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# Knowledge, Attitudes, and Practices (KAP) of Healthcare Workers on Viral Hepatitis B and its Vaccination in 12 Health Establishments in the Centre Region of Cameroon

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**Abstract:- Introduction: Viral hepatitis B (HBV) is a major public health issue around the globe. At 2020, the WHO estimated that 296 million people were carriers of chronic viral hepatitis B. During the same year, the number of deaths from cirrhosis and hepatocellular carcinoma was 80%. In 2019, a total of 1.5 million new infections were reported. HBV is most commonly transmitted through contact with blood or other body fluids during sexual intercourse with an infected partner, sharing needles, syringes, or preparation materials during injection drug use, and puncturing with a hollow needle or contact with sharp objects. Cameroon is one of the worst hit countries with an HBV prevalence of 11.5%. Healthcare workers (HCWs) who are constantly exposed to a variety of body fluids are at increased risk of contracting and transmitting the virus. It is thus important to evaluate their knowledge, attitudes and practices regarding HBV. Methodology: This cross-sectional study took place from February to July 2022. In total, 388 HCWs were recruited for the study. knowledge of HBV, particularly the routes of transmission, attitudes toward HBV, and vaccination practices were evaluated using a well-structured questionnaire. Data analysis was performed using SPSS V.25.0. Results: In total, 388 HCWs participated in the study. The recommended pathways for HBV transmission were sexual intercourse, soiled objects, blood transfusion and contact with contaminated blood (100%). Among the participants, 236 (60.8%) gave the correct answers on the signs of viral hepatitis B. Knowledge was significantly associated with the number of years spent in the vaccination service (p<0.0001). Overall, these HCWs possessed a satisfactory level of knowledge of HBV transmission pathways (388, 100%). Of the 388 HCWs, only 65 (16.8%) had a positive attitude towards those infected with HBV. Up to 87 (22.4%) gave incorrect answers regarding the need to test the effectiveness of the vaccine. There was a significant association between the service, the category, the number of years of work, and the attitudes of the staff, as well as with the 3 questions concerning the practice of vaccination, namely the storage temperature of the vaccines, the volume of the dose of vaccine administered and the site of vaccine administration (p<0.05). Conclusion: The level of knowledge regarding the HBV pathway observed in this study is satisfactory. Nevertheless, efforts still need to be redoubled on the attitude of the staff towards infected patients, on taking the full doses of vaccine, and finally on the practice of vaccination, particularly on the storage temperature, the volume, and the administration site. This lack of adequate knowledge may explain the often-observed lack of post-vaccination response as knowledge is usually the first step toward modifying desirable behavior.**

***Keywords:-*** *Vaccination, Hepatitis B, Knowledge, Attitude, Practice, HCWs.*

## I. INTRODUCTION

Vaccination is one of the most beautiful examples of human control environment, illustrating the ongoing struggle against microorganisms. Preventing diseases is here, the expression of human ingenuity anticipating the aggression of pathogenic agents [1]. Hepatitis B virus (HBV) is an envelope virus in the *Hepadnaviridae* family that infects the liver, causing hepatocellular necrosis and inflammation [2]. HBV is transmitted through percutaneous or mucous membrane exposure to infected blood and a variety of body fluids [3]. In 2020, the WHO estimated that 296 million people had chronically HBV [4]. Currently available treatments fail to eradicate the virus in most people treated, requiring potentially longlife treatment [5] when we know that about 820,000 people die each year because of chronic hepatitis B (OMS, 2020). Cameroon is one of the countries in sub-Saharan Africa, with an estimated 11.5% prevalence of HBV infection [6]. Healthcare Workers (HCWs), who frequently come into contact with blood and other body fluids in the course of their

