



Factors Influencing Awareness and Practices of Hepatitis B Viral Infection among Students at the University for Development Studies in Tamale, Northern Region, Ghana

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Abstract

Background: Hepatitis B viral (HBV) infection is a severe global health problem and the most serious type of viral hepatitis. There are an estimated 2 billion individuals infected worldwide, and more than 240 million suffer from chronic illness. Ghana is one of the West African countries which is hyper-endemic for HBV, with a prevalence estimate of 15% of the adult population. This study aimed to identify and examine the factors influencing the awareness and practices of Hepatitis B viral infection among university students in Tamale, the Northern Region of Ghana. **Methods:** A cross-sectional study was conducted among 400 university students for six weeks, from January to February 2023. Convenience sampling was used to select the participants. Data was obtained using a structured questionnaire. Data were analysed using SPSS Version 22. **Results:** A high percentage of the study population, 94.25%, knew Hepatitis B can affect all age groups. Of the significant complications of Hepatitis B inquired about, 94.25% answered that Hepatitis B could cause hepatocellular carcinoma, which is the number one killer among patients suffering from the disease. More than 90% of respondents knew a vaccine for Hepatitis B was available, and 95.25% were aware of the vaccine's safety. This underscores the importance of vaccination in preventing the disease. According to the respondents, unsafe blood transfusion and unprotected sex were the major routes of transmission, accounting for 90.25% and 80.5%, respectively. Females, who accounted for 59.25% of the respondents, had a higher level of awareness than males. **Conclusion:** There was a high level of awareness concerning the Hepatitis B viral infection among the university students. Factors significantly

impacting students' practices with Hepatitis B infection were the vaccination status (69%) and willingness to be vaccinated (92.5%). Among the respondents, 20.8% of fresh students and 23.7% of the final year students were aware of the disease.

Subject Areas

Clinical Medicine, Epidemiology, Infectious Diseases

Keywords

Hepatitis B, Awareness, University Students, Tamale

1. Introduction

Hepatitis B is a virus that causes a primary global health-threatening liver infection, which can be acute or chronic. The virus is an enveloped hepatotropic DNA virus belonging to the Hepadnaviridae family, which can cause both acute and chronic liver infections. Hep B is transmitted through contact with infected body fluids such as blood and semen during sexual intercourse, sharing needles and syringes or from mother to child [1]. The virus has an incubation period of an average of 90 days (range from 60 to 150 days) after exposure. It is usually detected in the blood of the infected adult for an average of 4 weeks with a range of from 1 to 9 weeks after exposure to the virus [2].

According to the World Health Organization (WHO), the regions with the highest burden of Hepatitis B virus infection are in the Western Pacific and Africa. In 2022, the global prevalence was estimated at 257 million people living with HBV infection (3.2%), with an estimated incidence of 1.5 million new cases per year. Hepatitis B kills about 820,000 people worldwide every year, primarily due to cirrhosis and hepatocellular carcinoma [3]. In Africa, the prevalence of Hepatitis B is at an average of 10% or more: Ghana, which is a hyper-endemic country, has a prevalence of 12.2%. Its prevalence in Ghana ranges from 10.6% in the Greater Accra Region to 13.7% in the Central and Brong-Ahafo Regions [4]. According to a publication from WHO, people from low-income countries like Ghana are progressing towards the global hepatitis elimination targets under the Sustainable Development Goals 2030. The WHO African Region bears 63% of new hepatitis B infections, yet despite this burden, only 18% of newborns in the Region receive the hepatitis B birth-dose vaccination. WHO is working to promote awareness and partnerships, and mobilises resources to formulate evidence-based policies. It also collects data to increase healthcare equities for hepatitis response, prevent transmission and scale up screening, care and treatment services [5].

WHO also organises the annual World Hepatitis Day campaign to educate, inform and raise awareness of viral hepatitis. For the prevention of Hepatitis B, WHO recommends that all infants should be vaccinated as soon as possible after

birth, especially within a day followed by 2 or 3 doses of the vaccine in four-week intervals for complete protection [6].

Acute infection usually presents with symptoms of fever, malaise, jaundice, dark urine, arthralgia, myalgia, nausea and vomiting, right upper quadrant pain, and headaches. Chronic infection is usually symptomless and it can lead to complications like liver cirrhosis or hepatocellular carcinoma. It is worth noting that this virus has no cure but can be prevented through vaccination [7] [8].

The prevalence of Hepatitis B is highest in most areas in the Asia Pacific and Sub-Saharan African regions of the world, with about 8% of the population having chronic infections [9]. A study conducted in Ethiopia on some undergraduate students of the Hawassa University of College of Medicine proved that there was very little knowledge of Hepatitis B practices, prevention, and associated factors [10]. Ghana is known to be hyper-endemic to Hepatitis B, with a prevalence of 12.3% among its adult population [11]. In a systematic review was found that among the sub-populations in Ghana: 8.36% were adults, 14.30% were adolescents, and 0.55% were children under five years of age [12].

