World Journal of Biology Pharmacy and Health Sciences
eISSN: 2582-5542
Cross Ref DOI: 10.30574/wjbphs
Journal homepage: https://wjbphs.com/

(RESEARCH ARTICLE)

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Disparities in Hepatitis B Knowledge and Perception among Senior High School Students in Northern and Southern Ghana: A Cross-Sectional Study

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World Journal of Biology Pharmacy and Health Sciences, 2023, 15(01), 221-232

Publication history: Received on 16 June 2023; revised on 24 July 2023; accepted on 28 July 2023

Article DOI: https://doi.org/10.30574/wjbphs.2023.15.1.0324

Abstract

Background: Hepatitis B virus (HBV) remains a major public health challenge in Ghana, yet gaps persist in understanding regional disparities in awareness among high-risk groups like adolescents. This study assessed HBV knowledge and perceptions among Senior High School students in northern (Bolgatanga) and southern (Accra) Ghana, where healthcare access and education vary significantly.

Method: A comparative cross-sectional study was conducted with 128 students (64 per region), selected via random sampling. Data were collected using structured questionnaires and analysed with SPSS v23, employing chi-square and t-tests ($p<0.05$ significance).

Result: It was revealed that while 91.4% of students had heard of HBV, only 18% could accurately define it, and fewer than 30% understood transmission routes or symptoms. Awareness was significantly higher in Accra (OR: 5.07, $p=0.027$), with schools being the primary information source (36.7%). Alarmingly, 46.1% believed infected individuals should be isolated, reflecting pervasive stigma, particularly in the north (54.7% vs. 37.5%, $p=0.076$). Despite 78.1% vaccination coverage, knowledge gaps persisted, highlighting disconnects between immunisation programs and education.

Conclusion: This study highlights stark regional disparities in HBV knowledge, demanding urgent, tailored interventions. School-based education, media campaigns in underserved northern regions, and vaccination drives paired with anti-stigma initiatives are essential. Future research should investigate long-term awareness trends and the cultural roots of misconceptions. Without addressing these gaps, Ghana's fight against HBV will fall short of its public health goals.

Keywords: Hepatitis B virus (HBV); School-based interventions; Ghana; Adolescents; Regional disparities; Vaccination; Public health policy; Health education

1. Introduction

Hepatitis B is a viral infection that affects the liver and is caused by a DNA virus, the hepatitis B virus (HBV). It is part of the five main hepatitis viruses (A, B, C, D, E), which usually present as either an acute or chronic infection [1]. The World Health Organisation [2] declared it the commonest infection that affects the liver. It is a potentially fatal infection. Hepatitis B virus is highly infectious and more contagious than HIV infection [3]. It is transmitted from individual to

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individual via contact with blood or other potentially infectious body fluids of a contaminated individual, and in addition through saliva, menstrual, vaginal and seminal fluids [4]. It can likewise be spread through injecting drugs. In territories where hepatitis B is highly endemic, the most well-known method of transmission is from an infected mother to her newborn during birth [5].

Currently, there are more than 2 billion people all over the world with proven recent or past infection, and over 350 million people as chronic carriers. In the East Asian Region, there are estimated to be 80 million HBV chronic carriers (about 6% of the aggregate population) [6]. Widely recognised methods of transmission include, for example, unprotected sexual intercourse, hazardous blood transfusions, and utilisation of infected needles, from mother to newborn at birth, close household contact and amongst children in early adolescence [7]. It ended up conceivable in 1964 to distinguish individuals with Hepatitis B infection utilising serology testing, by finding hepatitis B surface antigen (HBsAg) in a blood sample [8]. The majority of people with the infection do not present with clinical features at the time of diagnosis, meaning that a person can be infected without even knowing it and only be found on incidental testing [9, 10]. However, a few individuals may present with acute signs and symptoms like yellowing of the eyes (jaundice), easy fatigability, and loss of appetite, nausea and vomiting and abdominal discomfort. About 90% of adults who get infected, the infection may not persist, and they may become healed and healthy. However, for newborn children and adolescents, there is about 90% and 30-50% chance, respectively that the disease would result in chronic hepatitis B [11]. This gives an expanded chance, around 25%, that as they progress, they will experience the ill effects of injurious impacts of chronic Hepatitis B, like liver cirrhosis and liver malignancy, if the illness is not overseen suitably [12].

