

# Challenges Encountered by Care Providers in the Prevention of Hepatitis-b Virus During Clinical Practice. A Study Carried out in Health Facilities in Bamenda, North West Cameroon

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## Research Article

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## ABSTRACT

Hepatitis B is a worldwide health care problem, especially in developing countries with an estimated one third of the global population infected with the Hepatitis B virus (HBV) with 350-400 million people have lifelong chronic infection, and 0.5% spontaneously sero-converts annually from having the hepatitis B surface antigen (HBsAg) to having the hepatitis B surface antibody (anti-HBs).

Sub-Saharan Africa has the highest Hepatitis B virus infection rates, with health workers are at increased risk of contracting nosocomial HBV infection. Vaccination of health care workers plays a critical role in protecting them from sequelae of HBV. However, health workers vaccination remains a challenge for many workers.

The objective of this study was to assess the challenges encountered by health care workers in the prevention of hepatitis B virus infection in health facilities in Bamenda Town;

This result indicate that Health Care Workers still need education on effective preventive measures to employ at the work place and on exposure prone procedures to be able to safeguard their safety vis-à-vis hepatitis B infection. The challenges HCWs face with HBV prevention are mainly non-availability of preventive measures and their effective implementation during emergency scenarios.

A collective approach is essential for the effective resolution of these challenges and stakeholders need a concerted effort. A clear policy on health worker vaccination, constant supply of essential gadgets and training

on their use and effective follow up, and availability of PPE and education of health workers on effective post exposure interventions should be envisaged.

### INTRODUCTION

Hepatitis B Virus (HBV) infection is a global public health problem affecting millions of people every year and causing disabilities and death. Globally, it is estimated that approximately 257 million people are infected, particularly in Low-Income and Middle-Income countries. About 1 million people die each year (2.7% of all deaths) from causes related to viral hepatitis, mostly liver diseases, including liver cancer and cirrhosis. In highly endemic areas, Hepatitis B is most commonly spread from Mother-to-Child at birth (Perinatal transmission), or through Horizontal Transmission (exposure to infected blood and other body fluids), especially from an infected child to an uninfected child during the first five years of life and through needle pricks in health workers. It is equally transmitted through contact from an infected partner to an uninfected partner. An estimated 50 to 80% of cases of primary liver cancer results from infection with HBV. According to a study carried out in 2014, an estimated 350 million people were infected with Hepatitis B Virus. In the Global Burden of disease study 2010, HBV was estimated to have resulted in 786 000 deaths, the vast majority being attributed to liver cancer (351000 deaths) and Cirrhosis (312000 deaths). However, the epidemiology of HBV globally is changing because of the impact of universal infant vaccination programs <sup>[1]</sup>.

Regions of the world in which HBV prevalence is classified as intermediate (2% to 7%) include; North Africa, Middle East, Parts of Eastern and Southern Europe, Parts of Latin America and South Asia.

Transmission during delivery are the major transmission routes in areas of intermediate prevalence (rate of 3-5%). These regions include Eastern and Northern Europe, Japan, the Mediterranean basin, the Middle East, Latin and South America, and Central Asia. One study reported approximately 43% of HBV-infected individuals live in South, Central and West Asia, Eastern Europe, Russia and Central and South America, with a prevalence rate of 2-7% and a lifetime HBV risk of 20-60%. In areas of high prevalence ( $\geq 8\%$ , generally 10-20%), the predominant mode of transmission is perinatal and the disease is transmitted vertically during early childhood from the mother to the infant. Approximately 45% of individuals infected with HBV live in high prevalence areas, with a lifetime infection risk of over 60%, as demonstrated by the presence of hepatitis B core antigen (HBcAg) in serum. Such regions include China, Southeast Asia, Indonesia, Sub-Saharan Africa, Pacific Islands, Parts of Middle East and the Amazon Basin.

An estimated 257 million people are living with hepatitis B virus infection (defined as hepatitis B surface antigen positive). In 2015, Hepatitis B resulted in 887000 deaths, mostly from complications (including cirrhosis and hepatocellular carcinoma).

Chronic hepatitis B infection is the major contributor to the development of approximately 50% of cases of Hepatocellular Carcinoma (HCC) worldwide. Studies indicate that the level of Hepatitis B Virus (HBV) DNA, which indicates viral replication, is a strong predictor for cirrhosis and HCC regardless of other viral factors. Approximately 9% of patients in Western Europe who have Cirrhosis develop HCC due to hepatitis B infection at a mean follow-up of 73 months. The probability of HCC developing 5 years after the diagnosis of Cirrhosis has been established at 6%, and probability of decompensation is 23%.