Notwithstanding the efforts made globally, this virus is the seventh cause of death in the world, which would not have been so if there had been enough vaccination and effective advocacy to create awareness and campaigns to inform the masses [13].

Hepatitis B affects millions of people worldwide, many of whom are not even aware they are infected with the virus. Usually asymptomatic, individuals need to be aware of it and understand how to guard against contracting this infectious disease. The best way to detect those who have the disease and start them on treatment is through Hepatitis B screening and testing. Those who do not have the disease are urged to get vaccinated. Healthcare workers, students in medical-related fields, and intravenous drug users are some of the groups with high exposure to Hepatitis B infection [14] [15].

Despite the great havoc it has caused globally, little research has been done on the knowledge and practices of Hepatitis B among university students in Ghana and other developing countries. It is imperative to equip university students with ample information to protect themselves and their peers from infectious diseases, as they are valuable resources for the future of the country. The selection of appropriate preventive methods and innovative suggestions for tertiary-level Hepatitis B education should be vigorously pursued to safeguard the health and well-being of our students. This study aimed to explore the level of awareness about Hepatitis B infection among university students and the practices they adopt to protect themselves from acquiring the infection. Furthermore, the study examined the association between the socio-demographic characteristics of the respondents and their awareness and practices towards Hepatitis B infection and identified factors that influenced their awareness and practices. The research provides a comprehensive description of the awareness of HBV infection and vaccination rates among university students, shedding light on the socio-

demographic factors that influence HBV understanding and prevalence in this high-risk population. The knowledge gained from this study has the potential to guide the development of effective university-based HBV intervention programs for both Ghanaian and international students, making a significant difference in public health.

1.1. Factors Influencing Hepatitis B Awareness among University Students

A study conducted among different categories of people in Ghana showed a disparity in the knowledge and practices about Hepatitis B infection. In the Kintampo North Municipality, a study of 504 pregnant women showed that 41% knew about Hepatitis B as a disease, and 33.5% of respondents correctly mentioned its means of transmission. 42% were educated on the radio, and other places people received education on Hepatitis B were at places of worship [16].

A study conducted in Jordan also revealed that 64.8% reported that the school/university was the primary source of information, followed by TV/internet/social media, which constituted 63.9% [17].

A comprehensive study among health workers at M. S. Ramaiah Medical and Dental Hospitals, Bengaluru, India, found a remarkable 90.03% awareness of Hep B infection, with 67.2% demonstrating accurate risk perception [18].

Another research in the Gambia, involving 152 participants, revealed that 54% had adequate Hepatitis B knowledge. Interestingly, while the majority (81.6%) knew that Hepatitis B could cause chronic liver infection, only 33.6% correctly identified it as a viral infection [19]. Similarly, a survey conducted among undergraduate students at the Hawassa University College of Medicine in Ethiopia, found a high level of awareness, with 93.4% correctly identifying the virus as the causative agent and their potential to infect others. However, only 92.4% knew of the transmission via unsterilised syringes, needles, and surgical instruments [10].

Asian American college students showed very little knowledge of HBV vaccination; 50% of the study group did not know whether they had received it [20]. A study in Nigeria found that 16.8% of the participants never received the Hepatitis B vaccine, and a majority of them (94.7%) cited their busy schedule as the sole reason or one of the reasons for their failure to receive the vaccine [21]. From these statistics, it appears that university students are at higher risk of getting HBV infection than the general population in their respective countries. This could be due to the age group's perceived invincibility and lack of knowledge about how HBV is contracted. It's important to note that HBV infection can lead to serious health complications, including liver cirrhosis and liver cancer. These available statistics provide us with an impetus to examine the awareness and practices of university students concerning HBV.

1.2. Route of Transmission of Hepatitis B

A study conducted at a private Senegalese medical university included 317

participants. According to the survey, 66.2% of respondents believed that Hepatitis B can be transmitted from mother to child, 80.2% through sexual contact, and 86.3% through blood. However, 19.4% of the respondents indicated that the faecal-oral route was a mode of transmission. The high-risk group included individuals with multiple sexual partners, medical professionals, and neonates born to mothers with the Hepatitis B virus [22].

Another research conducted in Hong Kong by CM Leung *et al.* [23] found that 44%, 41%, and 37% of respondents appreciated that transmission of the virus can be through sexual contact, sharing a razor or toothbrush, and tattooing or body piercing, respectively. However, 73% had the mistaken belief that the virus is transmitted by eating contaminated seafood. In the USA [24] found that over half of the participants mentioned that Hepatitis B-infected persons could be identified by their appearance. Additionally, 26% believed it could be transmitted through the air or by sharing utensils.

