

Assessment of knowledge and treatment practices of hepatitis B infection in children among health professionals in Krachi districts in Ghana: a cross-sectional study

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Abstract

Background. Hepatitis B virus (HBV) infection remains one of the neglected infectious diseases. Children infected with HBV

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are at higher risk of becoming chronic carriers. Barriers to measures against HBV in children are attributed to inadequate knowledge by some health professionals. This study assessed knowledge and treatment practices of HBV in children among health professionals.

Materials and Methods. A cross-sectional survey was conducted among health professionals (185) in three districts in Krachi using a structured questionnaire. Stata version 15 was used to analyze participants' responses on awareness, knowledge, and treatment practices. Pearson's product-moment correlation was used to determine the relationship between knowledge and treatment practices. Multivariate regression analysis assessed the relationships between variables at $P < 0.05$ and 95% confidence interval.

Results. 20% were not aware of HBV in children and 85% had only fair knowledge about HBV in children. Only 29% indicated good knowledge and treatment practices of HBV in children. A unit increase in knowledge of HBV in children leads to a 1.42 unit increase in awareness ($P < 0.01$), and a 1.3 unit increase in treatment practice ($P < 0.01$) of HBV in children.

Conclusions. Participants demonstrated only fair knowledge about HBV in children. Seminars and workshops on HBV in children for health professionals must intensify.

Introduction

The estimated prevalence of hepatitis B virus (HBV) in Ghana among the adolescent population is 14.30%, and 8.36% among adults with 0.55% in children under five years.¹ The overall prevalence of HBV in Ghana is estimated at 12.3%.² This makes the country highly endemic to HBV.³ The prevalence in rural areas is reported to be 13.3% while that of urban areas was reported to be 12.2%.² Approximately 15% of the Ghanaian adult population is living with HBV of which 90% was acquired through mother-to-child transmission (MTCT).² Though there have been vaccines and treatment therapies for the management of HBV, there remains a larger number of persons living with HBV untreated.² Whereas about 70% of HBV-infected persons within the Americas and Western pacific regions have been treated successfully, only 10% got access to and received treatment for HBV from the World Health Organization (WHO) African region.⁴

Barriers to the effective administration of vaccines are attributed partly to inadequate knowledge about HBV by persons responsible for the active implementation of the elimination policy set by WHO.^{4,5} Despite a decrease in the incidence of HBV, prevalence remains higher due to insufficient coverage rates of vaccination.⁶

Healthcare providers who are to see to the implementation policies towards the eradication of HBV appear to be uncertain about the measures to be implemented and how to go about it as it is found that some facilities in Ghana do not administer the “at birth” dose of the vaccine as required.⁷ Reports indicate that most medical practitioners as well as students have been found to have received no formal training on the disease and how it should be managed.^{8,9} The birth dose of the HBV vaccine is supposed to be administered within 24 hours after birth to neonates born to HBV-positive mothers. However, studies found that they are mostly delayed until the routine vaccination period for children in Ghana which is 6, 10, and 14 weeks after birth, before the vaccine is administered when the child might have acquired the virus.⁷ The role of any anti-HBV vaccination strategy by health professionals is contingent on the vaccination policy of the Ministry of Health as implemented by the Ghana Health Service. The anti-HBV immunoglobins which are supposed to be administered to babies given birth to by HBV-positive mothers come at a cost to parents and are not even readily available in most facilities. This situation threatens HBV’s control and elimination strategy in the country.

Due to the asymptomatic nature of the virus, children are at higher risk of developing into chronic carriers before it is diagnosed, and they are also prone to getting the virus horizontally at school through open cuts and scratches.¹⁰ This as a result makes children more vulnerable to HBV disease.

