[1]</sup> In terms of mortality, an estimated 600,000 persons die each year due to the acute or chronic consequences of HBV.<sup>[2,3]</sup> The World Health Organization (WHO) also estimates that about 200 million people or 3% of the world's population are infected with HCV and 3-4 million persons are

newly infected each year, thus putting about 350 million and 130 million chronic carriers of HBV and HCV, respectively, who are at risk of developing chronic hepatitis, cirrhosis, and hepatocellular carcinoma.<sup>[4,5]</sup> Hence, HBV and HCV infections account for a substantial proportion of liver diseases worldwide. A varying but low prevalence of both HBV and HCV had been reported among young women in different parts of the world.<sup>[6-9]</sup>

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HBV and HCV share common transmission pathways,<sup>[10]</sup> thus making it possible to investigate them simultaneously.<sup>[11]</sup> Unlike human immunodeficiency virus (HIV), youths do not associate hepatitis infections with sexual activities. Youths are mostly at a stage where they can easily contract infection; however, no manifestation seems to reduce the fears of HBV and HCV among them. However, numerous activities of young females put them at risk; these activities include unprotected intercourse and multiple sexual relationships, manicure and pedicure, getting tattoos, undergoing beautification scarring and body and ear piercing, and coming in contact with blood specimens at the schools' science and medical laboratories.<sup>[12]</sup>

With hepatitis gradually assuming the dimension of a silent epidemic, there is a need for sustained surveillance on hepatitis in order to limit the chronicity of hepatitis and its eventual complications. The objective of this study was to assess prevalence and risk factors for HBV and HCV among sexually active female undergraduates in southwestern Nigeria.

## Materials and Methods

### Study area

The study area is the city of Osogbo in Osun State in southwestern Nigeria. There are three higher institutions of learning in the city, namely, Osun State University, LAUTECH College of Health Sciences, and Fountain University. There is a teaching hospital, one general hospital, and many primary health care (PHC) centers and private hospitals providing primary care in the city and where hepatitis infection can be diagnosed. Osun State University runs a collegiate system with each campus having own health center. Screening for HBV and HCV are now part of the routine screening for students and its immunization is mandatory for science students admitted to the university.

### Study design

A descriptive cross-sectional study was carried out among sexually active female undergraduates of Osun State University in southwestern Nigeria.

### Study population

The reference population consisted of all registered female students in Osun State University, which has been purposively used for this study. Male students were excluded from the study. This study was part of a larger study of reproductive health indices among students of the same university. Criteria for labeling a student as sexually active (study population) included having had sexual intercourse and currently having multiple sexual partners.

### Sampling size

Leslie Fischer's formula was used for the calculation of sample size for a population less than 10,000.<sup>[13]</sup> A calculated sample size of 278 was increased to 310 to account for attrition and non response.

### Sampling method

The university has six campuses; equal allocation technique was adopted for sharing the total sample size among the colleges. A list of eligible students was made after sorting out the coded questionnaire used in the original larger research. Students were confidentially invited to the college health center where one in three students on the list was selected using systematic random sampling. This continued until the allocated questionnaires were exhausted. Students not eventually used or selected for this study also had the hepatitis tests done on them, which served as a benefit for having taken part in the larger reproductive health research.

### Research instruments and data collection

A semi-structured pretested questionnaire was self-administered by participants. The questionnaire consisted of three parts: Sociodemographic characteristics, risk factors for both types of hepatitis, and results of the blood samples taken for screening of HBV and HCV. The collection of data was carried out over a period of about 3 months, leaving enough time for all subjects to accept our invitation.

### Blood collection and sample processing

About 5 mL of the venous blood samples were aseptically collected from the cubital fossa of all the participants and dispensed into sterile plain containers. The samples were allowed to stand on the bench for 15 min for clotting and clot retraction. Subsequently, the samples were centrifuged at 4,000 rpm for 5 min. The serum was separated into pre-labeled plain containers. Qualitative detection of serum hepatitis B surface antigen (HBsAg) was determined using commercial third-generation rapid chromatographic immunoassay. Two commercial rapid diagnostic HBsAg test strips were used. DiaSpot HBsAg rapid test strip (DiaSpot Diagnostics, USA) had relative sensitivity and specificity of >99% and 97%, respectively, and an accuracy of 98.5% and rapid test strip (Clinotech Diagnostics, Richmond, British Columbia, Canada) had relative sensitivity and specificity of 99% and 97%, respectively, and an accuracy of 98.5%. Strict adherence to manufacturers' instructions was observed.

### Ethical considerations

Ethical approval to conduct this study was obtained from Health Research Ethics Committee of Ladoke Akintola

University of Technology, and further permission was taken from the Provosts of the respective colleges and the Director of the university's health services. Written informed consent was obtained from each participant after duly explaining the rationale and procedure of the research to them.

