
Factors Associated with Vaccination Against Hepatitis B Among Health Workers in the Health District of Mali (Guinea)

Sadou Sow^{1,2,*}, Alpha Oumar Diallo², Casimi Manengu Tshikolasoni¹, Mamadou Oury Balde¹, Abdoulye Sow², Ahmadou Barry¹, Jean Konan Kouame¹, Mory Filany Keita², Sory Diallo³

¹World Health Organization, Conakry, Guinea

²Faculty of Health Science and Technology, Department of Medicine, University Gamal Abdel Nasser, Conakry, Guinea

³National Institute of Nutrition and Child Health, Conakry, Guinea

Email address:

Sadousow1968@yahoo.fr (S. Sow), docta135@gmail.com (A. O. Diallo), manenguc@who.int (C. M. Tshikolasoni), mbalde@who.com (M. O. Balde), drasowab@msn.com (A. Sow), mbarry@who.int (A. Barry), konank@who.int (J. K. Kouame), dankama83@gmail.com (M. F. Keita), sowydiallo1962@gamil.com (S. Diallo)

*Corresponding author

To cite this article:

Sadou Sow, Alpha Oumar Diallo, Casimi Manengu Tshikolasoni, Mamadou Oury Balde, Abdoulye Sow, Ahmadou Barry, Jean Konan Kouame, Mory Filany Keita, Sory Diallo. Factors Associated with Vaccination Against Hepatitis B Among Health Workers in the Health District of Mali (Guinea). *Central African Journal of Public Health*. Vol. 8, No. 4, 2022, pp. 158-162. doi: 10.11648/j.cajph.20220804.14

Received: June 6, 2022; **Accepted:** June 28, 2022; **Published:** July 28, 2022

Abstract: Viral hepatitis B virus infection is a global public health problem. Healthcare workers are most at risk. The objective of this study was to determine the vaccination coverage rate against hepatitis B and to identify risk factors associated with vaccination status among health professionals in the health district of Mali. This was a cross-sectional and analytical study that involved 202 workers in public health structures in the health district of Mali. Data were collected from June 2, 2020 to July 31, 2020. Multivariate analysis was used to look for factors associated with vaccination status. The chi-square test and the confidence intervals at (95%) were calculated for the qualitative variables. A total of 202 healthcare workers (HCWs) were interviewed with an average age of 34.2 years. 21.78% of participants declared a partial or complete vaccination against the hepatitis B virus. Only 12 (5.93%) participants declared having received three doses. Men were the most numerous (70.45%). The lack of information on hepatitis B was 64.97%. Vaccination was associated with the following factors: gender ($P=0.011$), occupation ($p=0.009$), and fear of being contaminated in the event of BEA ($p=0.000$). This study shows that only 21.78% of respondents know they are vaccinated. Lack of information on hepatitis B (64.97%) was the main cause of non-vaccination on HBV.

Keywords: Health Worker, Vaccination, Hepatitis B, Guinea

1. Introduction

Viral hepatitis B is a global public health problem, with more than 350 million chronic carriers capable of transmitting the virus for years [1]. More than 75% of cirrhosis and hepatocellular carcinoma are complications of chronic hepatitis B (HBV) or C (HCV) virus infection [2]. About 4.3 million people are infected with HBV and 800,000 people with HCV in the Eastern Mediterranean region each year. The majority of these infections are contracted in health facilities [3]. However, the disease has been accessible for more than two decades through effective prophylaxis through vaccination. The prevalence rate of the Hbs antigen among

health professionals in Africa varies from country to country. In Côte d'Ivoire, the prevalence of the Hbs antigen is estimated between 8 to 13% [4]. In Guinea, the prevalence among health professionals in Conakry is 41% [5]. The health care setting (injections and invasive medical procedures), injection drug use are common risk factors for contracting hepatitis viruses [4, 6]. Universal vaccination against the hepatitis B virus has greatly reduced the incidence of cirrhosis and hepatocellular carcinoma (HCC) worldwide [7]. The immunization of healthcare professionals is a fundamental element of controlling the risk of infection in healthcare establishments. The objective of this study was to determine the vaccination coverage rate against hepatitis B and identify risk factors associated with vaccination status

among health professionals in the health district of Mali.

2. Material and Methods

Our study was carried out in the health district of Mali (Guinea) from June 2, 2020 to July 31, 2020. The district is limited in the north by Senegal and the Republic of Mali. In 2016, its population was estimated at 307,552 inhabitants. In terms of health infrastructure and health personnel, the health district has 13 health centers, 1 prefectural hospital, 28 doctors, 23 midwives, 132 technical health workers, 10 biologists, 50 nurses, 1 pharmacist, and 1 health worker for maintenance.

