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Healthcare Workers' Hepatitis B Virus Preventive Practices at a Mission Hospital in Kenya

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ABSTRACT

Hepatitis B (HBV) infection constitutes a major public health concern worldwide. In its chronicity, the infection causes potentially fatal advanced liver diseases. In Kenya, the prevalence of HBV infection has been on an upward trajectory despite the availability of an effective vaccine. However, literature demonstrates a dearth of information regarding healthcare workers' (HCWs') practices towards the infection. This study assessed HCWs' preventive practices towards HBV infection at Kijabe Hospital.

A cross-sectional descriptive survey involving 254 frontline HCWs at Kijabe Hospital was conducted. Ethical approval from Kabarak University Research & Ethics Committee (KUREC- 090323), Kijabe Hospital Ethical Review Committee (KH/ISERC/02718/0054/2023), and a research license from the National Commission for Science, Technology & Innovation (NACOSTI/P/23/24856) were obtained. Prior to data collection, informed consent was obtained from each participant. Data was collected using validated self-administered questionnaires and analysed on STATA v18. Chi-square test was used to determine the association between categorical variables. More females (65.4%) than males participated in the study. Most (80.3%) were aged between 25 and 35 years with half of the participants being married. Most respondents held diplomas (44.5%). Nurses formed the majority (45.7%) of the respondents. No significant association was shown between HCWs' sex (P =.594), age (P=.686), education level (P=.492), service department (P=.538), experience years (P=.555), and practices. Most (60.24%) HCWs demonstrated a lack of absolute adherence to the available safety practices. For instance, about 60% completed 3 doses of the HBV vaccine, 14% never changed gloves between patients, 52% had had a past needlestick injury and about 63% recapped needles after use. These findings underscore suboptimal infection control practices among the sampled HCWs. Therefore, regular training and sensitization on preventive practices towards HBV cannot be overemphasized. We further recommend a targeted intervention anchored on qualitative study findings.

Keywords: Hepatitis B, Practice, Prevalence

INTRODUCTION

The Hepatitis B virus is a member of the *Hepadnaviridae* family. It infects the liver, causing a wide range of liver diseases ranging from acute hepatitis infection (including fulminant liver failure), chronic hepatitis infection, liver cirrhosis, to liver cancer chiefly hepatocellular carcinoma (HCC) (Liang, 2009). Two-thirds of people with acute hepatitis infection, usually have a mild, asymptomatic, and subclinical illness that often resolves spontaneously and unnoticed; whereas, one-third have clinical signs and symptoms of hepatitis ranging from mild (fatigue and nausea) to marked symptoms, jaundice, and rarely to acute liver failure (Guvenir & Arikan, 2020). On the other hand, chronic hepatitis B infection (CHBI) can progress to liver cirrhosis and liver cancer (Liaw & Chu, 2009). Developing CHBI however, depends on the age of an individual at the acquisition of the infection. For instance, neonates and infants below 5 years have 90-95% chance of developing CHBI whereas adults and adolescents have a low chance of up to 5% (Tang et al., 2018).

According to the global report by World Health Organisation [WHO] (2017), viral hepatitis caused 1.34 million mortalities globally. Out of these, 96% were due to hepatitis B and C viruses. Moreover, in the same report, 257 million people are estimated to live with CHBI globally. The prevalence of CHBI has since increased to 296 million with an estimated annual new infection of 1.5 million and another estimated 820 000 deaths in 2019 alone, largely from cirrhosis and hepatocellular carcinoma (WHO, 2022). In most sub-Saharan countries, HBV infection is hyperendemic in the immunocompetent population (Zampino et al., 2015). In consonance with this, Kenya for instance had an HBV infection prevalence of 8.54% by 2021 (Kafeero et al., 2021). In addition, more than 30% of patients presenting with jaundice in Nairobi were shown to have HBV infection (Ochwoto et al., 2016).

