

# Assessment of the Knowledge and Vaccination Status of Hepatitis B Among High School Students In Sagnarigu District, Ghana

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## Abstract

**Background:** According to a 2015 WHO report, 5-10% of adults in Sub-Saharan Africa are chronically infected with the Hepatitis B virus.

**Objective:** The study sought to assess the knowledge of HBV infection, its mode of transmission, and the attitude towards its vaccination among high school students in the Sagnarigu district of the Northern Region.

**Material and Methods:** In this descriptive cross-sectional survey, a purposive sampling technique was used to select the schools out of the lot found in the district due to their locations, populations, and varying social status of students in those schools, and simple random sampling was used to select respondents from March to July 2017 in the Sagnarigu district of the Northern Region of Ghana. An anonymous questionnaire was designed for the study based on the research objectives and this was used in the collection of data. The results obtained were presented in the form of tables & graphs and were analyzed statistically.

**Results:** The study revealed that a significant proportion of the respondents, specifically 343 individuals (92.2%), were aware of HBV infection, and many of them possessed adequate knowledge about the infection. In terms of transmission, 198 individuals (53.2%) correctly identified sexual intercourse as a mode of transmission, while 257 individuals (69.1%) were aware that sharing toothbrushes with an infected person could lead to transmission. vaccination, with 210 individuals (56.5%) expressing willingness to receive the vaccination. However, the actual vaccination rate was relatively low, with only 90 individuals (24.2%) reporting that they had received the vaccination.

**Conclusion:** There is an urgent need to increase student vaccination rates and raise awareness about HBV infection. We recommend that second-cycle students be vaccinated and educated at the time of admission to help reduce the spread of the infection and raise awareness.

**Keywords:** Awareness, Hepatitis B Virus, Attitude, Transmission and Vaccination.

**Cite as:** Faridu, A., Mahama, C.J., Malory, C., Nyarko, S., Aseyuure, W.C., Gyamfi, D. (2024). Assessment of the Knowledge and Vaccination Status of Hepatitis B Among High School Students In Sagnarigu District, Ghana BMC J Med Sci 2024. 5(1): 86-91

## Introduction

Hepatitis B is an infection of the hepatocytes as a result of exposure to the hepatitis B virus <sup>1,2</sup>. This can lead to chronic hepatitis, cirrhosis of the liver, and liver cancer. The Hepatitis B virus also known as serum hepatitis is a DNA virus found in blood and body fluids<sup>3</sup>. This virus is 50-100 times more infectious than HIV and is transmitted between people by percutaneous or per mucosal exposure to infectious blood products or other body fluids like saliva, semen, vaginal fluids, and mucous membranes <sup>1,4</sup>.

On average, the hepatitis B virus has an incubation period of 75 days but can vary from 30 to 180 days<sup>5</sup>. However, HBV can survive outside the body for at least <sup>7</sup> days and has the potential to cause infection when exposed to a susceptible host<sup>6</sup>. The hepatitis B virus may be detected within a period of 30 to 60 days after exposure to the virus and can persist and develop into chronic Hepatitis B <sup>7</sup>. It is estimated that 257 people are living with hepatitis B virus infection according to the World Health Organization in 2019 <sup>8</sup>. About 929,000 chronic hepatitis B deaths were recorded in 2006 according to Perz and colleagues<sup>9</sup> and also

Authorship Contribution: <sup>1,4</sup>Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work, <sup>2</sup>Final approval of the version to be published, Supervision, Active participation in active methodology

Funding Source: none  
Conflict of Interest: none

Received: March 25, 2024  
Accepted: May 8, 2024  
Published: July 2, 2024

subsequently in 2015, about 887,000 people died of hepatitis B virus and its related complications<sup>10</sup>. The most common ways of transmission are by unprotected sex with an infected person, unsafe blood transfusions, and reuse of needles and syringes by injection blood users in a health setting, from mother to child at birth, close household contact, and between children in early childhood<sup>11</sup>. HBV is unique compared to other sexually transmitted diseases because it can be prevented with a vaccine<sup>12,13</sup>. According to the World Health Organization in 2017, approximately 5-10% of the adult population of sub-Saharan Africa is chronically infected with the Hepatitis B virus. This makes sub-Saharan Africa one of the regions with the highest prevalence of hepatitis B viral infection<sup>1,2</sup>. Also, 2-5% of the general populations of the Middle East and Indian subcontinents are chronically infected with the Hepatitis B virus while less than 1% of the population of Western Europe and North America is chronically infected with the Hepatitis B virus<sup>1</sup>. Living in hepatitis B endemic populations predisposes a person to a higher chance of being infected<sup>14,15</sup>.