There are very limited studies conducted in the area of knowledge of health professionals in Ghana to assess why some medical practitioners do not administer the required dose of vaccination in children born to HBV-positive mothers, especially in rural areas. This study assessed health professionals’ knowledge and treatment of HBV in children in the Krachi districts which falls within the rural and peri-urban communities in Ghana where prevalence is about 13.3% as against 12.2% in the urban areas.²

Materials and Methods

Study area and population

The setting for this study included health facilities within the Krachi districts namely Krachi-Nchumuru, Krachi East, and Krachi West. According to the 2021 Population and Housing Census, the respective populations of these districts are 79,934, 116,804 and 61,128.¹¹

The Krachi-Nchumuru district does not have a Government Hospital. However, there are both private and public health service providers. For this study, participants were enrolled from the St. Luke Health Center at Chinderi (Private), Bora Health Center (Public), and Banda Health Center (Public).

The Krachi East District has 8 private and public health centers. Participants were enrolled from the Dambai Health Center (Public) which is in the district capital.

Krachi West district has 9 private clinics and 8 public health centers and 1 district hospital.

The district hospital serves as the main referral center where the other two neighboring districts refer their patients for serious medical cases. The participants for this study were enrolled from the district hospital.

The selected districts for this study are a combination of rural and peri-urban. The districts were chosen for the study because they give a reflection of both the rural and peri-urban areas which are mostly neglected in terms of health facilities and research (Figure 1).

Study design

The study used a cross-sectional survey design which was conducted between June to July 2019. The participants for the study were health professionals who are practicing in the selected health facilities in the three Districts.

Sample size

The single population proportion formula below was used to estimate the sample size:

$$n = \frac{(z)^2 p \times q}{(d)^2}$$

Where:

n= the desired sample size

z= confidence interval at 95% set at 1.96

p =prevalence (12.7%) of knowledge among health workers that HBV vaccine can prevent the transmission of the virus to newborns of HBV-infected mothers in the Eastern region of Ghana.⁵

q= the difference between 1 and p

d= maximum error allowed (5%); 0.05.

Substituting into the formula, the sample size was estimated as follows:

$$n = \frac{(1.96)^2 0.84 \times 0.16}{(0.05)^2} = 169$$

Although the estimated sample size was 169, a total of 185 health professionals participated in the study.

Sampling technique

Health workers available within each of the selected facility who were willing to participate in the study were enrolled. Participants were proportionally sampled from the three districts for the estimated sample size.

Inclusion criteria

Doctors, Physician Assistants, Nurses, Midwives, Disease Control Officers, and other Public Health professionals within the health centers who have had at least six months of working experience after training and have consented were enrolled in the study.



Figure 1. A map showing the three districts namely, Krachi Nchumuru, Krachi West and Krachi East where the health professionals were enrolled.

Exclusion criteria

Participants who did not consent and those who were still undergoing training or internships or had less than six months of working experience in the health profession were excluded from the study.

Study variables

The variables for this study were categorized into three: i) demographic characteristics which included sex, age, work experience, healthcare group, educational level, and HBV awareness, ii) knowledge of HBV infection in children iii) treatment practices of HBV infection in children.

Study questionnaire

The questionnaire for this study was adapted from previous studies on awareness, knowledge, and treatment practices of HBV among healthcare workers.^{2,12-14} The questionnaire has 38 items with five main sections (sections A to E). Section A consists of the introduction and ethical issues of the study; section B is about the demographic characteristics of participants; Section C measures awareness level; section D measures knowledge about HBV in children and contains 22 items; section E measures treatment practices.

Scoring of participants' responses on awareness, knowledge, and treatment practices of hepatitis B virus

Each correct response was scored one (1) and the incorrect response was zero (0). Awareness was scored as a correct and incorrect response about hepatitis B virus infection in children. Less than 7 correct knowledge score responses represented poor knowledge, 7-16 correct responses represented fair knowledge, and 17-22 correct responses represented good knowledge. This was based on the normal distribution curve. Concerning the treatment, 3 or fewer correct responses represented low treatment practices while 4 or more correct responses represented good treatment practices.