Hepatitis B virus is transmitted through exposure to infected blood and body secretions. In Sub-Saharan Africa, horizontal transmission among children aged between six months and five years is observed commonly due to their close contact with infected households and playmates (Spearman et al., 2017). Vertical (mother-to-child) transmission is common in areas of high endemicity for HBV infection (WHO, 2015) and HBV-HIV coinfection increases the risk of mother-to-child transmission (Spearman et al., 2017). Nevertheless, a study done by Karoney et al. (2020) in the western part of Kenya revealed that sexual activities present the highest risk for HBV infection followed by traditional practices such as tattooing, traditional marking, and traditional circumcision.

Proper practices directed towards early identification, appropriate treatment, and prevention of HBV infection reduce the risk of contracting the infection and development of CHBI thus decreasing the risk of liver cirrhosis and HCC (Schillie et al., 2018). The universally accepted preventive practices against HBV infection include (but are not limited to), screening, vaccination, and gloving as well as preventing both percutaneous and mucocutaneous injuries (Amoran & Onwube, 2013). According to Pittet et al. (2005), percutaneous injuries (needlestick and other sharp injuries) are the most common among HCWs globally followed by mucocutaneous injuries (blood and body fluids splash to the eyes, nose, and mouth or to parts of the body with non-intact skin (Eriksen et al. (2005). Similarly, in Kenya and other developing countries, needlestick injuries (NSI) have also been shown to be common among HCWs (Mbaisi et al., 2013). However, HCWs have not demonstrated good compliance with the practices that avert these injuries in developing countries (Pittet et al., 2008). For instance, a study conducted in Vietnam reported significant levels of unsafe practices in the prevention of HBV transmission among HCWs (Hang-Pham et al., 2019). In Saudi Arabia, a study by Elbur et al. (2017) showed that only 38% of HCWs screened for HBV infection. In Sudan, HCWs also have been shown to have poor practices towards HBV prevention and treatment (Bakry et al., 2012). The Hepatitis B vaccine, which is about 95% effective, has been available as a 3-dose vaccine globally since 1982 and got assimilated into the Kenya Expanded Program on Immunisation (KEPI) over 2 decades ago (Lule & Nyawira 2012). However, there is still a below-target uptake among the general population and HCWs globally (WHO, 2017).

In Kenya, data describing the HCWs' practices towards HBV infection are inadequate since most studies focus on their vaccination which is a section of the preventive practices. For instance, a study done at Makueni County showed HCWs' HBV vaccine uptake rate but not the other preventive practices such as preventing NSI, gloving, screening, etc (Kisangau et al., 2018), and another study conducted among students from various medical training college campuses (Maina & Bii, 2020) demonstrated their HBV vaccine uptake rate and reason for non-uptake. Against this background, this study assessed the preventive practices towards HBV infection among HCWs at Kijabe Hospital.

METHODOLOGY

A. *Study Design*

The study employed a descriptive cross-sectional design according to Wang and Chen (2020). It was conducted between 29th May and 27th June 2023.

B. *Study Location*

The study was conducted at AIC Kijabe Hospital, a referral and a teaching, faith-based, level 5, hospital in Kiambu County, Kenya.

C. *Study Population*

The study population comprised clinical staff clerking, treating, and counselling patients with infectious diseases. This consisted of doctors [medical officers (15), residents (36), and consultants (32)], clinical officers, [registered clinical officers (RCOs) (51), emergencies and critical care clinical officers, and paediatric emergencies and critical care clinical officers {ECCCOs and PECCCOs} (30) as well as nurses (186) working at the hospital, in both inpatient and outpatient areas. The target population was the entire 350 HCWs (the total number of frontline healthcare workers as per the hospital human resource records by June 2021).

D. *Sample Population*

The sample population comprised clinicians and nurses working at the hospital. Members of the target population sampled were defined based on the criteria below:

Inclusion Criteria

i. Clinicians and nurses working in both inpatient and outpatient departments and regularly interacted with patients suffering from infectious diseases.

