Original Article

Level of Knowledge of Health Professionals about BEA, HIV, COVID-19 and Viral Hepatitis B and C in Parakou in 2021

Niveau de Connaissance des Professionnels de la Santé sur les AES, le VIH, la COVID-19 et les Hépatites Virales B et C à Parakou en 2021

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Mots clés : AES, Hépatites B et C, COVID-19, VIH/SIDA, Agents santé, Parakou.

ABSTRACT

Introduction. An infection is associated with care (HAI) when it is contracted during care activities in a hospital setting (nosocomial infection) or on an outpatient basis. The objective of this study is to study the knowledge of nursing staff on nosocomial infections transmitted by blood. **Methods** This was a descriptive cross-sectional study for analytical purposes with prospective collection of data over the period from August 1 to September 20, 2021. The study included caregivers of both sexes who gave their consent to the study. Study variables were knowledge of HAI, the demographic and socio-professional characteristics of caregivers. Data collection was done based on a questionnaire. Data were entered using Epi Data version 3.1 software. and analysis using Epi Info version 7 software. **Results.** A total of 301 health workers participated in the study. The mean age was 35.30 ± 8.49 years. There were 192 female (63.79%) and 109 male (36.21%) participants, a sex ratio of 0.57 . The average seniority was 8.18 ± 6.60 years with extremes of 2 and 26 years. One hundred and seventeen agents (38.87%) had a poor level of knowledge of BEAs, 108 (35.88%) had an average level of knowledge of viral hepatitis B and C, 94 (31.23%) had a good level of knowledge of HIV/AIDS and 148 (49.17%) had an average level of knowledge of COVID-19. The qualification of healthcare workers was statistically significantly associated with their level of knowledge of viral hepatitis B and C (*p=0.0000*). **Conclusion.** Parakou health workers had a good knowledge of nosocomial diseases. However, an effort must be made for the knowledge of BEA.

RÉSUMÉ

Introduction. Une infection est associée aux soins (IAS) lorsqu'elle est contractée lors d'activités de soins en milieu hospitalier (infection nosocomiale) ou en ambulatoire. L'objectif de cette étude est d'étudier les connaissances du personnel soignant sur les infections nosocomiales transmises par le sang. **Méthodologie.** Il s'est agi d'une étude transversale descriptive à visée analytique avec recueil prospectif des données sur la période allant du 1er août au 20 septembre 2021. Étaient inclus dans l'étude, les soignants des deux sexes qui ont donné leur consentement à l'étude. Les variables d'étude étaient la connaissance des IAS, les caractéristiques démographiques et socioprofessionnelles des soignants. La collecte des données a été faite à base d'un questionnaire. Les données ont été saisies à l'aide du logiciel Epi Data version 3.1. et l'analyse à l'aide du logiciel Epi Info version 7. **Résultats.** Au total 301 agents de santé ont participé à l'étude. Leur âge moyen était de $35,30\pm8,49$ ans. Il y avait 192 participants de sexe féminin (63,79%) et 109 de sexe masculin (36,21%) soit un sex-ratio de 0,57. L'ancienneté moyenne était de $8,18\pm6,60$ ans avec des extrêmes de 2 et 26 ans. Cent dix-sept agents (38,87%) avaient un mauvais niveau de connaissance des AES, 108 (35,88%) avaient un niveau de connaissance moyen des hépatites virales B et C, 94 (31,23%) avaient un bon niveau de connaissance du VIH/SIDA et 148 (49,17%) avaient un niveau moyen de connaissance de la COVID-19. La qualification des acteurs de santé était en association statistiquement significative avec leur niveau de connaissance de l'hépatite virale B et C. **Conclusion.** Les agents de santé de Parakou ont une bonne connaissance des maladies nosocomiales. Cependant un effort doit être fait pour la connaissance des AES.

INTRODUCTION

An infection is associated with care when it is contracted during care activities in a hospital setting (nosocomial infection) or on an outpatient basis. Healthcare-associated infections (HAIs) represent a challenge for health policies due to their epidemiological scale and their human and

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financial consequences that are difficult to estimate. Caregivers who are most exposed to biological pathogenic factors (bacteria, viruses, parasites and fungi) must protect themselves to avoid accidents at work or occupational diseases. A study conducted in 2021 in Tunisia by Boujamline et *al,* on the Coronavirus disease (COVID-19) in 100 subjects, pointed out that fifty-five participants (55%) declared that they had not participated in training on prevention and control. of SARS-CoV-2 infections and in 72% of cases they had correct response rates on causative agent, mode of transmission, incubation period, clinical signs, diagnostic confirmation and measurements prevention [1] . Regarding the viral hepatitis B virus (HBV), Bomba et *al* in the Democratic Republic of Congo (DRC) in 2021 noted in 94.5% of cases that caregivers recognized the B virus as a pathogen of the disease. viral hepatitis B and 89% were aware that vaccination remained the most effective means of prevention although no one had been vaccinated against HBV, 53.7% of caregivers continued to recap the needles after use, 54.9% were victims accidental exposure to the risk of contamination by HBV [2] .

