

**PERSPECTIVES ON HEPATITIS B VACCINATION AMONG HEALTH CARE
WORKERS IN NIGERIA**

ABSTRACT

Nigeria has been declared among the group of countries endemic for hepatitis B infection with about 20 million people infected with HBV and about five million deaths resulting from the consequences of hepatitis B infection. Hepatitis B virus (HBV) infection is a serious global health problem, with 2 billion people infected worldwide, and 350 million suffering from chronic HBV infection. It is a major occupational hazard for Health care worker (HCWs). Approximately one health care worker dies each day from hepatitis B. Thus, Hepatitis B infection remains a major occupational hazard among health care workers in Nigeria. HBV being a vaccine preventable virus, about three-quarters of health workers in developed nations are vaccinated against HBV unlike the critically low percentage obtainable in developing countries. Despite the understanding of HCWs in Nigeria of their high risk of exposure to this deadly but vaccine preventable-virus, there is Poor compliance of Health workers to hepatitis B vaccination which calls for serious attention and thus, the heart of this review.

Keywords: [hepatitis B virus, health care workers, vaccine preventable-virus, hepatitis B vaccine]

1. INTRODUCTION AND BACKGROUND

Hepatitis B virus (HBV) is a major cause of morbidity and mortality worldwide causing 620,000 deaths per year [1]. More than 780 000, people die every year due to complications of hepatitis B, including cirrhosis and liver cancer [2]. Prevalence of hepatitis B surface antigen (HBsAg) in the general population varies geographically, with the highest rates (8%) measured in West Africa [3].

In the United States, 804,000-1.4 million persons are estimated to be infected with the HBV, with majority being unaware of their status [4]. HBV infection is highest in sub Africa and hyper endemic in Nigeria with 14% of the population in Nigeria being exposed to HBV [5].

2–5% of the general population in the Middle East and the Indian subcontinent have been found to be chronically infected. This proportion is larger compared to less than 1% of the population in Western Europe and North America that are chronically infected [6]. The World Health Organization has

classified Ireland as a country of low prevalence for HBV, i.e. prevalence of HBsAg <2%. In Europe, the total percentage of people infected with HBV varies between different countries, with higher rates in the southern part of Europe. The country with the highest prevalence (>4%) is Romania followed by medium prevalence countries (>1-2%), Spain, (parts of) Italy, and Greece. Belgium, Finland, Germany, Ireland, Sweden and Slovak have been identified as countries with a low prevalence of HBV (<1%) [7]. Figure 1 below shows the geographical distribution of hepatitis B virus in the world.



Figure 1: A map showing global distribution of hepatitis B infection Source: Centers for Disease Control and Prevention. CDC Health Information for International Travel 2012. New York: Oxford University Press; 2012[8]

Approximately one health care worker dies each day from hepatitis B [9]. Hence, HBV accounts for a major occupational hazard for health care workers due to their regular exposure to blood, blood products and body fluids [10], although, the concentration of hepatitis B virus in different body fluids varies. It is high in blood, serum, wound exudates; moderate in semen, vaginal fluid, saliva, and low/not detectable in urine, faeces, sweat, breast milk, tears[11] which are all the working medium of health care workers especially doctors, nurses, medical laboratory scientists.

More so, the risk of HBV infection in an unvaccinated person from a single HBV-infected needle stick injury ranges from 6-30% [12]. According to Rampal 2010[13], the risk exposure varies among the HCWs but exposure rate is higher among the nurses due to a number of activities they are involved in more than others. This is also in line with Ndakoda 2014[14] who reveals that the prevalence of HBV tends to be high among personnel with high proximity to blood and body fluids. Elmulkasfi et al [15] has also established the fact that there is association between occupation and type of department and the rate of getting HBV.

In the industrialised world, occupational surveillance assess and monitor the health hazards related to blood borne pathogens and preventive measures to reduce the risk of transmission but this is in contrast to what we have in the developing countries where exposure and health impacts are rarely monitored and much remains to be done to protect health workers from such risk that causes infection

[16]. According to Okwara et al 2014 [17], there's is poor adherence to safety practices among health care personnel in Nigeria which contribute to the risk of **Needle Prick Injuries** and majority of health care workers who **have had** needle prick injuries never take post exposure prophylaxis (PEP) despite the fact that they are aware of this PEP. It is also pertinent to note that In Nigeria, majority of HCWs have a good knowledge about hepatitis B infection but quite a number of healthcare workers in Nigeria are yet to be vaccinated while some were incompletely vaccinated this corroborates with the findings of [18] [19]. This is indeed a call for action!