HBs Agseropositivity HBV infection in Ghana had a prevalence of about 12.9% as of 2013 and mortality increased in Africa by 63%<sup>16,17</sup>. The prevalence rate was highest among studies published from 1995 to 2002 (17.3%) followed by those published between 2003-2009 (14.7%) and the lowest prevalence rate recorded in the period 2010-2015 (10.2%). Regional prevalence was recorded in Ashanti (13.1%), Greater Accra (10.6%), Eastern (13.6%), Northern (13.1%), Central (11.5%), and Brong Ahafo (13.7%). Volta, Western, Upper East, and Upper West regions had no aggregate data<sup>4,18</sup>. A higher prevalence of HBV infection was recorded for urban settings (12.2%) compared to rural settings (13.3%). Across the country, the highest HBV infection prevalence rate was recorded in persons within the age group of 16-39 years<sup>19</sup>. It is worthwhile to note that there is a proportional linkage between the prevention of any disease condition to the Knowledge, attitude, and practice (KAP) of the population<sup>20</sup> and is reflective of the importance that is paid to health-related issues by society. Such studies are therefore employed to play a crucial role in determining the uncertainties of society and are largely used in population-reported assessment research worldwide<sup>11</sup>. On the contrary, there is unsatisfactory data from Ghana, exploration of knowledge, and awareness of HBV among SHS students. Despite the efforts made by authorities to raise knowledge and awareness about HBV in the country, no progress has been reported<sup>16</sup>. This necessitated the rationale to assess and find out the awareness of the condition and attitude towards vaccination in some selected second-cycle institutions in the Sagnarigu District.

## **Materials and Methods:**

### **Study Area**

The Sagnarigu District with its capital at Sagnarigu is one of the six (6) newly created districts in the Northern

Region in the first half of 2012. It was carved out of the Tamale Metropolis by Legislative Instrument (LI) 2066. The district was inaugurated on 24th June 2012. The district covers a total land size of 200.4km<sup>2</sup> and shares boundaries with the Savelugu - Nanton Municipality to the north, Tamale Metropolis to the south and east, Tolon District to the west, and Kumbungu District to the northwest. According to the composite budget of the Sagnarigu district assembly for the 2014 fiscal year, the population of the District is estimated at 148,099 with 74,886 (50.7%) males and 73,213 (49.4%) females. Geographically, the district lies between latitudes 9°16' and 9°34' North and longitudes 0°36' and 0°57' West.

### **Study Design**

A descriptive cross-sectional survey was used to collect information on hepatitis B awareness and attitudes toward vaccination in second-cycle institutions in the Sagnarigu district of Tamale.

### **Sampling procedure**

Two schools in the district were chosen for this study: Tamale Senior High School, which has a student population of over 2000, and Northern School of Business, which has a student population of over 1600. The two schools in the Sagnarigu district were chosen using a purposeful sampling technique. This was due to their strategic locations, various types of students, and population. Participants were chosen from the three schools using simple random sampling.

### **Data collection tool**

An anonymous questionnaire was designed for the study based on the research objectives and this was used in the collection of data. The survey instrument was prepared in English since all our target participants could read and write. The data collection questionnaire comprised four (4) parts. Part I constituted the socio-demographics of the respondents, Part II tested respondents' knowledge of Hepatitis B infection, Part III sought to assess respondents' knowledge of the mode transmission of hepatitis B infection, and Part IV was to know respondents' attitudes towards hepatitis B virus vaccination.

### **Inclusion and exclusion criteria**

For purposes of this research, the target population covered both male and female residents be they Residence or Day students of the senior High School in Sagnarigu District. Anyone who is a Student of any Senior High School outside the Sagnarigu District was excluded from the study.

## **Results:**

A total of 372 students representing two different Senior High Schools were involved in the study. From Table 1, the majority of the students, 320 (86.0%) were within the age group of 15- 19 years while the least were aged 30 years and above 1 (0.3%). 4 (1.1%) of the students were within the age group of 10-14 years, 20-24 years recorded 33 (8.9%), from 25-29 years. 3 (0.8%) and 11 (3.0%) gave no response to their age. Most of the

respondents were males 242 (65.1%) and the females were 130 (34.9%).