In immune-competent adults, less than approximately 4% of HBV infections become chronic, whereas up to 90% of perinatal infected infants will have chronic disease. Among children who acquire HBV infection between ages 1 and 5 years, 30-50% become chronically infected.

According to the World Health Organization (WHO), by the end of 2010, the HBV had been routinely introduced in 179 countries, with a global coverage of 75%. Coverage in the Americas was 89%, in Europe, 78%, in Africa, 76%; and in Southeast Asia, 52%. In Taiwan, which in 1984 launched a nationwide HBV vaccination program, the prevalence of HCC in children younger than 20 years has been reported to be 0.5% or less.

In the United States, the estimated annual incidence of HCC in patients infected with hepatitis B is 818 cases per 100 000 persons. In Taiwan, the annual incidence of this malignancy in patients with Hepatitis B and Cirrhosis is 2.8%. Familial clustering of HCC has been described among families with hepatitis B in Africa, the Far East and Alaska.

The prevalence of HCC in patients with co-infection is even higher. People infected with HBV and who have co-infections like hepatitis C, hepatitis D and HIV are more prone to developing HCC than those who just have HBV infection.

The rate of development of HCC per 100 persons, years of follow-up is 2% in patients with Cirrhosis and HBV infection, 3.7% in patients with hepatitis C virus (HCV) infection, and 6.4% in patients with dual HBV and HCV infection. These findings point to a probable synergistic effect on the risk of HCC.

Individuals co-infected with Hepatitis D Virus (HDV) are thought to have a higher rate of HCC and cirrhosis, with the virus reportedly increasing the risk for HCC 3-fold and mortality rates 2-fold in patients with HBV Cirrhosis. Worldwide prevalence of HDV co-infection among patients infected with HBV is 0-3%, with the highest prevalence in Mongolia, Southeast Turkey, and the Orinoco River in South America. The Speculation that HDV may promote hepato-carcinogenesis in these patients has been investigated with varying results. The prevalence of anti-delta among patients with Cirrhosis with and without HCC was not significantly different in one study, whereas most other investigations show the delta virus (HDV) to be more aggressive, with higher rates of Cirrhosis and cancer.

In addition to causing HCC and Cirrhosis, Hepatitis B infection is also able to develop active and acute forms of HBV infection in congenital and or acquired immunodeficiency and also following immunosuppressive therapy. Human

Acquired Immunodeficiency Virus (HIV) attacks CD<sup>4+</sup> T cells, as critical cells in both cellular and humoral immunity, leading to defective cell-mediated and humoral immune responses and predisposing patients to future infectious diseases. It has been documented that one of the frequent complications of HIV infection is Hepatitis B co-infection and due to the common methods of transmission of these two viruses, the incidence rate of co-infection is increasing. It has been established that following reduction in CD4 positive cells count to lower than 200cells/ml, the immune system of HIV positive patients fails to develop an adequate immune response against microbial agents and as a result, re-activation of HBV infection and its related complications will occur. The prevalence of HBV co-infection among HIV positive patients are 3.7-59.8%, 3.6-59%, 1.8-28.6%, and 1.1-28.4% in the American, European, Asian and African countries respectively. According to this information, it can be concluded that, although, Africa and Asia are endemic areas for HIV, but the incidence of HIV/HBV co-infection is higher in the American and European populations.

Regions of the world in which HBV prevalence is classified as intermediate (2%-7%) include North Africa, Middle East, Parts of Eastern and Southern Europe, parts of Latin America and South Asia. The highest prevalence of up to 12% among adults was estimated to occur in Western Sub-Saharan Africa, followed by East and South Asia and the remaining parts of Sub-Saharan Africa with estimates of 5%-7% HBV prevalence among adults.

In 2018, the prevalence in Sub-Saharan Africa was estimated at 5-10%.According to, following the national survey on sero-prevalence of hepatitis B infection, it was confirmed that HBV infection is highly endemic in Nigeria (12.2%) a West African country, providing a prevalence within the estimate prevalence in Sub-Saharan Africa.

In Ghana which is another West African country, HBV infection is equally a major problem of public health. A review carried out by Richard et al, 2016 identified the prevalence of HBV in Ghana as detected by HBsAg sero-positivity to be high at 12.3%. This result is comparable to the prevalence rate reported. These results also align with the categorization of Ghana as a high HBV endemic country ( $\geq 8\%$ ).