Hepatitis B virus (HBV) infection remains a significant global public health challenge, particularly in sub-Saharan Africa and Southeast Asia, where prevalence rates exceed 8% [13]. The virus leads to chronic liver disease, cirrhosis, and hepatocellular carcinoma in approximately 25% of untreated cases [14]. Despite the availability of an effective vaccine since the 1980s, gaps in knowledge, vaccination coverage, and public awareness persist, especially in low-resource settings like Ghana [15]. Symptomatic persons with acute Hepatitis B infection will require some form of treatment since currently there is no cure available [16]. People determined to have chronic hepatitis B infection can be given interferon (pegylated interferon alfa 2a), which suppresses the HBV and helps to upgrade the immune system's ability to protect against HBV [17]. Early recognisable proof of infected patients with the assistance of blood tests can bring a halt to the ongoing transmission and prompt the needed treatment with antiviral medicine [18]. Likewise, it is imperative to identify and immunise individuals who live in a household with an infected person and sexual partners of any infected person to avoid transmission. Alcohol consumption coupled with Hepatitis B infection has been proven to increase the risk of hepatotoxicity and lead to early decompensation [19]. Hepatitis B viral infection and Human immunodeficiency virus (HIV) have similar modes of transmission, hence, a person can have a co-infection of both.

In health care service, HBV transmission poses a major challenge to both patients and health personnel, particularly those who often come into direct contact with blood [20]. These groups of health care providers stand a greater chance of being infected if infection prevention protocols are not properly observed [21]. Aside health care personnel, some individuals in the general public are more inclined to being infected with hepatitis B than others, for example, intravenous drug users or injectors, individuals who pierce or tattoo their bodies and adolescents who engage in unprotected sexual activities due to their inadequate knowledge on safe sexual practices.

Adolescents, due to high-risk behaviours like unprotected sex and needle-sharing, are a critical demographic for HBV transmission [22]. Studies consistently reveal inadequate HBV knowledge among adolescents in endemic regions. In Côte d'Ivoire, only 39.3% of students knew HBV could be sexually transmitted, and just 35.7% were aware of the vaccine [23]. Similarly, in Ghana's Dunkwa-on-Offin, while 92% had heard of HBV, only 20% understood its sexual transmission route, and 57.5% were unaware of its link to liver cancer [24]. In many nations where the prevalence of HBV is low, transmission as a rule happens amid adolescents or young adults because of the risky behaviours they engage in like unsafe intravenous drug injections and unprotected sexual activities. HBV, dissimilar to other known sexually transmitted maladies, can be highly prevented through vaccination [25]. The Hepatitis B vaccine is about 95% effective in preventing the chronic outcomes of the infection. Hepatitis B virus (HBV) infects 12.9% of Ghanaians chronically, yet awareness remains dangerously low, especially among adolescents [26]. Senior High School (SHS) students face heightened risk due to unprotected sex, sharing sharp objects, and low vaccination rates [27]. Despite its severe consequences, cirrhosis and hepatocellular carcinoma, HBV education is often sidelined by other diseases, leaving transmission and prevention poorly understood.

Existing studies in Dunkwa-on-Offin and the Upper West Region show superficial HBV knowledge among students, with myths (e.g., HBV requires isolation) worsening stigma [28]. No prior research compares northern and southern Ghana, where cultural and healthcare disparities may shape awareness. Geographical disparities compound these gaps. In Ghana, data on regional differences in HBV knowledge are virtually absent. This study fills that void by comparing