Data analysis

Data management and analysis were performed using Stata software version 15.0. Data were assessed for normality for some of the selected variables. Frequency distribution was used to analyze demographic characteristics as well as responses by participants on awareness, knowledge, and treatment practices. After scoring participants' knowledge of HBV in children on a 22-question item, the scores were further categorized into three knowledge levels (poor, fair, and good) through the use of a median split format of categorization. If participants correctly responded to only 7 items and below, it was categorized as poor knowledge; correct responses for items 7 to 16 were categorized as fair knowledge, and those who correctly answered 17 or more knowledge items were classified as having good knowledge of HBV transmission in children. Similarly, a composite score on treatment practices was generated and categorized into poor or inadequate practices (3 or fewer correct responses) and good treatment practices (4 or greater correct scores). Finally, the multivariate regression analysis was performed to assess the relationships between knowledge about hepatitis B in children among health practitioners and other variables at $P < 0.05$ and 95% confidence interval.

Ethical approval

This study received ethical clearance from the Ghana Health Service Ethics Review Committee (GHS-ERC 022/01/19). Participants consented prior to enrollment into the study and their

privacy and confidentiality were ensured at all stages of the study by de-identifying and storing the data on a password-protected computer which is accessible to only a few members of the study team.

Results

Socio-demographic characteristics and awareness of HBV by study participants are presented in Table 1. A total of 185 health workers participated in the study out of which 90(48.65%) were males and 95(51.35%) were females. The majority (66%) of participants were between 26-35 years, and 1.6% were between 46-55 years. Most of them (43.78%) had 2-5 years of work experience and only 1.08% had over 15 years of work experience. The majority of the participants (156/185, 84.32%) had certificate and diploma qualifications. Only 3 Doctors (1.62%) participated in the study. The 'others' representing public health officers, community health nurses, and disease control officers were only 9.19% of the study participants. Although all 185(100%) participants in the study were aware of HBV infection, 20% (37) were not aware of HBV infection in children (Table 1).

Participants' knowledge of HBV in children was tested and their responses were scored as correct or incorrect. In all, 22 knowledge items were scored as summarized in Table 2, which shows that 91.9% (170) of the participants correctly identified HBV as well as its ability to be transmitted through contaminated

Table 1. Socio-demographic characteristics and awareness of hepatitis B virus by study participants.

Variable	Frequency (N=185)	Percent (%)
Sex		
Male	90	48.65
Female	95	51.35
Age		
20-25	44	23.78
26-35	122	65.95
36-45	15	8.11
46-55	3	1.62
>55	1	0.54
Work experience		
6 months to 1	75	40.54
2-5	81	43.78
6-15	27	14.59
>15	2	1.08
Educational level		
Certificate and diploma	156	84.32
Degree	28	15.14
Postgraduate	1	0.54
Healthcare group		
Nurses	120	64.86
Midwives	33	17.84
Physician assistants	12	6.49
Doctors	3	1.62
Others	17	9.19
Source of HBV knowledge		
School Training	145	78.4
Seminar Knowledge	43	23.2
Workshop Knowledge	30	16.2
General awareness of HBV		
Aware	185	100
Unaware	0	0
Awareness of HBV in children		
Aware	148	80
Unaware	37	20

Table 2. Descriptive statistics for knowledge of hepatitis B in children among the participants.

