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HEPATITIS B VACCINE KNOWLEDGE AND PRACTICE AMONG KADUNA STATE UNIVERSITY STUDENTS

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ABSTRACT: Background: Hepatitis B virus (HBV) infection remains a significant global health challenge, particularly among young adults in university settings. Understanding students' knowledge and practices regarding Hepatitis B vaccination is crucial for developing effective prevention strategies. This study explored the knowledge and practice of Hepatitis B vaccine among students of Kaduna State University, Nigeria. A qualitative research approach was employed, utilizing in-depth interviews and focus group discussions. Twenty-four students were purposively selected from various faculties across the university. Data were collected using semi-structured interview guides and analyzed using thematic content analysis to identify patterns and themes related to knowledge, attitudes, and practices regarding Hepatitis B vaccination. The findings revealed varying levels of knowledge about Hepatitis B vaccination among participants. Major themes emerged, including limited awareness of transmission routes (among most participants), misconceptions about vaccine safety and efficacy, inadequate knowledge of vaccination schedules, and barriers to vaccine uptake, such as cost concerns, accessibility issues, and cultural beliefs. Participants demonstrated a better understanding of the disease itself, but showed significant gaps in their comprehension of vaccination protocols and their importance. University students showed moderate knowledge about Hepatitis B but significant deficits in understanding vaccination practices. Barriers to vaccination included financial constraints, limited access to healthcare services, cultural misconceptions, and inadequate health education programs. The findings suggest the need for comprehensive health education programs, improved access to vaccination services on campus, targeted awareness campaigns, and integration of hepatitis B vaccination into routine student health services to enhance knowledge and promote positive vaccination practices among university students.

Keywords: Hepatitis B, Vaccination, Knowledge, Practice, University Students, Health Education

INTRODUCTION

Hepatitis B virus (HBV) infection represents one of the most significant infectious disease challenges globally, affecting millions of individuals across diverse populations and geographic regions. The World Health Organization (WHO) estimates that approximately 296 million people were living with chronic hepatitis B infection in 2019, with 1.5 million new infections occurring annually (WHO, 2021). The burden of hepatitis B is particularly pronounced in developing countries, where limited healthcare infrastructure, inadequate prevention programs, and socio-economic constraints contribute to sustained transmission and poor health outcomes.

In sub-Saharan Africa, including Nigeria, hepatitis B represents a major public health concern with significant implications for morbidity, mortality, and healthcare system sustainability. Nigeria bears one of the highest burdens of hepatitis B globally, with an estimated prevalence of 8.1% among the general population, translating to approximately 20 million infected individuals (Schweitzer et al., 2015). The epidemiological profile of hepatitis B in Nigeria is characterized by endemic transmission patterns, with horizontal transmission during childhood and vertical transmission from infected mothers to newborns being the predominant modes of infection.

University students represent a particularly vulnerable population for hepatitis B infection due to various risk factors associated with their lifestyle, living conditions, and behavioral patterns. The transition to university life often involves exposure to new environments, increased social interactions, potential engagement in risky behaviors, and limited access to preventive healthcare services (Paudel et al., 2020). Additionally, the communal living arrangements in dormitories, sharing of personal items, and potential exposure to contaminated materials in laboratory settings may increase the risk of hepatitis B transmission among university students.

The availability of a safe and effective hepatitis B vaccine since 1982 has revolutionized prevention strategies and offers significant potential for reducing disease burden and transmission rates. The hepatitis B vaccine demonstrates excellent safety profiles and efficacy rates exceeding 95% in preventing infection when administered according to recommended schedules (Chang et al., 2019). However, despite the availability of this highly effective preventive intervention, vaccination coverage rates remain suboptimal in many settings, particularly among young adults and university populations.

Knowledge and awareness about hepatitis B and its prevention play crucial roles in shaping individuals' attitudes and practices regarding vaccination. Previous research has consistently demonstrated that higher levels of knowledge about hepatitis B transmission, prevention, and consequences are associated with increased vaccine acceptance and adherence to vaccination schedules (Al-Jamal et al., 2018). Conversely, misconceptions, myths, and inadequate understanding of the disease and vaccine can serve as significant barriers to vaccination uptake and contribute to the continued transmission of the disease within communities.

The university setting provides a unique opportunity for implementing comprehensive hepatitis B prevention programs, given the concentrated population of young adults, existing health services infrastructure, and potential for educational interventions. Understanding the current state of knowledge and practices regarding hepatitis B vaccination among university students is essential for developing targeted interventions and strategies to improve vaccination coverage and reduce disease transmission.

