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RESEARCH ARTICLE

Knowledge, attitude, and practice of pharmacists in Southern Nigeria towards management and prevention of hepatitis B virus

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Abstract

Background: This study assessed the attitude and awareness of pharmacists in Southern Nigeria towards management and prevention of hepatitis B infection. **Methods:** A 39-item, structured questionnaire was distributed online via WhatsApp groups of the Pharmaceutical Society of Nigeria (PSN) technical groups in 17 Southern Nigerian states for six weeks (August to September 2024). Data from 255 responses were analysed using SPSS v22, with statistical significance set *at* $p \leq 0.05$. **Results:** All respondents (100%) were aware of hepatitis B. Most (95.7%) knew that the virus could be transmitted via blood and blood products, and 73.7% knew that it could be transmitted from mother to child. In addition, 63.1 % identified Hepatitis B as a nosocomial infection and 96.1% knew about the availability of hepatitis B vaccine. Screening for hepatitis B was reported by 59.6%, whereas 48.6% had received formal training focused on hepatitis B. However, only 37.3% had been vaccinated, and 55.3% were unvaccinated. **Conclusion:** The study revealed that the respondents have good knowledge, awareness, and attitude towards the management and prevention of hepatitis B. However, this did not translate into optimal preventive practices. Specific training on hepatitis B should be incorporated into continuous professional development programs for pharmacists.

Introduction

Hepatitis B infection is a disease of the liver caused by the hepatitis B virus (HBV) (World Health Organisation, 2024). It can lead to chronic infection, significantly increasing the risk of death because of liver cirrhosis and primary hepatocellular carcinoma (Rizzo *et al.,* 2022). In endemic regions, like sub-Saharan Africa, HBV is mainly transmitted perinatally, i.e., from mother to child during childbirth. The virus can also be spread through horizontal transmission, i.e., exposure to infected bodily fluids like blood, vaginal fluid, and semen (Di Fillipo & Navas, 2023). Infections may be acute or chronic. Acute infections are more common in adults and usually resolve within six months. However, an infection is considered chronic when the hepatitis B surface antigen (HBSAg), a marker for infection with Hepatitis B, persists for over six months (Maruyama *et al.,* 1994). Most people who contract the virus experience no symptoms. When symptoms occur, they include fever, dark urine, nausea, fatigue, vomiting, and jaundice (yellowing of the skin and eyes). HBV is preventable with a vaccine. Administration of the full

dose confers almost 100% immunity to the recipient (World Health Organisation, 2024).

Globally, approximately 254 million people live with chronic hepatitis B. In developing countries, 5–15% of the population is affected. The World Health Organisation (WHO) African region accounts for 65 million cases, with Nigeria having a prevalence of 8.1%, translating to approximately 20 million infections. Of this number, 80% are unaware of their status (World Health Organisation, 2023). For this reason, the WHO has termed Hepatitis B a "silent epidemic" in the region, owing to its asymptomatic nature and prevalence. Certain segments of the population are considered high-risk groups, including children born to infected mothers, sex workers, men who have sex with men, illicit drug users, health care workers (HCWs), and those living in endemic areas. According to the WHO, of the 35 million HCWs worldwide, an estimated 2 million face annual exposure to HBV owing to work-related contact with blood and bodily fluids (Lee *et al.,* 2017).

It is well known that the role of pharmacists in the healthcare team has evolved beyond just the production and dispensing of medicines. They play a major role in the healthcare systems by providing needed health promotion, education, and preventive services. Pharmacists, including those in community settings, are responsible for providing patients with expert advice on drug information, engaging in healthcare programs, and collaborating with other professionals (Mohiuddin, 2020). As one of the most accessible healthcare providers, pharmacists significantly influence public health outcomes, particularly in the prevention and management of infectious diseases like HBV (Ihekoronye & Osemene, 2022). However, this increasing proximity to the patients places them at a higher risk of contracting infectious diseases. Despite their pivotal role, the level of awareness and attitudes towards HBV infection among pharmacists in Nigeria is not well-documented (Alabi *et al.,* 2023).

This study aimed to assess the attitude and awareness of pharmacists in Southern Nigeria towards HBV infection. By evaluating the knowledge of pharmacists about HBV infection, this study seeks to identify potential areas for educational interventions that can enhance the role of pharmacists in HBV prevention and control. Hepatitis B infection remains a global public health concern according to the WHO, and pharmacists play a vital role in its prevention and control (Dahal *et al.,* 2024). This study is particularly pivotal in Nigeria, where a large population and inadequate healthcare services pose significant challenges.

The findings from this research can guide policymakers and other healthcare educators in designing adequate programs and training that will equip pharmacists with the skills and knowledge required to protect themselves and contribute effectively to combating HBV infection.

Methods

Study design and population

This cross-sectional study was conducted amongst licensed pharmacists living and practising in Southern Nigeria between July and October 2024 to assess their knowledge, attitudes, and practices towards HBV management and prevention. Fully licensed and intern pharmacists practising across the Southern geo-political regions of Nigeria (South-south, South-west, and South-east) were included in this study. The 17 Southern Nigeria states involved are Lagos, Ogun, Oyo, Osun, Ondo, Ekiti, Edo, Delta, Bayelsa, Rivers, Akwa-Ibom, Cross-River, Imo, Abia, Anambra, Enugu, and Ebonyi states. This study was approved by the University of Nigeria Teaching Hospital Health Research Ethics Committee (approval number: NHREC/05/01/2008B-FWA00002458-1RB0002323) and all participants provided informed consent.

Data collection

A time-bound, non-probabilistic sampling approach was used for this study. The questionnaire was distributed online over a period of six weeks (August 12- September 23 2024). All eligible respondents who completed the questionnaire during this period were included in the final sample. As such, the total sample size was determined by the number of responses received within the data collection window, rather than through a pre-calculated statistical formula such as Cochran's method. This approach was adopted due to logistical and resource constraints and allowed for broad participation within the available timeframe. The questionnaire was distributed via different WhatsApp forums where pharmacists could be reached.