A study conducted in the Upper West Region of Ghana found that 90.8% of nursing students recognised contaminated blood and/or blood products, unsterilised surgical instruments (85.6%), unprotected sex (81.1%), and mother-to-child transmission (79.8%) as the major routes of transmission of Hepatitis B infection. Also, 60.2% and 43.5% of the respondents knew that casual contact and the faecal-oral route are not viable transmission routes of Hepatitis B infection, respectively [25].

This finding contrasts with research conducted on 100 students by Ghouri *et al.* 2015 where the majority of these students (95%) had heard of hepatitis, and a significant portion (78%) knew that blood transfusion and repeated syringe usage were the main mechanisms of transmission [26].

1.3. Prevention of Hepatitis B Infection

People must educate themselves about high-risk behaviours in addition to getting vaccinated. Prevention measures such as blood product screening, proper sanitation of injection needles and syringes, and avoiding risky activities like tattooing, skin piercing, and drug misuse can help prevent the horizontal transmission of HBV [27].

According to a survey of 118 participants, 93.7% of physicians and midwives were knowledgeable about the mother-to-child transmission of HBV. However, only 31% of the participants realized the importance of immunizing infants born to HBsAg/HBeAg-positive mothers before nursing [28]. Additionally, only 12.7% of the participants were aware of a vaccine that, when given along with Hepatitis B immunoglobulin to newborns of HBV-infected mothers, can prevent the transmission of the infection from mother to newborn.

A study conducted at a top healthcare institute in the Uttarakhand foothills, India [29] found that a relative proportion of medical and nursing students identified blood screening for Hepatitis B at blood banks (59.4% vs 26.2%), vaccination (57.2% vs 30.1%), use of barrier methods (36.1% vs 13.7%), and using universal health precautions (27.8% vs 29.5%) as important methods to prevent Hepatitis B transmission. This is in contrast to research conducted among doctors and nurses in Sindh

Hospital in Pakistan, which showed that 64.9% of doctors and 75.2% of nurses knew that Hepatitis B prevention was via vaccination and had taken the vaccine [30].

In a survey conducted among 185 health practitioners in Krachi District of the Volta Region of Ghana, it was found that 85.4% identified the need for screening pregnant women for HBV before delivery, and 29.2% indicated good knowledge of the management and prevention practices of HBV among children. However, 61.1% of participants responded that they would not vaccinate children irrespective of their status or that of their mothers [31].

Several studies have shown that HBV can be transmitted through blood, sexual contact, and mother-to-child transmission. A study on medical students in Malaysia found that 21.6% had experienced needle stick injuries during their clinical year, which put them at risk of HBV infection [32]. Another study found a higher prevalence of HBsAg among male students from a university in India who had a history of a sexually transmitted disease (STD) compared to those without any STD history. This underscores the importance of knowledge on HBV transmission for students, especially those in health science fields, to enable them to take necessary precautions to avoid infection.

1.4. Symptoms and Complications of Hepatitis B

The symptoms of liver cirrhosis or hepatocellular carcinoma in Hepatitis B infection may not be evident until the late stages of the disease, or individuals may periodically experience acute Hepatitis-like symptoms. In an Indian study, 92.7% of participants were aware of at least one Hepatitis B symptom. Around one-third of the participants reported that Hepatitis B was associated with loss of appetite, diarrhoea, and nausea/vomiting. Other symptoms mentioned included constipation (4.8%), weight loss (14.3%), and digestive issues (6.8%) [33].

A survey conducted among nursing students in the Upper West Region of Ghana indicated that the respondents had varying levels of knowledge about Hepatitis B, including recognizing jaundice as a symptom (59.7%), understanding the infectiousness of carriers (75.9%), and knowing that not all infected individuals show symptoms (58.7%) [25].

According to a study by [34], adults are more likely to develop clinical acute Hepatitis B, while children are more likely to develop chronic Hepatitis B infection. A survey involving 128 first-year medical students in Syria found that 92% of the respondents knew about Hepatitis B infection but were unaware of its symptoms. Similarly, 89.07% of the students did not know that chronic HBV infection is often asymptomatic. Additionally, only 35.2% of participants knew that chronic HBV infection carries a high risk of developing cirrhosis, liver cancer, and kidney disease [35].

1.5. The Factors Influencing Hepatitis B Practices among University Students

In a study conducted in India, only 8% of the 161 participants had previously

received a complete Hepatitis B vaccination. In comparison, 30 (18.7%) had been unable to complete the three doses of the Hepatitis B vaccination. The remaining 118 (73.3%) participants had never received the Hepatitis B vaccination. A majority of the participants reported practising safe injection and hygiene habits [36].

In contrast, a study in Asante Mampong, Ghana, reported poor Hepatitis B practices among high school students [35]. Another study among nurses in the Upper West Region of Ghana described the levels of adherence to Hepatitis B prevention practices. Hepatitis B vaccination (72.1%), complete vaccination dose (59.5%), and post-Hepatitis B vaccination antibody testing (19.4%) [25].