A study carried out by Ouendo et al in Benin in 2015 on the management of the infectious risk associated with care and services at the CNHU-HKM in Cotonou showed that the frequency of infections associated with care was 19 out of 193 or 9.84%. The burns unit and the urology department had recorded more cases; (Chi²=42.6; p=0.001) [3]. According to the same study, surveillance of healthcare-associated infections (HAI) had reached a level of 2 out of 7 expected, i.e. 29%, and there was a major gap involving the quality of management of the infectious risk associated with healthcare. The purpose of this study is to study the level of knowledge of some of the most common HAI, namely BEA, HIV/AIDS, COVID-19 and viral hepatitis B, C among health professionals in the city of Parakou.

MATERIAL AND METHODS

Study framework
The study was carried out in the 09 public and 22 private health establishments in the commune of Parakou at the time of the survey .

Type and period of study
This was a descriptive cross-sectional study for analytical purposes with prospective data collection over a period from August 1st to September 20, 2021.

Study population
The study population is made up of all the nursing staff in the municipality of Parakou.

Inclusion criteria
Were included in the study caregivers of both sexes who have between 2 and 30 years of seniority in the exercise of their function and who have given their informed consent to the study.

Non-inclusion criteria
Administrative and non-medical staff were not retained for the survey.

Sampling
An exhaustive census of health professionals present at the post and fulfilling the inclusion criteria was made.

Variables
The dependent variable was the knowledge of healthcare professionals about HAIs (BEA, HIV, COVID-19 and viral hepatitis B, C).
The independent variables were the socio-demographic characteristics (age, sex, religion and ethnicity), the professional characteristics (seniority, qualification of the agent), the characteristics in relation to the caregivers' knowledge of HAIs (definitions, severity, frequency, number of cases, clinical signs, means of screening, means of treatment, risk factors).

Appreciation of knowledge
The assessment of the level of knowledge was made based on the model of Essi et al .
The knowledge was assessed in 4 levels (poor, insufficient, average and good) [4] .
The level was considered bad when the respondent obtained less than 50% of correct answers, insufficient when he obtained between 50% inclusive and 65% excluded of correct answers, average if the rate of correct answers varied between 65% included and 85% excluded and finally of good level when he obtains more than 85% of correct answers.

Data collection techniques and tools
Data collection was done during a face-to-face interview. A questionnaire was used.

Data processing and analysis
Data encoded using Epi Data 3.1 software were exported to Epi Info version 7.1 to perform statistical analyses. The normally distributed continuous quantitative variables were presented in the form of means with their standard deviation and medians with their 25th and 75th percentiles depending on whether they are asymmetrical. Qualitative variables were expressed as a proportion. The level of precision of the confidence interval used is 5%.

Ethical considerations
The authorization of the local ethics committee for biomedical research of the University of Parakou (Reference 0395/CLERB-UP/P/SP/R/SA of March 12,

2021), as well as the authorization of the municipal authorities have been obtained prior to data collection. Respondents freely joined the study. The information collected was treated with confidentiality and the survey forms filled in anonymously.

RESULTS

Socio-demographic and professional characteristics

A total of 303 healthcare professionals participated in the study. The mean age was 35.30 ± 8.49 years. Women represented 63.79% (192) and men 36.21% (109) for a sex ratio of 0.57 . Nurses were the most represented (32.23%), followed by midwives (17.61%) and doctors (13.29%). The average seniority was 8.18 ± 6.60 years with extremes of 2 and 26 years (**Table I**).

Table I : General characteristics of the study population in Parakou in 2021. (N=301).