Scoring system

The knowledge questions were scored with correct answers receiving a score of 1, whereas wrong answers received a score of 0. Overall, a total knowledge score of 6 was obtainable for all respondents. Respondents who scored ≤3 were grouped as having "Poor Knowledge (PK)," whereas those who scored ≥4 were grouped as having "Good Knowledge (GK)."

For the attitude questions, the Likert scale was scored from 1 to 5 (SD = 1, D = 2, N = 3, A = 4, SA = 5) for positive questions and in reverse order for negative questions.

For the 10 questions in the attitude section, a total score of 50 was obtainable. 60% was used as the cut-off point, a modification of Bloom's cut-off point commonly applied in knowledge, attitude and practice studies (Boma et al, 2021), with those scoring ≤30 indicated as having "Negative attitude," whereas those that scored >30 were indicated as having "Positive attitude."

Statistical analysis

Data were cleaned and curated in Microsoft Excel 2016, and analysed using SPSS version 29. Descriptive statistics, such as mean, frequency, median, and variance, were used to characterise the data. Subsequently, the chi-square test of association was used to test the relationship between the grouped independent knowledge and attitude variables against the sociodemographic characteristics of the participants. Bar charts, pie charts, and line graphs were also used to represent the data points for ease of visualisation. Statistical significance was set at $p< 0.05$.

Results

At the end of the six weeks of data collation, 225 responses were recorded. The demographic characteristics of the study participants are shown in Table I below. More than half of the participants (73.7%) are aged between 20-30 years with a near equal number of males (49.0%) and females (51%). Nearly all the pharmacists (94.5%) in this study possess only the Bachelor's degree, with a few others holding advanced degrees. Early career pharmacists (one to five years) make up 84.3% of the respondents, while about 5% have practised for more than 15 years. The majority of the pharmacists practice in the Hospital (36.9%) and community (54.9%) settings, especially from the south-east (38.4%) and south-west (43.9%) regions of the country.

The grouped knowledge level of the participants is shown in Figure 1. Almost all the participants (88.6%) had good knowledge of Hepatitis B infection and vaccination. Only 11.4% had poor knowledge. The full details of the level of knowledge of hepatitis B infection, treatment and control by the participants are in supplementary information (Appendix A). The participants' knowledge of the main symptoms and complications of hepatitis B can also be found in supplementary information (Appendix C) and (Appendix D), respectively. The exact knowledge of the participants on the availability of hepatitis B infection was also assessed, as shown in supplementary information (Appendix E).

Table I: Sociodemographic characteristics of the participants

S/N	Variable	N (%)
1	**Age (yrs.)**	
	20 – 30	188 (73.7)
	31 – 40	49 (19.2)
	41 – 50	10 (3.9)
	51 – 60	5 (2.0)
	>60	3 (1.2)
2	**Gender**	
	Male	125 (49.0)
	Female	130 (51.0)
3	**Level of education**	
	B. Pharm	241 (94.5)
	Masters	12 (4.7)
	PhD	2 (0.8)
4	**Years of practice**	
	1 – 5	215 (84.3)
	6 – 10	19 (7.5)
	11 – 15	9 (3.5)
	>15	12 (4.7)
5	**Area of practice**	
	Community Practice	140 (54.9)
	Hospital Practice	94 (36.9)
	Academic Practice	4 (1.6)
	Industrial Practice	17 (6.7)
5	**State of practice**	
	South East	98 (38.4)
	South West	112 (43.9)
	South South	45 (17.6)

B. Pharm: Bachelors of Pharmacy

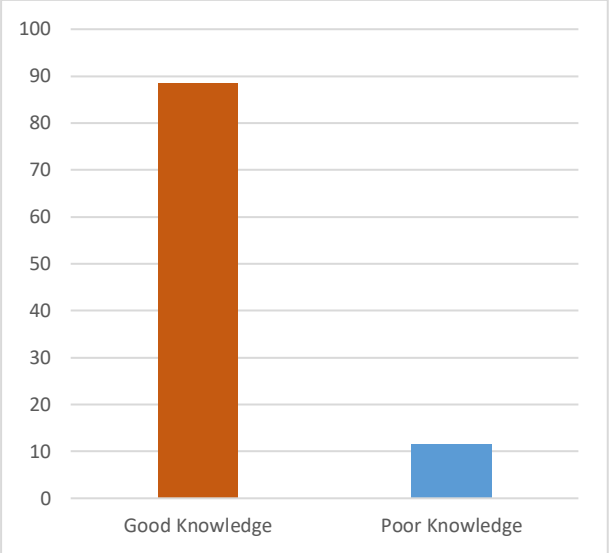

Figure 1: The overall knowledge level of Hepatitis B Infection and control among the participants

The attitudes towards hepatitis B infection, control and vaccination by the pharmacists in this study are shown in Table II. The participants believe that Pharmacists have a role in preventing the spread of Hepatitis B (SA= 61.2%, A= 34.5%, N= 1.2%, D= 1.2%, SD= 2.0%), that they are comfortable discussing Hepatitis B prevention with my patients (SA= 58.4%, A = 42.4%, N= 4.3%, D= 0.8%, SD= 0.8%), and that Hepatitis B vaccination should be compulsory for every individual (SA= 47.8%, A= 39.2%, N= 8.6%, D= 1.6%, SD= 2.7%). The participants are strongly opposed to the idea that Pharmacists do not need to be vaccinated against Hepatitis B, that Pharmacists have no role to play in raising awareness on the prevalence of Hepatitis B, and that all pharmacists should not be actively involved in efforts to eradicate Hepatitis B.