	Frequency	Percent
<b>Age group</b>		
10- 14years	4	1.1
15- 19year	320	86.0
20- 24years	33	8.9
25- 29years	3	0.8
30 above	1	0.3
No response	11	3.0
<b>Gender</b>		
Male	242	65.1
Female	130	34.9
<b>Total</b>	<b>372</b>	<b>100.0</b>

Table 2 depicts that, 157 (42.2%) were Muslims, 207 (55.6%) were Christians, 7 (1.9%) were traditionalists and 1 (0.3%) gave no response to their religious affiliation. In finding out who respondents live with, respondents who live with one parent were 80 (21.5%), with both parents 235 (63.2%), other family members 45 (12.1%), with friends 1 (0.3%), living alone 5 (1.3%) and others 6 (1.6%). With regards to the level(forms) of respondents, the majority were in Form 2, 225 (68.5%) followed by Form 1, 144 (30.6%), and the least 3 (0.8%) in Form 3.

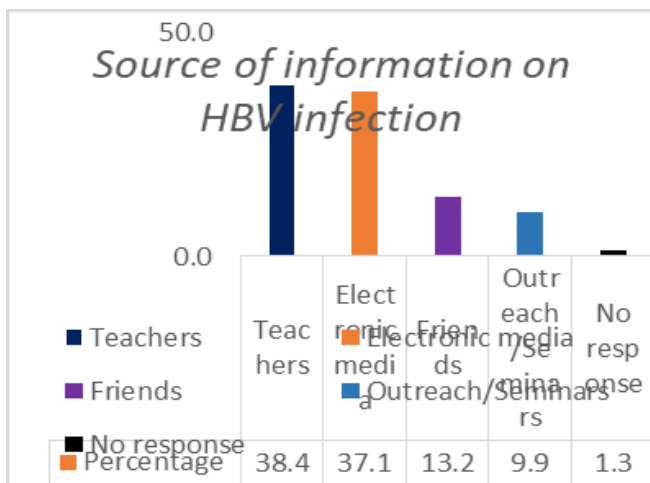
In terms of marital status, 350 (94.1%) respondents were single, 16 (4.3%) were married, 4 (1.1%) were separated, and 2 (0.5%) gave no response. Also, in terms of respondents' relationship with the opposite sex, the majority of them 271 (72.8%) said they have no partners of the opposite sex, 88 (23.7%) have partners, and 1 (0.3%) gave no response.

The majority of study participants had adequate knowledge of HBV infection. Of the 372 students polled, 343 (92.2%) said they had heard of the HBV infection, 28 (7.5%) said they had not, and 1 (0.3%) said they had not as shown in Table 3.

As shown in Figure 1, sources of information varied among respondents. Teachers were their primary source, accounting for 143 (38.2%), followed by electronic media (138.7%), friends (49.2%), outreach/seminars (9.9%), and 5 (1.3%) respondents who did not respond.

Characteristics	Frequency	Percentage (%)
<b>Religion</b>		
Muslim	157	42.2
Christian	207	55.6
Traditionalist	7	1.9
None	1	0.3
<b>With whom do you live</b>		
One parent	80	21.5
Both parent	235	63.2
Other family members	45	12.1
Friends	1	0.3
By myself	5	
Other.....	6	1.6
<b>Educational level (form)</b>		
Form 1	114	30.6
Form 2	225	68.5
Form 3	3	0.8
<b>Marital Status</b>		
Single	350	94.1
Married	16	4.3
Separated	4	1.1
No response	2	0.5
<b>Do you have a partner of the opposite sex?</b>		
Yes	88	23.7
No	271	72.8
Used to have	12	3.2
No response	1	0.3

	Frequency	Percentage (%)
<b>Have you heard about Hepatitis B infection?</b>		
Yes	343	92.2
No	28	7.5
No response	1	.3
<b>Total</b>	<b>372</b>	<b>100.0</b>



**Figure 1: Source of information on HBV infection**

In terms of HBV infection symptoms, 265 (71.2%) knew HBV has symptoms, 32 (8.6%) said HBV has no symptoms, 73 (19.6%) said they do not know, and 2 (0.5%) did not respond. Of the 372 respondents, 176 (47.3%) believe HBV can cause liver cancer, 43 (11.6%) believe HBV cannot cause liver cancer, 149 (40.1%) do not know, and 4 (1.1%) do not respond. 264 (71.0%) knew that a healthy-looking infected person could still spread the infection, 34 (9.1%) said healthy-looking people could not spread it, 73 (19.6%) said they didn't know, and 1 (0.3%) said they didn't know. This is shown in Table 4.