northern and southern Ghana, where cultural, educational, and healthcare access disparities may influence outcomes. This comparative approach is essential for informing targeted and effective interventions. This study bridges that gap by assessing HBV knowledge among SHS students in Bolgatanga (north) and Accra (south), informing targeted interventions to curb HBV's spread in this high-risk demographic [29]. Adolescents are a high-risk group for HBV due to their engagement in behaviours such as unprotected sex, sharing of needles, and inadequate hygiene practices, yet few studies have assessed their understanding of the disease [30]. The findings of this study reveal significant regional differences in HBV awareness, with students in the south (Accra) demonstrating marginally better knowledge than their northern (Bolgatanga) counterparts. These disparities likely stem from variations in health education access, media exposure, and regional healthcare infrastructure. By identifying these gaps, the study provides actionable insights for policymakers and health educators to tailor interventions that address specific misconceptions, such as the belief that HBV-infected individuals should be isolated, and improve vaccination campaigns.

This study seeks to evaluate how Knowledge gaps directly impact attitudes and practices. In Ghana, despite the vaccine's availability, only 4% of Dunkwa-on-Offin students were fully vaccinated [31]. Alarmingly, 29-54% of adolescents supported isolating HBV patients, reflecting stigma. Such attitudes mirror historical HIV-related discrimination [32]. The WHO recommends integrating HBV education into school curricula, yet implementation in Ghana remains inconsistent [33]. Countries like Taiwan have shown that robust school-based programs can reduce HBV prevalence dramatically. This study responds to these deficiencies by exploring how education systems and health communication influence awareness.

Specifically, this study aims to assess students' understanding of HBV transmission, prevention, and associated risks while comparing knowledge levels between these geographically and socio-culturally distinct areas. By doing so, the research will identify critical gaps in HBV education that may require region-specific interventions. The study addresses two key research questions: First, what is the extent of HBV knowledge among SHS students in Ghana? Second, how does this knowledge differ between students in the northern and southern regions? These questions are crucial for developing targeted public health strategies, particularly in high-risk adolescent populations where misinformation and low vaccination rates persist. The findings will inform policy decisions and help tailor educational campaigns to bridge regional disparities in HBV awareness. This study was therefore carried out to determine the knowledge of Senior High School students on Hepatitis B infection and compare the level of knowledge among selected Schools in the Northern and Southern regions of Ghana.

2. Methods

2.1. Study Design and Setting

This study employed a comparative cross-sectional design to assess and contrast the knowledge and perceptions of Hepatitis B virus (HBV) among Senior High School (SHS) students in northern and southern Ghana. Cross-sectional studies are particularly useful for capturing a snapshot of population characteristics at a specific point in time, making them suitable for evaluating awareness levels and attitudes toward public health issues such as HBV [34]. The research was conducted in two secondary schools: Labone Senior High School in Accra (southern Ghana) and Zamse Senior High Technical School in Bolgatanga (northern Ghana). These locations were strategically selected to represent the socioeconomic and cultural disparities between Ghana's northern and southern regions, which may influence health literacy and access to HBV-related information.

2.2. Study Population and Sampling Strategy

The study population comprised SHS students aged 15-20 years, a demographic particularly vulnerable to HBV due to risky behaviours such as unprotected sex and shared needle use. A random sampling technique was used to select participants. This sampling technique ensures each student has an equal probability of being selected [35, 36]. This approach minimises selection bias and enhances the generalizability of findings to similar student populations in Ghana [37].

2.2.1. Sample Size

The sample size was determined pragmatically, with 64 students recruited from each school, totalling 128 participants. While larger samples might improve statistical power, logistical constraints, such as school schedules and participant availability, necessitated a balance between feasibility and robustness [38, 39]. Students in SHS 1 and 2 were prioritised, as those in SHS 3 were preoccupied with final examinations (WASSCE) during data collection.

The study included Senior High School students from selected institutions who provided informed consent and were present during data collection. Science and General Arts students were specifically enrolled to assess potential knowledge variations, as science curricula include infectious disease education. Exclusion criteria removed unwilling participants and absentees to maintain data integrity. No incentives were provided, ensuring purely voluntary participation without external influence.