Question (items)	Correct responses (%)	Incorrect responses (%)
Is hepatitis B transmitted by virus?	170 (91.9)	15 (8.1)
Hepatitis B can be transmitted by contaminated/infected blood transfusion	170 (91.9)	15 (8.1)
Hepatitis B can be transmitted from child to child through bodily fluids	132 (71.35)	53 (28.65)
Persons are at higher risk of infections as infants and children than as adults	97 (52.4)	88 (47.6)
HBV can be transmitted from mother to child at birth	144 (77.8)	41 (22.2)
HBV can be transmitted from mother to her fetus	56 (30.3)	129 (69.7)
HBV cannot be transmitted through sharps and cuts by infected objects	95 (51.35)	90 (48.65)
HBV cannot survive on external surfaces for more than 24 hours	67 (36.2)	118 (63.8)
Hepatitis B disease can cause liver cancer and cirrhosis	117 (63.24)	68 (36.76)
HBV is the major cause of death among cancer patients	95 (51.35)	90 (48.65)
Jaundice is a symptom of HBV	36 (19.46)	149 (80.54)
Hepatitis B virus infection is symptomatic within the first six months in children	54 (29.19)	131 (70.81)
Hepatitis B virus is asymptomatic until it gets diagnosed	104 (56.22)	81 (43.78)
Children are at higher risk of developing into chronic carriers than adults	123 (66.49)	62 (33.51)
Children are more likely to recover from HBV than adults	71 (38.38)	114 (61.62)
There is vaccine available for prevention of HBV	130 (70.27)	55 (29.73)
Immunoglobulin can prevent infection few hours after exposure	71 (38.38%)	114 (61.62)
The minimum number of dose for a complete vaccination is 3 doses	127 (66.65)	58 (31.35)
Treatment of HBV among children is same for adults with drugs like lamivudine and nucleotides analogues	78 (42.16)	107 (57.84)
An immune response test should be done after vaccination	129 (69.73)	56 (30.27)
Tenofovir, entecavir drugs are the main drugs for treating children infected with HBV	116 (62.70)	69 (37.30)
Chronic HBV patients don't need to be on viral drugs like HIV infected patients	92 (49.73)	93 (50.27)
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Chronic HBV patients don't need to be on viral drugs like HIV-infected patients	92 (49.73)	93 (50.27)

HBV, hepatitis B virus.

blood. Also, 132 (71.35%) answered correctly on HBV horizontal transmission from child to child through bodily fluid, 130 (70.27%) identified the availability of vaccine for prevention of HBV while 129 (69.73%) also correctly answered that immune response test is necessary after vaccination.

Though the majority of them provided correct answers to the questions, there were some responses that raised lots of questions. In all, there were incorrect responses to each of the questions that tested their knowledge of HBV (Table 2). For instance, 114 (61.62%) of the participants failed to identify correctly that, immunoglobulin helps in HBV prevention after a few hours of exposure. Though 66.7% (123) knew that children are at higher risk of becoming chronic carriers than adults, 61.62% (114) were unable to identify that adults are more likely to recover than children. MTCT at birth was correctly answered by 144 (77.8%), but 129 (69.7%) were not able to identify that HBV cannot be transferred to a fetus. Furthermore, 118(63.8%) of the participants failed to correctly identify that, HBV can survive on surfaces for over 24 hours, and 131(70.8%) wrongly identified HBV as symptomatic within the first 6 months.

The scores of each knowledge item were summed up for a composite knowledge score. These scores were further categorized into three knowledge levels- poor, fair, and good, through the use of a median split format of categorization. The summary of this analysis of knowledge levels of HBV is shown in Table 3, where the majority (85.4%) of the participants had fair knowledge of HBV in children, with only 5.4% having good knowledge of HBV. About 9% (17/185) had poor knowledge of HBV in children.

Participants were further assessed on the treatment aspects of HBV in children on 7 items which were scored as correct or incorrect as shown in Table 4. 157(84.86%) correctly identify the need for screening pregnant women for HBV before they give birth. However, 114(61.08%) of the participants incorrectly responded that they would not vaccinate children against HBV irrespective of their status or that of the mother. 113 (61.08%) health workers also incorrectly answered that they have not adequately treated HBV in a child before while 118 (63.78%) rightly said they will not wait for treatment of HBV to be done later while attending to other conditions. A composite score on treatment practices was generated and categorized into poor or inadequate practices (3 or fewer cor-

rect responses) and good treatment practices (4 or greater correct scores). The results show that only 29.2% (54/185) indicated good knowledge of the treatment practices of HBV in children. The majority of the participants (70.8%) had poor or inadequate knowledge of HBV treatment practices in children.

Further analysis was conducted to determine the association between knowledge and other variables while adjusting for possible confounders. From Table 5, a unit increase in knowledge will lead to 1.42 units increase in awareness ($P < .01$, 95% CI; .543, 2.296) and 1.3 units increase in treatment practices ($P < .01$, 95% CI; .912, 1.680) (Table 5), although the confidence intervals transcend across one.

