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Original

The Knowledge of Post Exposure Prophylaxis for Hepatitis B Virus and the Related Factors among Health Care Workers in Accra, Ghana

Vivian Efua Senoo- Dogbey

Department of Community Health, School of Nursing and Midwifery, University of Ghana, Legon, Email: efuvivi@yahoo.co.uk

ABSTRACT

Background: Post Exposure Prophylaxis (PEP) of Hepatitis B virus (HBV) is important, especially in healthcare settings with low HBV vaccination uptake and high prevalence of HBV among the general public. It is important for Health Care Workers (HCWs) to have adequate knowledge of PEP for HBV for effective adherence following occupational exposure. This study assessed the level of knowledge of PEP for HBV among HCWs. **Methods**: A cross-sectional study involving 174 HCWs from five facilities in the Greater Accra Region. The selection was by random sampling after stratification into six professional categories. A structured, pretested questionnaire was used to collect data. SPSS software was used to analyse data. Chi-square test was used to determine significance, ANOVA and logistic regression analysis were done. **Results**: Thirty three percent of the HCWs had knowledge scores of less than 50%, whereas only 27% had good knowledge of PEP for HBV. The average mean of knowledge score was 47.85 (CI=44.35-51.35). An analysis of variance identified a statistically significant difference between the scores obtained by the various cadres (P=0.01). A logistic regression analysis revealed that nurses and midwives had lower odds of having a good knowledge of PEP for HBV (AOR=0.4; 95% CI=0.1-0.9). **Conclusion**: Respondents demonstrated inadequate knowledge of PEP for HBV in this study. In poor settings where HBV disease burden is high and HBV vaccination coverage among HCWs is suboptimal, good knowledge of PEP for HBV is recommended for effective adherence to PEP protocols among HCWs, who are at risk of exposure to HBV.

Keywords: Hepatitis B; Knowledge; Post exposure prophylaxis

Introduction

In 2015, it was estimated that 257 million people were living with a chronic form of Hepatitis B Virus (HBV) infection globally, with a huge burden on Africa and Western Pacific Regions, where a greater proportion of infected individuals lack access to essential testing and treatment services. [1] The high disease burden has led to the World Health Assembly's call for elimination of viral hepatitis as a major public health problem by 2030, a 90% reduction in new infections and a 65% reduction in mortality. [2] The contribution of Ghana to the global burden was revealed in a model estimate and meta-analysis performed in 2015. Ghana was ranked 14th among the 21 countries, making for 80% of the infections regarding the global HBV burden. [3]

A systematic review of the studies done among the general population in Ghana from 1995 to 2015

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estimated HBV prevalence to be 12.3%. Another review from 2015 to 2019 also revealed a prevalence of 14.3%. These studies suggested a rather slight increase in HBV prevalence among the general Ghanaian population. [4,5] Apart from the period under study, these prevalence rates are high enough to consider Ghana a West African country in the high endemic zone, according to WHO classification of endemicity. [6] HBV is a huge occupational hazard to HCWs, because it is transmitted following percutaneous exposure to contaminated blood and body fluids compared to Human Immunodeficiency Virus (HIV) and Hepatitis C virus. [7] The high prevalence of HBV in Ghana is an indication of increased risk of HCWs, because it has been observed that the prevalence of HBV infection among HCWs mirrors the general population. There is also evidence that HBV prevalence could be 2 to 4 times higher among HCWs compared to the general population. [8] In Ghana, where HBV prevalence is high, and pre-exposure prophylaxis in the form of HBV vaccination coverage is sup optimal, [9,10] the role of Post Exposure Prophylaxis (PEP) for HBV cannot be overemphasized. PEP is important for Ghanaian HCWs, because there is enough evidence to show that HCWs in Ghana continue to face needle stick and sharp injuries, which are considered high risk factors for occupational transmission of HBV. [11,12,13] PEP refers to a rapid medical response to prevent the transmission of blood borne pathogens following an exposure to HIV, HBV, HCV and so on. It is recommended that PEP should be initiated as soon as practicable, but not later than 72 hours after the potential exposure. [14]

Hepatitis B vaccine which provides long-term protection against HBV infection is recommended for pre- and post-exposure prophylaxis. Hepatitis B immunoglobulin (HBIG) provides a temporary form of protection which lasts for three to six months, and is only shown in certain post-exposure situations. [15,16] Many health authorities have strongly recommended that an appropriate, timely and effective prophylaxis should be available to all HCWs to help mitigate HBV infection and the subsequent development of complications. [17,18]

Having sufficient knowledge and positive attitudes towards PEP for HBV is critical for effective PEP. Poor knowledge and negative attitudes towards implementation of PEP for HBV have been identified as one of the factors affecting the use of PEP for HBV. [19] It is important for HCWs to have adequate knowledge of PEP concerning HBV, in order to protect themselves and work towards reducing the burden of HBV. There are limited studies available in Ghana focusing on PEP for HBV. One notable study conducted in the northern part of Ghana discovered inadequate knowledge of PEP for HBV. That study was done only among the nurses, [20] whereas this study was designed and implemented to assess knowledge of PEP for HBV among six different categories of HCW in the southern part of the country.