	Effective	Percentage
Sex		
Male	109	36.21
Women	192	63.79
Age		
[20-30]	116	38.54
] 30-40]	109	36.21
] 40-50]	65	21.59
] 50-60]	11	3.66
Religion		
Christian	181	60.13
Muslim	110	36.54
Endogenous	3	1.00
Atheist	3	1.00
Eckiste	4	1.33
Ethnic group		
Bariba	119	39.54
Ditamari	13	4.32
Dendi	19	6.31
Fulani	9	2.99
Fon and relatives	99	32.89
Nagot/Yoruba	27	8.97
Other*	15	4.98
Sector		
Public	174	57.81
Private	127	42.19
Seniority (years)		
] 2-5]	120	39.87
[5-10]	88	29.24
] 10-15]	40	13.29
] 15-20]	45	14.95
] 20-25]	7	2.32
] 25-30]	1	0.33
Qualification		
Doctor	40	13.29
Midwife	53	17.61
Nurse)	97	32.23
Laboratory Technician/Engineer	28	9.30
Radiology Technician/Engineer	9	2.99
Caregiver	74	24.58
*: 1Berba; 2 Boos; 3 Lokpa; 4 Yinde; 5 Yom; 6 Not provided.		

Level of knowledge of BEA, viral hepatitis B and C, HIV/AIDS and COVID-19

Among the respondents, 108 (35.88%) had an average level of knowledge of viral hepatitis B and C and about the same rate 101 (33.56%) for the good level; 94 health workers (31.23%) had a good level of knowledge of HIV/AIDS and 148 (49.17%) had an average level of knowledge of COVID-19; 117 (38.87%) had a poor level

of knowledge of BEA as well as what to do in the event of BEA. (**Table II**).

Table II: Distribution of respondents according to level of knowledge of BEA, HIV/AIDS, COVID-19 and viral hepatitis B and C in Parakou in 2021. (N=301).

	Effective	Percentage
Knowledge of BEA		
Bad	117	38.87
Insufficient	70	23.26
Average	94	31.23
Good	20	6.64
Total	301	100
Knowledge about HIV/AIDS		
Bad	61	20.27
Insufficient	59	19.60
Average	87	28.90
Good	94	31.23
Total	301	100
Knowledge about COVID-19		
Bad	7	2.32
Insufficient	34	11.30
Average	148	49.17
Good	112	37.21
Total	301	100
Knowledge of viral hepatitis B and C		
Bad	42	13.95
Insufficient	50	16.61
Average	108	35.88
Good	101	33.56
Total	301	100

Relationship between qualification and level of knowledge of health professionals on BEA, viral hepatitis B and C, COVID-19, HIV/AIDS (Table III).

Qualification and BEA

The qualification of the participants was significantly related to their level of knowledge of HIV/AIDS (*p=0.0000*). Less than half of doctors have a good knowledge of HAI 16 (40.00%). More than a third of nurses 36 (37.11%) have an average knowledge of ESAs and barely a quarter 11 (20.75%) of midwives.

Qualification and viral hepatitis B and C

The qualification of healthcare workers was statistically significantly associated with their level of knowledge of viral hepatitis B and C (*p=0.0000*). Doctors had more knowledge of viral hepatitis B and C 34 (85.00%) against 19 (35.85%) of midwives and 30 (30.93%) of nurses. Nurses and midwives had a rather average level of knowledge with 51 (52.58%) for nurses and 23 (43.40%) for midwives. Radiology technicians and nursing assistants had insufficient knowledge of viral hepatitis, 4 (44.44%) and 22 (29.73%) respectively.

Qualification and HIV/AIDS

The qualification of the participants was significantly related to their level of knowledge of HIV/AIDS (*p=0.0000*). For doctors 32 (80.00%) had a good level of knowledge of HIV/AIDS and about one third of nurses 35 (36.08%). Nurses and midwives have an average knowledge of HIV/AIDS with 37 (38.18%) for nurses and 21 (39.62%) for midwives. Radiology technicians have insufficient knowledge of HIV/AIDS 6 (66.67%) and nursing auxiliaries have poor knowledge 32 (43.24%).

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Qualification and COVID-19

The qualification of the participants was significantly related to their level of knowledge of COVID-19 (*p=0.0000*). More than three out of four doctors 31 (77.50%) had a good level of knowledge of COVID-19 compared to more than a third 40 (41.24%) of nurses. All the other professions have a rather average knowledge, 27 (50.94%) for midwives, 52 (53.61%) for nurses, 17 (60.71%) for laboratory technicians, 4 (44 .44%) for radiology technicians and even for nursing auxiliaries 41 (55.40%). This could be explained by the fact that COVID-19 is a new condition that has benefited from numerous trainings and sensitizations among health workers.