Table II: Pharmacists' attitude towards Hepatitis B infection, control and vaccination

S/N	Variables	SD	D	N	A	SA
				N (%)		
1	One dose of the Hepatitis B vaccine is enough to confer immunity on the recipient	98 (38.4)	91 (35.7)	31 (12.2)	28 (11.0)	7 (2.7)
2	All patients infected with Hepatitis B do not require treatment because natural immunity is enough to fight off the infection	148 (58.0)	80 (31.4)	14 (5.5)	8 (3.1)	5 (2.0)
3	Hepatitis B infection is serious	16 (6.3)	2 (0.8)	6 (2.4)	82 (32.2)	149 (58.4)
4	Pharmacists have a role in preventing the spread of Hepatitis B?	5 (2.0)	3 (1.2)	3 (1.2)	88 (34.5)	156 (61.2)
5	I am comfortable discussing Hepatitis B prevention with my patients?	2 (0.8)	2 (0.8)	11 (4.3)	108 (42.4)	132 (51.8)
5	Hepatitis B vaccination should be compulsory for every individual	7 (2.7)	4 (1.6)	22 (8.6)	100 (39.2)	122 (47.8)
7	Pharmacists do not need to be vaccinated against Hepatitis B	185 (72.5)	49 (19.2)	14 (5.5)	2 (0.8)	5 (2.0)
8	Pharmacists have no role to play in raising awareness on the prevalence of Hepatitis B	185 (72.5)	42 (16.5)	4 (1.6)	5 (2.0)	19 (7.5)
9	Pharmacists should avoid contact with patients infected with hepatitis B	69 (27.1)	91 (35.7)	48 (18.8)	27 (10.6)	20 (7.8)
10	All pharmacists should not be actively involved in efforts to eradicate Hepatitis B	163 (63.9)	51 (20)	6 (2.4)	15 (5.9)	20 (7.8)

Figure 2 shows the level of knowledge of the participants towards the mode of transmission of Hepatitis B infection. Transmission through Blood and blood products, unprotected sex, needles and sharp objects, and mother-to-child transmission were the most cited. Casual contact, contamination from an infected person and the faeco-oral route were the least possible methods of transmission.

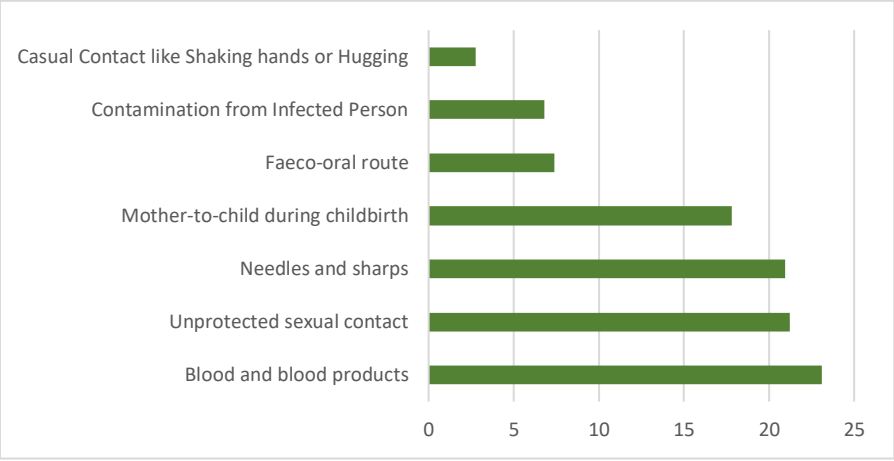

Figure 2: Pharmacists' knowledge of mode of transmission of hepatitis B

In Fig. 3, the participants responded to the various ways in which Hepatitis B can be prevented. Prevention by vaccination is the most prescribed way (23.56%), followed by avoiding casual sex/Multiple sex partners (22.15%), proper disposal of sharp objects (22.05%), and then avoiding the sharing of needles and sharp objects (20.83%). Drinking contaminated water and eating improperly cooked food are less common methods. A few documented practices of the pharmacists regarding Hepatitis B infection, control and vaccination can be found in supplementary information (Appendix B). The various aids to providing better education and care for Hepatitis B, as reported by the participants, are shown in the supplementary information (Appendix F)

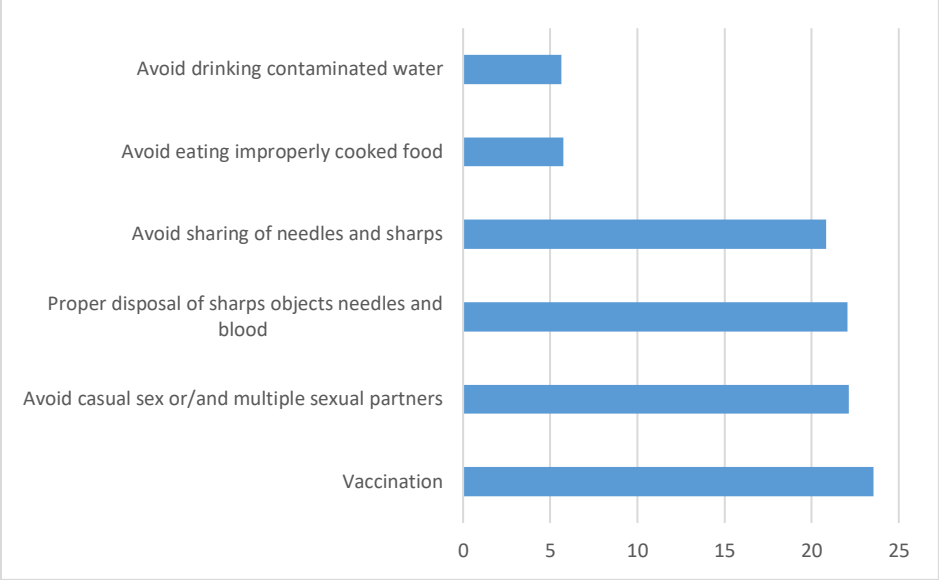

Figure 3: Ways of preventing hepatitis B infection

In Figure 4, the various barriers that pharmacists face while providing Hepatitis B education to patients are shown. More than one quarter (26.5%) of the participants cited lack of time as a factor, followed by lack of interest from the patients (22.5%) and lack of education materials (19.52%). Insufficient knowledge about hepatitis B and language barriers are the least cited barriers.