This was a cross-sectional and analytical study that involved 202 health workers. All health professionals present on the day of the survey were included in this study who accepted the interviews after their consent. Health workers fulfilling the inclusion criteria but absent at the survey time were excluded. The support of the survey is an individual and anonymous questionnaire which made it possible to collect the data. The questionnaire covered the following variables: socio-demographic (age, sex) and professional (doctor, midwife, nurse, ATS, pharmacist, and biologist) characteristics, place of work (medicine, pediatrics, maternity, and surgery), type of structure (health center and hospital), the vaccination status and the reasons for vaccination or not. The individualized interview with the health workers was carried out in strict respect of confidentiality after informing the interested parties of the objective of our study. Respondents answered the questionnaire without difficulty. Due to a lack of financial resources, no respondent benefited from blood sampling to search for HBs antigen, anti-HBs antibodies, and anti-HBc Ab. The dosage of these markers makes it possible to prove whether the person has been vaccinated (anti-HBs antibody level >100 U/l). As for the HBC antibodies, they testify to the presence of an infection by the hepatitis B virus or a cured old infection. The chi-square test and the confidence intervals at (95%) were calculated for the qualitative variables.

3. Results

Two hundred and two (202) health workers (AS) were interviewed at 14 health facilities during this study. Among them, 106 were men or 52.48%, and 96 were women or 47.52%. The average age was 34.2 ± 7.8 years, with the extremes ranging from 20 and 59 years. Nearly 78% of the participants were under 40 years old. The most represented age group was that of 30-39 years (50%) followed by those of 20-29 years (27.72%), 40-49 years (15.84%), and 50-59 years (6.44%). Paramedics staff was the most represented (93.56%). As for the medical staff, it was represented by 13 respondents or 6.44%. One hundred and forty-six (146) or 72.27% of the respondents worked in a health center compared to 56 (27.72%) of those who worked in the prefectural hospital or an improved health center. Respondents who said they had not been vaccinated accounted for 78.22% of cases. Only 12 respondents, or

5.93%, had declared having received three doses of the hepatitis B vaccine (Figure 1). Among those vaccinated, men were more concerned (70.45%) than women (29.55%). Nearly 41% of technical health workers had received one or more doses of the hepatitis B vaccine. Respondents aged between 30 and 39 were the most likely (43.34%) to be vaccinated (Table 1). Nearly half (48.02%) of the respondents were represented by health workers who worked in the general medicine department (figure 2). Nearly 66% of vaccinated health workers worked in the general medicine department (Table 4). In 47.73% of cases, the cost of vaccination coverage was provided by the Ministry of Health (table 2). Lack of information about the hepatitis B vaccine was the main reason cited by respondents (64.97%). Factors such as sex ($P = 0.011$), occupation ($p = 0.009$), obligation to be vaccinated ($p = 0.001$), and fear of being contaminated in the event of BEA ($p = 0.000$) were associated with vaccination against hepatitis B (Table 5).

Concerning the origin of the respondents, we have noticed that 81.19% of the participants came from general medicine (48.02%), maternity (22.77%) and the expanded program of immunization (10.4%). However, the smallest percentage came from the dental surgery unit, 1.49%.

Regarding vaccination status, our analysis shows that only 5.94% of the medical staff of the prefecture received three doses of vaccine, followed by two doses 3.47% and received one doses 12.38%. We noted with surprise that 78.22% of the health personnel did not take any dose despite being exposed to infections due to their direct contact with patients.

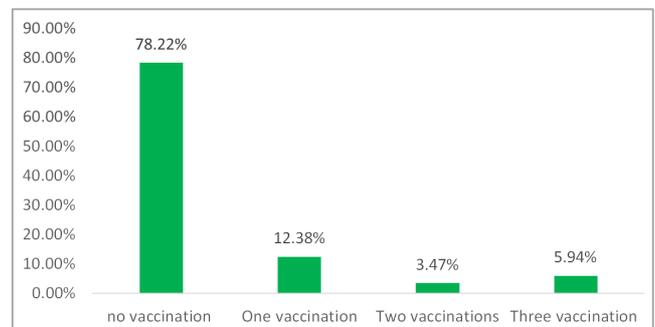


Figure 1. Hepatitis B vaccination status among health care professionals in Mali, 2020.

