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RISK FACTORS OF HBV INFECTION AMONG UNIVERSITY STUDENTS IN NORTH-CENTRAL NIGERIA

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ABSTRACT

This study investigates the risk factors associated with Hepatitis B virus (HBV) infection among university students in North-Central Nigeria, focusing on socio-demographic determinants, sexual behaviour, medical history, and awareness levels. A cross-sectional survey was conducted among 511 university students, utilizing structured questionnaires to collect data on socio-demographic factors, risk behaviours, and awareness regarding HBV infection. The results indicate that socio-demographic factors, such as residence and medical history, significantly impact the risk of HBV infection. Notably, 38.6% of respondents reported a history of injections in the past year, and 12.3% had received blood transfusions, both of which are associated with increased risk. Additionally, 20.0% of respondents engaged in unprotected sexual intercourse, highlighting a concerning trend in sexual health practices. A significant association was found between the number of sexual partners and HBV infection status, with higher rates of infection among those with multiple partners ($p < 0.00$). Awareness of HBV risk factors varied among students, influencing their engagement in preventive behaviours. The findings underscore the need for targeted health education interventions to raise awareness of HBV risks and promote safe practices among university students. Enhanced health education can help mitigate the risk of HBV transmission within this demographic. This study contributes to the understanding of HBV risk factors among university students in Nigeria, providing valuable insights for developing effective public health strategies aimed at reducing HBV transmission and improving health outcomes.

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Keywords: Hepatitis B Virus, Risk Factors, University Students, Prevalence, Public Health, Nigeria, Educational Interventions.

Introduction

Historically, the earliest record of epidemic caused by hepatitis B virus was made by Lurman in 1885 after the outbreak of smallpox in 1883. Hepatitis B surface antigen (HBsAg) was formerly called Australia antigen because it was first described in the serum of an Australian aborigine in 1963 (Blumberg et al, 1967; Okochi, 1968). In 1968 Okochi and Murakami discovered that the Australian antigen was related to type B hepatitis, while Dane found virus-like particles in the serum of patients suffering from type B hepatitis in 1973 (Okochi, et al, 1968; Jonas, 2003). These particles were designated as the hepatitis B virus (HBV). Transmission of HBV infection can occur in many ways which includes, parenteral transmission, sexual transmission, and vertical transmission (from mother to child during pregnancy and birth). Important factors contributing to its spread includes, unsafe sexual intercourse, use of therapeutic injection, blood transfusion, and mother to child transmission (Davlidova et al., 2021). Other high risk adult population are the people with multiple hetero-sexual partners, men who have sex with men, health workers and intravenous drug users (Okochi et al, 1968; Jonasm 2003; Fawad, 2011, (Lanre-Ogungbile et al., 2020)). All high-risk groups including university students in contact with blood and body fluids should know their antibody status and be vaccinated for HBV if they have not previously had HBV infection and should adhere to universal protective measures (Fry, 2007). Transmission of HBV occurs through several routes, including parenteral, sexual, and vertical transmission from mother to child. Key factors contributing to the spread of HBV include unsafe sexual practices, therapeutic injections, blood transfusions, and mother-to-child transmission (Magaji et al., 2021); (Kareem et al., 2022). High-risk populations typically encompass individuals with multiple heterosexual partners, men who have sex with men, healthcare workers, and intravenous drug users (Naderi et al., 2022).