The prevalence of HBV infection in Cameroon is high. Effective strategies to interrupt the transmission of HBV are urgently required. Specific attention is needed for rural settings, certain Regions and people born before the implementation of the HBV universal immunization programme In Cameroon in 2005.

According to a survey carried out by CAMPHIA in 2017 in Cameroon, Hepatitis B virus infection has a prevalence of 8% while HIV/AIDS prevalence rate stands at 3.4%. Differences exist across regions in Cameroon HBV sero-prevalence. Prevalence across regions can be categorized in three groups: regions with high (>15%; far-North, North and South regions), with medium (8%-15%; Centre, East and South-West) and low HBV sero-prevalence (<8%; Littoral, North-West and West. Nevertheless, interpretation of this result should be done with caution.

The Sub-Saharan region of Africa has the highest Hepatitis B virus infection rates, and health workers are at increased risk of contracting nosocomial HBV infection. Vaccination of Health Care Workers (HCW) plays a critical role in protecting them from sequelae of HBV. However, health workers vaccination remains a challenge for many

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workers. Vaccination and awareness of Health Care Workers in Sub-Saharan Africa is relatively high, but vaccination rates are lower, with 4.6- 6.4% of those ever vaccinated completing the vaccination regimen.

Hepatitis B infection is a preventable viral disease. Around 2 million health workers are exposed to Hepatitis B and have ten times higher risk of contracting the disease due to occupational exposure. Vaccination of the health care workers is of utmost importance in the prevention of Hepatitis B virus infection as it decreases the transmission effectively.

According to CDC Guidelines, an infected Health Care Worker should not perform exposure prone procedures at HBV DNA levels more than 1000IU/ml and an expert panel monitors the treatment. In most developing countries, facilities to measure HBV DNA levels and panel monitors are often limited, further exposing the health care workers to higher chances of contracting the virus even from their colleagues. The incidence of HBV has decreased since the advent of universal precautions and safe disposal of infected waste and sharps. Despite the decrease in incidence, much is still to be done to reinforce preventive measures against HBV particular in health care workers as they are increasingly being exposed to Hepatitis B virus as they care for patients at different levels. While HBV is vaccine-preventable and many countries have introduced vaccination in the past 20 years, most countries in Sub-Saharan Africa have Hepatitis B vaccines for infants only, without an adult catch up plan, and coverage is imperfect. In a study carried out in Sierra Leone in 2017, it was revealed that there is no national strategy plan for the prevention and control of Hepatitis B, either among health care workers or the general population and no routine surveillance or sero-surveys of infection [2].

The health care industry is powered by women and more than 76% of hospital employees are women. HBV is highly infectious and is 40 to 100 times more contagious than HIV (Human Immunodeficiency Virus). HBV can remain stable on the environmental surfaces for up to 7 days. It is therefore, the greatest threat of infection for health care workers. HBV infection can be prevented by following a simple and available vaccination schedule. Despite the high prevalence of HBV and effectiveness of the vaccine, there is no policy on routine vaccination of HCW in Cameroon. Awareness of transmission routes, risk involved in treatment procedures, and implementations of appropriate precautions when treating patients are critical in preventing the spread of the infection (Aroke et al, 2018). The prevention of nosocomial Hepatitis B virus remains a very challenging task that varies from region to region and across countries. The availability of preventive measures and their effective implementation is the greatest problem that places health care workers among the risk population for Hepatitis B virus. Hepatitis B virus is therefore, an important occupational hazard for health care workers. Going by a study carried out in the Netherlands, a large proportion of HCWs (especially nursing assistants) did not receive HBV vaccination and the reasons were the lack of payment support system for vaccination and the lack of attention to standard precautions.

According to information published in Cameroon Concord, the prevalence rate of Hepatitis B in Cameroon was estimated at 11.9%, that is about 2million persons and 1.0% for Hepatitis C that is about 200,000 persons.