**Data management**

Data were analyzed using the SPSS software version 17.0 (IBM, Armonk, NY, USA) after sorting out the questionnaires and data cleaning. Consistency of data was ensured through double entry and searching for outlier variables. Frequency tables and charts were produced. Composite knowledge score of the risk factors for hepatitis were calculated. The 10-point knowledge questions were scored as +1 for a favorable or positive or correct answer while -1 was given for an unfavorable or a negative or an incorrect answer. An aggregate score of 5 and above was regarded as "good" while a score less than five was regarded as "poor" Bivariate and multivariate analysis was done to demonstrate the association between two or more variables of interest. P value was considered significant at figures equal to or less than 0.05 for all inferential statistics considered.

**Study limitations**

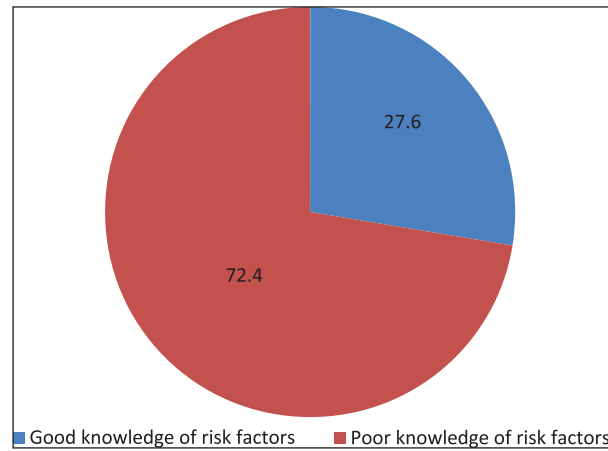
Some students were not comfortable with being labeled sexually active according to the criteria in the questionnaire while some were afraid of the pain of the needle prick during sample collection. These issues were tackled by gentle persuasion with the subjects, the assurance that all information shall be kept strictly confidential, and that no harm will be done to any of the subjects during the sample collection in the laboratory.

**Results**

Table 1 shows the sociodemographic characteristics of the respondents. The mean age of the respondents was 22.0 ± 2.7 years, with 250 (81.7%) belonging to the age group of 20-24 years. One hundred and fifty eight (51.6%) respondents were male, 32 (10.5) were married, and 169 (55.2%) were Christians.

Figure 1 showed the knowledge score of the risk factors for hepatitis infection. There was a good and poor knowledge score of risk factors 27.6% and 72.4% respectively among respondents.

Table 2 showed that 19 (6.2%) respondents were reactive to hepatitis B, seven (2.3%) were reactive for hepatitis C while two (1.6%) showed coinfection from both viruses. Two hundred and fifty one (82.0%) respondents were aware of hepatitis. Based on grouping



**Figure 1:** Knowledge of the risk factors for hepatitis among the respondents

**Table 1: Sociodemographic characteristics of the respondents**

Variables	N	Percent (%)
Age in years (Mean=22.0±2.7 years)		
15-19	24	8.2
20-24	250	81.7
25-29	27	8.8
30-34	3	1.0
35-39	2	0.3
Sex		
Male	158	51.6
Female	148	48.4
Marital status		
Married	32	10.5
Nonmarried	274	89.5
Religion		
Islam	105	34.3
Christianity	169	55.2
Traditional	24	7.8
Others	08	2.7

**Table 2: Prevalence and the risk factors for hepatitis infections**

Variable	F	Percent (%)
Hepatitis B		
Positive	19	6.2
Negative	276	90.2
Indeterminate	11	3.6
Hepatitis C		
Positive	7	2.3
Negative	288	94.1
Indeterminate	11	3.6
Coinfection- B and C	2	1.6
Aware of hepatitis	251	82.0
Risk factors		
Single risk	190	62.1
Double risk	77	25.2
Multiple risk	39	12.7

of identified risk factors for hepatitis, 190 (62.1%) had a single risk factor, 77 (25.2%) had double risk factors while 39 (12.7%) had multiple risk factors for hepatitis infections.

Table 3 shows that a statistically significant association exists between hepatitis B and the occurrence of risk factors ( $P < 0.05$ ) but there is no such association with age and sex. Likewise, a statistically significant association exists between hepatitis C and sex and the occurrence of risk factors ( $P < 0.05$ ) but there is no such association with age. Knowledge of risk factors does not have any statistically significant association with the occurrence of risk factors ( $P < 0.05$ ). Those in the age group of 15-24 years are one and a half times more likely to have developed either hepatitis B or C compared with those who are 24 years and above; however, this observation was not statistically significant. Females are twice more likely to have developed hepatitis B infection and this observation was found to be statistically significant. However, the occurrence of multiple risk factors was seven times and 11 times more likely to be a predictor of hepatitis B and C, respectively, compared to just having sexual intercourse as a single risk factor.