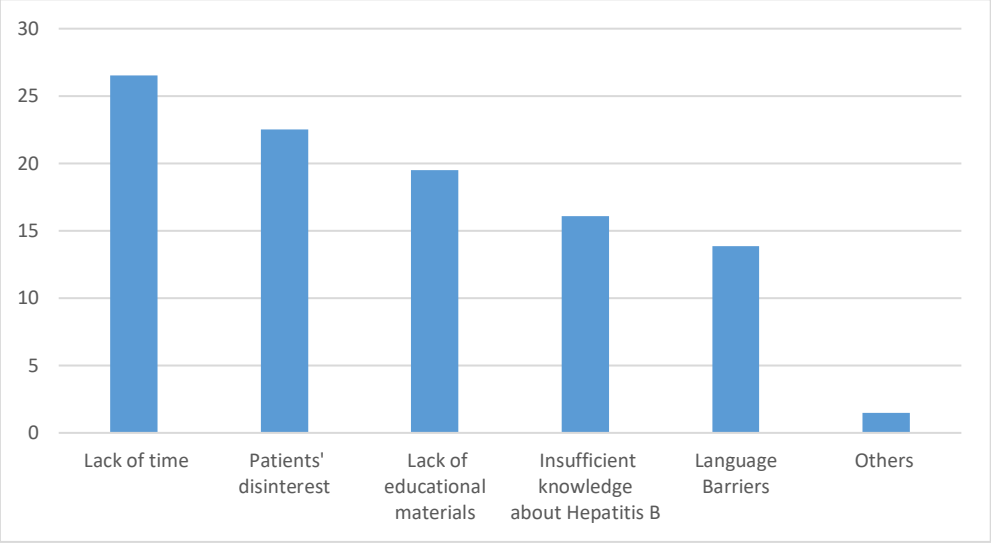

Figure 4: Barriers that pharmacists face while providing hepatitis B education to patients

Table III shows an association table between the sociodemographic of the participants and knowledge of hepatitis B infection. Age, gender, level of education and years of practice did not cause any significant variation in the level of knowledge among the participants. The area of practice and the region of practice follow a similar trend.

Table III: Chi square correlation between the sociodemographic variables and knowledge of hepatitis B infection by the participants

	Sociodemographic variables	Poor knowledge N (%)	Good knowledge N (%)	*P* value
1	**Age (yrs.)**			**0.325**
	20 – 30	20 (10.6)	164 (89.4)	
	31 – 40	8 (16.3)	41(83.7)	
	41 – 50	0	10 (100)	
	51 – 60	0	5 (100)	
	>60	1 (33.3)	2 (66.7)	
2	**Gender**			**0.757**
	Male	15 (12.0)	110 (88.0)	
	Female	14 (10.8)	116 (9.2)	
3	**Level of education**			**0.280**
	B. Pharm	26 (10.8)	215 (89.2)	
	Masters	3 (25.0)	9 (75.0)	
	PhD	0	2 (100)	
4	**Years of practice**			**0.149**
	1 – 5	27 (12.6)	188 (87.4)	
	6 – 10	0	19 (100)	
	11 – 15	2 (22.2)	7 (77.8)	
	>15	0	12 (100)	
5	**Area of practice**			**0.372**
	Community practice	20 (14.3)	120 (85.7)	
	Hospital practice	7 (7.4)	87 (92.6)	
	Academic practice	0	4 (100)	
	Industrial practice	2 (11.8)	15 (88.2)	
6	**Region of practice**			**0.236**
	South East	8 (8.2)	90 (91.8)	
	South West	17 (15.2)	95 (84.8)	
	South South	4 (8.9)	41 (91.1)	

Chi-Square correlation between the sociodemographic variables and attitude towards hepatitis B infection, control and treatment by the participants is shown in Table IV. The older age showed a higher positive attitude towards Hepatitis B infection, control and vaccination than the younger participants, though this did not reach a significant level. A significant association was observed between gender and attitude as the males have a slightly more positive attitude than the females (p=0.027). Level of education, years of practice, area of practice and the region of practice did not significantly cause variation in attitude. The chi-square correlation between sociodemographic variables and the practice of hepatitis B infection by the participants is in the supplementary information, Appendix G and Appendix H.

Table IV: Chi-Square correlation between the sociodemographic variables and attitude towards Hepatitis B infection, control and treatment by the participants

	Sociodemographic variables	Negative attitude N (%)	Positive attitude N (%)	*P* value
1	**Age (yrs.)**			
	20 – 30	5 (2.7)	183 (97.3)	**0.769**
	31 – 40	0	49 (100)	
	41 – 50	0	10 (100)	
	51 – 60	0	5 (100)	
	>60	0	3 (100)	
2	**Gender**			**0.027****
	Male	0	125 (100)	
	Female	5 (3.8)	125 (6.2)	
3	**Level of education**			**0.862**
	B. Pharm	5 (2.1)	236 (97.9)	
	Masters	0	12 (100)	
	PhD	0	2 (100)	
4	**Years of practice**			**0.814**
	1 – 5	5 (2.3)	210 (97.7)	
	6 – 10	0	19 (100)	
	11 – 15	0	9 (100)	
	>15	0	12 (100)	
5	**Area of practice**			**0.242**
	Community practice	5 (3.6)	135 (96.4)	
	Hospital practice	0	94 (100)	
	Academic practice	0	4 (100)	
	Industrial practice	0	17 (100)	
6	**Region of practice**			**0.175**
	South East	0	98 (100)	
	South West	4 (3.6)	108 (96.4)	
	South South	1 (2.2)	44 (97.8)	