Statement of the Problem

Hepatitis B virus (HBV) infection poses a significant public health threat in Nigeria, particularly among university students, who represent a vital segment of the population. Despite the availability of effective vaccines and treatments, knowledge about HBV transmission and associated risk factors remains inadequate among this group (Olaoye et al., 2024). Current research indicates that behaviours such as unprotected sexual intercourse, sharing of sharp objects, and unsafe medical practices contribute significantly to the risk of HBV infection (Magaji et al., 2021). Moreover, the socio-demographic characteristics of students, including their living arrangements and healthcare access, further complicate the situation (Oladeinde et al., 2022), (Sowunmi, et al, 2020) Understanding the specific risk factors associated with HBV infection is essential for developing targeted educational

programs and interventions. This study aims to assess these risk factors associated with HBV infection among university students in Kwara State, Nigeria, with a view to inform targeted public health interventions. The study provided answers to the following research questions:

1. What are the prevalent socio-demographic factors associated with the risk of HBV infection among university students?
2. What specific risk factors contribute to the transmission of HBV infection among university students?
3. How does the history of medical procedures, such as blood transfusions or injections, relate to the risk of HBV infection?
4. Is there a significant relationship between sexual behaviour and the prevalence of HBV infection among university students?
5. How do knowledge and awareness of HBV risk factors affect the behaviour of university students?

Materials and methods

This study employed a cross-sectional design involving a sample of 511 respondents, selected through stratified random sampling from four academic institutions in Nigeria. The participants included students from different academic levels (100 to 500 level), ensuring a diverse representation of knowledge and awareness levels. Data were collected using a structured questionnaire designed to assess various aspects of HBV knowledge, including awareness of the virus, modes of transmission, symptoms, risk factors, preventive measures, and treatment options. The questionnaire also captured socio-demographic information such as age, gender, ethnicity, religion, marital status, and living conditions (on-campus or off-campus). The data collection process was conducted systematically to ensure accuracy and confidentiality. Statistical analysis was performed using descriptive statistics to summarize the demographic data and inferential statistics, particularly chi-square tests, to determine associations between socio-demographic variables and knowledge scores related to HBV infection. A significance level of $p < 0.05$ was established for determining statistical significance. Ethical approval was obtained from the relevant institutional review board, and informed consent was secured from all participants before data collection commenced.

Results

Table 1: Socio-demographic variables determinants of knowledge score on HBV infection among the respondents

Socio-demographic Variables	Knowledge score				
	Poor (%)	Fair (%)	Good (%)	χ^2	P value n:461
Residence					
Campus	195 (77.6)	47 (18.9)	8 (3.5)		
Off campus	160 (78.3)	4 (2.4)	47 (19.3)	262.2	0.00*

Number Living together					
One	91 (77.8)	23 (19.6)	3 (2.6)		
2 – 3	120 (75.9)	32 (20.3)	6 (3.8)		
≥ 4	148 (79.6)	33 (17.7)	5 (2.7)	0.914	0.92
Institution					
UNILORIN	219 (78.8)	52 (18.7)	7 (2.5)		
KWASU	28 (84.8)	2 (6.1)	3 (9.1)		
AL-HIKMAH	43 (70.5)	16 (26.2)	2 (3.3)		
LANDMARK	69 (77.5)	18 (20.2)	2 (2.2)	9.732	0.13

*statistically significant

Table 1examines socio-demographic variables impacting knowledge scores, focusing on residence and living arrangements. The results indicate a significant association between residence and knowledge scores (χ^2 = 262.2, p < 0.00). Notably, off-campus respondents exhibited a much higher percentage of good knowledge (19.3%) compared to those living on-campus (3.5%). This finding could suggest that off-campus students have better access to health information or more opportunities to engage with health education resources outside of the university setting. The number of people living together did not show a statistically significant impact on knowledge scores (p = 0.92), indicating that living conditions are less influential on HBV knowledge than age or residence. Lastly, the institution attended also did not yield statistically significant differences in knowledge scores (p = 0.13), suggesting that while there may be variances; they are not strong enough to be statistically validated across the sampled institutions.

