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| RESEARCH ARTICLE

An Investigation into the Hepatitis Infection Prevalence, Risk Factors and Preventive Measures among Students of Tertiary Institutions in Nasarawa State of Nigeria

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| ABSTRACT

This study investigated the prevalence, risk factors, and preventive measures of hepatitis infection among students in tertiary institutions in Nasarawa State, Nigeria. A cross-sectional design was employed, and a sample size of 422 students was determined using the Cochran formula. Data was collected using a structured questionnaire and analyzed using SPSS version 25. The study found that only 24.2% of respondents had heard of hepatitis infection, and the most common risk factors identified were sharing personal items (42.7%), unprotected sex (26.5%), and tattooing/body piercing (19.0%). The study highlights the need for increased education and awareness about hepatitis infection, its risk factors, and preventative measures among young adults in tertiary institutions.

| KEYWORDS

Hepatitis Infection, Tertiary Institutions, Students, Risk Factors, Preventive

| ARTICLE INFORMATION

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1. Introduction

Hepatitis refers to inflammation of the liver, often caused by viral infections. There are five main types of hepatitis viruses: hepatitis A (HAV), hepatitis B (HBV), hepatitis C (HCV), hepatitis D (HDV), and hepatitis E (HEV) (Lemon *et al*., 2018). Hepatitis B and C are the most common causes of chronic liver disease and liver cancer worldwide (Perz *et al*., 2006). Hepatitis B is a viral infection that attacks the liver and can cause both acute and chronic disease (WHO, 2019). Hepatitis C is a liver infection caused by the hepatitis C virus (HCV) that can lead to severe liver damage (Shepard *et al*., 2005).

Hepatitis is a significant public health problem worldwide, with an estimated 2 billion people infected with HBV and 71 million people chronically infected with HCV (WHO, 2019). According to the Global Burden of Disease Study, hepatitis B and C infections resulted in approximately 1.4 million deaths in 2016 (Stanaway *et al*., 2016). Studies have reported varying prevalence rates of HBV and HCV infections across different regions and populations (Alter, 2006; Ott *et al*., 2012). For example, a study in the United States found a prevalence of 0.3% for HBV and 1.3% for HCV among the general population (Wasley *et al*., 2010).

In Africa, hepatitis B and C infections are significant public health problems, with high prevalence rates reported in many countries (Kiire, 2005). According to the World Health Organization, WHO (2019), Africa has the highest burden of HBV infection, with an estimated 8% of the population chronically infected. Studies have reported high prevalence rates of HBV and HCV infections among different populations in Africa, including blood donors, pregnant women, and healthcare workers (Otegbayo *et al.*, 2008; Pennap *et al.*, 2011; Fasola *et al.*, 2015).

In Nigeria, hepatitis B and C infections are significant public health problems, with high prevalence rates reported among different populations (Okonko *et al.*, 2010; Ezeonu *et al.*, 2014). According to a study, the prevalence of HBV infection among blood donors in Nigeria was found to be 11.4% (Otegbayo *et al.*, 2008). Other studies have reported high prevalence rates of HBV and HCV infections among pregnant women, healthcare workers, and students in Nigeria (Pennap *et al.*, 2011; Ezeonu *et al.*, 2014; Lesi *et al.*, 2015).

Limited studies have been conducted on the epidemiology of hepatitis infection in Nasarawa State, Nigeria. However, a study found a prevalence of 13.4% for HBV infection among pregnant women in the state (Audu *et al.*, 2019).

Students in tertiary institutions are a vulnerable population for hepatitis infection due to their lifestyle, behaviors, and exposure to risk factors (Adebajo *et al.*, 2013). Sharing of personal items, unprotected sex, and tattooing are common practices among students that can increase the risk of hepatitis transmission (Lesi *et al.*, 2015). Studies have reported varying prevalence rates of HBV and HCV infections among students in different countries (Wasley *et al.*, 2010; Adebajo *et al.*, 2013). For example, a study in Nigeria found a prevalence of 11.1% for HBV infection among students in a tertiary institution (Lesi *et al.*, 2015).

Several risk factors contribute to the transmission of hepatitis infection, including unsafe injection practices, blood transfusions, and mother-to-child transmission (Alter, 2006). Other risk factors include unprotected sex, sharing of personal items, and tattooing (Wasley *et al.*, 2010). Studies have reported that individuals with a history of blood transfusion, surgery, or dental procedures are at higher risk of hepatitis infection (Okonko *et al.*, 2010; Pennap *et al.*, 2011).