A sampled study of Ethiopian students in health-related fields revealed that lack of resources was a significant barrier to receiving the Hepatitis B vaccine and using personal protective equipment, as well as a reason for not screening for the virus [37].

A survey among undergraduate students at Hawassa University College of Medicine in Ethiopia shows mixed attitudes and practices towards Hepatitis B prevention. 56.1% had a good attitude, and 43.9% had an unfavourable attitude. [10]. Similarly, in South Sudan, at Juba Teaching Hospital, reasons for non-vaccination included lack of health education (64.9%), high cost of vaccines (55.2%), and unavailability of vaccines (46.10%) [38].

1.6. The Demographic Characteristics Associated with Awareness and Practice of Hepatitis B Infection

In research conducted in Türkiye, it was found that the younger generation had a lower likelihood of getting infected with the virus as compared to different age groups, which was attributed to their higher vaccination rates. It was also observed that male respondents were 5% more likely to get infected than females, and individuals with higher incomes had a lower chance of getting infected compared to low-income earners [39].

In another investigation conducted in Malaysia among households, it was found that age groups 35 - 44 years, high educational attainment, and high family income were associated with good knowledge and practices related to the virus [40].

A study on pregnant women in Korle-Bu Teaching Hospital, Ghana, revealed that the age group with the highest prevalence of the virus was 25 - 30 years, at 11.3%. It also found a 15% prevalence of the virus among pregnant women with no formal education. Additionally, it was observed that multiparous women were predominantly seropositive at 13.2%, and the highest prevalence was among the unemployed, constituting 14.3% of the total [41].

In Kumasi, Ghana, a study on pregnant women showed that demographic factors influencing Hepatitis B practices and awareness varied among different age groups, employment status, educational level, occupation, and marital status. The study indicated that respondents with formal education had more knowledge about the condition compared to those without education. Furthermore, patients

with tertiary education were found to be 5.8 times more likely to have adequate knowledge and 6.4 times more likely to have positive attitudes and practices towards Hepatitis B infection [42].

Results from a study of university students in Ghana showed that individuals aged 26 and older had a better vaccination history compared to those under 18. Additionally, people living in urban areas were more likely to get vaccinated than those in rural areas [43].

Another survey conducted in rural high schools in Nanumba North, Ghana, supported the findings of the previous study. The survey revealed low awareness of Hepatitis B infection, with only 22.5% of respondents reporting being vaccinated, and 21% of respondents admitting to never being tested for Hepatitis B.

It has been widely recognized that the modes of HBV transmission vary across different regions, as highlighted in a study [44]. The study specifically focused on assessing the awareness and practices related to HBV among university students, emphasizing their potential role in reducing HBV transmission as future professionals. A high level of knowledge about how the Hepatitis B virus (HBV) is transmitted is linked to a lower lifetime risk of being a carrier of HBV. Hence, the educational system needs to alert university students about HBV transmission and the associated risks compared to other populations, thus the need for this study.

2. Materials and Methods

2.1. Study Design

A quantitative cross-sectional study was conducted among university students of the University for Development Studies, Dungu campus, Tamale, between January to February 2023.

2.2. Study Population

The respondents in this study included tertiary education students at the University for Development Studies, in the Tamale Metropolitan District. This population was chosen because it comprised students of various levels of study (from level 100 to the final years), from various faculties, ethnic backgrounds, and religions.

2.3. Sample Size Calculation

Yamane's formula was used to establish the minimal number of participants needed for the study:

$$n = N/(1 + Ne^2).$$

N = is the total study population size

n = sample size

e = is the degree of precision

We utilised an accuracy level of 5% and a confidence level of 95%

e = margin of error (95% confidence interval) = 0.05

$N =$ study population (16,000)

Substituting the values into the formula above,

$$n = 16,000 / (1 + 1600(0.05)^2)$$

$n = 390$. This figure was rounded up to 400

2.4. Sampling Method

A cross-sectional study was conducted at the University for Development Studies in Tamale, located in the Northern Region of Ghana. The researcher identified the class representatives of each year group and sent them Google Forms via email. Each class representative was asked to share the Google form on their WhatsApp groups. The forms were to be completed anonymously and returned to the researcher using the provided email address. The forms emphasized that the students' consent was paramount, and they were respected in their decision to participate in the study by filling them out and returning them to the researcher. The researcher received 521 student responses, but only the first 400 replies were conveniently accepted for the study.

2.5. Data Collection, Technique and Tools

A self-administered structured questionnaire written in English containing the study objectives was developed as Google Forms, focusing on gathering data on factors influencing the students' awareness and practices towards Hepatitis B virus infection. To ensure the accuracy and inclusivity of the data, a pilot test was conducted among 35 university students, who were carefully selected to represent a diverse range of demographics. All inconsistencies in the questions were corrected before the final administration to study participants. The variables for this study included the demographic characteristics of the respondents: age, sex, religion, ethnicity, level of study and faculty of study; awareness about Hepatitis B infection-related symptoms and signs such as fever, jaundice, nausea and vomiting, general body weakness, abdominal pain and abdominal distension; and awareness about the complications of Hepatitis B infection such as liver cirrhosis and liver cancer. The questionnaire also included questions about the practices concerning Hepatitis B, with the means of transmission, such as sharing needles from infected individuals, having unprotected sex, the vaccination status of the respondents against Hepatitis B infection and their willingness to be vaccinated, their lifestyle, and methods employed for the prevention of Hepatitis B infection.