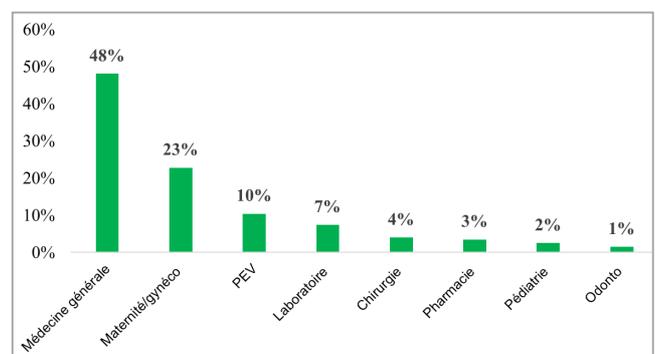


Figure 2. Distribution of health care professionals in the Mali prefecture according to their place of service in 2020.

Table 1. Sociodemographic and occupational characteristics of respondents who received one or more doses of hepatitis B vaccine (N=44).

| Caractéristiques | Fréquence | Frequency % | 95% confidence interval | % | Intervalle de confiance à 95% |
|---------------------------|-----------|-------------|-------------------------|-------|-------------------------------|
| Sexe | | | | | |
| Masculin | 31 | | | 70,45 | 54,80 83,24 |
| Féminin | 13 | | | 29,55 | 16,76 45,20 |
| Tranche d'âge | | | | | |
| 20 à 29 ans | 10 | | | 22,73 | 11,47 37,84 |
| 30 à 39 ans | 19 | | | 43,18 | 28,35 58,97 |
| 40 à 49 ans | 9 | | | 20,45 | 9,80 35,30 |
| 50 ans et plus | 6 | | | 13,64 | 5,17 27,35 |
| Catégorie professionnelle | | | | | |
| Agent technique de santé | 18 | | | 40,91 | 26,34 56,75 |
| Infirmier | 11 | | | 25,00 | 13,19 40,34 |
| Médecin | 7 | | | 15,91 | 6,64 30,07 |
| Sage-femme | 4 | | | 9,09 | 2,53 21,67 |
| Biologiste | 3 | | | 6,82 | 1,43 18,66 |
| Dentiste | 1 | | | 2,27 | 0,06 12,02 |

Table 2. Distribution of workers vaccinated according to the source of coverage of vaccination costs (N=44).

| Source of support | Number | % | 95 confidence interval | 95 % |
|--------------------|--------|-------|------------------------|-------|
| Ministry of Health | 21 | 47,73 | 32,46 | 63,31 |
| Myself | 19 | 43,18 | 28,35 | 58,97 |
| institutions | 3 | 6,82 | 1,43 | 18,66 |
| my department | 1 | 2,27 | 0,06 | 12,02 |

Table 1. Distribution of respondents according to the reasons mentioned for non-vaccination (n=157).

| Reasons given | Number | % | 95% confidence interval |
|------------------------|--------|-------|-------------------------|
| Lack of information | 102 | 64,97 | 56,96 72,40 |
| Vaccine unavailability | 46 | 29,30 | 22,32 37,08 |
| Vaccine cost | 9 | 5,73 | 2,65 10,60 |

Table 4. Distribution of people vaccinated by position (N=44).

| Type of services | Number | % | 95% confidence interval |
|------------------------------|--------|-------|-------------------------|
| General medicine | 29 | 65,91 | 50,08 79,51 |
| Maternity | 5 | 11,36 | 3,79 24,56 |
| Extended vaccination program | 3 | 6,82 | 1,43 18,66 |
| Surgery | 2 | 4,55 | 0,56 15,47 |
| Laboratory | 2 | 4,55 | 0,56 15,47 |
| Pediatrics | 2 | 4,55 | 0,56 15,47 |
| dental service | 1 | 2,27 | 0,06 12,02 |

Table 5. Multivariate analysis of factors associated with vaccination against hepatitis B.

| Characteristics | Vaccination | | Vaccination | P-Value |
|---|-------------|-----|-------------|--------------|
| | Yes | Yes | | |
| Sex | | | | |
| Male | 31 | 75 | 2,6 | [1,30-5,40] |
| Feminine | 13 | 83 | | |
| Age range | | | | |
| 20 to 29 years old | 10 | 46 | 3,94 | [1,09-14,28] |
| 30 to 39 years old | 19 | 82 | 3,70 | [1,12-12,27] |
| 40 to 49 years old | 9 | 23 | 2,10 | [0,55-7,99] |
| 50 years and over | 6 | 7 | | |
| Professional category | | | | |
| Doctor | 7 | 6 | | |
| Male nurse | 29 | 95 | 3,8 | [1,2-12,3] |
| Others | 8 | 45 | 6,6 | [1,8-24,7] |
| Care structure | | | | |
| *HP and *CSA | 12 | 44 | | |
| Health center | 32 | 114 | 0,97 | [0,46-2,06] |
| Feared infectious agents in case of BEA | | | | |
| Hepatitis B virus | 27 | 30 | | |
| HIV | 17 | 128 | 6,8 | [3,3-14] |