Hepatitis Infection Treatment and Management Hepatitis infection treatment and management involve a range of medications and therapies aimed at reducing viral replication, preventing disease progression, and minimizing the risk of complications (World Health Organization, 2019).

1.1 Treatment Options for Hepatitis C

Sofosbuvir and Velpatasvir (Epclusa): This combination therapy is highly effective for treating hepatitis C genotypes 1-6, with a cure rate of over 90% when taken for 8-12 weeks (Foster *et al.*, 2015). The recommended dosage is one tablet (400 mg sofosbuvir and 100 mg velpatasvir) taken orally once daily (Gilead Sciences, Inc., 2020).

Glecaprevir and Pibrentasvir (Mavyret): This combination therapy is effective for treating hepatitis C genotypes 1-6, with a cure rate of 98-99% when taken for 8-12 weeks (Zeuzem *et al.*, 2018). The recommended dosage is three tablets (300 mg glecaprevir and 120 mg pibrentasvir) taken orally once daily with food (AbbVie Inc., 2020).

Elbasvir and Grazoprevir (Zepatier): This combination therapy is effective for treating hepatitis C genotype 1, with a recommended dosage of one tablet (50 mg elbasvir and 100 mg grazoprevir) taken orally once daily for 12-16 weeks (Merck & Co., Inc., 2020).

1.2 Treatment Options for Hepatitis B

Lamivudine: This medication can be used to treat hepatitis B, with a recommended dosage of 100 mg taken orally once daily (Lai *et al.*, 2003). Combination therapy with pegylated interferon (PEG-IFN) may improve virologic response (Janssen *et al.*, 2005).

Entecavir: This medication can be used to treat hepatitis B, with a recommended dosage of 0.5-1 mg taken orally once daily (Chang *et al.*, 2006). Combination therapy with PEG-IFN may increase viral response (Bristol-Myers Squibb Company, 2020). Monitoring and Managing Treatment - On-treatment monitoring: Patients should be

monitored for hypoglycemia, particularly those on diabetes medication (American Diabetes Association, 2020). - Adverse events: Common adverse events associated with hepatitis C treatment include headache, fatigue, diarrhea, and nausea (Younossi *et al*., 2019).

Preventive measures, such as vaccination, safe injection practices, and health education, can reduce the transmission of hepatitis infection (WHO, 2019). Hepatitis B vaccination is highly effective in preventing HBV infection, and is recommended for all infants and high-risk groups (WHO, 2019). Other preventive measures include avoiding sharing of personal items, using condoms during sex, and avoiding tattooing or body piercing.

2. Materials and Methods

2.1 Study Design

This study employed a cross-sectional design to investigate the prevalence, risk factors, and preventive measures of hepatitis infection among students in tertiary institutions in Nasarawa State, Nigeria.

2.2 Study Area

The study was conducted in Nasarawa State, Nigeria, specifically in tertiary institutions located in the state. Public tertiary institutions namely: Federal University of Lafia (Fulafia), Nasarawa State University Keffi (NSUK), Federal Polytechnic Nasarawa (Naspoly), Isa Mustapha Agwai I Polytechnic (IMAP) Lafia, College of Education Akwanga (COEA), College of Agriculture Science and Technology (COAST) Lafia, Nasarawa State College of Health Science and Technology (NSCOHST) Keffi, and College of Nursing (CON) Lafia were purposely selected for this study.

2.3 Sample Size and Determination

A sample size of 422 students and Cochran formula is used to determine the sample size in this study. The Cochran formula is used to determine the sample size for a study, especially when estimating proportions or percentages. The formula is as follows:

$n = (Z^2 * p * q) / d^2$

Where:

n = sample size;

Z = Z-score corresponding to the desired level of confidence (usually 1.96 for 95% confidence level);

p = estimated proportion of the population with the characteristic of interest (prevalence rate);

q = 1 - p (proportion of the population without the characteristic); and

d = margin of error (usually 0.05 for 5% margin of error).

In this study, the sample size was determined using the Cochran formula as follows:

$n = (Z^2 * p * q) / d^2$

$n = (1.96^2 * 0.111 * 0.889) / 0.05^2$

$n = (3.8416 * 0.0987) / 0.0025$

$n = 0.3795 / 0.0025$

n = 422 (approximately)

Where:

Z = 1.96 (for 95% confidence level)

p = 0.111 (prevalence rate of 11.1% from Lesi *et al*., 2015)

q = 1 - 0.111 = 0.889

d = 0.05 (margin of error of 5%)

Therefore, the sample size for this study was determined to be approximately 422 students.