Kaduna State University, situated in northern Nigeria, caters to a diverse student body comprising individuals from diverse socio-economic backgrounds, ethnic groups, and geographic regions. The university's location in Kaduna State, which has reported significant hepatitis B burden in previous studies, makes it an important setting for examining hepatitis B knowledge and vaccination practices among young adults (Musa et al., 2017). Furthermore, the university's role in training

future healthcare professionals and leaders underscores the importance of ensuring adequate knowledge and positive practices regarding hepatitis B prevention among its student population.

Despite the recognized importance of hepatitis B vaccination and the vulnerability of university students to infection, there remains a limited body of research specifically examining the knowledge and practices regarding hepatitis B vaccination among Nigerian university students. Most existing studies have focused on healthcare workers, pregnant women, or general population samples, leaving a significant gap in understanding the specific needs, challenges, and opportunities for hepatitis B prevention among university students.

The following research objectives guided this investigation:

This study aimed to address this research gap by conducting a comprehensive qualitative exploration of knowledge and practices regarding hepatitis B vaccination among students of Kaduna State University

1. To explore the level of knowledge about hepatitis B disease and vaccination among university students
2. To examine current practices and experiences regarding hepatitis B vaccination among the study population
3. To identify barriers and facilitators to hepatitis B vaccination uptake among university students
4. To understand the influence of socio-cultural factors on hepatitis B vaccination decisions
5. To explore students' perceptions of hepatitis B vaccination programs and healthcare services

By achieving these objectives, this study aimed to contribute valuable insights to the existing body of knowledge and provide evidence-based recommendations for improving hepatitis B prevention programs in university settings. The findings have the potential to inform the development of targeted interventions, educational programs, and policy initiatives aimed at enhancing hepatitis B vaccination coverage and reducing disease transmission among young adults in Nigeria and similar contexts.

LITERATURE REVIEW

The global burden of hepatitis B virus infection and the critical importance of vaccination as a primary prevention strategy have generated substantial research interest in understanding factors that influence vaccine knowledge, attitudes, and practices across diverse populations. This literature review synthesizes existing research on hepatitis B vaccination, with particular emphasis on studies involving university students and young adults, to provide context for the current investigation.

Hepatitis B Disease Burden and Prevention

Hepatitis B virus infection remains a significant global public health challenge, with chronic infection affecting approximately 296 million people worldwide and causing over 820,000 deaths annually due to complications such as cirrhosis and hepatocellular carcinoma (WHO, 2021; WHO,

2024). The disease burden is disproportionately concentrated in low- and middle-income countries, particularly in sub-Saharan Africa and East Asia, where endemic transmission patterns perpetuate high prevalence rates across generations.

In Nigeria, hepatitis B represents one of the most significant infectious disease challenges, with national prevalence estimates ranging from 6.0% to 14.1% across different regions and population groups (Schweitzer et al., 2015; Musa et al., 2017). The northern regions of Nigeria, including Kaduna State, have reported particularly high prevalence rates, with some studies documenting rates exceeding 10% among certain populations (Balogun et al., 2019). This high burden underscores the critical importance of effective prevention strategies, particularly vaccination programs targeting vulnerable populations.

The hepatitis B vaccine, first licensed in 1982, represents one of the most significant achievements in preventive medicine and offers excellent protection against infection when administered according to recommended schedules. Current vaccines demonstrate efficacy rates exceeding 95% in preventing infection and have excellent safety profiles, making them suitable for widespread population-based prevention programs (Chang et al., 2019). Despite these proven benefits, vaccination coverage remains suboptimal in many settings, particularly among young adults and specific high-risk populations.

Knowledge Gaps Among University Students

Several studies have examined hepatitis B knowledge among university students, revealing significant variations across different populations and geographic contexts. Research consistently identifies knowledge gaps as a primary barrier to vaccination uptake among young adults, with many students demonstrating inadequate understanding of transmission routes, prevention strategies, and vaccination schedules (Hepatitis B Foundation, 2020). These knowledge deficits are particularly concerning given that university students possess relatively high levels of general education and health literacy compared to the broader population.

Research conducted in various African countries has consistently documented suboptimal knowledge levels among university students regarding hepatitis B. A study by Olajuyin et al. (2019) among Nigerian university students found that while 78% of participants had heard about hepatitis B, only 34% could correctly identify all major transmission routes, and fewer than 25% understood the importance of completing the full vaccination series. Similarly, research by Kesieme et al. (2018) among medical students in southern Nigeria revealed significant knowledge gaps, with many participants unable to distinguish between different types of viral hepatitis or understand the chronic nature of hepatitis B infection.