HBV infection poses a major public health problem and according to WHO, there are more than two billion infected persons globally with 350million of them suffering from chronic disease which principally comprises liver cirrhosis

and hepatocellular carcinoma. In developing countries most especially, hepatitis B features among the most pertinent infectious diseases. Sub-Saharan Africa has particularly high hepatitis B virus (HBV) infection prevalence and according to different studies, values range between 7-26% in different countries. WHO estimates that about two million HCWs are exposed each year and Sub-Saharan Africa and other low income countries account for about 90% of the infections resulting from these exposures. Generally HBV transmission risk from infected carriers to others who get exposed varies from 6 to 30%. In the health care setting, the risk of transmission is two way, from patient to HCW or from HCW to the patient and a surge in cases of the latter has been reported. There have been 50 spates of transmission of HBV from HCW to patients since 1972 with 48 HCWs including 39 surgeons transmitting the disease to about 500 patients. Greater exposures are recorded among nurses than among any other health care profession. In developing countries usually, hepatitis B knowledge among HCWs is inadequate and their preventive practices likewise. In Cameroon only a very limited number of studies have been conducted on the prevalence of the HBsAg and associated factors among HCWs despite a rising prevalence.

A study carried out in Fako Division of the South West Region of Cameroon revealed that HCWs in the Division have a low knowledge level about hepatitis B infection, its transmission, prevention and vaccine availability. This is coupled with a high occurrence of occupational exposure among these HCWs especially those who are less qualified. From same study, the prevalence of HBsAg in HCWs in Fako Division stood at 4.98% which is however, lower than in other regions of the country.

Positive HCWs are not only a risk to their families but most especially to the patients they cater for. Elsewhere in Africa similar HBsAg prevalence to that of Cameroon have been reported among HCWs, such as 8.1 % in Uganda, 7 % in Tanzania.

The World Health Organization (WHO) has recommended that high-risk groups, including health workers, be targeted for routine provision of HBV vaccine to protect them from infection. Despite the fact that health workers are an accessible and easily identifiable population in which to implement vaccination strategies, many countries (including those in the West) face challenges in addressing at-risk target groups, and 24% of the health workforce worldwide remains unvaccinated against HBV.

The Sub-Saharan region has the highest HBV rates, ranging from 5% to 8%, with high human immunodeficiency virus (HIV) and HBV co-infection (15%) rates. The region also faces critical shortages of health workers; despite shouldering 24% of the global disease burden, it has only 3% of the global health workforce. Morbidity and mortality related to chronic diseases, such as HIV, and potentially HBV, contribute to high attrition among health workers. While many of these countries have implemented universal HBV vaccination for infants, there is limited visibility on what is happening related to protecting health workers from an infection that can be easily prevented with a three-dose regimen of the HBV vaccine. This review provides an insight into practices/measures currently in place in the Sub-Saharan region addressing vaccination of health workers against HBV.

The study had as main objective to assess the challenges encountered by Health Care Providers in the prevention of Hepatitis B virus infection during professional practice. Specifically, it was geared at:

- Finding out the mechanisms employed by Health Care providers in avoiding Hepatitis-B Virus infection during professional practice.
- Assessing the availability and proper utilization of preventive gadgets or equipment to curb Hepatitis-B Virus infection.
- Assessing the challenges encountered by Health Care Providers in the implementation of preventive measures against HBV infection.
- Identifying possible measures that can resolve these challenges so as to curb the infection of Health Care Providers.

### MATERIALS AND METHODS

The investigators used a cross-sectional design where data was collected from a sampled population of HCWs that fell within the inclusion criteria at a given point in time, and their practical preventive measures and challenges encountered in preventing Hepatitis B Virus were assessed as per the study objectives.

This was limited to Healthcare Providers serving in the Bamenda Regional Hospital, The Azire Integrated Health Centre and Saint Maria Soledad Catholic Hospital. Healthcare providers currently carrying out invasive procedures in these health institutions constituted the sample population.

The researcher used a non-probabilistic random sampling technique to recruit participants where questionnaires were administered to health care providers currently practicing invasive procedures in the Health Facilities who fell within the inclusion criteria. This was done for three weeks until the sample size was reached. The tool used for data collection was a well-structured questionnaire designed according to the specific objectives of the study.

An authorization letter was obtained from the Regional Delegate for Public Health North West who is the President of the Ethical Committee. In the health facilities, letters of authorization were written to the various health authorities and a written consent obtained from each respondent before administering the questionnaires.

Primary data collection was effected with the help of structured questionnaires. The questionnaires were administered to the participants after securing informed consents from individual respondents. After handing the questionnaire to each participant, the investigator went on to orient them on how to respond to the questions in the questionnaire [3].

### RESULTS AND DISCUSSION

#### Socio-demographic characteristics

This study was done to assess the challenges health care providers encounter in the prevention of Hepatitis B infection in contemporary clinical practice. 80 clinical workers of the three hospitals were signed for the exercise,

15 males (37.5%) and 25 females (62.5%). This is a little lower than data published by Dan Diamond (2014) which revealed that more than 76% of hospital employees are women (Table 1).