2.3. Data Collection Instrument and Procedures

Data were collected using a structured, self-administered questionnaire adapted from prior HBV studies in similar settings. The tool was divided into three sections:

- **Demographics**: Age, gender, educational level, and religious affiliation.
- **Knowledge of HBV**: Definitions, transmission routes, symptoms, complications, and prevention methods. Responses were categorised as "adequate," "inadequate," or "no knowledge" based on predefined criteria.
- **Perceptions and Attitudes**: Vaccination history, willingness to be screened, and misconceptions.

Before deployment, the questionnaire was pretested among 10 students from a non-participating school to assess clarity and reliability. Minor revisions were made to ambiguous questions. Trained research assistants supervised data collection to ensure consistency and address queries. Ethical approval was obtained from school authorities, and written consent was secured from all participants.

2.4. Method of Data Analysis

Completed questionnaires were entered into Microsoft Excel and analysed using SPSS version 23. Descriptive statistics (frequencies, percentages, means, and standard deviations) summarised demographic variables and key outcomes. Chi-square tests compared categorical variables (e.g., knowledge levels between regions), while independent t-tests assessed mean differences in quantitative responses. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to determine associations, such as the likelihood of HBV awareness in Accra versus Bolgatanga. Statistical significance was set at $p < 0.05$.

2.5. Ethical Considerations

The study adhered to ethical guidelines outlined in the Declaration of Helsinki. Participation was voluntary, and anonymity was maintained by omitting personal identifiers. Students were informed of their right to withdraw without penalty. Given the sensitivity of health-related data, questionnaires were stored securely, and findings were reported aggregately to prevent individual identification

3. Results

The study assessed HBV knowledge and perceptions among 128 Senior High School (SHS) students from Accra (southern Ghana) and Bolgatanga (northern Ghana). Key findings are presented below, structured by demographic characteristics, HBV awareness, knowledge gaps, and attitudes toward prevention.

3.1. Demographic Characteristics

The sample comprised 62.5% males (n=80) and 37.5% females (n=48), with a mean age of 20 years (SD ±1.8). Notably, 75% of Accra respondents were male, while Bolgatanga had equal gender representation. Most participants were in SHS 2 (80.5%), and General Arts (66.4%) was the dominant course of study. Religious affiliation skewed toward Christianity (82.8%), with a higher Muslim representation in Bolgatanga (28.1% vs. 6.3% in Accra). (Table 1).

Table 1 Demographic Characteristics

Gender	**Count (%)**	**Count (%)**	**Count (%)**
Male	48 (75.0)	32 (50.0)	80 (62.5)
Female	16 (25.0)	32 (50.0)	48 (37.5)
Age			
≤20	29 (45.3)	26 (40.6)	55 (43.0)

>20	35 (54.7)	38 (59.4)	73 (57.0)
Educational level			
SHS 1	13 (20.3)	9 (14.1)	22 (17.2)
SHS 2	51 (79.7)	52 (81.3)	103 (80.5)
SHS 3	0 (0.0)	3 (4.7)	3 (2.3)
Course			
General science	30 (46.9)	9 (14.1)	39 (30.5)
General arts	34 (53.1)	51 (79.7)	85 (66.4)
Business	0 (0.0)	1 (1.6)	1 (0.8)
Home economics	0 (0.0)	3 (4.7)	3 (2.3)
Religion			
Christian	60 (93.8)	46 (71.9)	106 (82.8)
Muslim	4 (6.3)	18 (28.1)	22 (17.2)

3.2. Awareness and Sources of HBV Information

91.4% of students had heard of HBV, but awareness was significantly higher in Accra (53%) than Bolgatanga (47%) (OR: 5.07, 95% CI: 1.05–24.50, p = 0.027). (Table 2).

Table 2 Relationship between location and hearing about hepatitis B

Location	**Heard about Hepatitis B**		**OR (95% C.I)**	**P-value**
	Yes N=117	**No N=11**		
Accra	62 (53.0)	2 (18.2)	5.07 (1.05-24.50)	0.027
Bolgatanga	55 (47.0)	9 (81.8)		

However, schools were the primary source of information (36.7%), followed by television/radio (28.1%), and hospitals (26.6%). (Figure 1).