The multi-stage sampling technique was used to select participants from the study area. This involves selecting the sample in stages, starting with larger units (e.g., institutions) and then selecting smaller units (e.g., students) within those units. This technique is useful when the population is large and dispersed, and it allows for more efficient sampling and data collection.

2.4 Procedure for Data Collection

The data collection procedures for this study were as follows:

Step 1: Institutional Approval

The researchers obtained approval from the management of each of the 8 selected tertiary institutions in Nasarawa State, Nigeria. The institutions and their samples collected are: Federal University of Lafia (Fulafia) - 53 students; Nasarawa State University Keffi (NSUK) - 53 students; Federal Polytechnic Nasarawa (Naspoly) - 53 students; Isa Mustapha Agwai I Polytechnic (IMAP) Lafia - 53 students; College of Education Akwanga (COEA) - 53 students; College of Agriculture Science and Technology (COAST) Lafia - 53 students; Nasarawa State College of Health Science and Technology (NSCOHST) Keffi - 53 students; and College of Nursing (CON) Lafia - 50 students.

Step 2: Participant Selection

The researchers used a multi-stage sampling technique to select participants from each institution. The participants were selected randomly from various departments and levels of study.

Step 3: Questionnaire Administration

The researchers administered a structured questionnaire to the selected participants in each institution. The questionnaire was designed to collect data on socio-demographic characteristics, knowledge, attitudes, and practices regarding hepatitis infection.

Step 4: Data Collection

The participants were given the questionnaire to complete, and the researcher ensured that all questions were answered accurately and completely. The researcher also provided clarification and guidance to participants as needed.

Step 5: Data Quality Control

The researcher checked the completed questionnaires for accuracy, completeness, and consistency to ensure high-quality data.

2.5 Data Collection Timeline

The data collection process was done between 2 - 3 months in the year 2024, and it's depending on the availability of participants and the researchers' scheduled.

2.6 Data Collection Tools

The data collection tool used in this study was a structured questionnaire. The questionnaire was designed to collect data on socio-demographic characteristics, knowledge, attitudes, and practices regarding hepatitis infection.

2.7 Inclusion and Exclusion Criteria

Inclusion criteria included students who were enrolled in tertiary institutions in Nasarawa State, Nigeria, and who gave informed consent to participate in the study. Exclusion criteria included students who were not willing to participate or who did not complete the questionnaire.

2.8 Limitation of the Study

This study had some limitations, including the cross-sectional design, which limited the ability to establish causality between variables. Additionally, the study relied on self-reported data, which may be subject to bias. Despite these

limitations, the study provides valuable insights into the prevalence, risk factors, and preventative measures of hepatitis infection among students in tertiary institutions in Nasarawa State, Nigeria.

3. Results

3.1 Presentation of Frequency Distribution Tables

Table 1: Socio-Demographic Characteristics of Respondents

Characteristic	Frequency (n)	Percentage (%)
Age (18-20 years)	150	35.5
Age (21-23 years)	180	42.7
Age (24 years and above)	92	21.8
Male	220	52.1
Female	202	47.9
Year 1	120	28.4
Year 2	130	30.8
Year 3	90	21.3
Year 4 and above	82	19.4

Note: n = 422.

Table 2: Knowledge of Hepatitis Infection

Statement	Frequency (n)	Percentage (%)
Heard of hepatitis infection	102	24.2
Know hepatitis B is a viral infection	100	23.7
Know hepatitis C is a viral infection	100	23.4
Believe hepatitis infection is a serious health problem	120	28.4

Note: n = 422.