Discussion

Our results showed very good knowledge (88.6%) about hepatitis B infection, control, and vaccination among pharmacists. This is significant compared with studies among medical students (55.6%) conducted in Duhok province, Kurdistan Region of Iraq (Naqid *et al.,* 2023); over 70% in a study among pharmacy students in Jordan (Alaridah *et al.,* 2024); 65.6% among Health Care Professionals at Tibebe Ghion Specialised Hospital, Bahir Dar, Northwest Ethiopia (Belete et al., 2022); and 89.2% among health workers across various levels of health facilities in Ondo, South-West, Nigeria (Oni et al., 2022). These differences may be attributed to a wider scale of study in our case compared with smaller scales in other studies, which might suffer from regional disparities. In addition, this study focused on fully licensed and practising pharmacists and not just students or mixed healthcare workers.

Pharmacists in this study believe that Hepatitis B vaccination should be compulsory for every individual; however, only about half (55.3%) of them had received their first dose of hepatitis B vaccination. Similarly, Naqid and authors (2023) reported that over half of the medical students were not vaccinated, with only 18.8% completing the full dose of vaccination (Naqid *et al.,* 2023). Vaccination against HBV infection in healthcare professionals is crucial owing to their regular exposure to patients' bodily fluids and the potential for transmission to patients. While routine measures and post-exposure prophylaxis mitigate the risk of HBV infection in vulnerable populations, such as healthcare professionals, active vaccination remains the most effective prevention strategy (Singhal *et al.,* 2009). A nationwide study conducted in Nigeria between January and June 2021 among health workers revealed that only 42% were fully vaccinated against HBV, indicating little improvement over the years (Issa *et al.,*

2021). This corroborates the low vaccination rate amongst the respondents in this study, and shows a pattern of low vaccination rate amongst health workers in the country.

The Centres for Disease Control (CDC) indicates that community pharmacists are able to significantly enhance the nation's capacity to administer the HBV vaccine to high-risk populations and have been urged to assume a more prominent role in addressing the needs of patients with opioid use disorder amid the opioid crisis in the United States (Freeland & Ventricelli, 2020). In a study in the United States, a pharmacist-led MI intervention increased hepatitis B vaccination rates by 3.71% among adult patients with diabetes compared with the control group (Berenbrok *et al.,* 2023). Similarly, community pharmacists in Nigeria are pitched as critical to reaching broader vaccination coverage in Nigeria because they are among the most accessible healthcare professionals in the country (Okafor *et al.,* 2024).

Education is critical for public health campaigns at all levels. Pharmacists in this study sometimes (51.8%) and always (32.2%) provided valuable tips to patients on hepatitis B vaccination modalities. This practice is strongly associated with the area of practice in pharmacy as community and hospital pharmacists were at the forefront of these activities (p = 0.025). While vaccination coverage remains a significant challenge in most developing countries, including Nigeria, patient and community engagement is increasingly recognised as key to overcoming these barriers (Guan *et al.,* 2024). Large-scale community programs foster mutual trust in government policies and vaccination initiatives, thus shaping health behaviours and improving vaccination uptake. The massive community engagement and drive for immunisation during the coronavirus 2019 (COVID-19) era have had a positive effect on the trajectories of vaccine acceptance and uptake in Nigeria (Ibekwe *et al.,* 2024).

However, pharmacists must be trained to discharge these duties carefully and comprehensively. This study found that only a few pharmacists have received training on hepatitis B vaccination programs, which was significantly associated with their area of practice as community and hospital pharmacists. The scarcity of research and statistical data about HBV infection awareness in the Nigerian general populace underscores a significant need for public health knowledge, warranting advocacy for effective public campaigns. The Pharmacy Council of Nigeria (PCN) could address this gap by tailoring its mandatory professional development programs to meet the country's vaccination needs (Education and training 2021).

Limitations

This study has some limitations. It was conducted in three selected geopolitical zones of Nigeria, limiting its generalizability across the nation. The associations described in this study do not translate to causality due to weak correlation. One of the main limitations of this study is the absence of a statistically determined sample size. Instead of calculating the required sample using a formula such as Cochran's, the study adopted a time-bound, non-probabilistic sampling strategy. The sample size was ultimately determined by the number of participants who responded within a one-month data collection window.

The lack of a calculated sample size may compromise the statistical power of the study, meaning that it may not be sensitive enough to detect real differences or associations within the data. This could increase the risk of Type II errors—failing to identify statistically significant relationships when they actually exist.

Also, because the sampling method was non-probabilistic (i.e., not random), the sample may not be truly representative of the target population. Participation was based on respondent availability and willingness within a fixed period, which introduces the risk of selection bias. For instance, individuals with easier access to the questionnaire (e.g., online users, urban dwellers) may be overrepresented, while those with limited access to technology or lower health literacy may be underrepresented. The nature of the questionnaire could give room for recall bias, as some of the questions require subjective responses which are reliant on the respondents' recollection. It is also worthy of note that there stands a risk of social desirability bias, which could arise from the respondents' penchant to provide responses that are perceived to be acceptable by others, especially to the questions measuring behaviour. Additionally, this study was limited to pharmacists in southern Nigeria. This geographic limitation could affect the generalizability of this study, and it might not be reflective of other populations outside the focal region. Due to the convenience-based nature of sampling, the findings may lack external validity—that is, the ability to generalise the results to the wider population.