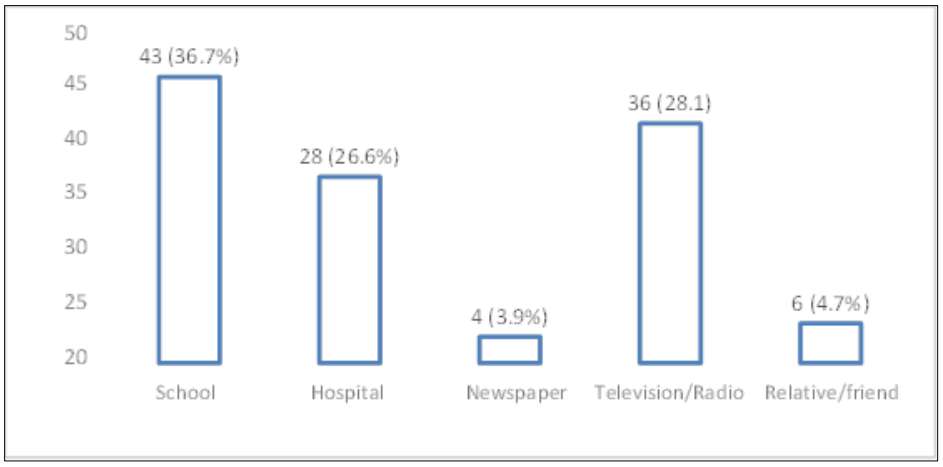

Figure 1 Sources of information on HB

3.3. Knowledge of HBV Transmission, Symptoms, and Prevention

The data reveal stark gaps in HBV knowledge among students, with only 18% able to accurately define HBV, a marginally higher proportion in Accra (20.3%) compared to Bolgatanga (15.6%). Transmission routes were poorly understood, with just 12.5% demonstrating adequate knowledge. Notably, Bolgatanga students outperformed their southern counterparts (18.8% vs. 6.3%, p = 0.059), though the difference was not statistically significant. This unexpected finding may reflect localized health education efforts in northern schools or cultural exposure to HBV risks, such as traditional practices involving shared sharp instruments.

Furthermore, symptoms and complications were similarly misunderstood. While 28.9% identified key symptoms (e.g., jaundice, fatigue), Accra students again fared better (34.4% vs. 23.4%). Only 25.8% knew about severe outcomes like cirrhosis or liver cancer, underscoring a critical gap in linking HBV to long-term health consequences. Prevention knowledge was dismal: just 18% cited effective measures (e.g., vaccination, safe sex). Yet, 65.6% correctly recognised asymptomatic transmission, with Accra students significantly more informed (85.9% vs. 45.3%, p < 0.001). This disparity highlights an urban advantage in accessing intensive health messaging, possibly through digital media or school programs.

Table 3 Knowledge of Hepatitis B virus infection

Location	**Location**		**Totals**	**P-value**
	Accra N=64	**North N=64**		
What is hepatitis B?				0.646
Adequate knowledge	13 (20.3)	10 (15.6)	23 (18.0)	
Inadequate knowledge	51 (79.7)	54 (84.4)	105 (82.0)	
What are the ways of spreading HBV				0.059
Adequate knowledge	4 (6.3)	12 (18.8)	16 (12.5)	
Inadequate knowledge	60 (93.8)	52 (81.3)	112 (87.5)	
What are the Symptoms of HBV				0.242
Adequate knowledge	22 (34.4)	15 (23.4)	37 (28.9)	
Inadequate knowledge	42 (65.6)	49 (76.6)	91 (71.1)	
What are the complications associated with HBV?				0.687
Adequate knowledge	18 (28.1)	15 (23.4)	33 (25.8)	
Inadequate knowledge	46 (71.9)	49 (76.6)	95 (74.2)	
Ways of preventing HBV				0.646
Adequate knowledge	13 (20.3)	10 (15.6)	23 (18.0)	
Inadequate knowledge	51 (79.7)	54 (84.4)	105 (82.0)	
Can healthy HBV infected persons spread HBV				<0.001
Yes	55 (85.9)	29 (45.3)	84 (65.6)	
No	9 (14.1)	35 (54.7)	44 (34.4)	
There’s no efficient treatment for HBV				0.443
Yes	22 (34.4)	17 (26.6)	39 (30.5)	
No	42 (65.6)	47 (73.4)	89 (69.5)	
People infected with HBV should be isolated				0.076
Yes	24 (37.5)	35 (54.7)	59 (46.1)	
No	40 (62.5)	29 (45.3)	69 (53.9)	