Risk Factors of HBV infection

Table 2: Distribution of risk factors for HBV infection among the respondents

Risk factors	**Yes (%)**	**No (%)**	**N= 511**
History of injection in the last one year	197 (38.6)	314 (61.4)	
Admission in the last one year	94 (18.4)	417 (81.6)	
Anybody with liver disease	38 (7.4)	473 (92.6)	
unprotected sexual intercourse	102 (20.0)	409 (80.0)	
Family history of HBV infection	38 (7.4)	473 (92.6)	
Intravenous drug use	29 (5.7)	482 (94.3)	
Sharing sharp objects	242 (47.4)	269 (52.6)	
Ear/Nose piercing	113 (22.1)	398 (77.9)	
Scarification mark	78 (15.3)	433 (84.7)	
Acupuncture & Tattooing	49 (9.6)	462 (90.4)	
Stayed with anybody on hospital admission	128 (25.0)	383 (75.0)	

Table 2 highlights notable 38.6% of respondents reported a history of injections in the past year, suggesting a significant prevalence of a behaviour often linked to

increased risk of bloodborne infections, including HBV. The majority, however, 61.4%, did not report such a history, indicating that while injection practices are a concern, they are not universally common among the population surveyed.18.4% of respondents had been admitted to a healthcare facility in the last year. This relatively low percentage indicates that hospital stays, which could potentially expose individuals to HBV through medical procedures or blood transfusions, are not a widespread risk factor in this cohort. Conversely, 81.6% of respondents had no recent admissions, which may reflect a generally healthy population or effective healthcare access. Only 7.4% of respondents reported having someone with liver disease in their vicinity, while a substantial 92.6% did not. This low percentage suggests that direct exposure to individuals with liver disease, a known risk factor for HBV, is infrequent among the respondents and may indicate limited familial or social contact with affected individuals.

Unprotected sexual intercourse was reported by 20.0% of respondents, highlighting a moderate risk factor for HBV transmission. The majority (80.0%) reported practicing safe sex, which suggests a general awareness of and adherence to safer sexual practices among the population. Family history of HBV infection was reported by 7.4% of respondents. This low percentage indicates that hereditary or familial risk factors for HBV is not prevalent in this sample, potentially reducing the likelihood of genetic predisposition to the virus. Intravenous drug use, a significant risk factor for HBV infection, was reported by only 5.7% of respondents. This suggests that substance abuse via injection is not a widespread behaviour in this cohort, which is encouraging from a public health perspective. A significant 47.4% of respondents reported sharing sharp objects, which is a substantial risk factor for HBV transmission. This high percentage raises concern about the potential for increased HBV spread, as sharing needles or other sharp implements can facilitate the transfer of blood and bodily fluids.

The practice of ear or nose piercing was reported by 22.1% of respondents. This moderate percentage suggests that while some individuals engage in body modification practices, the majority do not, which may mitigate risk if proper hygiene practices are followed. Scarification, reported by 15.3% of respondents, indicates another potential risk factor. This relatively lower percentage suggests that while some individuals may participate in this practice, it is not as prevalent as other behaviours such as sharing sharp objects. Acupuncture and tattooing were reported by 9.6% of respondents. Similar to scarification, this low prevalence may indicate that these practices are not widespread, which could reduce the overall risk of HBV transmission if conducted safely with sterilized equipment. Finally, 25.0% of respondents reported staying with someone who had been hospitalized. This could represent a moderate risk factor for potential exposure to HBV, depending on the nature of the hospital stay and the health condition of the individual admitted. However, a significant 75.0% had

no such contact, which may limit risk exposure in this demographic.

Table 3: Distribution of risk factors for HBV infection among the respondents

Risk factor	Frequency (%) N= 511
Blood transfusion	
Yes	63 (12.3)
No	448 (87.7)
Where blood was transfused	**n=63**
Government hospital	27 (42.9)
Private	36 (57.1)
Number of pints of blood transfused	
≤ 1	28 (44.4)
2 – 5	33 (52.4)
≥ 6	2 (3.2)