Methods

This was a cross-sectional, hospital- based study taking place in the Greater Accra Region of Ghana. The cross- sectional structure was most appropriate for assessing HCWs knowledge of PEP for HBV at a particular point in time.

Participants in this study were selected from five healthcare institutions in the region. HCWs who participated in the study included doctors, nurses, laboratory staff, anesthetists, physician assistants and orderlies. The inclusion criteria were 18 years of age and above, work experience of 6 months or more in that center, and consent to participate in the study.

Sample Size and Sampling Technique

Knowledge score of 23.4% regarding HBV was used to estimate the sample size, given the fact that a study in Ghana assessing PEP knowledge among the nurses found that only 23.4% knew about PEP for HBV. [20] The formula for estimating proportions proposed by Cochrane ($Z^2 \times PQ/D^2$) was used to

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calculate the sample size, [21] which was 141. However , considering the low level of PEP knowledge observed in other studies, [20] which could result in the lack of interest to participate in the study or even in complete withdrawal from the study, the sample size was increased to 174 to solve the problem of non-response. The total sample was allocated to the five centers using proportional allocation procedures. In each selected center, however, HCWs were stratified into six groups of (1) doctors, (2) nurses/midwives, (3) laboratory staff, (4) physician assistants, (6) anesthetists and (6) orderlies or sanitation workers. The inclusion of HCWs in various categories in each study site was done proportional to the size. The specific staff list was used as a sampling framework to randomly select participants for the study.

Data Collection Tool/Instrument

Data were collected using a 25-item, structured, pretested questionnaire, which was self-administered. The data collection instrument included questions on socio-demographic and occupational characteristics such as age, sex, occupational category, duration of service, etc. Questions on knowledge of PEP for HBV also included factors used for PEP of HBV, timing for PEP, etc. PEP for HBV knowledge scores were obtained through a positive response as '1' and a negative response as '0'. The total score was summed up to form an index score. Scores of ≤'50%' were considered low, '51-74%', moderate, and ≥75and more was 'good'. [22,23] Percentage of the mean and standard deviation scores were obtained. Validity of the instrument was established by rigorous examination of the questionnaire as well as pretesting of the instrument by authorities regarding occupational health and safety.

Data Analysis

SPSS version 20.0 (Chicago Illinois USA) was used to code, enter and analyze data. Data were summarized using descriptive statistics in the form of frequencies, proportions, means and standard deviations. Analysis of Variance (ANOVA) was conducted to compare PEP knowledge scores among the six categories of HCWs. Post hoc tests ,such as Turkey's, were carried out to identify the source of differences or variations regarding the mean of PEP knowledge scores among the various categories of HCWs. The Knowledge scores were dichotomised into 'good' and 'poor' knowledge, and subsequently, binary logistic regression was used to specify factors associated with good knowledge of post exposure prophylaxis. The results were presented in tables.

Ethical issues and Informed Consent

Clearance was obtained from the Ethical Review Committee of Ghana Health Service (GHS-ERC 006/08/17). The heads of the facilities or hospitals that served as study sites were duly informed. The nature, purpose and procedures associated with the study were clearly explained to all participants after which they filled a consent form indicating their willingness to be part of the study.

Results

Background Characteristics of the Study Subjects

Most of the HCWs participating in the study were males (72.4%). The participants aged between 21 and 59, with the mean age of 34.5, and a standard deviation of 7.7. Nurses and midwives formed 47.1% of the participants , doctors 25.3%, and anaesthetists, being the least professional group made up for 4.6% of the participants. 69.5% of the healthcare workers had more than 10 years of work experience. 47.1% worked as providers in critical units (e.g. Labour ward, theatre), where there is more blood and body fluid exposures, while 52.9 % provided care at less critical units or departments. Workshops for preventing blood borne infections were held on a large scale, with almost 85.6 % of the respondents admitting they had never attended such training sessions. The majority of the respondents (88.5%) had reached tertiary level of education (Table 1).