### Discussions

Viral hepatitis caused by HBV and HCV is endemic in many counties worldwide and is a major health concern as it causes devastating life-threatening acute

hepatitis<sup>[14]</sup> and chronic liver diseases such as cirrhosis and hepatocellular carcinoma.<sup>[15]</sup> This study, however, showed HBsAg seroprevalence rate of 6.2%. This supports other studies among Nigerian undergraduates with 6.1%<sup>[16]</sup> and 6.2%<sup>[17]</sup> prevalence rates. However, our figure was higher when compared to similar studies among Nigerian undergraduates with HBsAg seroprevalence rate of 3.2%,<sup>[18]</sup> and 4.5%.<sup>[19]</sup>

Our figures might have been higher because our study was carried out among sexually active subjects or females, and sexual activity is a known risk factor for hepatitis. But our figure was lower when compared to other studies with HBsAg seroprevalence rate of 15.5%<sup>[20]</sup> and 12.5%<sup>[21]</sup> and the national average prevalence rate of hepatitis marked at 20.0%.<sup>[22]</sup>

The result of HCV seroprevalence in our study (2.3%) supports another study stating a global HCV prevalence rate of 2-10% in Nigeria.<sup>[4]</sup> Higher prevalence figures had been reported from other studies, namely, 9.2%<sup>[23]</sup> and 8.0%.<sup>[17]</sup> The declined trend of HBV and HCV in our study population may be attributed to the growing literacy rate, improving housing and hygienic conditions, and possibly the generally good or positive attitude of people in the southwestern part of the country toward vaccination. Across the board these prevalence figures are high considering the numerous complications associated with hepatitis, and this underscores a dire need to step up preventive efforts.

**Table 3: Associations between sociodemographic characteristics and hepatitis results**

Variable	Bivariate cross tabulations							
	Hepatitis B infections				Hepatitis C infections			
	Yes (positive)	No (negative)	X <sup>2</sup>	P value	Yes (positive)	No (negative)	X <sup>2</sup>	P value
Age (years)								
15-24	2 (0.7)	29 (9.5)	3.707	0.152	1 (0.3)	30 (9.8)	3.864	0.145
24>	17 (5.6)	258 (84.3)			6 (2.0)	269 (87.9)		
Sex								
Male	13 (4.2)	145 (45.4)	2.360	0.307	7 (2.3)	151 (47.4)	6.785	0.034
Female	6 (2.0)	142 (46.4)			0 (0.0)	148 (46.7)		
Risk factors								
Single	5 (1.6)	185 (60.5)	15.179	0.019	1 (0.3)	189 (61.8)	23.175	0.001
Double	7 (2.3)	70 (22.9)			1 (0.3)	76 (24.9)		
Multiple	7 (2.3)	32 (10.4)			5 (1.6)	34 (11.1)		
Variable	Logistic regression analysis							
	Hepatitis B			Hepatitis C				
	OR <sup>†</sup>	CI <sup>**</sup>	P value	OR	CI	P value		
Age (constant=respondents of 15-24 years)	0.68	0.076-5.098	0.684	0.61	0.096-3.484	0.687		
Sex (constant=female)	2.1	0.784-5.737	0.069	-1.00*	1.797-1.000	0.004		
Risk factors (constant=single)	0.15	0.187-4.463	0.447	0.09	0.029-3.800	0.376		

<sup>†</sup>Midpoint odds ratio (since OR was "indefinite"), <sup>\*</sup>OR - Odds ratio, <sup>\*\*</sup>CI-Confidence interval

High awareness but poor knowledge of the risk factors for hepatitis found in this study is a concern since mere awareness does not translate into in-depth knowledge as reported by our study, and may not necessarily translate into good attitude and preventive practice. The nonsignificant association of prevalence of hepatitis B and C with some sociodemographic factors supports the findings from another study.<sup>[15]</sup> The nonsignificant association between knowledge and the occurrence of risk factors also supports the findings from other studies.<sup>[15,21]</sup>

In order to prevent the many future complications of hepatitis among the economically productive and future leaders of tomorrow in our society, there is an urgent need to carry out sustained awareness and improvement in the knowledge of risk factors and preventive measures against hepatitis among this high-risk category of students. This is important in a situation like this when social risk factors that are prevalent among them are not regarded by them as important. The university health center may have roles to play including routine screening for hepatitis for all newly admitted women or women students, and administering vaccinations to all eligible students, especially medical and science students who may come in contact with blood samples and other fluids during their school's practical laboratory work.

## Conclusion

University undergraduates and youths are generally at risk of contracting hepatitis infections with a lot of consequences and complications in the near future. High awareness but poor knowledge of hepatitis led to cauterization of the respondents under study. Seroprevalence of hepatitis was also found to be significant. Improved awareness and in-depth knowledge and the university's proactive steps toward prevention of the disease would go a long way in resolving these issues.

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## Conflict of interest

There are no conflicts of interest.

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Olalekan: Hepatitis B and C sero-prevalence among sexually active Nigerian youths

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