2.6. Data Analysis

The data was entered in an Excel spreadsheet for cleaning, ensuring accuracy and reliability. The data was exported to SPSS (IBM-SPSS) version 22 for analysis. Frequency distribution was used to analyse the categorical variables, demographic characteristics, and participants' responses to awareness and preventive practices regarding Hepatitis B infection.

The discrete variables were presented using charts and tables. Finally, a multivariate regression analysis was performed to assess the association between Hepatitis B infection awareness and sociodemographic characteristics of the study population at $p \leq 0.05$ significance level with a 95% confidence interval.

2.7. Ethical Clearance

We wrote a letter to the University for Development Studies to obtain clearance to proceed with our work. We received permission to conduct the study.

3. Results

3.1. Demographic Characteristics of the Study Population

A total of 400 students agreed to participate in the study. Out of the 400 participants, the majority of responses regarding age came from the 19-24 age group, accounting for 55.0%, followed by the 25-30 age group, accounting for 37.0%. There were more female participants (60.5%) than male participants. Forty-three percent of the respondents were continuing students; level 100 students, accounting for 33.3% (Table 1).

Table 1. Demographic characteristics of the study population.

Characteristics	Frequency (n)	Percent (%)
Gender		
Male	158	39.5%
Female	242	60.5%
Age		
19 - 24	220	55.0%
25 - 30	148	37.0%
31 - 36	32	8.0%
Faculty of study		
Health Related	269	67.3%
Non-Health related	131	32.8%
Level of Study		
Level 100 students	133	33.3%
Continuing Students	172	43.0%
Final year students	95	23.8%

3.2. Awareness of Hepatitis B Infection

The study revealed a 100% response rate, with 96.0% of the respondents being aware of the infection. The remaining participants had never heard of it. Over ninety-four per cent of the students knew that Hepatitis B could affect all age groups. A significant finding was that 94.2% of the 400 participants knew that

Hepatitis B could lead to hepatocellular carcinoma. The study also assessed the students' knowledge about vaccination, showing that 93.2% knew a vaccine for preventing the infection was available. Furthermore, a large percentage of students (93%) stated that being vaccinated against Hepatitis B and using protection during sex (73.4%) were essential methods for preventing the infection. Vaccination knowledge, which revealed that 93.2% knew a vaccine for preventing the infection was available. A large percentage of students (93%) stated that being vaccinated against Hepatitis B and using protection for sex (73.4%) were essential methods for acquiring the infection. Regarding vaccine safety, 95.2% of the participants stated that the vaccine was safe. When it came to symptoms, over seventy percent were aware of abdominal distension and jaundice, while less than 30.0% were unaware of these symptoms. Additionally, a significant number of participants correctly identified unsafe blood transfusion and unprotected sex as major routes of transmission, accounting for 90.2% and 80.5% of respondents, respectively (**Table 2**).

Table 2. Awareness of Hepatitis B infection.

Knowledge	YES (n, %)	NO (n, %)
Awareness of Hepatitis B infection	384 (96.0%)	16 (4.2%)
Can Hepatitis B affect any age group?	377 (94.2%)	23 (5.7%)
Is Hepatitis B curable?	188 (47.0%)	212 (53.0%)
Can Hepatitis B cause cancer?	377 (94.2%)	23 (5.7%)
How can one protect oneself from acquiring Hepatitis B infection?		
Abstinence from sex	336 (84%)	64 (16%)
Protected sex	295 (73.4%)	105 (26.25%)
Been vaccinated	374 (93.5%)	26 (6.5%)
Having a faithful uninfected partner	312 (78%)	88 (22%)
Is there a Hepatitis B vaccine?	373 (93.2%)	27 (6.7%)
Do you think the liver is the only organ in the body affected by Hepatitis B?	328 (82.0%)	72 (18.0%)
Symptoms and signs of Hepatitis B infection:		
Fever	341 (85.2%)	59 (14.7%)
Yellowish discoloration of the eyes	309 (77.2%)	91 (22.7%)
Nausea and vomiting	308 (77%)	92 (23%)
Dark urine	291 (72.7%)	109 (27.2%)
Abdominal distension	289 (72.2%)	111 (27.7%)
Route of transmission of Hepatitis B virus:		
Unsafe blood	361 (90.2%)	39 (9.7%)
Unprotected sex	322 (80.5%)	78 (19.5%)
Is the vaccine safe?	381 (95.2%)	19 (4.8%)

Concerning vaccination status, 276 (69%) had been vaccinated. Approximately 92.5% of participants expressed willingness to be vaccinated. There was a very positive response from participants towards screening and this accounted for 93.0% of respondents (**Table 3**).