Exclusion Criteria

i. Clinicians and nurses who were away during the study.
ii. Clinicians and nurses who declined consent.
iii. Clinicians on internship training such as clinical officer interns as well as medical officer interns.
iv. The rest of the healthcare workers who do not directly diagnose and treat infectious diseases e.g., pharmacy staff, dental staff, laboratory staff, and rehabilitative services staff.

E. *Sample Size Determination*

This study was a census survey according to Triola et al. (2006)., targeting the total number of frontline HCWs at the hospital.

F. *Data Collection Tools*

A self-administered questionnaire adapted from a study conducted in Ghana by Balegha et al. (2021) was administered to the participants who met the inclusion criteria. Prior to adopting the questionnaire for use in this study, permission was sought from the principal investigator of the aforementioned donor study. The tool was divided into 3 sections, namely: sociodemographic characteristics, screening and vaccination as well as protective practices.

F.1 Validity and Reliability of the Data Collection Tool

This was a validated questionnaire that had been used in multiple studies in Africa. A suitability test was run by explaining the study to a group of nurses from another health facility and having them fill it out while being timed. The result was that the questions were understandable, it could easily be filled and only took 7 minutes to complete. This, therefore, made the contemplated pretest of the questionnaire among different HCWs unnecessary.

G. *Data Collection Procedures*

Ahead of data collection process, the study was approved by the Kabarak University Institution of Post-graduate Studies, thereafter all the necessary ethical approvals were sought.

Subsequently, a research assistant was hired to help with data collection. Informed consent was then obtained from each participant, and the questionnaires administered to those who consented. HCWs' date on socio-demographics, screening and vaccination practices as well as protective practices were collected. On the questionnaire, the questions on screening and vaccination were to be answered by either 'Yes' or 'No'. The respondents were required to give the number of doses they received during vaccination and those who were never vaccinated were required to give reasons as to why. The other set of questions had 'always', 'sometimes', and 'never' as responses and the participants were required to respond to the best of their knowledge.

H. *Data Management*

Each questionnaire was scrutinised for completeness daily before temporarily storing in the envelopes pre-labelled according to the respective participants' service departments. Subsequently, the data were entered into Microsoft Excel and stored in a password-protected computer device, whose access is only allowed to the lead researcher, for management. After entry, the filled questionnaires were then stored in a lockable cupboard.

I. *Data Analysis*

Data were imported to the STATA version 18 from MS Excel for analysis. Descriptive statistics were used to analyse the socio-demographic characteristics of the respondents. The results obtained were presented in the form of tables, and graphs. Categorical variables were summarized as absolute counts and relative frequencies. In agreement with Habib et al. (2021), participants' practices were each ranked as poor, moderate, and good to keep in line with ≤62%, 63-75%, and ≥76% respectively. This scoring system has been used in a number of studies in the past (Mallhi et al., 2018). Associations between demographic variables and HCWs' preventive practices were analysed using Pearson's chi-square test (χ^2). A *p*-value of < 0.05 and a confidence interval of 95% was set to determine the statistically significant difference of the reported results from the expectations.

J. *Ethical Considerations*

Ethical clearance was sought from the Kabarak University Research Ethics Committee (approval number KUREC- 090323), Kijabe Hospital Ethics and Research Committee (approval number KH/IS-ERC/02718/0054/2023), and finally the Research license obtained from the National Commission of Science, Technology, and Innovation (research license number NACOSTI/P/23/24856).

RESULTS

A. *Socio-Demographic Characteristics of the HCWs*

In view of the HCWs' sociodemographic characteristics (SDC), there was a female predominance among the study participants 166 (65.4%). Two hundred and four (80.3%) participants were aged between 25 and 35 years, followed by 32 (12.6%) who were aged between 36 and 45 years. Those who were aged below 25 years and above 45 years formed the minority with each entity consisting of 8 (3.1%) and 10 (3.9%) respectively.

Half (129, 50.8%) of the participants were married, 107 (42.1%), were single, and those in the consensual union and divorced formed the least number at 17 (6.7%) and 1 (0.4%) respectively. A vast majority were Christians (253, 99.6%), and 1 (0.4%) was from the Islamic faith.