work, are exposed to blood-borne viral diseases such as HBV, hepatitis C virus, and Human Immunodeficiency Virus [7,8]. HBV among HCWs (37%) is attributable to occupational exposure to lesions due to sharps [5]. The risk of occupational infections in developing countries is intensified by a variety of factors, including overcrowding in hospitals, low staff-to-patient ratios, insufficient or non-existent basic safety and protective equipment, reutilisation/reprocessing of contaminated needles and sharp instruments, and partial awareness of the risk of exposure to blood and body fluids [8]. Although seroconversion of hepatitis due to needle stick injury is quite rare, the costs of treatment and the anxiety associated with the possible consequences of exposure are severe [9]. That may be the reason why some HCWs refuse to serve patients with blood-borne viral diseases, such as HBV [10]. Prevention through immunization and improving knowledge, therefore, appears to be the surest strategy against the high prevalence of viral hepatitis among HCWs. Knowing the facts and adequate awareness can influence the attitude of HCWs and control the threat of disease [11]. Several studies in Africa have assessed the level of knowledge, attitude, and practice of HCWs vis-à-vis HBV and their vaccination status [12]. The low level of vaccination and the high prevalence of hepatitis B surface antigen (HBsAg) recorded in different studies could be justified by the low level of knowledge about HBV among HCWs [13]. Prevention remains a recommended guarantee against an epidemic of viral hepatitis. The knowledge and attitudes of HCWs play a key role in preventing and spreading infection. By Knowing the facts and having the appropriate awareness and attitudes, the threat of this disease can be largely avoided. With that in mind, the objectives of this study are to assess the knowledge, attitudes, and practices of HCWs regarding HBV in 12 health facilities in the Centre Region of Cameroon.

## II. MATERIAL AND METHODES

### *A. Type of study, setting, and population studied:*

This cross-sectional study was conducted among HCWs from health structures in the Centre Region and those from the international vaccination center in Yaounde, Cameroon. The samples were collected between February and July 2022 and included 12 health establishments in the Centre Region of Cameroon (one Centre hospital, three confessional hospitals, four district hospitals, one military hospital, one District medical center, one private medical center and the international vaccination center). The participant sampling technique was simple random. For each participant, the questionnaire was self-administered and contained both closed and open questions to assess respondents' knowledge, attitudes, and practices on HBV. HCWs that were present in the selected hospitals during the study period were informed and invited to participate in the study. These were doctors, nurses, dentists, pharmacists, midwives, and laboratory technicians.

### *B. Measured variables and statistical analyses*

HCWs who agreed to participate in the study completed a structured questionnaire which was used to collect data on socio-demographic characteristics, knowledge of HBV (particularly transmission), attitude towards HBV, and practice of vaccination against HBV. The information was given by the Chief Medical Officer (if applicable), the General Supervisor, and the Heads of Unit who were contacted respectively and asked to inform their staff of the study still in their respective establishment. An information notice was placed on the notice board of the hospital and hospital departments where available, to inform hospital staff of the study objectives and the timetable for its implementation. Finally, individual contacts were used to reach some staff. The questionnaire was completed in the presence of researcher to avoid participants sharing answers or obtaining them online. Semi-structured, pre-designed, and pre-test questionnaire items, with response options, have been developed based on KAP (knowledge, attitudes, and practices) with similar objectives [11, 14]. The questionnaire was validated according to the guidelines proposed by Jain *et al* in 2016 [14]. Knowledge of the route of HBV transmission was assessed using five questions directly related to the route of HBV infection. Knowledge was considered adequate when there were correct answers to all five questions. This minimum of five correct answers to define a good level of knowledge may seem rigorous. However, this minimum level justified the reasonable difficulty of the questions. The attitude was assessed using the following criteria: attitude towards people infected with HBV and HIV, frequency of glove use, frequency of needlestick injuries, and vaccination status. The attitude was considered positive when a participant was able to give all expected answers correctly, as HCWs are at the forefront of health care delivery and should have an appropriate attitude towards HBV. Vaccination practice was assessed using the criteria vaccine storage temperature, volume of vaccine dose administered, and site of administration. Information on vaccination knowledge, attitude, and practice were self-reported, and individual risk of bias cannot be completely ruled out. The variables collected were qualitative, recorded, and processed in Excel. The analysis were performed using SPSS V.25.0. Results were expressed as proportions and Pearson's $\chi 2$ ($p<0.05$) was used to assess the significance between study variables.