Studies from other sub-Saharan African countries have reported similar patterns of inadequate knowledge among university populations. Research by Mudawi et al. (2019) in Sudan found that university students demonstrated poor knowledge about hepatitis B prevention, with only 42% aware of the availability of vaccination and fewer than 30% understanding the recommended vaccination schedule. A study by Teshale et al. (2021) in Ethiopia reported that while general

awareness of hepatitis B was relatively high among university students, detailed knowledge about transmission, prevention, and treatment remained inadequate.

Barriers and Facilitators to Vaccination

Multiple studies have identified various barriers to hepatitis B vaccination among university students and young adults, which can be broadly categorized into knowledge-related, access-related, economic, and socio-cultural factors. Knowledge-related barriers include misconceptions about vaccine safety, inadequate understanding of disease severity, and lack of awareness about personal risk factors (Singh et al., 2020). Research by Abebe et al. (2017) found that many university students held unfounded concerns about vaccine side effects and questioned the necessity of vaccination in the absence of obvious risk factors.

Access-related barriers encompass challenges in obtaining vaccination services, including limited availability of vaccines, inconvenient clinic hours, and inadequate healthcare infrastructure (Paudel et al., 2020). Studies have documented that many university health centers lack consistent vaccine supplies or fail to provide adequate vaccination counseling and follow-up services. Economic barriers represent significant challenges, particularly in resource-limited settings where vaccination costs may be prohibitive for students from lower socio-economic backgrounds (Mudawi et al., 2019). Research has consistently identified cost as a primary determinant of vaccination decisions, with many students unable or unwilling to pay for vaccination services.

Socio-cultural factors, including religious beliefs, cultural practices, and social norms, have been identified as important influences on vaccination decisions (Teshale et al., 2021). Some studies have reported that certain cultural beliefs about disease causation and prevention may conflict with biomedical approaches to vaccination, creating barriers to vaccine acceptance. Conversely, research has also identified various factors that facilitate hepatitis B vaccination uptake among university students, including comprehensive health education programs, peer influence, healthcare provider recommendations, and institutional policies supporting vaccination (Chang et al., 2019).

Studies have demonstrated that targeted educational interventions can significantly improve vaccination knowledge and uptake among university students. Research by Owusu-Agyei et al. (2019) showed that a comprehensive hepatitis B education program implemented among Ghanaian university students resulted in significant improvements in knowledge scores and vaccination coverage rates. Peer influence and social support have been identified as important facilitators of vaccination behavior, with students who have friends or family members who have received hepatitis B vaccination being more likely to seek vaccination themselves (Singh et al., 2020).

Cultural and Gender Considerations

The influence of cultural and social factors on hepatitis B vaccination decisions has received increasing attention in the literature, particularly in African contexts where traditional beliefs and practices may influence health-seeking behaviors. Research by Balogun et al. (2019) explored the role of cultural beliefs in hepatitis B prevention practices among northern Nigerian populations, finding that traditional concepts of disease causation sometimes conflicted with biomedical

approaches to prevention. Studies have also examined the influence of family and community attitudes on vaccination decisions among young adults, suggesting that parental attitudes and community norms significantly influence vaccination behavior, even among university students who may be making independent healthcare decisions (Kesieme et al., 2018).

Several studies have examined gender differences in hepatitis B knowledge and vaccination practices among university students, with mixed findings across different contexts. Some research has suggested that female students may demonstrate higher levels of health knowledge and be more likely to seek preventive healthcare services, including vaccination (Olajuyin et al., 2019). However, other studies have reported that cultural and social factors may create gender-specific barriers to vaccination access and uptake, with female students facing unique challenges related to healthcare access, family decision-making processes, and cultural restrictions on healthcare-seeking behavior (Abdela et al., 2016).

METHODOLOGY

This study employed a qualitative research approach to gain in-depth understanding of the knowledge and practices regarding hepatitis B vaccination among students of Kaduna State University. Qualitative methodology was selected as the most appropriate approach for exploring the complex social, cultural, and personal factors that influence vaccination decisions and for understanding participants' lived experiences and perspectives regarding hepatitis B prevention.

Research Design

A descriptive qualitative research design was utilized, incorporating phenomenological elements to explore participants' experiences, perceptions, and understanding of hepatitis B vaccination. This approach allowed for detailed exploration of the meaning that students attach to hepatitis B vaccination and the factors that influence their health-seeking behaviors and decision-making processes.