The lowest level of education was diploma with 113 (44.5%) respondents being holders, followed by

undergraduate which was held by 62 (24.4%) and higher diploma, held by 48 (18.9%) participants respectively. Master, postgraduate diploma, and Ph. D holders formed the minority with each represented by 24 (9.4%), 6 (2.4%) and 1(0.4%) respectively. Most participants were nurses 116 (45.7%), followed by clinical officers 51 (20.1%). Residents followed closely at 30 (11.8%), whereas consultants, emergency and critical care clinical officers as well as the medical officers were the minority at 26 (10.2%), 22 (8.7%) and 9 (3.5%) respectively.

The outpatient department (OPD) contributed 63 (24.8%) of the participants followed by critical care areas [High Dependency Units (HDUs) and Intensive care units (ICUs)] at 49 (19.3%), surgery and paediatrics at 45 (17.7 %) and 41 (16.1%) respectively. Obstetrics and gynaecology (OBGY), internal medicine and casualty had the least number of participants.

Finally, most of the participants 119 (46.9%) had served for 2 to 5 years whereas 43 (16.9 %) had served for less than 2 years. The numbers declined with increasing number of experience years where 20 (7.9%) had worked for between 11 and 15 years, 10 (3.9%) between 16 and 20 years and only 4 (1.6%) participants above 20 years. The social-demographic characteristics of the HCWs are presented in table 1.

Table 1:

Socio-Demographic Characteristics of HCWs at AIC Kijabe Hospital

Variable	Total (N=254)	
Sex	Frequency	Percent (%)
Male	88	34.6
Female	166	65.4
Age		
Below 25 years	8	3.1
25-35 years	204	80.3
36-45 years	32	12.6
Above 45 years	10	3.9
Marital status		
Married	129	50.8
Consensual union	17	6.7
Divorced	1	0.4
Single	107	42.1
Religion		
Christian	253	99.6
Islam	1	0.4
Level of education		
Diploma	113	44.5
Higher Diploma	48	18.9
Undergraduate	62	24.4
Master (Graduate)	24	9.4
Postgraduate Diploma	6	2.4
Ph. D	1	0.4
Service cadre		
Medical Officer	9	3.5
Nurse	116	45.7
Clinical officer	51	20.1
ECCCO/PECCCO	22	8.7
Resident	30	11.8

Consultant/ specialist	26	10.2
Department of service		
General OPD	63	24.8
Surgery	45	17.7
OBGY	22	8.7
Critical care (ICU/HDU)	49	19.3
Casualty	14	5.5
Internal medicine	20	7.9
Paediatrics	41	16.1
Years of experience		
Below 2 years	43	16.9
2-5 years	119	46.9
6-10 years	58	22.8
11-15 years	20	7.9
16-20 years	10	2.8
Above 20 years	4	1.6

B. *Association Between Healthcare Workers' SDC and Practices*

This was assessed using Peason's Chi-square test. The HCWs' sex (*P*=.594), age (*P*=.686), level of education (*P*=.492), cadre (*P*=.066), department of service (*P*=.538), and year of experience (*P*=.555) were shown not to have statistically significant association with their practices towards HBV infection as shown on Table 2.

Table 2:
Association Between HCWS' Socio- Demographic Characteristics and Practices

Variable	HCWs' level of Practice			
	Poor	Moderate	Good	*p*-value
Sex				**0.594**
Male	56	30	2	
Female	97	62	7	
Age				**0.686**
Below 25 years	7	1	0	
25-35 years	123	73	8	
36-45 years	18	13	1	
Above 45 years	5	5	0	
Level of education				**0.492**
Diploma	61	46	6	
Higher Diploma	32	14	2	
Undergraduate	43	18	1	
Master (Graduate)	13	11	0	
Postgraduate Diploma	4	2	0	
Ph. D	0	1	0	
Service cadre				**0.066**
Medical Officer	8	3	0	
Nurse	58	51	5	
Clinical officer	35	16	2	