Healthy people need vaccination				0.134
Yes	58 (90.6)	51 (79.7)	109 (85.2)	
No	6 (9.4)	13 (20.3)	19 (14.8)	
No	9 (14.1)	35 (54.7)	44 (34.4)	

3.4. Attitudes Toward Vaccination and Screening

The data revealed that vaccination uptake was 78.1% receiving at least one HBV vaccine dose (82.8% in Accra vs. 73.4% in Bolgatanga). However, only 35.2% believed vaccination was necessary for their age group, with northern students more likely to endorse this view (53.1% vs. 17.2%, $p < 0.001$). Furthermore, 93% expressed interest in HBV screening, but 4.7% declined, all from Accra ($p = 0.038$).

Table 4 Attitude towards HBV screening

Location	**Location**		**Totals**	**P-value**
	Accra N=64	**North N=64**		
Ever received Hep B vaccine				0.285
Yes	53 (82.8)	47 (73.4)	100 (78.1)	
No	11 (17.2)	17 (26.6)	28 (21.9)	
Do you need vaccination at your age				<0.001
Yes	11 (17.2)	34 (53.1)	45 (35.2)	
No	53 (82.8)	30 (46.9)	83 (64.8)	
Want to be screened for HBV				0.038
Yes	57 (89.1)	62 (96.9)	119 (93.0)	
No	6 (9.4)	0 (0.0)	6 (4.7)	
I don't know	1 (1.6)	2 (3.1)	3 (2.3)	
Want to be given more information of HBV				0.406
Yes	57 (89.1)	61 (95.3)	118 (92.2)	
No	4 (6.3)	2 (3.1)	6 (4.7)	
I don't know	3 (4.7)	1 (1.6)	4 (3.1)	

Furthermore, people desired more HBV information, particularly on symptoms (33% in Accra) [Figure 2], general knowledge (28% in Bolgatanga) and mode of transmission (31% in Bolgatanga). [Figure 3].

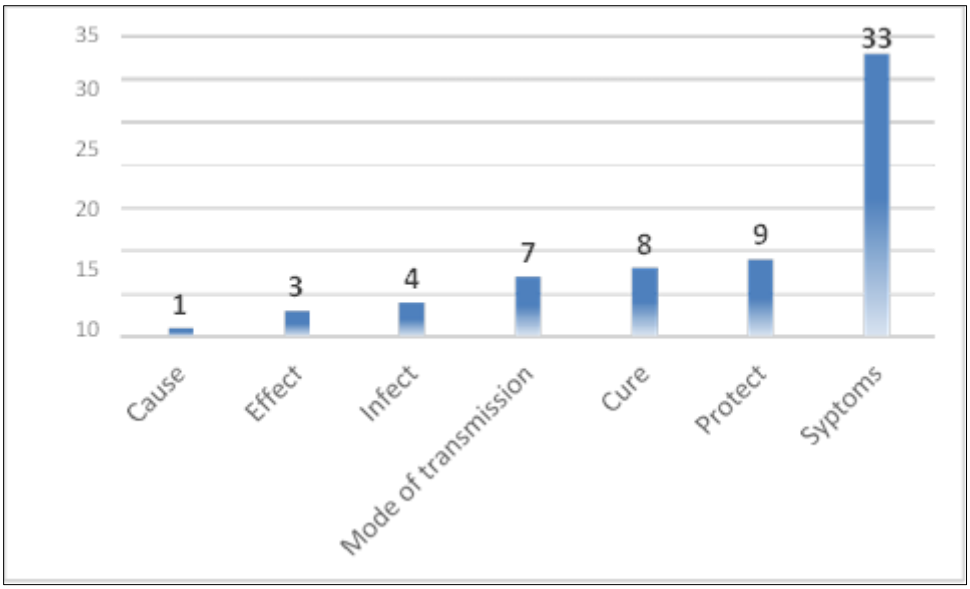

Figure 2 Further comment on HBV information (Accra)