Table 3. Practices for the prevention of Hepatitis B infection.

Practices	YES (n, %)	NO (n, %)
Vaccination status	276 (69.0%)	124 (31.0%)
Willingness to be vaccinated	370 (92.5%)	30 (7.5%)
Willingness to be screened	372 (93.0%)	28 (7.0%)
Healthy lifestyle	334 (83.5)	66 (16.5%)
Practising safe sex	308 (77.0%)	92 (23.0%)

3.3. Factors Influencing Hepatitis B Infection Awareness

Table 4 illustrates the relationship between awareness of Hepatitis B infection and the sociodemographic characteristics of the study population. The findings reveal that 37.0% of male participants exhibited good knowledge of Hepatitis B, while the percentage among female participants was 59.3% (P-value = 0.043). Furthermore, 66.0% of respondents enrolled in health-related fields demonstrated a strong understanding of the factors influencing awareness of Hepatitis B infection, compared to only 30.0% in non-health-related courses (P-value = 0.10).

Female students (59.2%), health-related faculties (66.0%), and students in the continuing years (41.2%) demonstrated a higher level of awareness regarding Hepatitis B infection.

Table 4. Association between Hepatitis B infection awareness and sociodemographic characteristics of the study population.

Sociodemographic variables	Positive response (n, %)	Negative response (n, %)	χ^2 (df)	P value
Gender			6.275	0.043
Male	147 (36.75%)	11 (2.75%)		
Female	237 (59.25%)	5 (1.25%)		
Faculty of study			9.300	0.10
Health-related	264 (66.0%)	5 (1.25%)		
Non-health-related	120 (30.0%)	11 (8.75%)		
Level of study			0.320	0.989
Level 100 students	127 (31.75%)	6 (1.5%)		
Continuing students	165 (41.25%)	7 (1.75%)		
Final year students	92 (23.00%)	3 (0.75%)		

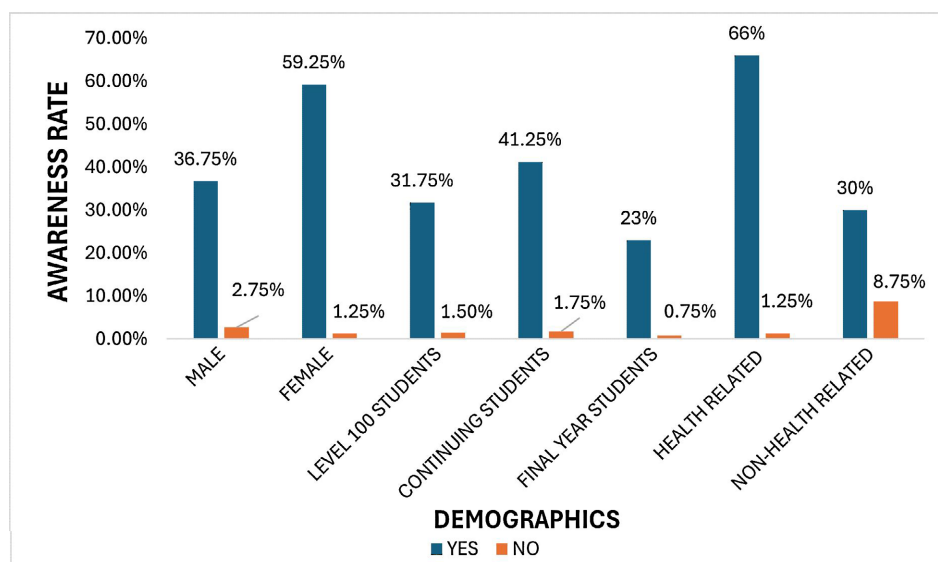


Figure 1. Association of Hepatitis B infection awareness and demographic characteristics.

3.4. Willingness to Get Vaccinated and Its Influence on Hepatitis B Infection Practices

The results regarding factors related to Hepatitis B infection showed a 100% response rate. The most critical variable assessed was participants' willingness to be vaccinated. The data indicated a concerning gender disparity, with only 34.8% of male respondents agreeing to be vaccinated, while a significantly higher 57.8% of females agreed (p -value = 0.005) (Table 5). Among the respondents, 61.8% of students in health-related faculties, such as medicine and nursing, were willing to be vaccinated, compared to only 30.8% of students in non-health-related faculties. The survey also found that 32.3% of first-year students were willing to be vaccinated,

Table 5. Association between willingness to be vaccinated against Hepatitis B infection and sociodemographic characteristics of the population

Sociodemographic variables	Positive response (n, %)	Negative response (n, %)	χ^2 (df)	P value
Gender			7.709	0.005
Male	139 (34.8%)	19 (4.8%)		
Female	231 (57.8%)	11 (2.8%)		
Faculty of study			0.545	0.460
Health-related	247 (61.8%)	22 (5.5%)		
Non-health related	123 (30.8%)	8 (2.0%)		
Level of study			6.990	0.030
Level 100 students	129 (32.3%)	4 (1.0%)		
Continuing students	153 (38.3%)	19 (4.8%)		
Final year students	88 (22.0%)	7 (1.8%)		

with a statistically significant difference compared to students in other years (p-value = 0.030) (Table 5).