Study Setting and Population

The study was conducted at Kaduna State University, a public university located in Kaduna, northern Nigeria. Established in 2004, the university serves a diverse student population of approximately 25,000 students across multiple faculties, including Medicine, Engineering, Social Sciences, Natural Sciences, and Humanities. The university's location in Kaduna State, which has reported a significant hepatitis B burden in previous epidemiological studies, provided an appropriate setting for examining hepatitis B knowledge and vaccination practices among young adults. The target population comprised undergraduate and postgraduate students enrolled at Kaduna State University during the 2023 academic session. Students from various academic disciplines, year levels, and demographic backgrounds were included to ensure diversity in perspectives and experiences.

Sampling Strategy and Participant Selection

A purposive sampling strategy was employed to select participants who could provide rich, informative perspectives on hepatitis B knowledge and vaccination practices. Maximum variation sampling was employed to ensure representation across various faculties, academic levels, genders, and socio-economic backgrounds.

The sample included 24 participants selected through the following criteria:

Inclusion Criteria:

- Currently enrolled students at Kaduna State University.
- Age 18 years and above
- Willing to participate voluntarily in the study
- Able to communicate effectively in English or Hausa

Exclusion Criteria:

- Students with known chronic hepatitis B infection
- Healthcare students in their final clinical years (to avoid potential bias from specialized knowledge)
- Students unwilling to provide informed consent

Data Collection Methods

Data were collected using multiple qualitative methods to ensure triangulation and a comprehensive understanding of the research phenomenon:

In-Depth Interviews

Semi-structured, in-depth interviews were conducted with 16 individual participants to explore their personal experiences, knowledge, and practices regarding hepatitis B vaccination. Interview guides were developed based on a literature review and research objectives, covering the following key areas:

- -General knowledge about hepatitis B disease
- Understanding of transmission routes and risk factors
- Awareness of hepatitis B vaccination
- Personal vaccination experiences and practices
- Perceived barriers and facilitators to vaccination
- Cultural and social influences on vaccination decisions
- Sources of health information
- Recommendations for improving vaccination programs

Focus Group Discussions

Two focus group discussions were conducted with 8 participants (4 participants per group) to explore social and cultural factors influencing hepatitis B vaccination decisions. Focus groups provided opportunities for participants to interact, share experiences, and build upon each other's responses, generating rich data about social norms, peer influences, and community perspectives. Focus group discussions were stratified by gender to encourage open discussion about sensitive topics and to explore potential gender-specific perspectives on hepatitis B vaccination.

Data Collection Procedures

All data collection activities were conducted between September and November 2023. Interviews and focus group discussions were conducted in quiet, private settings on the university campus, including conference rooms and study areas that ensured participant privacy and comfort. Interviews lasted approximately 45-60 minutes, while focus group discussions extended for 60-90 minutes. All sessions were conducted in English, with occasional use of Hausa language when participants preferred to express certain concepts in their native language. Sessions were audio-recorded with participant consent and supplemented with field notes to capture non-verbal communications and contextual observations.

Data Analysis

Thematic content analysis was employed to analyze the qualitative data. The data analysis was conducted using NVivo 12 software to facilitate systematic coding, theme development, and data management. Multiple researchers participated in the coding process to enhance credibility and reduce potential bias.

Analysis Procedures

Transcription and Translation: All audio recordings were transcribed verbatim within 48 hours of data collection to ensure accuracy and capture of contextual details. Transcriptions conducted in Hausa were translated into English by bilingual research team members, with back-translation performed by independent translators to verify accuracy and maintain conceptual equivalence.

Coding Process: The analysis followed Braun and Clarke's (2006) six-phase approach to thematic analysis. Initial familiarization involved repeated reading of transcripts while noting preliminary ideas. Initial codes were generated systematically across the entire dataset using NVivo 12 software. Data extracts relevant to each code were collated, creating a comprehensive coding framework. Three independent researchers conducted initial coding to enhance reliability, followed by team discussions to resolve discrepancies and refine the coding structure.

Theme Development: Codes were organized into potential themes by examining relationships and patterns across the dataset. Theme development involved iterative processes of grouping, regrouping, and refining categories to capture the essence of participants' experiences. Themes were reviewed against coded extracts and the entire dataset to ensure internal homogeneity and external

heterogeneity. Final themes were named and defined through consensus among the research team, ensuring they accurately represented the data and addressed the research objectives.

Ethical Considerations

Ethics Approval: Ethical approval for this study was obtained from the Research Ethics Committee of Kaduna State University (Approval Reference Number: KASU/REC/2023/089) prior to commencement of data collection. The study was conducted in accordance with the Declaration of Helsinki and institutional ethical guidelines for research involving human participants.