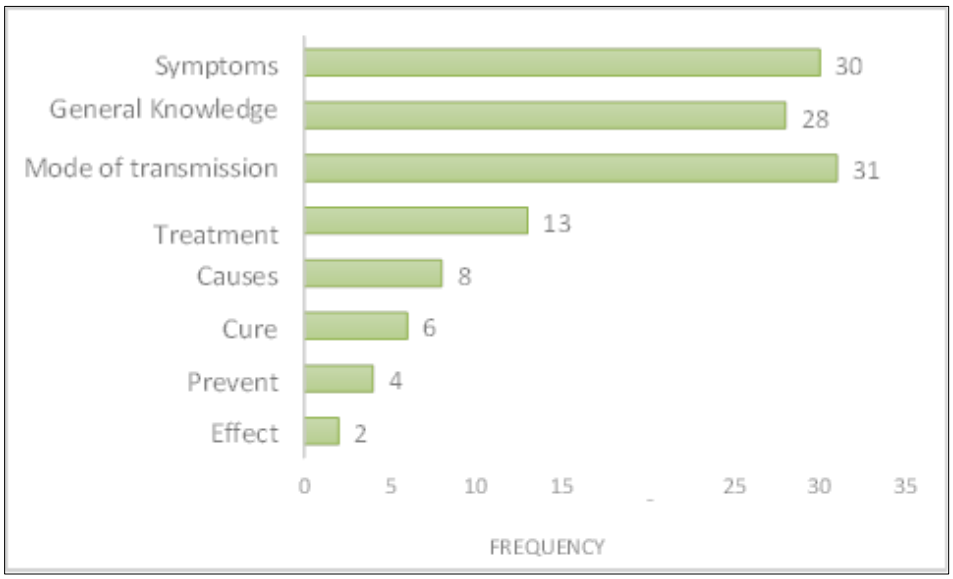

Figure 3 Further comment on HBV information (Bolgatanga)

4. Discussion

The findings of this study reveal critical gaps in HBV knowledge and concerning regional disparities between northern and southern Ghana, despite relatively high awareness levels. While 91.4% of students had heard of HBV, a figure comparable to studies in Dunkwa-on-Offin (92%) and higher than in Côte d'Ivoire (76.6%) [40]. The depth of understanding was alarmingly superficial. Only 18% could accurately define HBV, and a mere 12.5% understood its transmission routes. This suggests that awareness campaigns, while successful in name recognition, fail to impart functional knowledge needed for prevention.

The study highlights a troubling paradox: despite 78.1% vaccination coverage, most students lacked basic HBV literacy. This mirrors findings in Nigeria, where high vaccine uptake coexisted with persistent myths about transmission via casual contact [41]. The misconception that HBV patients should be isolated (held by 46.1% of respondents, rising to 54.7% in Bolgatanga) reflects deep-seated stigma, likely compounded by cultural beliefs and inadequate health

education. Such attitudes are dangerous; they discourage testing and treatment, perpetuating silent transmission [42]. The Ghana Education Service should develop standardised, age-appropriate HBV modules for SHS students, covering transmission, prevention, and stigma reduction. Lessons should incorporate interactive methods like role-playing to combat misconceptions (e.g., 46.1% supported isolating patients). Studies show that curriculum-based health education significantly improves retention and behavioural outcomes [43].