Variable	HCWs' level of Practice			
	Poor	Moderate	Good	*p*-value
ECCCO/PECCCO	18	5	1	
Resident	23	4	1	
Consultant/ specialist	11	12	0	
Department of service				**0.538**
General OPD	35	27	1	
Surgery	29	16	0	
OBGY	12	9	1	
Critical care (ICU/HDU)	30	17	2	
Casualty	9	5	0	
Internal medicine	11	8	1	
Paediatrics	27	10	4	
Years of experience				**0.555**
Below 2 years	27	14	2	
2-5 years	70	45	4	
6-10 years	38	17	3	
11-15 years	9	11	0	
16-20 years	6	1	0	
Above 20 years	3	4	0	

C. *Practices of HCWs towards HBV Infection*

C.1 Screening and Vaccination Practices

Most of the respondents, 153 (60.24%), were found to have poor practices with scores of 62% and below, 93 (36.22%) had moderate practices with scores of between 63% and 75% while only 9 (3.54%) had exhibited good practices with scores of 76% and above. Slightly more than half, 133 (52.4%) of the participants had screened for HBV infection with 244 (96.1%) having been vaccinated. However, out of the 244 respondents who had been vaccinated, 132 (53%) received the recommended 3 doses of HBV vaccine with another 25 (9.8%) having received more than the 3 recommended doses. The remaining participants had received 2 doses and below with 79 (31.1%) receiving 2 doses and the other 18 (7.1%) having received only one dose. This is presented in Table 3.

Table 3:
Screening and Vaccination Practices of the HCWs

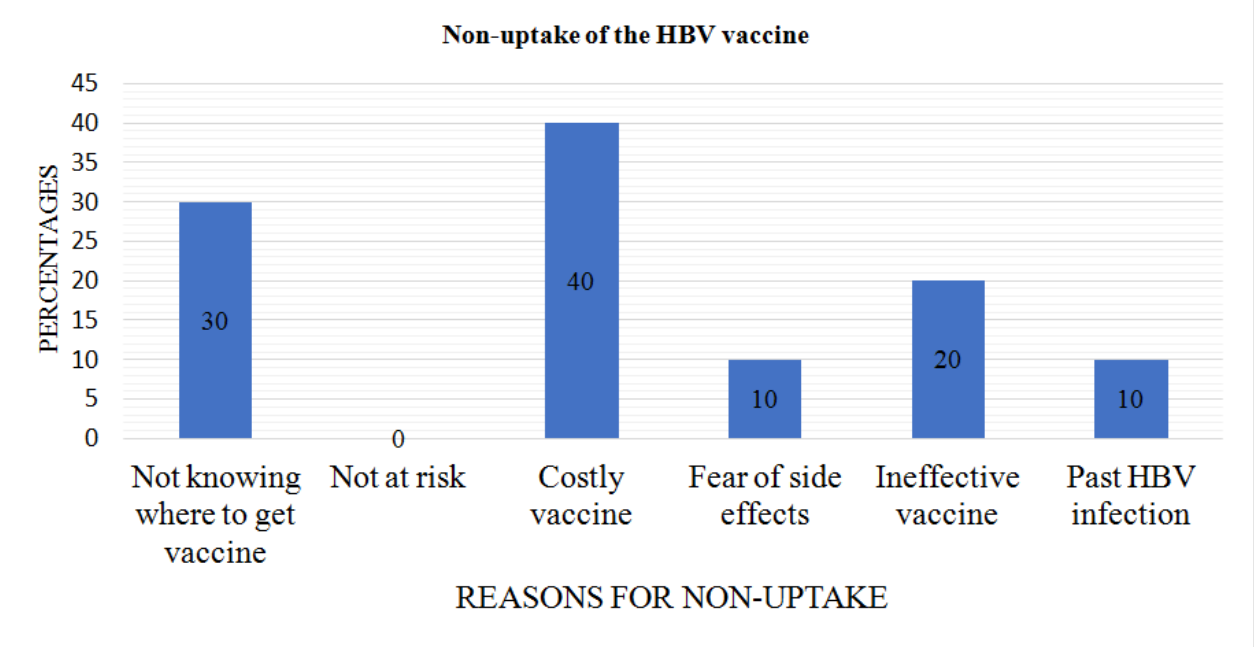
Practice (n =254)	Frequency	Percentage (%)
Have you screened for Hepatitis B infection?		
Yes	133	52.4
No	121	47.6
Have you ever taken the hepatitis B vaccine?		
Yes	244	96.1
No	10	3.9
How many doses of hepatitis B vaccine did you receive?		
1 dose	18	7.1
2 doses	79	31.1
3 doses	132	52.0
> 3 doses	25	9.8
Have you done a post-hepatitis B vaccination antibody test?		
Yes	33	13
No	222	87