## III. RESULTS

### *A. Sociodemographic parameters*

In each health establishment, more than 50% of the HCWs consented to participate in the study. These were doctors, nurses, dentists, pharmacists, midwives, and laboratory technicians. A total of 388 HCWs participated in the study. Among them, 287/388 (74%) were women. The age group (37-41 years) was the most represented 203/388 (52.3%). Most participants were nurses 179/388 (46.1%) followed by doctors 160/388 (41.2%). The number of years spent in the service between (6-8 years) was the most represented 139/388 (35.8%) (Table 1).

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Table 1: Sociodemographic parameters of participants

| Variable | | Number (N=388) | Percentage |
|---|---|---|---|
| **Sex** | Feminine | 287 | 74.0 |
| | Male | 101 | 26.0 |
| **Grouped age** | 27-31 | 21 | 5.4 |
| | 32-36 | 48 | 12.4 |
| | 37-41 | 203 | 52.3 |
| | 42-46 | 116 | 29.9 |
| **Study level** | High | 388 | 100.0 |
| **Service** | Welcome | 21 | 5.4 |
| | Surgery | 20 | 5.2 |
| | Gynecology | 20 | 5.2 |
| | Laboratory | 30 | 7.7 |
| | Maternity | 65 | 16.8 |
| | Medicine | 110 | 28.4 |
| | Pediatrics | 38 | 9.8 |
| | Vaccination | 84 | 21.6 |
| **Occupation** | Male nurse | 179 | 46.1 |
| | Doctor | 160 | 41.2 |
| | Midwife | 19 | 4.9 |
| | Laboratory technician | 30 | 7.7 |
| **Status** | Contractual | 275 | 70.9 |
| | individual | 113 | 29.1 |
| **Number of years spent in service** | [3-5] | 104 | 26.8 |
| | [6-8] | 139 | 35.8 |
| | ≤2 | 48 | 12.4 |
| | ≥9 | 97 | 25.0 |
| **Immunization activities** | No | 181 | 46.6 |
| | Yes | 207 | 53.4 |
| **HBV vaccination activities** | No | 181 | 46.6 |
| | Yes | 207 | 53.4 |

*B. Knowledge about HBV transmission*

A questionnaire comprising five questions was used to assess the knowledge of the staff of the various hospitals on the routes of transmission of HBV and those recommended were sexual intercourse, soiled objects, blood transfusion, and contact with contaminated blood 388/ 388 (100%), this corresponded to a satisfactory level of knowledge on the transmission routes of HBV (table 2)

Table 2: Knowledge about HBV transmission

| | | Percentage of the correct answer (%) | | | | |
|---|---|---|---|---|---|---|
| **Questions** | | Nurse (n=179) | Doctor (n=160) | Midwife (n=19) | Laboratory technician (n=30) | **Overall (N=388)** |
| **About sex** | Yes | 179 (100.0) | 160 (100.0) | 19 (100.0) | 30 (100.0) | 388(100.0) |
| **By soiled objects** | Yes | 179(100.0) | 160 (100.0) | 19 (100.0) | 30 (100.0) | 388 (100.0) |
| **By blood transfusion** | Yes | 179 (100.0) | 160 (100.0) | 19 (100.0) | 30 (100.0) | 388 (100.0) |
| **By contact with contaminated blood** | Yes | 179 (100.0) | 160 (100.0) | 19 (100.0) | 30 (100.0) | 388 (100.0) |
| **By physical contact** | No | 130 (72.6) | 117 (73.1) | 19 (100.0) | 10 (33.3) | 276 (71.1) |
| | Yes | 49 (27.4) | 43 (26.9) | // | 20 (66.7) | 112 (28.9) |
| **Modes of transmission** | Right answer | 179 (100.0) | 160 (100.0) | 19 (100.0) | 30 (100.0) | 388(100.0) |

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*C. Knowledge of the signs, complications, methods of prevention, and fear of HBV*

Among participants, 236/388 (60.8%) gave good answers on the signs of viral hepatitis B. All of the participants mastered the knowledge of the complications of hepatitis B 388/388 (100%). The staff that were afraid of the disease was 277/388 (71.4%) while the prevention methods were known to all 388/388 (100%). The doctors were the best informed about the signs of HBV 120/388 (75%) and all the midwives 19/19 (100%) were afraid of illness followed by nurses 132/179 (73.7%) (Table 3).