Table 3 reveals among the respondents, 12.3% reported having received a blood transfusion, while a substantial 87.7% indicated they had not. This relatively low percentage of individuals who have undergone blood transfusion suggests that this particular risk factor may not be as prevalent in the surveyed population. However, it still represents a significant concern, as any exposure through transfusion can lead to potential HBV infection. For those who did receive a transfusion (63 respondents), the data reveals where the transfusions took place. A majority, 57.1%, received their transfusions in private hospitals, while 42.9% were transfused in government hospitals. This distribution indicates a reliance on private healthcare facilities for blood transfusions, which may have implications for the quality and safety of the blood supply. Additionally, the data on the number of pints of blood transfused provides further insight. For those who received transfusions, 44.4% received one pint or less, while 52.4% received between two to five pints. Only 3.2% reported receiving six or more pints. This distribution suggests that most transfusion recipients had relatively moderate exposure, with the majority receiving fewer than six points. However, any transfusion carries a risk of HBV transmission, especially if the blood is not screened adequately.

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Table 4: Association between risk factors of HBV infection and the University of the Respondents

Risk factors	University (%)					
	UNILORIN	KWASU	AL-HIKMA	LANDMARK	X^2	p
Injection in the last one year	103 (34.3)	26 (57.8)	36 (52.9)	32 (33.7)	17.833	0.00*
Admission in the last one year	41 (13.5)	15 (33.3)	10 (14.7)	28 (29.5)	19.844	0.00*
Blood transfusion	27 (8.9)	13 (28.9)	7 (10.3)	16 (16.8)	16.743	0.00*
Unprotected sexual intercourse	46 (15.2)	15 (33.3)	24 (35.3)	17 (17.9)	24.420	0.00*
Family history of liver disease	14 (4.6)	10 (22.2)	10 (14.7)	4 (4.2)	27.966	0.00*
Intravenous drugs	13 (4.3)	9 (20.0)	6 (8.8)	1(1.1)	23.387	0.00*
Sharing sharp objects	145 (47.9)	20 (24.4)	26 (38.2)	51 (52.7)	3.978	0.26
Ear/Nose piercing	63 (20.8)	10 (22.2)	20 (29.4)	20 (21.1)	2.473	0.48
Scarification mark	35 (11.6)	7 (15.6)	22 (14.7)	14 (14.7)	18.606	0.00*
Acupuncture & Tattooing	22 (7.3)	10 (22.2)	10 (14.7)	7 (7.4)	12.773	0.00*
Stayed with anybody on hospital admission	137 (45.2)	19 (42.2)	34 (50.0)	52 (54.7)	6.995	0.32
Family member with HBV infection	9 (3.0)	7 (15.6)	14 (20.6)	9 (8.5)	45.379	0.00*

*Significant

Table 4 shows a significant association was found for several risk factors, with p-values less than 0.05, indicating strong statistical significance. For instance, the history of injections in the last year was reported by 34.3% of UNILORIN students, 57.8% at KWASU, 52.9% at AL-HIKMA, and 33.7% at LANDMARK, yielding a chi-square value of 17.833 and a p-value of 0.00. This suggests that injection practices may vary considerably among the universities, with KWASU exhibiting the highest prevalence. Similarly, the association with hospital admissions in the last year also showed significant variation. The percentages were 13.5% for UNILORIN, 33.3% for KWASU, 14.7% for AL-HIKMA, and 29.5% for LANDMARK, resulting in a chi-square value of 19.844 and a p-value of 0.00. This pattern indicates that students from KWASU had a notably higher rate of hospital admissions.

Blood transfusion as a risk factor also demonstrated significant differences, with 8.9% at UNILORIN, 28.9% at KWASU, 10.3% at AL-HIKMA, and 16.8% at LANDMARK ($X^2 = 16.743$, $p = 0.00$). This suggests that individuals from KWASU are more likely to have undergone blood transfusions compared to those from the other universities. Unprotected sexual intercourse was reported by 15.2% of UNILORIN respondents, 33.3% at KWASU, 35.3% at AL-HIKMA, and 17.9% at LANDMARK, with a chi-square value of

24.420 and a p-value of 0.00. The higher prevalence in KWASU and AL-HIKMA highlights a concerning trend regarding sexual health practices among students. Family history of liver disease showed significant differences as well, with frequencies of 4.6% at UNILORIN, 22.2% at KWASU, 14.7% at AL-HIKMA, and 4.2% at LANDMARK ($X^2 = 27.966$, $p = 0.00$). This indicates a higher awareness or occurrence of liver disease in students from KWASU.