| Characteristics | Vaccination | | Vaccination | P-Value |
|--|-------------|-----|-------------|------------|
| | Yes | Yes | | |
| Risk of hepatitis in case of BEA | | | | |
| Yes | 34 | 128 | 0,80 | [0,40-1,8] |
| No | 10 | 20 | | |
| Obligation to get vaccinated against hepatitis B | 43 | 130 | | |
| Yes | 1 | 28 | 9,3 | [1,2-70,1] |

*HP (prefectural hospital)

*CSA (improved health center).

4. Discussion

This study has certain limitations. Firstly, the respondents did not provide documentary evidence (vaccination record) against hepatitis B. Secondly, no respondent benefited from a blood sample to search for the HBs antigen, anti-Hbs antibodies, and anti-Hbc AC. However, the dosage of these markers would make it possible to prove whether the person had been vaccinated or not. The self-reported vaccination status of the respondents could therefore be overestimated or underestimated. In this study, 21.78% of respondents know they are vaccinated, and 78.22% are not. Among those vaccinated, only 5.94% of health workers claim to be correctly vaccinated against hepatitis B. This rate is significantly lower than those observed in Europe (50 to 90%) [8, 9], in North America (63.4%) [10], in Kenya (12%) [11], in Morocco (47.4%) [12], but higher than in Nigeria (5% in 1995) [13]. Hepatitis B vaccination coverage among health professionals is even lower in African countries. These low vaccination rates are of concern because accidental blood and body fluids exposure is common among healthcare workers [14, 15]. Efforts should be made to increase coverage. In our series, people who declare themselves to be incompletely vaccinated represent 15.85%. Incomplete vaccination is another worrying situation because many health care workers are at risk of contracting hepatitis B if they are exposed.

This message needs to be clearly conveyed to healthcare workers as incomplete vaccination is widely attributed to negligence or forgetfulness [11]. In addition, compulsory vaccination against hepatitis B should be instituted because health workers in contact with infected blood are a prime target for HBV infection, hence the importance of correct vaccination [16]. In France, for example, vaccination against hepatitis B is governed by the law of January 18, 1991, of the public health code, which stipulates that any person exercising a professional activity in a public or private establishment or organization for prevention or care is exposed to the risk of contamination, must be vaccinated against hepatitis. While in Guinea, the vaccination of health professionals is not compulsory, it is based solely voluntarily. A study carried out at the Assistance Public-Hôpitaux de Paris showed that the number of symptomatic hepatitis B cases had been divided by 15 in ten years since the vaccine [17]. During this study, we found that vaccination against hepatitis B was associated with the following factors: gender ($P = 0.011$), occupation ($p = 0.009$), obligation to be vaccinated ($p = 0.001$), and the fear of

being contaminated in the event of BEA ($p = 0.000$). On the other hand, we did not find a link between the workplace and vaccination against hepatitis ($p > 1.00$).

Doctors were more likely to report being vaccinated (53.84%) among health professionals than nurses and technical health workers. However, occupational viral hepatitis is more frequent among health personnel, particularly paramedics, for documented cases and possible ones. This category constitutes a high-risk group, with a prevalence seven to eight times higher for HVB than that of the general population [18]. In this study, hepatitis B was feared by 90% of caregivers ($p=0.000$). The same observation was made by Omar L *et al.*, who found that hepatitis was feared by 82% of caregivers [12]. According to the same study, the modes of transmission mentioned were blood on damaged skin (91.7%), needle bites (83.5%), blood on mucous membranes (82.7%), sexual (44.1%), and blood on healthy skin. We also observed that the lack of information on hepatitis B (64.97%) was the leading cause of non-vaccination (Table 3).

Knowledge of the modes of transmission of occupational viral hepatitis and their prevention by immunization does not seem satisfactory for all health personnel, especially paramedical personnel. The Ministry of Health must fulfill its role through information, education, communication, and training actions on BEAs.

5. Conclusion

This study shows that only 21.78% of respondents know they are vaccinated. Therefore, this self-affirmed vaccination status could be overestimated or underestimated because no respondent provided documentary proof of their vaccination against hepatitis B. The lack of information on hepatitis B (64.97%) was one of the main causes of non-vaccination. To increase the anti-hepatitis B vaccination coverage rate, the Ministry of Health must ensure its role through information, education, communication, and training on AES, the purchase of anti-hepatitis, and the search for immunization. The immunization of healthcare professionals is a fundamental element of controlling the risk of infection in healthcare establishments.