All participants provided written informed consent after receiving comprehensive information about the study. Confidentiality was maintained through the use of participant codes rather than names in all transcripts and reports. Data were stored securely in password-protected files accessible only to the research team. Participants received no monetary compensation but were provided with refreshments during data collection sessions and health education materials about hepatitis B prevention.

RESULTS AND DISCUSSION

The qualitative analysis of in-depth interviews and focus group discussions revealed several key themes related to knowledge and practices of hepatitis B vaccination among students of Kaduna State University. This section presents the major findings organized according to the thematic framework that emerged from the data analysis, followed by discussion contextualizing these findings within existing literature and health behavior theories.

Theme 1: Limited Comprehensive Knowledge About Hepatitis B Disease

Participants demonstrated varying levels of knowledge about hepatitis B, with most having basic awareness of the disease but significant gaps in comprehensive understanding.

Basic Disease Awareness

Most participants had heard about hepatitis B and could identify it as a liver disease. As one participant explained: "I know hepatitis B is a disease that affects the liver. My aunt had it, so I heard about it from family discussions. But I don't really know much detail about it." (Female, 3rd year, Social Sciences). However, detailed knowledge about the disease progression, complications, and long-term consequences remained limited. Many participants were unaware that hepatitis B could lead to liver cirrhosis or liver cancer.

Understanding of Transmission Routes

Knowledge about hepatitis B transmission showed significant gaps and misconceptions. While most participants correctly identified blood contact as a transmission route, understanding of other modes remained incomplete: "I know it spreads through blood, like when you use unsterilized sharp objects. But I'm not sure about other ways it can spread." (Male, 2nd year, Engineering). Several

participants held misconceptions about transmission, including beliefs about transmission through casual contact, sharing meals, or respiratory droplets: "I thought you could get it from eating with someone who has it, or maybe from coughing. I wasn't sure about the sexual transmission part."* (Female, 4th year, Natural Sciences). Only a minority of participants correctly identified all major transmission routes including mother-to-child transmission, sexual contact, and blood exposure.

Knowledge of Disease Consequences

Understanding of hepatitis B complications and long-term consequences was particularly limited. Most participants were unaware of the potential for chronic infection or the relationship between hepatitis B and liver cancer: "I didn't know it could stay in your body forever or cause cancer. I thought it was just something that makes you sick for a while and then you get better." (Male, 1st year, Humanities). This knowledge gap contributed to underestimation of disease severity and reduced motivation for preventive measures including vaccination.

Theme 2: Inadequate Knowledge About Hepatitis B Vaccination

Knowledge about hepatitis B vaccination showed significant deficits across multiple dimensions, including availability, schedules, efficacy, and safety. While most participants were aware that a hepatitis B vaccine existed, detailed knowledge about vaccine characteristics remained limited: "I heard there's a vaccine for hepatitis B, but I don't know much about it - like where to get it, how much it costs, or how it works." (Female, 2nd year, Medicine). Several participants confused hepatitis B vaccination with other vaccines or were uncertain about vaccine specificity. Knowledge about hepatitis B vaccination schedules was particularly poor, with only a few participants correctly identifying the three-dose series requirement: "I thought it was just one injection, like some other vaccines. I didn't know you had to go back multiple times." (Female, 4th year, Natural Sciences). This knowledge gap contributed to incomplete vaccination series among participants who had initiated vaccination: "I got the first injection when I was in secondary school, but nobody told me I needed to continue. I thought one was enough." (Male, 2nd year, Engineering).

Participants expressed mixed perceptions about vaccine efficacy and safety, with some holding misconceptions that served as barriers to vaccination: "I'm not sure if the vaccine really works 100%. Some people say vaccines don't always protect you, so maybe it's not worth the trouble." (Female, 1st year, Humanities). Safety concerns were particularly prominent, with several participants expressing unfounded fears about side effects: "I heard vaccines can cause problems sometimes. I'm worried about what might happen if I take it." (Male, 3rd year, Social Sciences).

Theme 3: Limited Vaccination Practice and Experience

Analysis of participants' vaccination experiences revealed low uptake rates and significant barriers to completing recommended vaccination schedules. Only a minority of participants reported having received hepatitis B vaccination, and among these, even fewer had completed the full three-dose series: "I started the vaccination when I was in secondary school during a health program, but I never finished it. I moved schools and forgot about it." (Female, 3rd year, Natural Sciences). Several participants were uncertain about their vaccination status, particularly regarding vaccines received

during childhood: "I'm not sure if I was vaccinated as a child. My parents might know, but I don't have any records with me here at school." (Male, 4th year, Engineering).