The use of intravenous drugs was reported by 4.3% of respondents from UNILORIN, 20.0% from KWASU, 8.8% from AL-HIKMA, and 1.1% from LANDMARK, yielding a chi-square value of 23.387 and a p-value of 0.00, further indicating a higher prevalence among KWASU students. Conversely, some risk factors did not show statistically significant associations. The sharing of sharp objects had 47.9% prevalence at UNILORIN, 24.4% at KWASU, 38.2% at AL-HIKMA, and 52.7% at LANDMARK, with a chi-square value of 3.978 and a p-value of 0.26. Similarly, ear/nose piercing ($X^2 = 2.473$, $p = 0.48$) and staying with anyone on hospital admission ($X^2 = 6.995$, $p = 0.32$) did not show significant differences across the universities. Scarification marks displayed a significant association, with 11.6% at UNILORIN, 15.6% at KWASU, 14.7% at AL-HIKMA, and 14.7% at LANDMARK ($X^2 = 18.606$, $p = 0.00$). Acupuncture and tattooing also reflected significant variation, with 7.3% at UNILORIN, 22.2% at KWASU, 14.7% at AL-HIKMA, and 7.4% at LANDMARK ($X^2 = 12.773$, $p = 0.00$). Lastly, family history of HBV infection was notably higher among KWASU students (15.6% and 20.6% for AL-HIKMA), with a chi-square value of 45.379 and a p-value of 0.00, indicating a significant association.

Table 5: Association between sexual behaviour and HB status of the respondents

Sexual behaviour	**HB status (%)**		**X^2**	**p value**
	Positive n;35	**Negative n;476**		
Unprotected sexual intercourse				
Yes	18 (17.6)	84 (82.4)		
No	17 (3.7)	392 (96.3)	23.288	0.00*
Number of sexual partner				
0	5 (1.3)	367 (98.7)		
1	10 (12.7)	69 (87.3)		
> 1	20 (33.3)	40 (66.7)	87.81	0.00*
Number of times of intercourse (past three months)	**n;30**	**n;109**		
1	6 (24.0)	19 (76.0)		
2-3	15 (24.6)	46 (74.4)		
> 3	9 (17.0)	44 (83.0)	7.56	0.02*

*significant

Almost one-fifth, (17.6%) of the respondents that engaged in unprotected sexual intercourse were positive to HBsAg, compared with less than one tenth, 17 (3.7%) of those that were not engaged in an unprotected sexual intercourse. The observed differences were however statistically significantly. $p<0.05$. Just about one-tenth, (12.7%) of the respondents with one sexual partner were positive compared with one-third, (33.3%) of those with more than one. Statistically significant association was found between number of sexual partners and HB status.

Table 6: Association between Vaccination status and Institution

School	Vaccination Yes (%)	No (%)	χ^2	P	N= 511
UNILORIN	62 (20.5)	241 (79.5)			
KWASU	7 (15.6)	38 (84.4)			
AL-HIKMAH	12 (17.7)	56 (82.3)			
LANDMARK	20 (21.1)	75 (78.9)	0.481	0.92	

More than one-fifth, 20.5%, 21.1% of the respondents of UNILORIN and LANDMARK had history of vaccination against HBV respectively, compared with KWASU with lowest proportion, 15.6%. The differences observed confirmed no statistically significant association between vaccination status and Institutions of the respondents.