Table 3: knowledge of the signs, complications, methods of prevention, and fear of HBV

| | | **Answer (%)** | | | | |
|---|---|---|---|---|---|---|
| | | nurse (n=179) | Doctor (n=160) | Midwife (n=19) | Laboratory technician (n=30) | **Total (N=388)** |
| **Signs of Hepatitis B** | Right answer | 116 (64.8) | 120 (75.0) | // | // | 236 (60.8) |
| | Wrong answer | 42 (23.5) | // | // | // | 42 (10.8) |
| | Insufficient response | 21 (11.7) | 40 (25.0) | 19 (100.0) | 30 (100.0) | 110 (28.4) |
| **Knowledge of hepatitis B complications** | Right answer | 179 (100.0) | 160 (100.0) | 19 (100.0) | 30 (100.0) | 388 (100.0) |
| **The different methods of prevention** | Right answer | 179 (100.0) | 160 (100.0) | 19 (100.0) | 30 (100.0) | 388 (100.0) |
| **Fear of disease** | No | 47 (26.3) | 54 (33.8) | // | 10 (33.3) | 111 (28.6) |
| | Yes | 132 (73.7) | 106 (66.3) | 19 (100.0) | 20 (66.7) | 277 (71.4) |

*D. General knowledge of vaccination, staff attitudes, and frequency of correct answers on the practice of vaccination against HBV*

Among the 388 HCWs, only 65 (16.8%) had good attitude towards people infected with HBV (Table 4). There was a significant association between the service, the category, the number of years of work, and the attitudes of the staff, as well as with the 3 questions concerning the practice of vaccination, namely the storage temperature of the vaccines, the volume of the dose of vaccine administered and the site of vaccine administration ($p<0.05$) (Table 5). Nurses had the highest frequency of correct answers 157/179 (87.7%) while 55/160 (34.4%) of doctors had the highest frequency of wrong answers (Table 6).

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# Table 4: General knowledge about vaccination

| | | *Answer (%)* | | | | |
|---|---|---|---|---|---|---|
| | | Nurse (n=179) | Doctor (n=160) | Midwife (n=19) | Laboratory technician (n=30) | *Overall (N=388)* |
| **Be vaccinated** | No | 56(31.3) | // | // | 10(33.3) | 66(17.0) |
| | Yes | 123(68.7) | 160 (100.0) | 19(100.0) | 20(66.7) | 322(83.0) |
| **Complete vaccination** | No | 56(31.3) | 41 (25.6) | // | 10(33.3) | 107 (27.6) |
| | Yes | 123(68.7) | 119 (74.4) | 19(100.0) | 20(66.7) | 281 (72.4) |
| **Complete your vaccine** | Yes | // | 41 (25.6) | // | // | 41 (10.6) |
| | No answers | 179(100.0) | 119 (74.4) | 19(100.0) | 30(100.0) | 347 (89.4) |
| **Preferred vaccination schedule** | Right answer | 179(100.0) | 160 (100.0) | 19(100.0) | 30(100.0) | 388 (100.0) |
| **Vaccine storage temperature** | Right answer | 153(85.5) | 139 (86.9) | 19(100.0) | 30(100.0) | 341 (87.9) |
| | Insufficient response | 26(14.5) | 21 (13.1) | // | // | 47 (12.1) |
| **Administration site** | Right answer | 158(88.3) | 126 (78.8) | 19(100.0) | 30(100.0) | 333 (85.8) |
| | Wrong answer | 21(11.7) | 34 (21.3) | // | // | 55 (14.2) |
| **Vaccine dose volume** | Right answer | 123(68.7) | 139 (86.9) | 19(100.0) | 20(66.7) | 301 (77.6) |
| | Wrong answer | 56(31.3) | 21 (13.1) | // | 10(33.3) | 87 (22.4) |
| **Knowledge of names of HVB vaccines** | Right answer | // | // | // | 10(33.3) | 10 (2.6) |
| | Insufficient response | 179(100.0) | 160(100.0) | 19(100.0) | 20(66.7) | 378 (97.4) |
| **Most used vaccine** | Right answer | 156(87.2) | 133 (83.1) | 19(100.0) | 20(66.7) | 328 (84.5) |
| | Insufficient response | 23(12.8) | 27 (16.9) | // | 10(33.3) | 60 (15.5) |
| **The rationale for most used vaccine** | Right answer | 23(12.8) | 27 (16.9) | // | 10 (33.3) | 60 (15.5) |
| | Insufficient response | 156(87.2) | 133 (83.1) | 19(100.0) | 20(66.7) | 328 (84.5) |
| **Requires verification of vaccine efficacy** | Right answer | 133(74.3) | 119 (74.4) | 19(100.0) | 30(100.0) | 301 (77.6) |
| | Wrong answer | 46(25.7) | 41 (25.6) | // | // | 87 (22.4) |
| **Vaccination of HIV+** | Right answer | 179(100.0) | 133 (83.1) | 19(100.0) | 30(100.0) | 361 (93.0) |
| | Wrong answer | // | 27 (16.9) | // | // | 27 (7.0) |
| **What to do in case of side effects** | Right answer | 179(100.0) | 160 (100.0) | 19(100.0) | 30(100.0) | 388 (100.0) |
| **Attitudes towards infected patients** | Right answer | 45(25.1) | 20 (12.5) | // | // | 65 (16.8) |
| | Wrong answer | 134(74.9) | 140 (87.5) | 19(100.0) | 30(100.0) | 323 (83.2) |
| **Wearing gloves** | Right answer | 179(100.0) | 160 (100.0) | 19(100.0) | 30(100.0) | 388 (100.0) |
| **Needle prick** | No | 159(88.8) | 160 (100.0) | 19(100.0) | 30(100.0) | 368 (94.8) |
| | Yes | 20(11.2) | // | // | // | 20(5.2) |