A good number of the respondents had a fair knowledge of the mode of transmission of the HBV (Table 5). About 135 (36.5%) of the respondents think it can be transmitted through genes, 102 (27.4%) think otherwise, 135 (36.3%) do not know. 200 (53.8%) believe HBV can be transmitted through air, 76 (20.4%) said it cannot be through air, 93 (25.0%) do not know about this and 3 (0.8%). Moving on to transmission through sexual relationships, 198 (53.2%) responded yes, 74 (19.9%) said no, 94 (25.3%) did not know and 6 (1.6) gave no response. With transmission during childbirth, 117 (31.5%) said it can be transmitted during birth, 119 (32.0%) said it cannot, 132 (35.5%) do not know and 4 (1.1%) gave no response. 209 (56.2%) answered yes to HBV spreading by sharing spoons or bowls for food, 80 (21.5%) answered no, 80 (21.5%) did not know and 3 (0.8) gave no response. HBV spreads by eating food that has been pre-chewed by an infected person, 223 (59.9%) believe it's possible, 48 (12.9) think otherwise, 98 (26.3%) have no idea and 3(0.8%) gave no answers. Also, 257 (69.1%) answered yes to spreading by sharing a toothbrush with an infected person, 37 (9.9%) answered no, 75 (20.2%) did not know and 3 (0.8) gave no response. When it comes to holding hands with an infected person, 106 (28.5%) said HBV can be transmitted, 172 (46.2%) said no, and 94

**Table 4 Knowledge of HBV infection of respondents**

Knowledge	Yes	No	Do not know	No response
Does HBV infection have symptoms?	265(71.2)	32(8.6)	73(19.6)	2(0.5)
Does HBV cause liver cancer?	176(47.3)	43(11.6)	149(40.1)	4(1.1)
If someone is infected with hepatitis B but looks and feels healthy, do you think that person can spread HB?	264(71.0)	34(9.1)	73(19.6)	1(0.3)

**Table 6 Comparison of respondents vaccinated and those who will be vaccinated**

		Will you receive the hepatitis B vaccination?				
		Yes	No	Do not know	No response	
Got the Hepatitis B vaccination?	Yes	66	9	15	0	90
	No	136	52	57	1	246
	Do not know	8	2	26	0	36
Total		210	63	98	1	372

(25.3%) do not know if it can be transmitted this way. Finding out if HBV can be transferred by eating food prepared by an infected person, 52 (14.0%) said yes, 215 (57.8%) answered no, 104 (28.0%) did not know and 1 (0.3%) gave no response.

Among those whose attitudes toward vaccination were compared, 90 (24.2%) had received the HBV vaccine, 246 (66.1%) had not, and 36 (9.7%) were unsure of their vaccination status.

The majority of respondents, 210 (56.5%), said they would get an HBV vaccination; 63 (16.9%) said no; 98 (26.3%) said they didn't know; and 1 (0.3%) said they had no opinion (Table 6)

Assessing the knowledge and attitude of students towards vaccination as provided above, 265 (71.2%) answered they know healthy people need vaccination, 56(15.1%) answered no, 50 (13.4%) answered they do not know and 1 (0.3%) gave no response. Most of the participants 248 (66.7%) agreed they needed vaccination at their age, 55 (14.8%) answered no, 68 (18.3%) respondents reported they did not know and 1(0.3%) gave no response. In finding out if

children less than 2 years old needed vaccination, 101 (27.2%) reported yes, 164 (44.1%) reported no, 106 (28.5%) reported they did not know and 1 (0.3%) gave no response. 185 (49.7%) student participants know where to receive vaccination, 116 (31.2%) answered no, 70 (18.8%) answered they do not know and 1 (0.3%) gave no response. 179 (48.1%) mentioned they know or low-cost through certain programs, 83 (22.3%) answered no, 108 (29.0%) answered they do not know and 2 (0.5%) gave no response that vaccination can be free as shown in Table 7.

transmit HBV infection, which is in contrast to a study conducted by Han and Pers in 2017 in Guangdong Province, China, where 53.3% of respondents were not aware of this mode of transmission. Furthermore, 31.5% of the respondents in the current study acknowledged that HBV infection can be transmitted during childbirth, while 32.0% believed it cannot be transmitted during childbirth, and 35.5% were unsure about this mode of transmission. These findings contrast with a study conducted by Han and peers 5 in Guangdong