Participants identified multiple barriers that prevented them from seeking hepatitis B vaccination. Financial constraints emerged as a primary barrier, with many participants unable to afford vaccination fees: "The cost is really high for students like us. Between school fees, accommodation, and feeding, there's no money left for things like vaccination." (Female, 2nd year, Social Sciences). Accessibility challenges included lack of awareness about vaccination locations and inconvenient service hours: "I don't know where to go for the vaccination. The health center on campus doesn't always have it, and going to town is expensive and time-consuming." (Male, 1st year, Humanities). Many participants did not perceive themselves as being at risk for hepatitis B infection: "I don't think I'm at risk because I don't do risky things. I don't share needles or have multiple partners, so I thought I didn't need it." (Female, 4th year, Medicine).

Among participants who had initiated vaccination, barriers to completing the series included financial constraints and lack of follow-up reminders: "After the first injection, I didn't have money for the next one when it was due. Then I forgot about it until much later." (Male, 3rd year, Engineering). Another participant noted: "The health center where I started didn't remind me about the follow-up appointments. I lost track of when I was supposed to return." (Female, 2nd year, Natural Sciences).

Theme 4: Cultural and Social Influences on Vaccination Decisions

Cultural beliefs, family influences, and social norms emerged as significant factors shaping vaccination decisions among participants. Family attitudes and decisions significantly influenced participants' vaccination behaviors: "My family doesn't really believe in vaccines unless they're absolutely necessary. They prefer traditional medicine and think vaccines might have bad effects." (Male, 2nd year, Social Sciences). Another participant shared: "My parents are supportive of vaccination, but they leave health decisions up to me now that I'm in university. Sometimes I wish they would push me more to take care of these things." (Female, 3rd year, Natural Sciences).

Traditional beliefs about disease causation and prevention influenced some participants' attitudes toward vaccination: "In our culture, some people believe diseases come from spiritual causes or as punishment. Vaccination might not work if the problem is spiritual." (Female, 1st year, Humanities). Another noted: "My grandmother says traditional herbs are better than modern medicine for preventing diseases. She doesn't trust vaccines." (Male, 4th year, Engineering). Religious considerations played a role in vaccination decisions for some participants: "My religion supports protecting health, so vaccination should be okay. But some people in my community worry about vaccine ingredients and whether they're permissible." (Female, 2nd year, Medicine).

Social networks and peer behaviors influenced vaccination decisions. As one participant explained: "Most of my friends haven't been vaccinated either, so I don't feel like I'm missing out on something important. If everyone was doing it, I might feel more pressure to get vaccinated too." (Male, 3rd year, Social Sciences).

Theme 5: Information Sources and Health Literacy

Analysis revealed significant variations in information sources and health literacy levels among participants. Participants obtained health information from diverse sources with varying reliability: "I mostly get health information from social media and internet searches. Sometimes I ask friends who are studying medicine." (Female, 3rd year, Natural Sciences). Another stated: "I trust information from healthcare workers most, but I don't have regular contact with them unless I'm sick." (Male, 2nd year, Engineering).

Many participants struggled to evaluate the quality and reliability of health information: "There's so much information online, but it's hard to know what's true. Different websites say different things about vaccines." (Female, 4th year, Social Sciences). Formal health education experiences were limited, with most participants reporting inadequate coverage of hepatitis B in their educational experiences: "We learned about some diseases in secondary school, but not much detail about hepatitis B or vaccination. University orientation didn't cover it either." (Male, 1st year, Humanities).

Theme 6: Healthcare System Factors

Participants identified various healthcare system-related factors that influenced their vaccination experiences and decisions. Access to healthcare services, including vaccination, was identified as a significant challenge: "The university health center has limited hours and is often crowded. It's hard to get appointments, especially for preventive care like vaccination." (Female, 2nd year, Medicine). Another participant noted: "Getting to healthcare facilities outside campus is expensive and time-consuming. It's easier to just ignore health issues unless they're serious." (Male, 3rd year, Engineering).

Quality of communication with healthcare providers affected vaccination decisions: "When I asked about hepatitis B vaccination, the nurse just said it was available but didn't explain why I needed it or how it works. I left feeling confused." (Female, 4th year, Natural Sciences). Participants noted that vaccination services were not well integrated into routine healthcare: "Vaccination seems like something separate from regular healthcare. It's not something they ask about during routine visits or health checkups." (Male, 2nd year, Social Sciences).

Theme 7: Recommendations for Improvement

Participants provided various suggestions for improving hepatitis B vaccination knowledge and practices among university students. Most participants emphasized the need for comprehensive health education programs: "We need proper education about hepatitis B - not just basic information, but detailed explanation about risks, prevention, and why vaccination is important." (Female, 3rd year, Medicine). Another added: "Health education should be part of university orientation and ongoing programs throughout our studies." (Male, 4th year, Engineering).