The questionnaire used was adopted from a validated questionnaire (Amorha *et al.,* 2017), which was designed for and applied in the same language, population, cultural and study context. Considering the alignment in objectives and geographic relevance, the decision was made to retain the original structure and framework of the validated tool without revalidating it. This ensures consistency in data collection, especially since no major modifications were made to the instrument. Hence, the risk of measurement bias was

considered minimal. However, contextual differences may influence interpretation, even with validated tools. This is noted as a potential limitation.

Recommendation

Future studies should focus on nationwide assessments of pharmacists' roles in hepatitis B vaccination, exploring barriers and facilitators to patient engagement and vaccination uptake. The annual continuing professional development programs designed for Pharmacists in Nigeria should include a section for enlightening pharmacists on managing patients with Hepatitis B, and the importance of protecting themselves especially through vaccination. Furthermore, longitudinal research is needed to evaluate the impact of such targeted training and public health campaigns. Investigating pharmacists' contributions to improving vaccination rates in underserved regions can provide actionable insights.

Conclusion

This study provided key insights into the knowledge, attitude, and practice of pharmacists in three geopolitical zones of Nigeria towards the management and prevention of Hepatitis B. While pharmacists demonstrated robust knowledge, vaccination uptake among them and patient engagement remain suboptimal. Strategies to improve patient engagement at the community level and enhance pharmacists' training are critical steps to address these gaps.

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Declaration of interest

The authors declare no conflict of interest associated with this study.

Ethics approval and Informed consent

Ethical clearance for this research was issued by the Health Research Ethics Committee of the University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu State, Nigeria.

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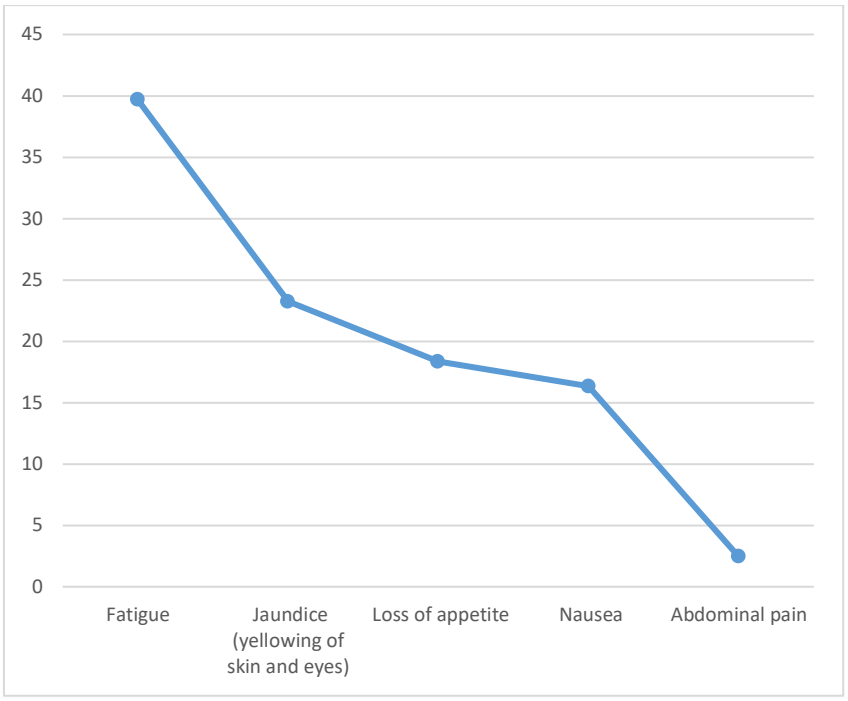
Appendix A: Knowledge of hepatitis B infection, treatment and control by the participants

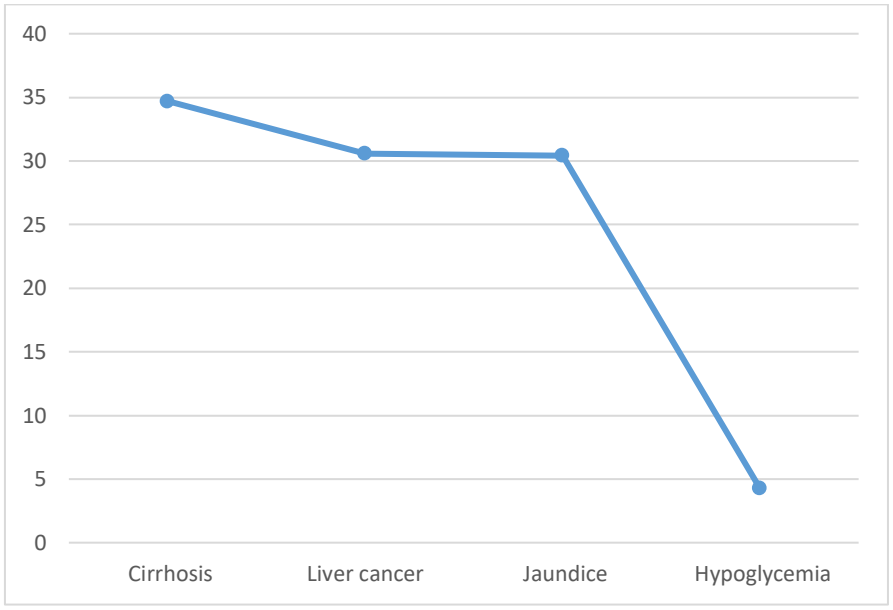
S/N	Variable		N (%)
1	Have you heard about Hepatitis B?	Yes	255 (100)
		No	Nil
2	All patients infected with Hepatitis B experience symptoms at the early stage of the disease?	Yes	44 (17.3)
		No	211 (82.7)
3	Hepatitis B can be transmitted as a nosocomial infection?	Yes	161 (63.1)
		No	94 (36.9)
4	Do you think Pharmacists are at risk of Hepatitis B infection by virtue of their work?	Yes	200 (78.4)
		No	55 (21.6)
5	Is Hepatitis B virus infection treatable?	Yes	154 (60.4)
		No	101 (39.6)
6	Chronic hepatitis B can be self-cured by the body	Yes	18 (7.1)
		No	237 (92.9)