<b>Attitude</b>	<b>Yes</b>	<b>No</b>	<b>Do not know</b>	<b>No response</b>
<b>Do you know if vaccinations can be free or low-cost through certain programs?</b>	<b>179(48.1)</b>	<b>83(22.3)</b>	<b>108(29.0)</b>	<b>2(0.5)</b>
<b>Do you know if healthy people need a vaccine?</b>	<b>265(71.2)</b>	<b>56(15.1)</b>	<b>50(13.4)</b>	<b>1(0.3)</b>
<b>Do you know if you need vaccination at your age?</b>	<b>248(66.7)</b>	<b>55(14.8)</b>	<b>68(18.3)</b>	<b>1(0.3)</b>
<b>Do you know if children less than 2 years old need to be vaccinated?</b>	<b>101(27.2)</b>	<b>164(44.1)</b>	<b>106(28.5)</b>	<b>1(0.3)</b>
<b>Do you know the place where one can get Hepatitis B vaccination?</b>	<b>185(49.7)</b>	<b>116(31.2)</b>	<b>70(18.8)</b>	<b>1(0.3)</b>

## **Discussion:**

The findings of the study indicated that the majority of the respondents exhibited a satisfactory level of knowledge regarding HBV infection. Specifically, 92.2% of the respondents had heard of HBV infection, with teachers (38.2%) and electronic media (37.1%) being the primary sources of information. This finding can be compared to a study conducted among Vietnamese Americans in the USA by Taylor et al. (2006), which also reported a high awareness rate of 81% among respondents. Further analysis revealed that a higher percentage of male participants (93.4%) were knowledgeable about HBV infection compared to their female counterparts (90.0%). Additionally, a substantial proportion of respondents (71.2%) knew that HBV infection could present with symptoms, while 47.3% were aware that it could potentially lead to liver cancer. However, a notable percentage (40.1%) were uncertain about this association, and 11.6% believed that HBV infection cannot cause liver cancer.

In terms of transmission, knowledge among the respondents was varied. While 27.4% correctly identified that HBV infection cannot be transmitted through genes, 53.8% believed that it could be spread through the air (e.g., coughing or staying in the same room), with 25.0% being uncertain about this mode of transmission and 20.4% correctly recognizing that it cannot be transmitted through the air. Notably, 53.2% of the respondents were aware that sexual intercourse can

Province, China, where nearly 20% of respondents were unaware of mother-to-child transmission of HBV infection. In terms of other modes of transmission, 56.2% of the respondents believed that sharing spoons or bowls for food can transmit HBV infection, while 21.5% disagreed and the same percentage (21.5%) were uncertain. Additionally, 59.9% of the respondents were aware that HBV infection can be transmitted by consuming food that has been pre-chewed by an infected person, with 12.9% believing otherwise and 26.3% being uncertain.

Furthermore, 69.1% of the respondents correctly identified that sharing a toothbrush with an infected person can transmit HBV infection, and 46.2% of the students were aware that hands-on contact with an infected person cannot spread the infection. These findings contrast with a study conducted in Northwest Ethiopia by Abdelaand peers in 2016<sup>21</sup>, where a higher proportion (62.2%) of respondents believed that HBV infection can be spread through casual contact, such as handshaking. Remarkably, 57.8% of the respondents in the current study were aware that HBV infection cannot be transmitted through the consumption of food prepared by an infected person.

Overall, the findings highlight a mixed level of knowledge among the respondents regarding HBV infection and its modes of transmission. While many respondents demonstrated good awareness, some misconceptions and knowledge gaps were identified.

These findings underscore the importance of targeted education and awareness campaigns to enhance knowledge about HBV infection and its prevention among the general population.

## Conclusion:

In conclusion, the findings of this research highlight the knowledge and attitudes toward hepatitis B virus (HBV) infection and vaccination among Senior High School students in the Sagnarigu District. The majority of respondents were found to be aware of HBV infection, with teachers and electronic media playing a significant role in providing information. This suggests that teachers in second-cycle schools can serve as important sources of information to improve education about HBV infection. However, there is still a need to enhance HBV infection knowledge and awareness among students and increase the uptake of vaccination. It is recommended that students should be vaccinated and educated about HBV infection at the time of admission to help prevent the spread of the infection and raise awareness. Further efforts are needed to address knowledge gaps and promote preventive measures to combat HBV infection among Senior High School students in the Sagnarigu District.

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