Participants suggested various strategies to improve vaccination access: "The university should provide free or subsidized vaccination for students. It could be part of student health services."

(Female, 2nd year, Natural Sciences). Another recommended: "Vaccination should be available on campus with convenient hours, maybe during registration or orientation periods." (Male, 1st year, Humanities). Several participants suggested utilizing peer education approaches: "Students trust other students. Having peer educators who can share accurate information about vaccination might be more effective than lectures from adults." (Female, 4th year, Social Sciences). Participants recognized the importance of engaging families and communities: "Education programs should include families, especially parents, so they can support their children's vaccination decisions." (Male, 3rd year, Engineering).

DISCUSSION

This qualitative study provides important insights into the knowledge and practices regarding hepatitis B vaccination among students of Kaduna State University, revealing significant gaps in knowledge, limited vaccination practices, and multiple barriers that prevent optimal hepatitis B prevention among this vulnerable population. The findings can be understood through the lens of the Health Belief Model and socio-ecological frameworks, which emphasize the interplay of individual knowledge, perceived susceptibility, structural barriers, and social influences in shaping health behaviors.

Knowledge Gaps and Misconceptions

The study demonstrates that while basic awareness of hepatitis B exists among university students, comprehensive knowledge remains inadequate. Participants showed significant gaps in understanding transmission routes, disease complications, and vaccination protocols. These findings align with previous research by Olajuyin et al. (2019) among Nigerian university students, which reported similar knowledge deficits despite general awareness of the disease. The prevalence of misconceptions about hepatitis B transmission, particularly beliefs about casual contact transmission, reflects inadequate health education and reliance on unreliable information sources. These misconceptions can contribute to both unnecessary anxiety and inadequate risk perception, potentially affecting vaccination decisions and preventive behaviors (Singh et al., 2020).

According to the Health Belief Model, perceived susceptibility and perceived severity are critical determinants of preventive health behaviors. The limited understanding of hepatitis B complications, particularly the potential for chronic infection and liver cancer, represents a critical knowledge gap that may contribute to underestimation of disease severity and reduced motivation for vaccination. This finding is consistent with research by Mudawi et al. (2019) in Sudan, which reported similar gaps in understanding disease consequences among university students. Recent WHO reports emphasize that knowledge interventions targeting youth must address not only factual gaps but also risk perception and self-efficacy to promote vaccination uptake (WHO, 2024).

Vaccination Knowledge and Practices

The study revealed particularly concerning deficits in vaccination knowledge, with most participants unaware of vaccination schedules, efficacy, and safety profiles. Only a small proportion of participants correctly understood the three-dose vaccination series requirement, which helps

explain the high rates of incomplete vaccination among those who had initiated the process. The low vaccination coverage observed in this study is consistent with previous research in sub-Saharan Africa, which has documented similarly low rates among university populations (Noubiap et al., 2018; Abdela et al., 2016). However, the qualitative nature of this study provides deeper insights into the complex factors contributing to these low rates.

The finding that many participants were uncertain about their vaccination status highlights the importance of vaccination record-keeping and the need for improved documentation systems. This uncertainty can lead to unnecessary re-vaccination or, more concerning, false confidence about protection status. The gaps in vaccination knowledge directly relate to structural and informational barriers identified in socio-ecological models, where individual capacity to act is constrained by system-level deficiencies.

Barriers to Vaccination

The study identified multiple interconnected barriers to hepatitis B vaccination, consistent with the socio-ecological model of health behavior. Financial constraints emerged as a primary barrier, reflecting the socio-economic challenges faced by many university students in Nigeria. This finding aligns with previous research by Mekonnen et al. (2018) in Ethiopia, which identified cost as a major determinant of vaccination decisions among young adults. Economic barriers represent structural impediments that individual knowledge alone cannot overcome, necessitating policy-level interventions such as subsidized or free vaccination programs.

Access-related barriers, including limited availability of vaccination services and inconvenient service delivery, represent structural challenges that require systemic interventions. The finding that university health services do not consistently provide hepatitis B vaccination suggests opportunities for improving campus-based preventive care programs. These access barriers interact with knowledge deficits to create compounding obstacles to vaccination uptake.

The lack of perceived risk among participants represents a significant behavioral barrier rooted in the Health Belief Model's construct of perceived susceptibility. Many participants did not recognize their potential exposure risks, particularly in university settings where sharing of personal items, potential laboratory exposures, and social behaviors may increase transmission risk. This low perceived susceptibility may be addressed through targeted education programs that personalize risk and emphasize relevant transmission pathways for university students.