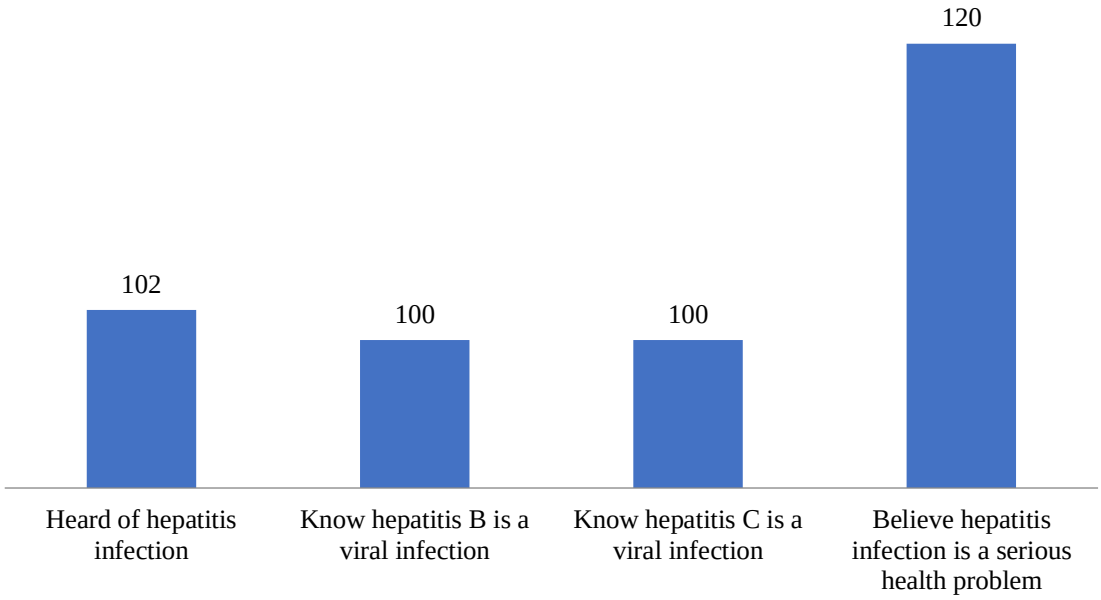

Fig. 1: Knowledge of Hepatitis Infection

Table 3: Risk Factors for Hepatitis Infection

Risk Factor	Frequency (n)	Percentage (%)
Sharing personal items	180	42.7
Unprotected sex	112	26.5
Tattooing/body piercing	80	19.0
Blood transfusion	50	11.8

Note: n = 422.

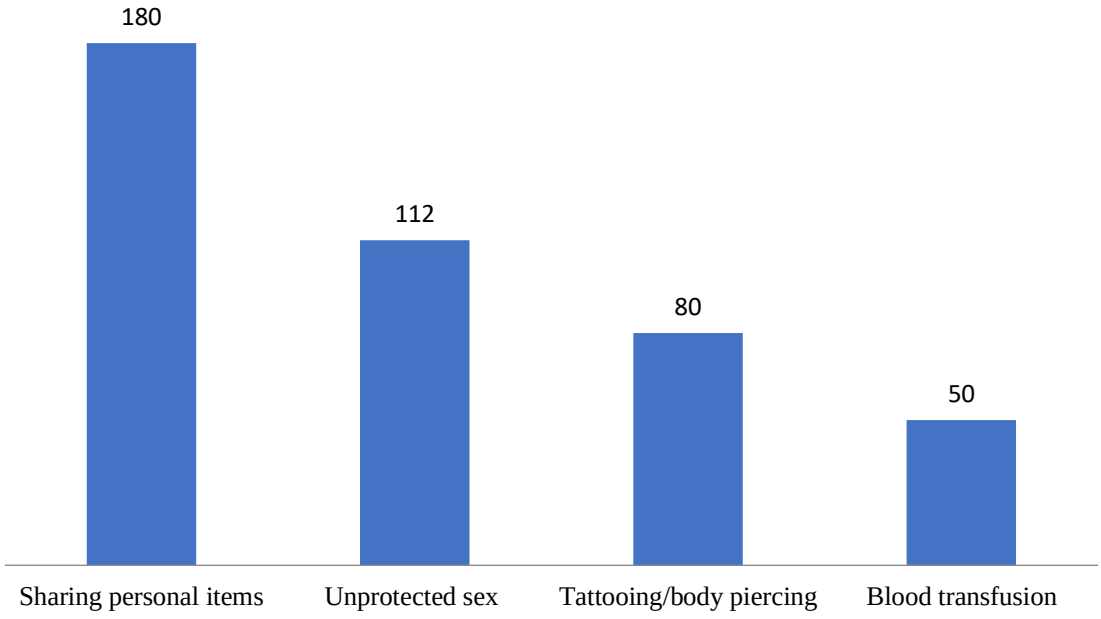

Fig. 2: Risk Factors for Hepatitis Infection

Table 4: Preventive Measures for Hepatitis Infection

Preventive Measure	Frequency (n)	Percentage (%)
Vaccination against hepatitis B	102	24.
Using condoms during sex	100	24
Avoiding sharing personal items	120	28
Avoiding tattooing/body piercing	100	24

Note: n = 422.