Discussion

This study has demonstrated that although the majority of the participants were aware of HBV in the general population, some of them were not aware that HBV can infect children. Most of the participants had demonstrated only a fair knowledge of HBV in children. Furthermore, there were positive relationships between knowledge about HBV in children among health practitioners and awareness and treatment practices.

The awareness level of HBV in the general population by the participants is higher than the moderate awareness level reported in Cameroon, Southern India, and Saudi Arabia.^{12,15-16} This general high-level awareness of HBV among the participants is a good indication of first-level achievement when it comes to infectious disease transmission and public health issues among these health practitioners. This awareness level could be linked with training

Table 3. Summary statistics for the knowledge level of hepatitis B virus in children.

Knowledge level	Frequency	Per cent (%)
Poor	17	9.2
Fair	158	85.4
Good	10	5.4

Table 4. Descriptive analysis for scores on treatment items of hepatitis B in children.

Question (items)	Correct responses (%)	Incorrect responses (%)
I normally will screen pregnant women for HBV before delivery.	157(84.86)	28(15.14)
I always vaccinate babies with the HBV vaccine within 24 hours after birth.	97(52.43)	88(47.57)
I usually give vaccines together with immunoglobulin to children	105(56.76)	80(43.24)
I vaccinate children against HBV irrespective of their status or that of mothers.	71(38.38)	114(61.62)
I have adequately treated a child with HBV	72(38.92)	113(61.08)
Adults present with HBV are normally given attention by me than children due to the risk of exposure	102(55.14)	83(44.86)
I could wait for treatment to be done at another time when a child is diagnosed with HBV and attend to other conditions	118(63.78)	67(36.22)

HBV, hepatitis B virus.

Table 5. Summary statistics of multiple regression analysis for relationships between knowledge about hepatitis B in children among health practitioners and awareness and treatment practices.

Knowledge	Coefficient	SE	P-value	95% CI
Awareness	1.42	.44	.002*	.543, 2.296
Treatment	1.30	.19	<.001*	.912, 1.680
Cons	4.62	1.23		

that they obtained from school before practice since the majority of them indicated that they have had training on HBV in school. This finding is consistent with the similar awareness level reported in a study conducted in the Eastern region of Ghana where awareness campaigns that are organized in the country through various media platforms and screening programs contributed to this high level of HBV awareness among the health professionals.²

Against the background that some of the participants are not aware of HBV in children, it raises issues of public health concern. This is because HBV infection among children is high since they are vulnerable in relation to the exposure and progression of the disease in adults. Most of the factors that hinder the prevention and control of HBV is the lack of inadequate awareness and knowledge of healthcare providers.¹⁷ Therefore, awareness of HBV in children should be intensified as they greater chance of developing into chronic carriers,^{4,18} compared with adults. Awareness campaigns can be embedded in vaccination programs and HIV educational campaigns among others.

Knowledge about a disease or condition serves as an opening step toward the modification of desirable behavior.¹⁹ In general, this study showed fair knowledge of health practitioners on HBV in children, which is consistent with the moderate knowledge level reported in a study conducted in Jhalawar, India.²⁰ It is however not consistent with a study in Nigeria which reported good knowledge of HBV among health professionals.¹⁹ The report from this study is better than the low levels of knowledge recorded in Sharourah in Saudi Arabia among health workers.²¹ The disparity in the knowledge level in this study compared with the others could be associated with the differences in the study areas. Whereas the current study was conducted in rural and peri-urban areas, the other studies were conducted in urban centers.