2. METHODS

A number of documents were reviewed. Six documents from CDC on hepatitis B [4][7-8][29][49-50], **two** documents of the WHO on hepatitis B virus[1][6]. Twenty two published documents on different researches carried out on the state of HBV vaccine among health care workers outside Nigeria[2-3][10-13][15-16][20-26][28][30-33][47][51]. Twenty one published documents from Nigeria on the prevalence of hepatitis B vaccination, barriers to vaccination among health care workers in Nigeria and the state of HBV vaccine among the HCWs in Nigeria[5][9][14][17-19][27][34-46][48]. All these fifty- one documents were selected from an internet search. They all provided a basis for the perspectives on hepatitis B vaccination among health care workers in Nigeria and the need for prompt action to reduce the prevalence of **hepatitis B** virus among HCWs in Nigeria.

3. FINDINGS

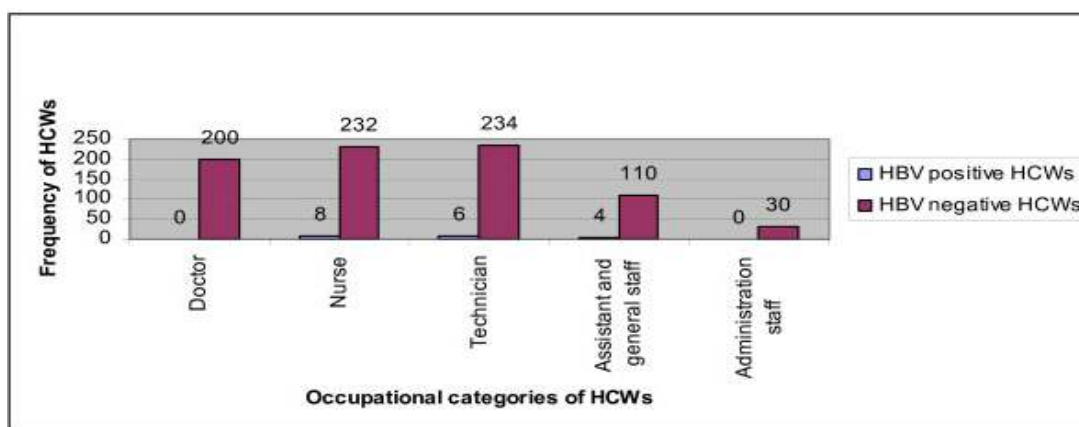
3.1 GLOBAL OVERVIEW OF PREVALENCE OF HEPATITIS B VIRUS AMONG HEALTH CARE WORKERS

The worldwide annual proportion of HCWs exposed to HBV infection were reported to be about 5.9% and the risk of contracting hepatitis B by HCWs being fourfold higher as compared to general adult population ,thus, reaffirming HBV as a major occupational hazard for HCWs [20]. The World Health Organization (WHO) also reported that about two million health care workers (HCWs) in sub-Saharan Africa face occupational exposure to HBV each year [21]. Singhal 2009[22] identified the prevalence of HBV infection among HCWs with frequent blood contact or those who frequently report Needle Prick injuries is about two folds higher than other HCWs. This report is based on the **seroprevalence** study carried out among health care workers in India where 2% of HCWs were also found to be HBsAg positive [23]. This is smaller to the result of the sero-frequency of HBV among HCWs in Khartoum where 4.4% were positive to HBsAg [24].In Turkey the prevalence rate of HBV positive **HCWs is** as low as 0.7% [25].

In Uganda 8.1% of health care workers were seropositive to HBV with 67.8% prevalence of needle stick injuries and 41.0% prevalence of exposures to mucous membranes such as the eyes [26]. In Tanzania, 7% of HCWs tested positive to HBV this shows the high burden of HBV among HCWs in Tanzania [10]. Nigeria being among the group of countries endemic for HBV infection with about 18

million of its residents being infected with HBV [27], 17% of HCWs in Nigeria were said to be positive to HBsAg based on a screening for hepatitis b surface antigen (HBsAg) carried out among HCWs in an urban community south –south Nigeria[14]. In Egypt, prevalence of HBV was also seen to be high among HCWs (7.3%) compared to the non HCWs (0.9%). This is in line with the high number of needle stick injury which was reported among the HCWS[28].All these prevalence studies of hepatitis B virus among HCWs shows that HBV still pose a great threat to the health of many health workers .

Figure 2 below shows the prevalence of HBV among HCWs with nurses and technicians having highest frequency among other HCWs who tested positive for HBV.