Discussion

The study revealed several significant risk factors associated with HBV infection among university students in Kwara State. Notably, the prevalence of HBV infection was found to be 7.0% among the respondents, indicating a concerning level of infection within this population. This prevalence is consistent with other studies conducted in similar settings, which have reported varying rates of HBV infection among young adults, highlighting the on-going public health challenge posed by this virus (Ogunbosi et al., 2020; Akinola et al., 2019). In addition, 38.6% of respondents had a history of injections in the past year, a behaviour closely linked to increased risk of blood borne infections, including HBV. This finding aligns with existing literature that emphasizes the importance of safe injection practices to mitigate the risk of HBV transmission. For instance, a study by Karam et al. (2018) found that unsafe injection practices were a significant risk factor for HBV transmission in healthcare settings, underscoring the need for stringent protocols to ensure safe practices. Moreover, the study found that 20.0% of respondents engaged in unprotected sexual intercourse, which is another critical risk factor. This prevalence is consistent with previous studies that have identified unsafe sexual practices as a major contributor to the spread of HBV, particularly in young adult populations (Opele & Adepoju, 2024). In addition, a study by Ojo et al. (2017) reported that unprotected sexual

intercourse was significantly associated with HBV infection among university students in Nigeria.

The association between unprotected sexual intercourse and positive HBsAg status underscores the need for comprehensive sexual health education and promotion of safe practices among university students. Significant associations between various demographic factors and risk behaviours across different universities. For instance, students from KWASU exhibited higher rates of risky behaviours such as unprotected sex and intravenous drug use compared to their peers at UNILORIN and LANDMARK. This variability suggests that targeted interventions should be tailored to the specific needs of different university populations to effectively address HBV risk factors. Similar findings were reported by Adesina et al. (2021), who emphasized the importance of context-specific interventions in addressing health risks among different demographic groups. Despite the concerning rates of certain risk behaviours, the study found that the history of vaccination against HBV was relatively low, with only 20.5% of UNILORIN respondents reporting vaccination. This highlights a critical gap in public health efforts, as vaccination is one of the most effective methods for preventing HBV infection (Opele et al., 2019)s. The World Health Organization (WHO) recommends universal vaccination against HBV, particularly for high-risk populations (WHO, 2021). The lack of statistically significant differences in vaccination rates among the universities suggests a need for increased awareness and accessibility of vaccination programs across all institutions. Previous studies have shown that educational interventions can significantly improve vaccination rates among university students (Ogunbiyi et al., 2019).

Conclusion

In conclusion, this study elucidates the various risk factors associated with HBV infection among university students in Kwara State, Nigeria. The findings indicate a significant prevalence of injection-related and sexual risk behaviours, underscoring the urgency for targeted public health interventions. Educational programs aimed at raising awareness about HBV transmission, the importance of safe practices, and promoting vaccination are essential to mitigate the risk of HBV infection in this vulnerable population. Future research should focus on longitudinal studies to monitor changes in risk behaviours and vaccination uptake over time, ensuring that public health strategies remain effective and responsive to the evolving landscape of HBV transmission dynamics among university students.

Recommendations

The following recommendations are suggested

1. Implement targeted educational programs on HBV transmission and prevention, focusing on high-risk behaviours such as unprotected sex and

unsafe injection practices among university students.
2. Expand access to HBV vaccination programs within universities, ensuring that all students, particularly those in high-risk categories, are informed about and encouraged to receive the vaccine.
3. Establish training and guidelines for safe injection practices in healthcare settings and among students, emphasizing the importance of using sterile equipment.
4. Facilitate regular HBV screening and testing in university health centers to identify infected individuals early and provide appropriate counseling and treatment.
5. Develop tailored interventions and support services for high-risk groups identified in the study, such as students with multiple sexual partners and intravenous drug users.
6. Encourage peer-led education initiatives where trained students can share knowledge about HBV prevention and safe practices, fostering a supportive environment for discussions.
7. Partner with local health authorities and organizations to enhance public health initiatives focused on HBV prevention, ensuring a coordinated response to the epidemic among young adults.

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