**Table 1.** Distribution of respondents according to age.

Age range	Frequency	Percentage
20 - 29	44	55
30 -39	28	35
40 - 49	6	7.5
50 - 59	2	2.5
Total	80	100

It was equally observed that 65% of participants were nurses; this could be attributed to the fact that nurses work in diverse departments of the hospital and therefore, required in a higher number than other health workers.

Fifty-five percent of the respondents were between the age of 20-29 years, 35% between the age of 30-39, 3 (7.5%) were between the age of 40-49 years while 2.5% fell between the age of 50-59 years. 70% of the respondents have worked between 0-5 years, 25% have worked between 6-10 years, while 5% have worked for more than 15 years. This is consistent as the majority young staff are reflected in the number of health workers that have served between 1-5 years. This could pose a potential risk to the entire staff if pre-employment vaccination is not emphasized and implemented (Table 2) [4].

**Table 2.** Distribution of respondents according to level of professional education.

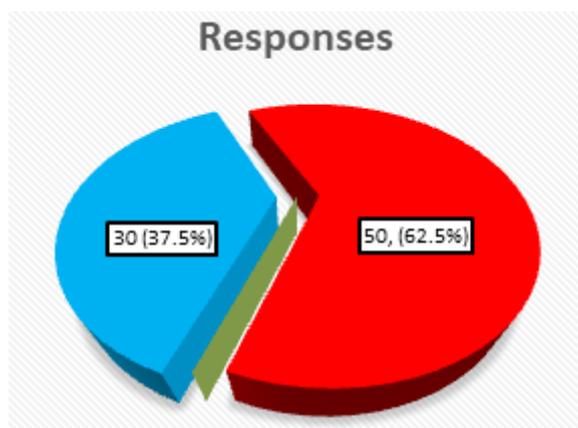
Qualification	Frequency	Percentage
Medical doctor	8	10
BNS	14	17.5
Anaesthetist	4	5
SRN	34	42.5
Lab scientist	2	2.5
Lab Technician	4	5
SRN Midwife	6	7.5
Nurse Assistant	4	5
Lab Ass Technician	4	5
Total	80	100

### Hepatitis B Virus infection

Results obtained from this study indicate that health care workers are well aware of hepatitis B virus infection. All 100% participants demonstrated good awareness of the condition as their definitions were consistent with the WHO (2018) definition, though few were not very certain on the mode of transmission.

This is however, in contrast with a study carried out in Fako Division of the South West Region of Cameroon which revealed that HCWs in the Division have a low knowledge level about the hepatitis B infection, its transmission, prevention and vaccine, coupled with a high occurrence of occupational exposure among these HCWs especially those who are less qualified of the 80 participants recruited, 57.5% practiced poor prevention techniques, where majority depend on the use of examination gloves, 35% practice moderately good prevention techniques where they uphold vaccination, proper utilization of PPE and the avoidance of accidental pricks, 7.5% employed good preventive which they enumerated as proper use of PPE, vaccination, disinfection of equipment and work surfaces. This result indicate that Health Care Workers still need education on effective preventive measures to employ at the work place and on exposure prone procedures to be able to safeguard their safety vis-à-vis hepatitis B infection. They discovered that HCWs such as nurses, physicians, medical students and nursing students receive incomplete and variable training in infection control (Figure 1).

**Figure 1.** Distribution of respondents.



### **Availability of post exposure prophylaxis and post exposure interventions**

It is evident that the availability and knowledge on the protocol for post exposure prophylaxis is low among the respondents. Out of the 80 recruits, 47.5% did not know whether there were PEPs in the health facility or not, 30% said PEPs were not available while 22.5% were certain of the availability of PEPs in the health facility. This statistics confirms the fact that the respondents have limited knowledge on the availability of PEPs and this will eventually hamper the effective utilization of PEPs. This data is further proven by the fact that only 12.5% of the respondents have good knowledge of post exposure intervention, as only this number gave responses that were consistent with the standard precautions