Table 5: General distribution of responses on the practice of vaccination

| | | Vaccine storage temperature n(%) | p | Administration site n(%) | p | Vaccine dose volume n(%) | p |
|---|---|---|---|---|---|---|---|
| **Service** | Welcome | 21 (5.4) | < 0.0001 | 21 (5.4) | < 0.0001 | 21 (5.4) | < 0.0001 |
| | Surgery | 20 (5.2) | | 20 (5.2) | | 20 (5.2) | |
| | Gynecology | 20 (5.2) | | 20 (5.2) | | 20 (5.2) | |
| | Laboratory | 30 (7.7) | | 30 (7.7) | | 30 (7.7) | |
| | Maternity | 65 (16.8) | | 65 (16.8) | | 65 (16.8) | |
| | Medicine | 110 (28.4) | | 110 (28.4) | | 110 (28.4) | |
| | Pediatrics | 38 (9.8) | | 38 (9.8) | | 38 (9.8) | |
| | Vaccination | 84 (21.6) | | 84 (21.6) | | 84 (21.6) | |
| **Category of HCWs** | State nurse | 179 (46.1) | 0.048 | 179 (46.1) | 0.048 | 179 (46.1) | 0.048 |
| | Doctor | 160 (41.2) | | 160 (41.2) | | 160 (41.2) | |
| | Midwife | 19 (4.9) | | 19 (4.9) | | 19 (4.9) | |
| | Laboratory technician | 30 (7.7) | | 30 (7.7) | | 30 (7.7) | |
| **Number of years spent in the vaccination service** | [3-5] | 104 (26.8) | < 0.0001 | 104 (26.8) | < 0.0001 | 104 (26.8) | < 0.0001 |
| | [6-8] | 139 (35.8) | | 139 (35.8) | | 139 (35.8) | |
| | ≤2 | 48 (12.4) | | 48 (12.4) | | 48 (12.4) | |
| | ≥9 | 97 (25.0) | | 97 (25.0) | | 97 (25.0) | |
| **HBV vaccination activity** | Nope | 181 (46.6) | 0.008 | 181 (46.6) | 0.008 | 181 (46.6) | 0.008 |
| | Yes | 207 (53.4) | | 207 (53.4) | | 207 (53.4) | |

Healthcare Workers: HCWs

Table 6: Frequency of correct answers on the practice of vaccination concerning the storage temperature, the volume of the dose administered, and the site of administration.