3.5. Vaccination Status and Its Influence on Hepatitis B Infection Practices

All of the students (100%) expressed a desire to know their Hepatitis B vaccination status. Notably, within the sample groups, 25.3% of males and 50.7% of females were vaccinated against Hepatitis B, indicating a significant gender difference (p-value = 0.005). The participants who responded positively to the question about knowing their vaccination status were predominantly students in health-related courses such as medicine and nursing, comprising 53.3% of the total. Only 22.8% of participants from the non-health-related programs responded positively to the same question (p-value = 0.044). This underscores the influence of the field of study on the answers (Table 6).

Table 6. Association between Hepatitis B vaccination status and sociodemographic characteristics of the respondents.

Sociodemographic variables	Positive response (n, %)	Negative response (n, %)	χ^2 (df)	P value
Gender			20.879	0.000
Male	101 (25.3%)	57 (14.2%)		
Female	203 (50.7%)	39 (9.8%)		
Faculty of study			4.043	0.044
Health-related	213 (53.3%)	56 (14.0%)		
Non-health related	91 (22.8%)	40 (10.0%)		
Level of study			18.714	0.000
Level 100 students	108 (27.0%)	25 (6.3%)		
Continuing students	113 (28.2%)	19 (4.8%)		
Final year students	83 (20.8%)	12 (3.0%)		

4. Discussion

4.1. Awareness of Hepatitis B viral Infection

Among the 400 participants, 96% demonstrated a high awareness of Hepatitis B infection, with only 4% showing poor knowledge of the disease. These findings are consistent with a study by [45], which also reported a high awareness of Hepatitis B infection, accounting for 95% out of a sample size of 100 students. Another publication, based on a study of medical students by [46], found that 73.7% had an above-average awareness level. The similarity of these findings, all conducted among student populations, suggests that the students' exposure to information may have been a significant advantage in their heightened awareness levels. A high percentage of 90.3% of the 400 participants in our study demonstrated a solid

understanding of the two major routes by which the Hepatitis B virus is transmitted. These routes were identified as unsafe blood transfusion and unprotected sex, respectively. This finding is similar to a publication by (Mesfin and Kibret, 2013), which revealed that out of 322 participants, 89.8% knew blood transfusion was a significant route of transmission, followed by unprotected sex, which accounted for 71.7% [47].

In our study on methods of preventing Hepatitis B infection, 93.5% of respondents mentioned that vaccination was an essential preventive measure, and 73.4% admitted that having protected sex was also important in preventing the infection. This finding is consistent with a study conducted by [48], which reported that 87% of the 100 participants were aware of the Hepatitis B vaccine, and 81.6% had good knowledge of Hepatitis B prevention.

There is a positive trend in awareness about the disease; a significant 94.25% of the study population knew of the significant complication of Hepatitis B infection, which is liver cancer. This information aligns with a study by [19], which also showed that 83.7% out of a total of 483 had adequate knowledge that liver cancer is a complication of Hepatitis B. There was a generally positive awareness of the complications of Hepatitis B infection. 93.3% of the 400 participants were aware of the Hepatitis B vaccine, which agrees with a study conducted in Nigeria focusing on health workers by [49], which revealed that 67.9% were aware of a vaccine available against the Hepatitis B virus. Regarding vaccine safety, out of 400 respondents, 95.25% believed the vaccine was safe, while 4.75% thought it was dangerous. This finding is consistent with a study conducted by [50] among medical students; out of 92 students, 63.0% considered the vaccine safe, and 52.2% were vaccinated.

4.2. Hepatitis B Infection Practices

Out of the total sample size of 400, a significant 69.0% of the respondents were vaccinated, while 31.0% were not vaccinated. These findings reflect a heightened level of awareness and good practices of the disease among our respondents. Our study disagrees with the findings of a publication by [51], where 16.5% reported they had not yet been vaccinated, and 31.2% of this group believed the Hepatitis B vaccine was not safe. Similarly, our study shows a higher vaccination rate than the study [47], where 13.4% of 322 participants were vaccinated. Another study conducted by [52] published that out of 181 students, 37.0% of participants were fully vaccinated, whereas 39.3% were never vaccinated, and their main reason was poor vaccination programs. Our study group demonstrated excellent prevention practices, with 69% of respondents aware of their Hepatitis B status, while 31% were unaware, indicating a reassuring level of disease management.