### **Knowledge of availability of preventive equipment**

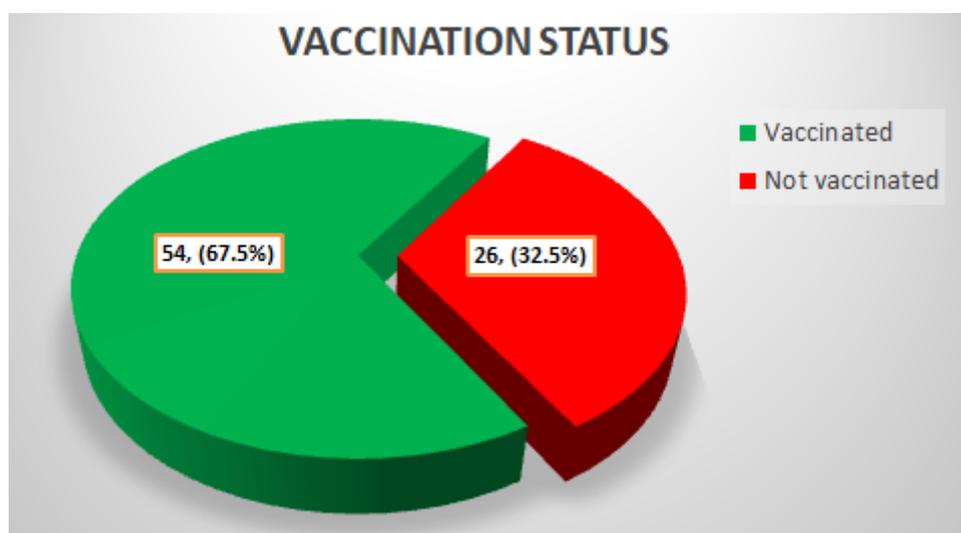
Asked to list protective equipment present in the health facility, 17.5% named gloves and aprons, 35% named gloves, 27.5% listed gloves, face masks, aprons, boots and goggles, 20% listed gloves, safety boxes, sterilization machine and disinfecting solution. This shows that their knowledge on what protective equipment are needs to be improved upon. This inadequate knowledge could be attributed to the fact that majority of respondents, 50% said they do not receive any training on prevention of HBV.

### Vaccination status of health care workers

Out of the 80 participants, 67.5% were vaccinated and 32.5% were not vaccinated. This is similar to a study carried out, which states that despite the fact that health workers are an accessible and easily identifiable population in which to implement vaccination strategies, many countries (including those in the West) face challenges in addressing at-risk target groups, and 24% of the health workforce worldwide remain unvaccinated against HBV.

Of the 26 unvaccinated, 92.3% cited financial constraint as their barrier. This is in line with a study carried out in the Netherlands, which revealed that a large proportion of HCWs (especially nursing assistants) did not receive HBV vaccination due to the lack of payment support system for vaccination and the lack of attention to standard precautions (Figure 2) [5].

**Figure 2.** Distribution of respondents according to vaccination status.



Meanwhile, the institution's policy on vaccination is not clear to many health workers as 60% respondents said vaccination cost is subsidized, 5% said the institution covers all the cost of staff vaccination, 27.5% revealed that staff cover the whole cost, and 7.5% said they have no idea. An understanding of the vaccination policy by all staff is imperative to enhance good decision making and ensure a good vaccination coverage among HCWs.

Specific Challenges encountered by HCWs.

Healthcare workers still face numerous challenges in implementing preventive measures. These challenges range from vaccination to availability of PPE and PEP, knowledge on proper use of these equipment and many more. Out of the 80 participants in the study, 5% stated that they have no specific challenge in the implementation of preventive measures against HBV. Of the other 95% participants, 27.5% said their main challenge is periodic unavailability of PPE, 25% face difficulties using PPE during emergency situations, 17.5% cited workload as their challenge, 15% simply had negligence as their challenge and 10% usually faced the challenge of avoiding stigma on the patient by not putting on gloves.

The challenges HCWs face with HBV prevention are mainly non-availability of preventive measures and their effective implementation during emergency scenarios.

### CONCLUSION

Concluding on the challenges that healthcare workers encounter in the prevention of hepatitis B in contemporary practice, despite the awareness health workers have about HBV infection, they face a number of challenges in the practice of preventive measures. This study reveals that the main constraints of health workers are limited knowledge on appropriate PPE, PEP and their effective utilization, limited access to hepatitis B vaccine, periodic unavailability of PPE, and lack of in-service training on occupational exposures, negligence, and workload. A collective approach is essential for the effective resolution of these challenges and stakeholders need a concerted effort. A clear policy on health worker vaccination, constant supply of essential gadgets and training on their use and effective follow up, and availability of PEPs and education of health workers on effective post exposure interventions.

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