| Variables | | Correct answer n(%) | Wrong answer n(%) | P-value |
|---|---|---|---|---|
| Service | Welcome | 10 (47.6) | 11 (52.4) | < 0.0001 |
| | Surgery | 20 (100.0) | 0(0,0) | |
| | Gynecology | 20 (100.0) | 0(0,0) | |
| | Laboratory | 20 (66.7) | 10 (33.3) | |
| | Maternity | 46 (40.0) | 69 (60.0) | |
| | Medicine | 75 (68.2) | 35 (31.8) | |
| | Pediatrics | 17 (44.7) | 21 (55.3) | |
| | Vaccination | 93 (83.8) | 18 (16.2) | |
| Category of HCWs | State nurse | 157 (87.7) | 22 (12.3) | 0.008 |
| | Doctor | 105 (65.6) | 55 (34.4) | |
| | Midwife | 19 (100.0) | 0 (0.0) | |
| | Laboratory technician | 20 (66.7) | 10 (33.3) | |
| Number of years spent in the vaccination service | [3-5] | 87 (66.4) | 44 (33.6) | < 0.0001 |
| | [6-8] | 129 (77.7) | 37 (22.3) | |
| | ≤2 | 27 (56.3) | 21 (43.8) | |
| | ≥9 | 58 (48.3) | 62 (51.7) | |
| Immunization activity | No | 125 (69.1) | 56 (30.9) | 0.119 |
| | Yes | 176 (62.0) | 108 (38.0) | |
| HBV vaccination activity | No | 125 (69.1) | 56 (30.9) | 0.119 |
| | Yes | 176 (62.0) | 108 (38.0) | |

Healthcare Workers: HCWs

## IV. DISCUSSION

The level of knowledge on HBV transmission routes was satisfactory (100%). Among the 388 HCWs, only 65 (16.8%) had good attitude towards people infected with HBV. There was a significant association between the service, the category, and the number of years of work of the staff, as well as with the 3 questions concerning the practice of vaccination, namely the storage temperature of the vaccines, the volume of the dose of vaccine administered and site of vaccine administration ($p<0.05$).

HCWs are at the forefront of HCWs delivery and are expected to know the transmission routes of different infectious agents to protect themselves and their patients from nosocomial infections. The results of the current study revealed a significant association between the service, the category, the number of years of work of the HCWs, and knowledge about HBV. This is similar to what was obtained in the North West region of Cameroon and North East Ethiopia [2, 3, 9]. This can be justified by the fact that the category of nurse and doctor does not have the same level of education because the latter trains individuals to acquire, evaluate and use information. This can justify the unequal access to and use of educational resources, which increase with the level of education [13] as well as the role in the health environment. Similarly, staffs already working in vaccination services have more knowledge of vaccination compared to those working in other services. All the HCWs of the different structures 388 (100%) had a good knowledge of the transmission route of HBV. This figure does not corroborate that found in the South West Region of Cameroon (58.7%) [2]and that found in Tanzania (62.5%) [15]. This difference could be explained by the fact that all our participants had a level of study higher than 388 (100%). The result obtained by our study on the knowledge of the route of transmission is much higher than that found in the North-West of Ethiopia (52%) [1], Sierra Leone (29.9%) (14), and in rural population of the North West Region of Cameroon (42.1%) [13]. The most likely reason for the results found in the latter could be inadequate health education programs, requiring staff to learn about HBV from friends and/or colleagues, which increases the likelihood of obtaining inappropriate information [16].

In addition to what is already known on the knowledge, attitudes, and practice of HCWs on HBV, our study provides new information on the vaccination practice, in particular, the control of the storage temperature, the volume of the dose, the administration site and finally the administration or not to HIV+ patients.

## V. CONCLUSION

The level of knowledge of the HBV transmission route observed in this study is satisfactory. However, efforts still need to be made on the attitude of the staff towards infected patients, on the complete taking of the vaccine doses and finally on the practice of vaccination, notably on the storage temperature, the volume and the site of administration. This lack of adequate knowledge could explain the absence of post-vaccination reactions often observed.

### CONFLICTS OF INTEREST

The authors declare no conflict of interest

### AUTHORS CONTRIBUTIONS

All authors contributed to this work. They read and approved the final version of the manuscript

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