Cultural and Social Influences

The study revealed important cultural and social factors that influence vaccination decisions, including family attitudes, traditional beliefs about disease and prevention, and religious considerations. These findings highlight the importance of culturally sensitive approaches to health promotion that acknowledge and address community beliefs and values. The influence of family attitudes on vaccination decisions, even among young adults, underscores the importance of engaging families and communities in vaccination promotion efforts. This finding is consistent with

previous research by Balogun et al. (2019) in northern Nigeria, which documented the significant influence of family and community attitudes on health-seeking behaviors.

From a socio-ecological perspective, these cultural influences operate at the interpersonal and community levels, shaping individual attitudes and behaviors through social norms and expectations. The role of peer influences in vaccination decisions suggests opportunities for implementing peer education programs that leverage social networks to promote positive health behaviors. Research has shown that peer education can be particularly effective among university populations where social influence is strong (Owusu-Agyei et al., 2019). Religious and traditional beliefs about health and healing represent deeply held values that health promotion efforts must engage respectfully rather than dismiss.

Healthcare System Factors

The study identified several healthcare system-related factors that affect vaccination access and uptake, including limited service availability, poor provider communication, and lack of integration with routine healthcare services. These findings suggest opportunities for improving healthcare system responses to vaccination needs among university students. The limited communication between healthcare providers and students about vaccination represents a missed opportunity for health promotion. Effective provider communication has been identified as a crucial factor in vaccination acceptance and adherence (Al-Jamal et al., 2018).

Healthcare system barriers operate at the organizational and policy levels of the socio-ecological model, requiring institutional commitment and resource allocation to address effectively. The fragmentation of vaccination services from routine healthcare reflects broader challenges in preventive health service delivery that affect not only hepatitis B vaccination but other preventive interventions as well.

Information Sources and Health Literacy

The study revealed concerning patterns in health information seeking and evaluation, with many participants relying on unreliable sources and struggling to assess information quality. These findings highlight the importance of improving health literacy and providing access to reliable, culturally appropriate health information. The limited formal health education experiences reported by participants suggest opportunities for integrating comprehensive health education into university curricula and orientation programs. Research has demonstrated that structured health education programs can significantly improve vaccination knowledge and uptake among university students (Chang et al., 2019).

In the digital age, the proliferation of health misinformation on social media platforms compounds the challenge of promoting evidence-based health behaviors. University settings offer unique opportunities to build critical health literacy skills that enable students to navigate complex and sometimes contradictory health information landscapes. Recent studies emphasize that health literacy interventions should focus not only on knowledge transmission but also on developing

skills for evaluating information credibility and applying knowledge to personal health decisions (WHO, 2024).

Conclusion and Recommendations

This qualitative study demonstrates that university students possess basic hepatitis B awareness but lack comprehensive knowledge essential for informed vaccination decisions, particularly regarding transmission routes, disease complications, and vaccination protocols. Vaccination uptake remains critically low due to interconnected barriers spanning financial constraints, healthcare access limitations, cultural influences, and information gaps. These findings underscore the urgent need for multi-level interventions addressing individual knowledge deficits alongside structural and social determinants of health behavior.

Based on these findings, the following evidence-based recommendations are proposed:

1. Universities should integrate structured hepatitis B education into orientation programs and ongoing health promotion activities, utilizing interactive pedagogical approaches that address knowledge gaps, correct misconceptions, and enhance perceived susceptibility and severity. Educational content should be culturally appropriate and delivered through multiple channels including lectures, peer education, digital platforms, and printed materials.
2. Universities should establish on-campus vaccination programs offering free or heavily subsidized hepatitis B vaccination as part of routine student health services. Vaccination should be available during registration periods, orientation, and regular health center hours, with proactive outreach to ensure students complete the full three-dose series through reminder systems and follow-up protocols.
3. Targeted Awareness Campaigns: Multi-media awareness campaigns should be developed specifically for university populations, utilizing social media, campus events, and peer networks to disseminate accurate information about hepatitis B risks, prevention, and vaccination. Campaigns should feature testimonials, address common misconceptions, and emphasize personal relevance of vaccination for university students.
4. Health promotion efforts should extend beyond students to engage families and communities, recognizing their significant influence on vaccination decisions. Community dialogue sessions, parent information programs, and collaboration with religious and traditional leaders can help address cultural concerns and build community support for vaccination.
5. 5 training, and protocols to provide comprehensive vaccination services including counseling, administration, record-keeping, and follow-up. Healthcare providers should receive training in effective communication strategies to address vaccine hesitancy and promote informed decision-making.

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