C.2 Reasons for HBV Vaccine Non-uptake

Most of the participants (40 %) noted that the vaccine is costly with the other 30 % not aware of places where to get vaccinated. Twenty percent thought that the vaccine is ineffective while only 10 % feared the side effects of the vaccine with another 10 % having had a past HBV infection. None of the respondents reported 'not being at risk' as a reason for non-vaccine uptake. This is shown in Figure 1.

Figure 1:

Reasons For Non-Uptake of HBV Vaccine Among HCWs at AIC Kijabe Hospital



C.3 Protective Practices

Only 5 participants (2%) reported to always change gloves between patients while 213 (83.9%) sometimes changed gloves between patients and the other 36 (14.1%) reported to never change gloves between patients. In regards to the practice of recapping needles after use, only 92 (36.2%) reported to have never done the practice whereas 155 (61%) and another 7 (2.8%) indicated to sometimes and always recap needles after use respectively. Close to half of the respondents [122 (48%)] have never had a needle-stick injury in the past while 33 (15%) and 94 (37%) indicated to always and sometimes have this accident respectively. Finally, following blood and body fluid exposure, a majority 228 (89.8%) always had these splashes and another 25 (9.8%) sometimes splashing the fluids on them with only 1 (0.4%) having never experienced this accident in their practice. This is summarised in Table 4.

Table 4:

Practices Employed by The HCWs in Managing HBV Infection at AIC Kijabe Hospital

Practice (n= 254)	Always		Sometimes		Never	
	Frequency	*(%)*	*Frequency*	*(%)*	*Frequency*	*(%)*
Change of gloves between patients	5	2.0	213	83.9	36	14.1
Recapping of used needles	7	2.8	155	61.0	92	36.2
Past NSI history	38	15.0	94	37.0	122	48.0
Body fluid/ blood splash	228	89.8	25	9.8	1	0.4

DISCUSSION

A. *Socio-Demographic Characteristics of the HCWs*

In this study, female participants were more than males with the nursing cadre forming the majority just like in a study by Hussein et al. (2022). This was contrary to the findings of a study among Sri Lankan HCWs which reported more male HCWs than females (Chathuranga et al., 2013). This could be due the different geographical locations of these studies which could be informing the cultural and (or) religious beliefs among the study populations. The presence of more nurses than other cadres at the hospital justifies the argument of Oetelaar et al. (2016) that nurses address more patients' needs compared to the other cadres. Employing more nurses could be a better strategy to improve their quality of life, by reducing burnouts due to shared workloads, and enhancing patient care quality (Diehl et al., 2021). Additionally, this study showed that a large number of the respondents were between the ages of 25 and 35 years, a finding that was similar to a Kenyan study done by Kisangau et al. (2018), similar observations were also made by Olum et al. (2020) in Uganda and Bhagavathula et al. (2020) in the Middle East. This can be explained by the fact that the HCWs of this age bracket are young and energetic thus, they can perform more duties and faster than their older counterparts. Further, in this study, most participants had between 2 to 5 years of work experience whereas very few had work experience above 10 years. This finding was similar to that of Kamil et al. (2022) where most respondents also had less than 10 years of work experience. Conversely, Mursy and Mohamed (2019) found that most of the Sudanese HCWs responding to their study had below 2 years of experience. This could be informed by various beliefs and preferences of the employing authority at the hospitals.