Notably, Accra students were five times more likely to have heard of HBV than their northern counterparts, highlighting the urban-rural divide in health information access. This disparity aligns with Ghana's broader healthcare inequities, where urban centres benefit from stronger media penetration and school-based health programs [44]. In addition, the north-south knowledge gap is not incidental but symptomatic of long-standing neglect. Bolgatanga's reliance on hospitals (32.8%) rather than schools for HBV information, compared to Accra's school-dominated sources (40.6%), points to weaker institutional health education in northern regions. This echoes findings by Dzando et al. [45], who attributed rural knowledge deficits to fewer trained teachers and fragmented outreach programs, and also a research by Li et al. [46] in China. Therefore, in northern Ghana where hospital-based education is more common than school-based learning, radio dramas in local languages should debunk myths (e.g., HBV as "witchcraft"). In urban areas, social media campaigns can leverage influencers to reach adolescents. Research confirms that culturally adapted messaging increases engagement and knowledge uptake [47].

The fact that Bolgatanga students were more likely to endorse vaccination (53.1% vs. 17.2%) yet had lower uptake (73.4% vs. 82.8%) suggests logistical barriers, such as vaccine shortages or distance to clinics, a known challenge in Ghana's underserved north [48]. A 2022 study demonstrated that combining vaccines with education improves both coverage and long-term knowledge retention [49]. Furthermore, the high vaccination rate (78.1%) is commendable but rings hollow when paired with poor comprehension. For instance, only 30.5% knew HBV has no cure, and 65.6%, mostly in Accra, recognised asymptomatic transmission. This indicates that vaccination drives are not paired with sufficient education, wasting opportunities to instil preventive behaviours. Similar issues were observed in India, where vaccinated adolescents remained vulnerable due to unchecked risk behaviours like needle-sharing [50]. Ghana's HBV strategy appears to prioritise biomedical intervention over behavioural change, a critical flaw given that vaccines alone cannot curb stigma or risky practices. In addition, the insistence on isolating HBV patients (46.1%) reveals a pervasive stigma that public health campaigns have failed to address. This mirrors HIV's early epidemic, where fear-driven discrimination hindered testing and treatment [51]. In northern Ghana, where traditional beliefs often attribute illnesses to supernatural causes [52], such stigma may be more entrenched. The study's finding that Bolgatanga students were more likely to support isolation (54.7%) highlights the need for culturally tailored interventions that collaborate with local leaders to dispel myths.

5. Conclusion

This study exposed critical gaps in HBV knowledge and perception among Ghanaian Senior High School students, with stark disparities between northern and southern regions. While 91.4% of respondents had heard of HBV, the deeper understanding was alarmingly superficial; only 18% could define the disease, and fewer than 30% identified symptoms or transmission routes. These findings mirror trends in other high-burden countries like Côte d'Ivoire, where awareness rarely translates to actionable knowledge. The regional divide is particularly troubling: Accra students were five times more likely to know about HBV than their Bolgatanga counterparts, reflecting Ghana's entrenched healthcare inequities.

Misconceptions further complicate prevention efforts. Nearly half (46.1%) of students believed HBV patients should be isolated, a dangerous stigma more prevalent in the north. Such attitudes, coupled with the finding that 82% lacked knowledge of prevention methods, suggest that current health education is failing to address cultural and logistical barriers. Paradoxically, vaccination rates were relatively high (78.1%), yet this did not correlate with improved knowledge, indicating that immunisation drives may be conducted in an informational vacuum.

Limitations

This study reveals important insights but has key limitations. First, its focus on only two schools (Accra and Bolgatanga) limits generalisability across Ghana's diverse regions. The modest sample size (n=128) may also reduce statistical power, and random sampling could not account for prior HBV education exposure. Self-reported data risk recall and social desirability biases, potentially skewing responses on vaccination or risky behaviours. As a cross-sectional study, it captures only a single time point, missing evolving awareness trends. Furthermore, the quantitative design lacks qualitative depth, leaving cultural misconceptions (e.g., supernatural HBV causes) unexplored. These constraints highlight the need for larger, longitudinal, and mixed-methods research to strengthen findings.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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