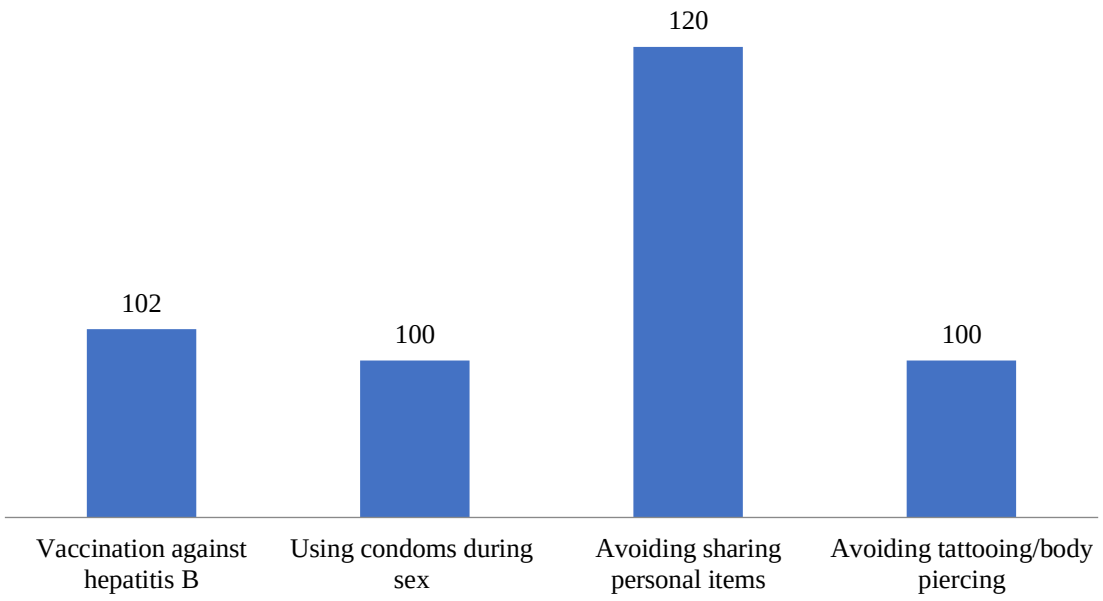

Fig. 3: Preventive Measures for Hepatitis Infection

4. Discussion

4.1 Socio-Demographic Characteristics

The majority of respondents (42.7%) were between 21-23 years old, and slightly more males (52.1%) participated than females (47.9%). This demographic distribution is consistent with other studies on young adults in tertiary institutions, such as the study by Adebajo *et al*. (2013), which reported a similar age and gender distribution.

4.2 Knowledge of Hepatitis Infection

Only 24.2% of respondents had heard of hepatitis infection, and a similar percentage knew that hepatitis B and C are viral infections. This lack of knowledge is concerning and consistent with other studies that have reported low awareness of hepatitis infection among young adults, such as the study by Lesi *et al*. (2015), which found that only 30.5% of respondents had adequate knowledge of hepatitis B infection.

4.3 Risk Factors for Hepatitis Infection

The most common risk factors identified were sharing personal items (42.7%), unprotected sex (26.5%), and tattooing/body piercing (19.0%). These findings are consistent with other studies that have reported similar risk factors among young adults, such as the study by Wasley *et al*. (2010), which found that sharing personal items (45.6%) and unprotected sex (29.4%) were common risk factors for hepatitis B infection.

4.4 Preventive Measures for Hepatitis Infection

The most common preventative measures reported were avoiding sharing personal items (28%), vaccination against hepatitis B (24%), and using condoms during sex (24%). These findings suggest that respondents are taking some steps to prevent hepatitis infection, but more education and awareness are needed to increase the adoption of preventative measures, as emphasized by WHO (2019), which recommends vaccination against hepatitis B as a key preventative measure.

5. Conclusion

The study highlights the need for increased education and awareness about hepatitis infection, its risk factors, and preventative measures among young adults in tertiary institutions. The findings suggest that respondents have limited knowledge of hepatitis infection and its transmission, but are taking some steps to prevent it. More efforts are needed to promote knowledge, awareness, and adoption of preventive measures.

5.1 Recommendation

Based on the study's findings above, we therefore, recommend the following:

1. The management of tertiary institutions should incorporate health education programs that focus on hepatitis infection, its transmission, and prevention.
2. The management of institutions should provide access to hepatitis B vaccination for students.
3. Public health professionals should develop targeted awareness campaigns to increase knowledge and promote preventative behaviors among young adults.
4. The management of institutions should improve access to healthcare services, including vaccination and testing, for students.

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Author's Contributions

JMD and OMU conceptualized the study. OMU, ARS, ATJ and AI design the study. OMU, AI, JMD, ATJ and ARS contributed to the bench work. All Authors contributed to the development of the final manuscript and approved its submission. JMD, ARS, ATJ and AI prepared the final draft which was reviewed by OMU.

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