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Knowledge of PEP for HBV

The majority of the HCWs (140 individuals, 80.5%) incorrectly stated that PEP for HBV is solely administered through the use of HBV vaccination. Also, 64% of the participants with HCWs believed that antiretroviral drugs were effective when used as PEP against HBV. A total of 76.4% gave correct response to the importance of immunoglobulin within the first 48 hours of exposure. Summing up the responses to form a composite score or index, and categorizing the knowledge scores into three performance categories, it was found that 33.3% of the HCWs had knowledge scores below 50%, representing poor knowledge of PEP for HBV. The results also indicated that 40% of the participants had moderate knowledge of PEP for HBV, whereas approximately 27 % obtained scores above 75% indicating good knowledge of PEP.

PEP knowledge by category

The overall mean percentage score of PEP knowledge was 47.85 (CI=44.35-51.35), which indicated poor knowledge of PEP for HBV among the population. Physician assistants obtained the highest mean score which was 66.67, followed by doctors who had a mean score of 54.54. Orderlies, however, recorded the lowest mean score of 48.22. Analysis of the variance revealed a statistical significant difference in knowledge scores obtained by the various categories of HCWs (F=3.110; P=0.010). *Table 2*

A post hoc analysis (Turkey's' method) revealed a difference in PEP knowledge between nurses/midwives and physician assistants with a mean difference of -23.98 (p=0.036; 95% CI=-46.99 -97.54).

Factors Associated with PEP Knowledge among HCWs

Both individual and occupational factors including educational level, ,attending training sessions on blood borne infection prevention , and unit of work were assessed regarding their effect on PEP knowledge.

According to age, sex, educational level, duration of service, training in IPC and working area risk level, the results in table 3 indicated that only the category of staff showed a significant relationship with PEP knowledge at both bivariate and multivariate levels. Nurses and midwives demonstrated lower odds of having good knowledge of PEP compared to doctors (aOR=0.4; 95%CI=0.1-0.9). *Table 3*

Table 1. Sociodemographic, Occupational and Exposure Variables. (N=174)

Variables	Frequency	Percent
Sex		
Male	126	72.4
Female	48	27.6
Age(years)		
21-30	57	32.8
31-40	78	44.8
41-50	27	15.5
51-60	12	6.9
Category of staff		
Doctor	44	25.3
Nurse/midwife	82	47.1
Anaesthetist	8	4.6
Laboratory Staff	17	9.7
Orderly	14	8.1
Physician assistants.	9	5.2
Level of education		
Less than tertiary	20	11.5
Tertiary and more	154	88.5
Training in IPC*		
Trained	149	85.6
Not trained	25	14.4
Duration of employment		
≥10 years	53	30.5
<10 years	121	69.5
Working area risk exposure		
High risk of exposure	82	47.1
Minimal risk of exposure	92	52.9

*Infection Prevention and Control

Table 2. Comparison of PEP Knowledge Score by Job Category (N=174)

Category	N	Mean Knowledge Scores	Standard Deviation
Doctor	44	54.55	22.41
Nurse/midwife	82	42.68	22.73
Anaesthetist	8	53.13	20.86
Laboratory staff	17	42.68	22.99
Orderly	14	48.22	22.93
Physician assistants	9	66.67	25.00
Total	174	47.85	23.42

*F=3.11
*P value=0.010

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Table 3. Factors Associated with Good PEP knowledge (N=174)

Variables	Knowledge Level		Unadjusted Estimates		Adjusted Estimates	
	Poor	Good	OR(95% CI)	P-value	OR (95% CI)	P-value
Sex						
Male	95(75.4)	31(24.6)	1.00		1.00	
Female	32(66.7)	16(33.3)	1.5(0.7 – 3.2)	0.248	1.2(0.5 – 3.0)	0.656
Age(years)						
21-30	45(79.0)	12(21.1)	1.00		1.00	
31-40	57(73.1)	21(26.9)	1.4(0.6.0– 3.1)	0.434	1.3(0.5 – 3.5)	0.558
41-50	16(59.3)	11(40.7)	2.60(1.0 – 7.0)	0.063	2.9(0.8 – 10.4)	0.099
51-60	9(75)	3(25)	1.3(0.3 – 5.3)	0.764	1.9(0.3 – 11.5)	0.460
Category of staff						
Doctor	27(61.4)	17(38.6)	1.00		1.00	
Nurse/midwife	69(84.2)	13(15.9)	0.3(0.1 – 0.7)	0.005	0.4(0.1 – 0.9)	0.028
Anaesthetist	5(62.5)	3(37.5)	1(0.2 – 4.5)	0.952	0.7(0.1 – 4)	0.726
Laboratory staff	14(82.4)	3(17.7)	0.3(0.1 – 1.4)	0.128	0.3(0.1 – 1.5)	0.148
Orderly	10(71.4)	4(28.6)	0.6(0.2 – 2.4)	0.497	0.8(0.2 – 3.2)	0.705
Physician assistants.	2(22.2)	7(77.8)	5.6(1.0– 30.0)	0.046	5.0(0.8 – 32)	0.088
Training in IPC*						
Trained	107(71.8)	42(28.2)	1.00		1.00	
Not trained	20(80)	5(20)	0.6(0.2 – 1.8)	0.397	1.1(0.3 – 3.3)	0.951
Duration of employment						
≥10 years	37(69.8)	16(30.2)	1.00		1.00	
<10 years	90(74.4)	31(25.6)	0.8(0.4 – 1.6)	0.533	1.1(0.4 – 2.9)	0.846
Working area risk of exposure						
High risk of exposure	56(68.3)	26(31.7)	1.00		1.00	
Minimal risk of exposure	71(77.2)	21(22.8)	0.6(0.3 – 1.2)	0.189	0.7(0.3 – 1.6)	0.376