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Figure2: **Distribution** of HBV positives and HBV negative among health care workers.

Adapted from: Attaullah et al. 2011[12]

3.2 OVERVIEW OF HEPATITIS B VACCINATION AMONG HEALTH CARE WORKERS

The CDC has recommended Hepatitis B vaccine as on the vaccines that is to be taken by HCWs due to their exposure blood and body fluids of patients or handling of materials that could spread infection .Hence, all Healthcare workers including physicians, nurses, emergency medical personnel, dental professionals and students, medical and nursing students, laboratory technicians, pharmacists, hospital volunteers, and administrative staff have been mandated to have a document showing evidence of a complete HBV vaccine series otherwise they should get the 3 doses of hepatitis B vaccine and have an anti- HBs serologic test within 1-2 months after the third dose.[29]

It is worthy to note that despite this recommendation, the global history of vaccination among health care workers is generally low as many HCWs have never been vaccinated, and majority have been incompletely vaccinated. Those who have had the three doses of the HBV vaccines are yet to go for serologic test to ensure they are completely immunized against this infectious disease. In the United States, 72% of HCWs had received the primary vaccination and 68% had completed the course of vaccination [30].In India, 50% have been fully vaccinated, 6% are partially vaccinated and 1.8% were not vaccinated at all [23]. In a study carried out in Netherlands

it was discovered by Askariah 2014[31] that 35% of HCWs and 47% of nursing staff were not vaccinated against HBV. Among HCWs in Tanzania 48.8 % received three doses of the vaccine in the last 10 years, while 10 % had received two vaccinations, and 4.5% only had one vaccination[10]. The prevalence of complete hepatitis B vaccination among primary HCWs in rural areas of North West Pakistan was 40.2%. This is lower than the prevalence among primary HCWs reported from rural Sindh Pakistan where 50.2% had complete vaccination [32]. In a cross sectional study by Abeje and Asage, 2015 [33] a very poor history of hepatitis B vaccination was reported among HCWs in Ethiopia where only 5.4% reported that they took three or more doses of hepatitis B vaccine. In a tertiary health care centre in North India, the prevalence of hepatitis B vaccination acceptance was 60% out of which only 38.8% of the health workers had received the full three dose vaccination schedule while 21.4% had received one or two doses, and 40% were unvaccinated. This implies that Coverage of complete immunization was low among health care workers in India. A low coverage was also recorded in Pakistan where only 49% health care workers and 42.20% medical students were vaccinated [34]. Vaccination coverage rates vary greatly across countries and these dissimilarities might be justified by economic status or other characteristics of these countries.

3.3 PREVALENCE OF HEPATITIS B VACCINATION AMONG HEALTH CARE WORKERS IN NIGERIA

Despite the availability of Hepatitis B vaccination since 1981, a large proportion of Health Care Workers are still unvaccinated and the condition is same in most of the countries. Musa et al [5] reveals that Vaccination against the hepatitis B virus (HBV) in the West African nation of Nigeria is lower than many Sub-Saharan African countries thus making health workers in Nigeria to be at risk of contracting hepatitis B virus while discharging their duties Health care workers (HCWs) in Nigeria have an extra risk of getting infected from their workplace and yet they are not routinely vaccinated against HBV infection.

In a study carried out among health care workers in a teaching hospital in Ile-Ife south west Nigeria, it was revealed that only 65% of the health workers have been vaccinated against hepatitis B infection while majority of nurses and pharmacist have never been screened of hepatitis B infection[19]. In Sokoto 56.0% HCWs have had the recommended three doses of HBV vaccine as reported by Hassan et al 2016[35]. This is high compare to only 32.6% of HCWs who have had HBV in a cross sectional study on prevalence of hepatitis B vaccination among health care workers in a teaching hospital in Jos and Bayelsa in Nigeria [18]. Also, in a study carried out among health care workers in a secondary health care facility in Lagos state revealed that 11.9%, 17.2% and 48.5% of the HCWs had received 1 dose, 2 doses and complete 3 doses of HBV vaccine respectively [36]. Mohammed et al 2016[37], reported that only 65% of nurses in a public hospital in Niger claimed that they had HBV screening before while 35% have never been screened for HBV. Majority of public health workers in

Jos have good knowledge about the immunization but only 10.8% of them had ever attended any training or workshop on standard safety precautions and blood borne infections. Also the vaccination history among them is also poor [38]. Among dental surgeons in Benin, only 20.0% had received three doses of the hepatitis-B vaccine, 48.6% either two doses or a single dose, and 31.4% were not vaccinated [39]. HBV vaccination rate among Warri, laboratory worker was as low as 16.4% [40].