Appendix B: Pharmacists' practices regarding hepatitis B infection, control and vaccination

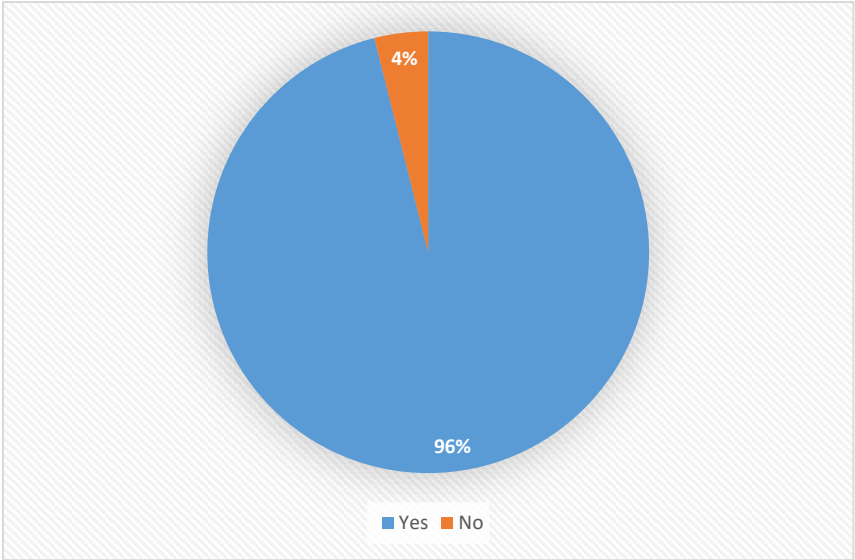
S.N	Variables	Never	Sometimes	Always
			N (%)	
1	Do you routinely educate your patients about Hepatitis B prevention?	36 (14.1)	182 (71.4)	37 (14.5)
2	How often do you recommend the Hepatitis B vaccine to at-risk patients?	41 (16.1)	132 (51.8)	82 (32.2)
3	Do you use personal protective equipment (PPE) to avoid exposure to blood or bodily fluids?	43 (16.9)	111 (43.5)	101 (39.6)
4	Do you follow proper protocols for the disposal of needles and other sharp instruments?	1 (0.4)	57 (22.4)	197 (77.3)
		No	**Yes**	**I have not completed the dose**
			N (%)	
5	Have you received any formal training or education specifically focused on hepatitis?	124 (48.6)	131 (51.4)	
6	Have you received the Hepatitis B vaccine?	95 (37.3)	141 (55.3)	19 (7.5)
7	In case you are diagnosed of Hepatitis B, would you go for further investigation and treatment?	250 (98.0)	5 (2.0)	
8	Have you ever gone for a screening on Hepatitis B?	152 (59.6)	103 (40.4)	



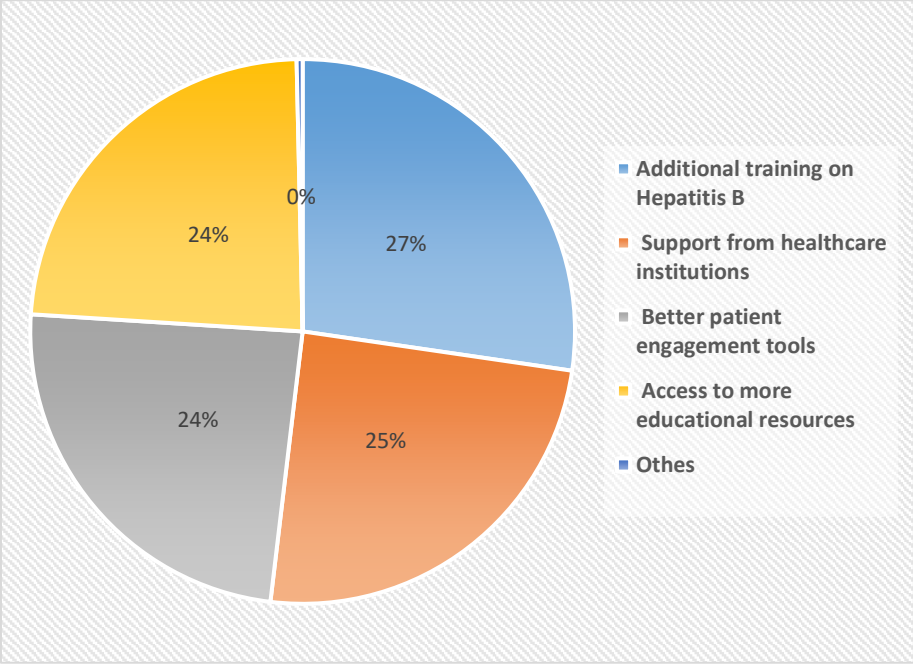
Appendix C: Participants' knowledge of main symptoms of hepatitis B



Appendix D: Participants' knowledge of complications of hepatitis B infection



Appendix E: Knowledge of vaccination for hepatitis B infection



Appendix F: Aids to provide better education and care for hepatitis B

Appendix G: Chi-Square correlation between the sociodemographic variables and practice of hepatitis B infection by the participants