The participants who agreed to be vaccinated constituted 92.6% out of the 400 respondents. This aligns with a study in Indonesia by [52], which revealed that 84.5% of respondents were willing to take the vaccine. Our participants demonstrated a good understanding of the health benefits of the vaccine among our

participants. The participants' attitude towards screening for Hepatitis B was generally good; 93.0% of our participants thought screening for Hepatitis B was a good idea, and this is in alignment with a study conducted in Indonesia, of which more than 82% of the participants showed a high level of desire for Hepatitis B diagnostic screening [53].

4.3. Factors Influencing Hepatitis B Infection Awareness

Our study found a significant association between gender and knowledge about Hepatitis B infection ($p < 0.05$). The level of awareness among females was better, accounting for 57.8% compared to males at 36.8%. This finding is consistent with a study by [54], which revealed that females had four times more knowledge about the infection than males. Similarly, a study by [55] indicated that 56.5% of female medical students had a higher 4 level of awareness of Hepatitis B infection than males. These findings suggest that public health education efforts should be tailored to address the gender disparities in Hepatitis B awareness.

On the other hand, a study conducted in Taiwan Region by [56] found that Hepatitis B infections were more common among males, a finding that has significant implications for public health strategies. This correlated with their level of awareness. However, a study by [57] revealed inadequate Hepatitis B awareness among females, with only 33.88% knowing about blood transfusion and 19% aware of unprotected sex as a route for transmission of the virus. These findings underscore the need for targeted education and awareness campaigns.

Moreover, our study revealed a significant contrast with previous research. Students in health-related courses demonstrated a robust 66% awareness level of Hepatitis B, a stark difference from [55], which found a lower awareness level of 53.5% among medical students, with 44.3% not following the vaccination program. This contrast underscores the dynamic nature of research in our field and the need for continued investigation.

4.4. Willingness to Be Vaccinated and Its Influence on Hepatitis B Infection Practices

Our findings revealed a statistically significant association between willingness to be vaccinated and gender ($p < 0.05$). Out of the 400 participants, a high percentage of 57.8% were females willing to get vaccinated, a stark contrast to the 12.3% of males from the same study who were willing. This gender disparity was further highlighted in a survey conducted in Indonesia by [53], where 88% of the 1000 participants, predominantly females, were willing to get vaccinated, mainly due to their high understanding of the disease. Another statistically significant association in our study concerned the level of study in the university and their health practices towards Hepatitis B infection. 38.3% of continuing students were willing to get vaccinated compared to 32.3% of students in their first year and 22% in their final year of studies ($p \leq 0.030$). These results contrast with research conducted among Public Health students in Ghana, where 41.2% of respondents were

not vaccinated against Hep B infection. Among them, 50.9% were not willing to be vaccinated even if it was offered to them at no cost [58].

4.5. Vaccination Status and Its Influence on Hepatitis B Infection

In our study, 76.5% of participants were vaccinated against the Hepatitis B virus. This result sharply contrasts the results of a study conducted among students in three universities in Ghana, where only 38.2% of participants were vaccinated [58]. Gyimah attributed the low vaccination status to the non-compulsory nature of Hepatitis B vaccination and lack of awareness of the vaccine.

Our research findings show a significant association between the faculty of study and the vaccination status of participants. Notably, 53.3% of students in health-related faculties had a higher vaccination status than their counterparts in non-health-related faculties, which stood at 22.8% ($p \leq 0.05$). This aligns with the findings of a study among nursing students in Ho, Ghana, by [59], where 49.4% of the students had good vaccination status.

A similar research carried out in South Africa among health workers by [60] had a comparable result, where 49% of the participants were vaccinated against Hepatitis B. On the contrary, a survey among medical students in Somalia showed an inferior immunization history, accounting for only 2.8% of the participants. The main reasons students gave for this low vaccination status were the inaccessibility of vaccines (32.8%), the high cost of the vaccines (26.7%), and issues regarding the safety of vaccines (12.6%) [45].

The high awareness of the Hepatitis B infection, reaching 78.2%, underscores the urgent need for comprehensive vaccination programs, screening, and promotion campaigns among the population.

4.6. Study Limitations

As a result of the spread of respondents in the sampled population, a significant effort was required to collect the necessary data from the students. Additionally, some students were delayed in filling out and submitting the Google forms.

5. Conclusion

The study found that university students were highly aware of Hepatitis B infection. They demonstrated a commendable understanding of the symptoms and complications of Hepatitis B. The students also positively perceived the availability and safety of the Hepatitis B vaccine. Many students had already been vaccinated, and a high percentage were willing to undergo screening to find out about their Hepatitis B status and get vaccinated. The study also identified gender, level of education, and faculty of study as significant factors influencing the students' awareness and practices related to Hepatitis B infection. The willingness to be vaccinated among junior students was low, underscoring the urgent need for more promotion campaigns among the population, especially among university students.

Conflicts of Interest

The authors declare no conflicts of interest.

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