Among the operating room personnel (ORP) teaching Hospitals in the Northern, Eastern, Western, and Southern Nigeria, only 26.8% were vaccinated against HBV [41]. [42] Also identified 50.6% Hepatitis B vaccination uptake among doctors in Benin City, Edo state Nigeria. All these reports shows that healthcare workers in Nigeria, who are expected to have high knowledge of and exposure to hepatitis-B infection, showed the greatest apathy to the vaccination program.

At this juncture it is pertinent to ask for the major reasons or barriers to having complete hepatitis B immunization among Nigeria health workers so as to be fully protected from this global occupational hazard.

4. BARRIERS TO HBV VACCINATION AMONG HEALTH CARE WORKERS IN NIGERIA

The prevalence of hepatitis B infection in Nigeria should reinforce the importance of administering Hepatitis B vaccination for all HCWs. It should also serve as a key for evaluating hepatitis B protection among previously vaccinated HCWs particularly those who have been vaccinated more than ten years ago and clarifies recommendations for post exposure management of HCWs exposed to blood or body fluid. But despite their understanding of their high risk of exposure to this deadly but vaccine preventable-virus, there is Poor compliance of Health workers in Nigeria to hepatitis B vaccination which calls for serious attention [43]. The following are some of the barriers identified by HCWs in Nigeria to HBV vaccination

4.1 LACK OF OPPORTUNITY

This is one of the most common reasons given by health care workers in Nigeria for non compliance with the HBV vaccine. This was identified by Ibekwe, 2006[44] and [40]. In Nigeria majority of the health facilities are understaffed and health workers usually have a great deal of work to carry out on daily basis. Fatusi 2000[45] also reasoned that the heavy work load of doctors and nurses may hinder them from getting vaccinated. This corroborates with Obi and Ofii 2013 [42] where it was identified that pressure from work coupled with the long vaccination schedule for Hepatitis B may further hinder HCWs from been completely vaccinated.

4.2 NEGLIGENCE

Many health workers in Nigeria had never given it a thought to be immunized against HBV infection [46]. They focussed more on other people's health neglecting their own health. This is in line with the findings of [26][47], where negligence was the highest reason for unvaccination of most HCWs.

4.3 LONG VACCINATION SCHEDULE OF THE VACCINE

The long vaccination schedule of HBV vaccine may contribute to the tendency for forgetfulness among health care workers resulting in missed vaccine administration and the immunity that should have been acquired through vaccination thus, further increasing HCWs being exposed to Hepatitis B infection [42].

4.4 FEAR OF SIDE EFFECTS OF THE VACCINE

Perception of vaccine safety was identified as the most important predictor for acceptance of HBV vaccine [16], logistics of vaccine administration and fear of side effects was identified among doctors, nurses and laboratory staffs. This might have reduced the compliance for HBV vaccine. Although, HBV vaccine (particularly Recombivax) have some common side effects like irritability, pain or redness at the injection site, fever, headache, tiredness, sore throat, nausea, loss of appetite. If all these persist, it is pertinent to inform your doctor or care giver. Occasionally it has temporary symptoms such as fainting, dizziness or seizure-like movement which require immediate attention of the care provider. However, the benefit one gets from the vaccine outweighs the side effects [51]. On the other hand the fear of disease and the high hope placed on HB vaccine promoted its acceptance by the other [39].

4.5 FEAR OF BEING RECOGNIZED AS A HEPATITIS-B CARRIER

This always hinders the confidence level of health workers in going for hepatitis B vaccine knowing well that **the result of their hepatitis status will be required from them before they will commence hepatitis B vaccination.** Thus, fear of "what if I tested positive" is always a major concern and many will choose not to be aware of their hepatitis B status.

4.6 NON-AVAILABILITY,

Unavailability of vaccine through government channels have also been identified by some healthcare worker. This may depend largely on the economic state of the country [39][42]. Other barriers reported in other countries apart from Nigeria are high cost of the vaccine [34].

5. FACTORS THAT CAN ENHANCE VACCINE COMPLETION AMONG HEALTH CARE WORKERS IN NIGERIA.

5.1 LEVEL OF EDUCATION

Education as it is generally said is power. The level of education that each health worker has can be of great advantage to completion of hepatitis B vaccine. Knowing the consequences of not completing the HBV will encourage each health worker to go for the vaccine and ensure they had a complete dose. This is congruent with the study carried out among theatre and laboratory workers in Imo state, Nigeria; where it was discovered that only 48% of the participants had completed the three doses of HBV majority having tertiary education [17].