S.N	Sociodemographic variables	Do you routinely educate your patients about Hepatitis B prevention?				How often do you recommend the Hepatitis B vaccine to at-risk patients?			
		Never	Sometimes	Always	*P*- Value	Never	Sometimes	Always	*P*-value
	Age (yrs.)				0.011**				0.309
	20 – 30	34 (18.1)	132 (70.2)	22 (11.7)		36 (19.1)	97 (51.6)	55 (29.3)	
	31 – 40	2 (4.1)	34 (69.4)	13 (26.5)		4 (8.2)	24 (49)	21 (42.9)	
	41 – 50	0	10 (100)	0		1 (10)	7 (70.0)	2 (20.0)	
	51 – 60	0	3 (60.0)	2 (40.0)		0	3 (60.0)	2 (40.0)	
	>60	0	3 (100)	0		0	1 (33.3)	2 (66.7)	
	Gender				0.888				0.531
	Male	19 (15.2)	88 (70.4)	18 (14.4)		17 (13.6)	68 (54.4)	40 (32.0)	
	Female	17 (13.1)	94 (72.3)	19 (14.6)		24 (18.5)	64 (49.2)	42 (32.3)	
	Level of education				0.371				0.969
	B. Pharm	36 (14.9)	171 (71.0)	34 (14.1)		39 (16.2)	125 (51.9)	77 (32.0)	
	Masters	0	10 (83.3)	2 (16.7)		2 (16.7)	6 (50.0)	4 (33.3)	
	PhD	0	1 (50.0)	1 (50.0)		0	1 (50.0)	1 (50.0)	
	Years of practice				0.127				0.617
	1 – 5	35 (16.3)	146 (67.9)	34 (15.8)		33 (80.5)	112 (84.8)	70 (32.6)	
	6 – 10	1 (5.3)	17 (89.5)	1 (5.3)		5 (26.3)	10 (52.6)	4 (21.1)	
	11 – 15	0	9 (100)	0		2 (22.2)	5 (55.6)	2 (22.2)	
	>15	0	10 (83.3)	2 (16.7)		1 (8.3)	5 (41.7)	6 (50.0)	
	Area of practice				0.025**				0.044**
	Community practice	16 (11.4)	98 (70.0)	24 (18.6)		20 (14.3)	75 (53.6)	45 (32.1)	
	Hospital practice	19 (20.2)	69 (73.4)	6 (6.4)		18 (19.1)	52 (55.3)	24 (25.5)	
	Academic practice	0	2 (50.0)	2 (50.0)		0	2 (50.0)	2 (50.0)	
	Industrial practice	1 (5.9)	13 (76.5)	3 (17.6)		3 (17.6)	3 (17.6)	11 (64.7)	
	Region of practice				0.215				0.095
	South East	16 (16.3)	68 (69.4)	14 (14.3)		16 (16.3)	56 (57.1)	26 (26.5)	
	South West	16 (14.3)	84 (75.0)	12 (10.7)		18 916.1)	60 (53.6)	34 (30.4)	
	South South	4 (8.9)	30 (66.7)	11 (24.4)		7 (15.6)	16 935.6)	22 (48.9)	

Appendix G: Chi-Square association between the sociodemographic variables and practice of hepatitis B infection by the participants

S.N	Sociodemographic variables	Have you received any formal training or education specifically focused on hepatitis?			Have you received the Hepatitis B vaccine?			
		Yes	No	*P*- Value	Yes	No	I have not completed my dose	*P*- Value
	Age (yrs.)			0.364				0.713
	20 – 30	91 (48.4)	97 (51.6)		67 (35.6)	106 (56.4)	15 (8.0)	
	31 – 40	26 (53.1)	23 (46.9)		17 (34.7)	28 (57.1)	4 (8.2)	
	41 – 50	2 (20.0)	8 (80.0)		6 (60.0)	4 (40.0)	0	
	51 – 60	3 (60.0)	2 (40.0)		3 (60.0)	2 (40.0)	0	
	>60	2 (66.7)	1 (33.3)		2 (66.7)	1 (33.3)	0	
	Gender			0.071				0.788
	Male	68 (54.4)	57 (45.6)		46 (36.8)	71 (56.8)	8 (6.4)	
	Female	56 (43.1)	74 (56.9)		49 (37.7)	70 (53.8)	11 (8.5)	
	Level of education			0.554				0.072
	B. Pharm	119 (49.4)	122 (50.6)		85 (35.3)	138 (57.3)	18 (7.5)	
	Masters	4 (33.3)	8 (66.7)		8 (66.7)	3 (25.0)	1 (8.3)	
	PhD	1 (50.0)	1 (50.0)		2 (100)	0	0	
	Years of practice			0.018**				0.088
	1 – 5	104 (48.4)	111 (51.6)		74 (34.4)	125 (58.1)	16 (7.4)	
	6 – 10	14 (73.7)	5 (26.3)		8 (42.1)	10 (52.6)	1 (5.3)	
	11 – 15	1 (11.1)	8 (88.9)		5 (55.6)	2 (22.2)	2 (22.2)	
	>15	5 (41.7)	7 (58.3)		8 (66.7)	4 (33.3)	0	
	Area of practice			0.589				0.284
	Community practice	67 (47.9)	73 (52.1)		47 (33.6)	84 (60.0)	9 (6.4)	
	Hospital practice	44 (46.8)	50 (53.2)		40 (42.6)	45 (47.9)	9 (9.6)	
	Academic practice	2 (50.0)	2 (50.0)		0	4 (100)	0	
	Industrial practice	11 (64.7)	6 (35.3)		8 (47.1)	8 (47.1)	1 (5.9)	
	Region of practice			0.357				0.425
	South East	44 (44.9)	54 (55.1)		33 (33.7)	59 (60.2)	6 (6.1)	
	South West	54 (48.2)	58 (51.8)		41 (36.6)	60 (53.6)	11 (9.8)	
	South South	26 (57.8)	19 (42.2)		21 (46.7)	22 (48.9)	2 (4.4)	