References

- [1] POL, S. Epidemiology and natural history of hepatitis B. *Rev. Prat.* 55, 599–606 (2005).

- [2] PERZ, J. F., ARMSTRONG, G. L., FARRINGTON, L. A., HUTIN, Y. J. F. & BELL, B. P. The contributions of hepatitis B virus and hepatitis C virus infections to cirrhosis and primary liver cancer worldwide. *J. Hepatol.* 45, 529–538 (2006).
- [3] HAURI, A. M., ARMSTRONG, G. L. & HUTIN, Y. J. F. The global burden of disease attributable to contaminated injections given in health care settings. *Int. J. STD AIDS* 15, 7–16 (2004).
- [4] ASSI, C. et al. Vaccination coverage against hepatitis B and prevalence of HBsAg: a cross-sectional study involving 592 persons attending public screening in Abidjan. *Clin. Res. Hepatol. Gastroenterol.* 35, 506–507 (2011).
- [5] TRAORE M. Study of vaccination coverage against hepatitis B and risk factors among health professionals in Conakry. (2018).
- [6] TALAAT, M. et al. Case-control study to evaluate risk factors for acute hepatitis B virus infection in Egypt. *EMHJ - East Mediterranean Health J.* 16 1 4-9 2010 (2010).
- [7] USMAN, H. R. et al. Injections in health care settings: a risk factor for acute hepatitis B virus infection in Karachi, Pakistan. *Epidemiol. Infect.* 130, 293–300 (2003).
- [8] KARAIVAZOGLU K, TRIANTOS C, LAGADINO M, BIKAS C, MICHAILIDOU M, KALAFATELI M, THOMOPOULOS K, ASSIMAKOPOULOS K, NIKOLOPOULOU V, JELASTOPULU E, LABROPOULOU-KARATZA C. Acceptance of hepatitis B vaccination among health workers health in western Greece. *62 (2) 107–11 (2014).*
- [9] MARKOVIC-DENIC, L. et al. Occupational exposures to blood and body fluids among health care workers at university hospitals. *Srp. Arh. Celok. Lek.* 141, 789–793 (2013).
- [10] BYRD, K. K., LU, P. & MURPHY, T. V. Hepatitis B vaccination coverage among health-care personnel in the United States. *Public Health Rep. Wash. DC* 128, 498–509 (2013).
- [11] SUCKLING, R. M. et al. Susceptibility of healthcare workers in Kenya to hepatitis B: new strategies for facilitating vaccination uptake. *J. Hosp. Infect.* 64, 271–277 (2006).
- [12] OMAR LARAQUI, SIHAM LARAQUI, SALWA LARAQUI, DOMINIQUE TROPIDI, LAAZIZA CHALED OUZZANI, ALAIN CAUBET, CHRISTIAN VERGER, CHAKIB EL HOSSINE LARAQUI. Assessment of knowledge, attitudes and practices on viral hepatitis B and C in healthcare settings in Morocco. *Public Health* 2009/3 (vol. 21). PAGES 271-286.
- [13] OLOBUYIDE IO, OLAWUYI F. Self-reported incidence of accidental exposures to patients' blood body fluids by resident doctors in Nigeria. *JR Soc Health* 1995 Aug; 115 (4): 235-236, 241-243.
- [14] VARUN GOEL, DINESH KUMAR, RAGHAVENDRA LINGAIAH, AND SARMAN SINGH. Occurrence of Needlestick and Injuries among Health-care Workers of a Tertiary Care Teaching Hospital in North India. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5015493/> (2017).
- [15] BRAKA, F. et al. Hepatitis B infection among health workers in Uganda: Evidence of the need for health worker protection. *Vaccine* 24, 6930–6937 (2006).
- [16] CANTINEAU A, BRAUER G, DEISS V, GUILLET N, HECHT MT. Prevention of BEAs and training-action. *Care* 2002; 671: 42-44.
- [17] FLORENTIN A, GIORGI M, LOUET M. Occupational accident with exposure to blood that occurred in 1994 in three pediatric establishments of the AP-HP. *Arch Mal Prof* 1997; 58 (4): 346-347.
- [18] DENIS MA, STRAUCH G. Individual and organizational factors likely to reduce the risk of exposure to blood of hospital workers in the Hospices Civils de Lyon. *Health & system science-1998; 2 (HS): 133-117.*