5.2 GOOD KNOWLEDGE ABOUT THE HBV INFECTION

Knowledge about the modes of transmission of HBV being through percutaneous mean, via sexual contacts and via body fluids as well as knowledge of people who are at risk of getting the virus will help HCWs in Nigeria to get vaccinated. Also, knowing that hepatitis B is 50 to 100 times more infectious than HIV will also aid the vaccination of health workers in Nigeria [6].

Ndako 2014[14] identified that the risk of HBV infection in HCWs depends on the prevalence of HBV infected patients that the HCWs are exposed to, and the frequency of exposure to infected blood and body fluids. This understanding will enhance HCWs who have regular contact with the blood and body fluid of patients to ensure they have complete hepatitis B vaccine.

5.3 GOOD KNOWLEDGE OF THE SAFETY AND EFFICACY OF HBV VACCINE

Hepatitis B immunisation has been described as a vaccine that is safe and effective for children and adult population at risk such HCWs against hepatitis B infection [48]. It has been demonstrated to be safe among persons in all age groups. It is not contraindicated in persons with history of multiple sclerosis, Guillain- Barre syndrome, autoimmune diseases and other chronic diseases [49]. CDC weekly report in 2006[50] identified that Hepatitis B vaccine is not contraindicated for pregnant women as vaccines contain non-infectious HBsAg and this causes no risk of infection to the fetus. It is also not contraindicated for lactating mothers but it is contraindicated for persons with history of sensitivity to yeast components. Knowledge of this fact will help HCWs in Nigeria to embrace HBV vaccine.

5.4 A REMINDER SYSTEM

Owing to the busy schedule of majority of health care worker, a reminder system should be developed to ensure the complete uptake of the vaccine

248 This can be done by sending a text message to remind them of their next immunization appointment
249 so as to enhance their compliance and also reduce incomplete immunization due to lack of
250 opportunity and forgetfulness.

251 5.5 PRE-EMPLOYMENT SCREENING FOR HEPATITIS B VIRUS

252 Just like HIV test is being done as a pre employment screening in the same vein, hepatitis B
253 screening should be done for every health worker before they are fully employed. Those who are
254 negative should immediately go for the vaccination and ensure completion while those who tested
255 positive should go for treatment as soon as possible. This claim is supported by [17] who also
256 identified that screening for Hepatitis B virus should be done as a pre employment screening for all
257 health care workers.

258 6. RECOMMENDATIONS

259 In order to reduce the global burden of hepatitis B among Nigeria population and also among HCWs
260 in Nigeria the following recommendations are made:

- 261 • Nationwide vaccination campaign against hepatitis B in high risk groups especially HCWs.
262 Nigeria government has greatly improved in vaccination of children against HBV, the next
263 step could be to consider adults at risk, such as HCWs, hairdressers, motorist, etc and
264 targeted vaccination should be done for such group.
- 265 • Free HBsAg screening for newly employed staff before vaccination. This is needed to make
266 vaccination of health care workers against HBV infection a firm policy and ensure complete
267 and consistent adherence to work standard safety measures.
- 268 • To increase the vaccination rate among HCWs in Nigeria is to make the vaccine available at
269 no cost to all HCWs
- 270 • Nigeria government should further ensure that there should be a written policy on hepatitis
271 control in all hospitals; hence, they should be encouraged to adopt standard precautions, to
272 use safety devices and other personal protective equipments there is need for health workers
273 to take standard precaution against this deadly virus.

- Apart from the annual world hepatitis day marked in the hospital, training and seminar should be done for all HCWs on the merits of vaccination and using the evidence of vaccination as a requirement for annual practicing license renewal.
- Government should ensure that Post-exposure management be put in place in hospital settings so that it can be centrally initiated, promptly, as and when required. Similar to HIV prophylaxis there must be a centralized counselling, testing, vaccination, and treatment facility that is widely advertised, and the location and contact numbers must be displayed at most visible sites of the hospital premises and made available round the clock.

7. CONCLUSION

In conclusion, a large number of residents in Nigeria have been identified to be chronically infected with HBV and being a major occupational health hazard it poses HCWs in Nigeria to be at greater risk of contacting this deadly disease while discharging their duties. It is therefore pertinent for the health care providers who are at high risk to proclaim that hepatitis affects everyone, everywhere and to get themselves protected via vaccine against the deadly virus.

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