*Infection Prevention and Control

Discussion

Healthcare workers are known to be at constant risk of occupational exposure to blood and body fluids, and these exposures carry the risk of transmission of HBV and other blood borne infections. Therefore, developing the occupational health and safety of healthcare workers through increasing knowledge of PEP for HBV should be a priority for every health institution. Accordingly, this study assessed the knowledge of PEP for HBV, which is an important strategy for prevention of occupational acquisition of HBV among HCWs. The study found participants had inadequate knowledge whose overall mean score was 47.85. The overall poor knowledge observed in this study was consistent with other studies done in Asia, Europe and Africa, which were all conducted under different settings and designs, and reported inadequate knowledge of PEP for HBV among HCWs. [19,20,24,25] In particular, a study done in Northern Ghana among nurses found insufficient knowledge of PEP, despite high risk perception for HBV among the population. [20] Few studies have strongly linked poor knowledge to poor health practices among the general population, and even among HCWs. Knowledge and attitudes are known to have direct correlation with performance. [26,27] Poor knowledge and negative attitudes towards the use of PEP for HBV has been identified as one of the factors affecting PEP administration. [19] Poor knowledge of PEP for HBV has serious consequences for occupational health and HCWs' safety, especially in situations where HCWs, out of fear of being stigmatized, opt for self-treatment following an exposure to blood and body fluids. [28] For the lack of knowledge, HCWs may resort to local, incorrect and ineffective measures that may make them vulnerable to HBV infection. [28] Lack of knowledge can even lead to none use of PEP after an exposure. For example, a study found that 25% of HCWs exposed

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to blood and body fluids failed to utilize PEP because they were less knowledgeable about the existence of PEP policies within the hospital they work. [29] In this study, however, training courses for blood-borne infection prevention were held on a large scale. Yet, participants demonstrated insufficient knowledge of PEP for HBV. It is likely that the infection prevention training paid little attention to PEP for HBV, indicating insufficient integration of HBV issues into routine infection prevention training programs in healthcare facilities. This analogy concurs with findings from a study, reporting that poor knowledge and utilization of PEP for blood borne infections could arise from several gaps within the health sector of which the HCW has limited or no control over. [30] Availability of PEP protocols, posters and constant reminders displayed in the immediate environment of HCWs could serve as measures to promote PEP utilization through the increase of PEP knowledge. This is in line with recommendations that, availability of guidelines and protocols are crucial in providing knowledge and skills needed to improve health care processes. [31] It is important to know that 48.8% of the entire HCW population in this study never heard of PEP for HBV. This situation is worrying, given the fact that having sufficient knowledge and positive attitudes regarding PEP for HBV is paramount for effective PEP practice. It was also obvious from the study that there was a significant difference in knowledge between the various categories of HCWs, with orderlies or sanitary workers obtaining the least knowledge scores. This could probably be one of the reasons why the burden of HBV is higher among hospital orderlies or sanitary workers compared to other HCW categories in Ghana. [32] The study again found that the category of staff had a good knowledge of PEP with nurses and midwives demonstrating lower odds of having good knowledge, compared to the doctors. This disparity calls for support of all categories of HCWs to receive adequate training and knowledge on the WHO recommended protocol for managing HCWs exposed to blood and body fluids contaminated with HBV.

Conclusion

Health care workers from the six professional categories demonstrated inadequate knowledge of PEP for HBV. In health care settings where HBV disease burden is high in the general population and HBV vaccination coverage is suboptimal, good knowledge of PEP for HBV is required for effective adherence to PEP management protocols among HCWs who are at constant risk of exposure to HBV.

Conflict of Interest

None of the authors of this study have a conflict of interest in publishing this article.

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Authors contribution

All aspects of this research-VES-D

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