B. *Practices of the HCWs Towards HBV Infection*

This study found that the overall preventive practices of HCWs towards HBV infection was suboptimal. This data agrees with those of Abiola et al. (2016), Afihene et al. (2015 and Shindano et al. (2017) whose studies were conducted in Nigeria, Ghana, and the Democratic Republic of Congo respectively. Conversely, the findings of studies in India (Garg et al., 2023) and Somalia (Moussa et al., 2020) reported a good practice among HCWs. The discrepancy demonstrated here could be an affirmation that practice is greatly influenced by the individual, cultural, societal or even religious beliefs (Hayre et al., 2018).

Concerning screening, half of the HCWs had screened for HBV infection. This finding agrees with that of Sikakulya et al. (2022) where only 47.7% of HCWs had screened for HBV infection. Overlooking HBV screening among HCWs can be detrimental to patients and HCWs' families since the infection can be transmitted to them unknowingly. Additionally, it is important to note that there are a number of HCWs who are infected with HBV. This is exemplified in a Nigerian study done by Ndako et al. (2014) which emphasized the need for screening HCWs' HBV statuses after establishing that 17% of HCWs screened randomly were seropositive for HBV infection. In another study done in Nigeria, HCWs' HBV seroprevalence was indicated as 1.1% (Alese et al.,2016), a percentage that was lower than that in the latter study but still shows that HBV could be prevalent among HCWs and screening is key.

Moreover, this study revealed that slightly above 50% of the HCWs had completed all the three recommended HBV vaccine doses and another 9.8% having exceeded the 3 doses. According to Mwangi et al. (2022), completion of 3 vaccine doses is important in aiding individuals vaccinated to have higher anti HBs titres which is protective rather than lower titres. This low rate of vaccination has also been seen in other studies across the world. For instance, the study conducted in Kenya by Kisangau et al. (2018) had a vaccination rate of 48% among the HCWs as well as the Tanzanian study by Ndunguru et al. (2022) which reported a suboptimal HBV vaccine uptake rate of 18%. Moreover, Hussein et al. (2022), in their study also found only 16.4% of the HCWs fully vaccinated in Somalia. The fact that this study may appear to have higher vaccine uptake rate compared to the others, does not mean that we are at par with the rest of the world. For example, the contrary findings of an Indian study by Garg et al. (2023) that more than 76% of HCWs at risk of HBV had received three doses of HBV vaccine. Similarly, Soomar et al. (2021) also disagree with this study by reporting two-thirds of HCWs at risk having been vaccinated in their study done in Pakistan.

Compared to the estimated HBV vaccine uptake rate between 2020 and 2030 of 90%, the developing world is still lagging behind (WHO, 2017). The reasons for poor HBV vaccine uptake in the developing world could be due to its unavailability in some areas, fear of injection by certain HCWs and cost of the vaccine (Abebaw et al., 2017) or maybe the failure of HCWs to adjust to change by heeding HBV vaccination protocols (Burnes, 2015). Some countries have innovated ways of increasing HCWs' HBV vaccine uptake. This is exemplified in the case of Pakistan where most hospitals require a record of completed HBV vaccination before employing HCWs (Soomar et al., 2021).

Remarkably, this study disclosed that a majority of the participants had not done a post-hepatitis B vaccine antibody (anti HBs) test. A test which confirms that adequate immunity is acquired after vaccination since the vaccine is expected to provide a strong immunogenicity against HBV for up to 30 years even without a booster vaccine after the recommended 3 doses (Cocchio et al., 2021). However, certain individuals poorly respond or do not respond at all to vaccination, showing low or no titres of HBV surface antibody (anti HBs) in blood thus the need to test in a duration of 1-2 months after vaccination (Garzillo et al., 2020). It is recommended that anti HBs be tested after every 5 years and if titres fall below 10mlU/mL, then the individual should receive a booster dose (Batra et al., 2015). The finding of low anti HBs test post vaccination in this study confirms those of studies done in a number of East and West African countries, including Kenya (Shah et al.,2020) and a study among HCWs in Ghana by Efua et al. (2023) where post vaccination testing rate was 21.3%. This may be a practice that has not been fully embraced in the sub-Saharan Africa and therefore should be emphasized among HCWs in the region.