Although this study was conducted in rural and peri-urban areas in the Krachi Districts, the knowledge level of HBV among the participants is better than what was reported in another study in the Eastern region of Ghana which is an urban area where knowledge level is expected to be high.² Knowledge about MTCT at birth was good among the participants and this is consistent with other studies in Guangdong, China, among doctors and nurses in rural and urban health facilities.²² Also, higher knowledge score items were recorded by respondents for infected blood transfusion and horizontal transmission from child to child through bodily fluid contact with infected persons, however, there was a misunderstanding about transmission from mother to her fetus by most health practitioners in the study. Two-thirds of the health practitioners did not know that HBV cannot be transmitted to a fetus in the womb unless there is bodily fluid contact from infected persons to an infant at birth. Such knowledge gaps need to be addressed. In addition, a greater number of the health workers in the study did not know that jaundice is a symptom of HBV infection in its chronic stage. Other reports showed that 25% of all chronic carriers of HBV develop hepatocellular carcinoma or cirrhosis of the liver.²³ In this study, over 50% of the health practitioners know about the association between HBV and liver cancer but a lesser percentage knew HBV as a major cause of liver cancer which is consistent with the findings from another study in Nigeria and India.^{20,24} The lapses in the knowledge of symptoms of HBV in children among the participants could be linked to the low levels of in-service training that are organized in the institutions as part of the health system strengthening to upgrade knowledge acquisition of health practitioners after their school training. Hence there is a need for improved knowledge of HBV among health professionals which could be achieved through seminars and various awareness campaigns. When good knowledge of the mode of transmission is known it can translate into breaking transmission in children.

Surprisingly, the majority of the study participants had no knowledge of the asymptomatic nature of HBV in children within the first six months. This implies that health practitioners may be looking forward to seeing symptoms of HBV before they try to take control measures which could lead to too many missed opportunities. This gap in knowledge may be a result of the unavailability of periodic training as well as the lack of treatment protocol. Both the availability of the vaccines and the presence of skilled professionals like midwives with adequate knowledge of HBV in children will help in the control and elimination process of the virus.²⁵

In terms of HBV treatment, about half of the participants indicated that they prioritized treatment for adults presenting with HBV over children with the misconception that there is more risk associated with adults than with children. Also, majority of them indicated that they have not adequately treated a child with HBV before. This is a clear demonstration that, more attention is given to adults than children with HBV treatment due to a gap in knowledge and lack of experience with HBV in children. Meanwhile, some of the health practitioners indicated that they tend to give priority to treating other diseases than HBV. This again shows that some of these practitioners lack adequate knowledge about the burden of HBV in children. Opportunities must be created for these health practitioners to attend seminars and workshops on HBV because in-service training increases one's knowledge as well as good and better practices.²⁶

This study has demonstrated a significant and positive relationship between knowledge about HBV in children and treatment practices. Similar findings were reported in three larger cities in China among health workers.²⁷ The correlation between knowledge and HBV management indicates that, as knowledge levels increase, awareness and treatment practices improve significantly and vice versa.

This implies that, once knowledge of health practitioners concerning HBV infection is improved, it will lead to a proportional increase in awareness and treatment practices to protect children against the disease and decrease morbidity and mortality. The findings are consistent with a study conducted in Guangdong, China, where knowledge was found to be related to the prevention of MTCT among rural and urban doctors and nurses.²²

In light of the observations from this study, the World Health Organization's target of achieving 90% vaccination coverage against HBV by 2030, must first focus on achieving higher knowledge, awareness and treatment practices among health practitioners especially those in the rural areas to help improve on their services.

Limitations of the study

Being a cross-sectional study, the findings cannot be generalized to health professionals in other districts in Ghana. The study also could not delineate awareness, knowledge, and treatment practices in one category of health professionals, for example, doctors from other professionals for targeted future education and training.

Conclusions

This study concludes that some health professionals in the study area are still not aware of HBV in children and that in all, the participants demonstrated only fair knowledge about HBV in children. There are still lapses in certain key knowledge items about HBV in children which might influence treatment practices. This translated into how some of them prioritized HBV management in

adults over children. The study further shows a positive relationship between knowledge about HBV in children and awareness and treatment practices. Hence the need to continue organizing seminars workshops and in-service training on HBV in children for health professionals in rural and peri-urban areas cannot be overemphasized.

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