Regarding the change of gloves, this study found out that only a few consistently changed gloves between patients. A risky practice that exposes patients to risk. This finding is similar to that of a study in Egypt by Refeai et al. (2020) which also showed that a few HCWs changed gloves between patients. On the contrary, a study among Nigerian HCWs reported 72.4% of HCWs who always changed gloves between patients (Amoran & Onwube, 2013). This could be due to the nature of patients treated in the hospitals. For instance, in the aforementioned Nigerian study, the study site was described to have a HIV prevalence of 10%, a reason that could have motivated cautious practices among the HCWs.

Furthermore, more than half of the respondents reported to sometimes recap needles after use. A risky practice that predisposes to needlestick (percutaneous) injuries and thus transmission of HBV infection (Kaweti & Abegaz, 2015). This finding agrees with that of Bakry et al. (2012) who reported a bigger percentage (93%) of HCWs having the norm of recapping used needles. Ganczak et al. (2019) differed with this study by reporting that only 35.9% of HCWs recap needles after use in Poland. This is a lower needle recapping rate compared with the one of this study. The difference could be due to the fact that Kenya and Poland are two different worlds with Poland being a developed economy while Kenya is still developing. However, there should be no recapping of needles among HCWs across the globe.

Surprisingly, a majority (89.8%) of the respondents reported to always splash blood and body fluids on their bodies, a finding that confirms that of Hebo et al. (2019) as well as Yasin et al. (2019). Contrary to this, Sabermoghaddam et al. (2015) and Nouetchognou et al. (2016) in their studies done in Iran and Cameroon respectively reported lower percentages of blood and body fluids splash accidents among their respective HCWs. The discrepancy could be due to difference in study subjects and their beliefs. Although the percentages are smaller than the one of this study, there is still need for improvement to help eradicate this harmful practice. Hospitals should be encouraged to supply HCWs with enough protective gears such as goggles, aprons, masks and gloves, just to mention a few.

CONCLUSION

This study established a suboptimal level of preventive practices among HCWs towards HBV infection. Modifiable factors such as failure to screen for HBV infection, low HBV vaccine uptake, unacceptable gloving practices as well as lack of prevention of NSI and blood/ body fluid splash accidents account for the observed unsatisfactory practices.

RECOMMENDATIONS

The following are the recommendations of this study:

A. *Policy Recommendations*

i. It is recommended that the hospital encourages regular screening of HBV among its HCWs, this could be through subsidizing screening costs.
ii. The hospital should facilitate vaccination of its HCWs to ease the burden of vaccination.
iii. Creating awareness of the availability of the HBV vaccine, its efficacy, and the vaccination venue within the hospital.
iv. It is recommended that the HCWs place safety boxes close to where they inject patients to aid immediate discard of used needles and other sharps to prevent recapping of used needles that can predispose to needlestick injuries.

B. *Recommendations for Further Research*

i. In the future, it would be good to have this research in multiple areas of the country for better generalisability.
ii. A mixed-method version of this study is highly recommended to help elicit more reasons for the findings of the study. Owing to some respondents writing on the questionnaires that they 'knew little' about HBV infection, it is suggested that future studies be interventional.

CONFLICT OF INTEREST

All authors declare that they have no conflict of interest.

AUTHOR CONTRIBUTIONS

FO: Conceived and designed the study
Wrote the proposal and sought ethical approval
Collected and analysed data
Compiled the data
Wrote the final version of the manuscript

PH: Critical review of the work
Approval the manuscript for publication

MW: Reviewed the manuscript drafts
Approved the manuscript for publication

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