Relationship between seniority and the level of knowledge of health professionals about BEA and viral hepatitis B and C, COVID-19 and HIV/AIDS

The oldest respondents [20 -25] years old had more knowledge of viral hepatitis B and C and BEA than the other categories with 4 (57.14%) for hepatitis B, C and 3 (42.86 %) for AES. Among the youngest respondents having between] 2-5] years of seniority, 31 (25.83 %) had an average knowledge of BEA and (34) 28.33 % a good knowledge of viral hepatitis B and C, 40 (33.33%) average knowledge of viral hepatitis B and C. These differences were not significant for BEA (*p=0.780*) and for viral

hepatitis B and C (*p=0.071*). The oldest health workers (]20-25]years), have a good knowledge of COVID-19 and HIV/AIDS better than the youngest with respectively 5 (71.43%) for COVID-19 and 4 (57.14%) for HIV/AIDS. More than half, 62 (51.67%) and almost a third, 37 (30.83%) of the youngest respondents had an average knowledge of COVID-19 and an average knowledge of HIV/AIDS respectively. These differences were not significant for the HIV/AIDS (*p=0.316*) and for COVID -19 (*p=0.400*) (**Table IV**).

DISCUSSION

Sociodemographic and professional characteristics
Sex

The female gender predominated in this study with a sex ratio (M/F) of 0.57. Gounongbé et *al* , had also found in 2018, this female predominance among health professionals in the Parakou-N'Dali health zone (sex-ratio = 0.42) [5] . The same was true among healthcare professionals in Tunisia in 2017 in the study by El Ghoul et *al* , where the sex ratio was 0.7 [6] . This same observation had been made in several countries around the world, particularly in the studies carried out by Laraqui et *al,* in 2008 among caregivers in Morocco with a sex ratio = 0.8 [7] . Luciane et *al* , in 2011, also noted this female predominance among pre-hospital care professionals in the city of São Paulo in Brazil (sex-ratio = 0.7) [8] .

Table III : Distribution of respondents according to qualification and level of knowledge of BEA, viral hepatitis B and C , HIV/AIDS and COVID-19 in Parakou in 2021. (N=301)

Qualification	Nb	Good %	Average %	Insufficient %	Bad %	*p*
BEA						*0.0000*
Doctor	40	40.00	32.50	17.50	10	
Midwife	53	16.98	20.75	24.53	37.74	
Nurse)	97	19.59	37.11	23.71	19.59	
Laboratory technician	28	21.43	10.71	10.71	57.14	
radiology technician	9	0.00	55.56	11.11	33.33	
Caregiver	74	6.75	14.86	20.27	58.10	
Total	301	18.27	26.25	20.60	34.88	
Hepatitis B and C 0.0000						
Doctor	40	85.00	7.50	7.50	0.00	
Midwife	53	35.85	43.40	16.98	3.77	
Nurse)	97	30.93	52.58	9.28	7.22	
Laboratory technician	28	21.43	21.43	32.14	25.00	
radiology technician	9	0.00	33.33	22.22	44.44	
Caregiver	74	16.21	29.73	24.32	29.73	
Total	301	33.55	35.88	16.61	13.95	
HIV/AIDS 0.0000						
Doctor	40	80.00	12.50	5	2.50	
Midwife	53	28.30	39.62	22.64	8.77	
Nurse)	97	36.08	38.18	17.53	8.25	
Laboratory technician	28	28.57	25.00	17.86	28.57	
radiology technician	9	0.00	0.00	66.67	33.33	
Caregiver	74	9.45	29.73	17.57	43.24	
Total	301	31.23	28.90	19.60	20.27	
COVID-19 0.0000						
Doctor	40	77.50	17.50	5.00	0.00	
Midwife	53	33.96	50.94	13.21	1.89	
Nurse)	97	41.24	53.61	3.09	2.06	
Laboratory technician	28	25.00	60.71	7.14	7.14	
radiology technician	9	0.00	44.44	55.56	0.00	
Caregiver	74	21.62	55.40	20.27	2.7	
Total	301	37.21	49.17	11.30	2.33	

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Table IV : Level of knowledge of BEA, viral hepatitis B and C, HIV/AIDS and COVID-19 according to seniority in Parakou in 2021. (N=301)

Seniority (years)	NOT	Good %	AVERAGE %	Insufficient %	Bad %	p
BEA						0.780
] 2-5]	120	15.83	25.83	21.67	36.67	
] 5-10]	88	15.91	27.27	18.18	38.64	
] 10-15]	40	20	27.50	20	32.50	
] 15-20]	45	22.22	26.67	24.44	26.67	
] 20-25]	7	42.86	14.29	14.28	28.57	
] 25-30]	1	100	0	0	0	
Total	301	18.27	26.25	20.60	34.88	
Viral hepatitis B and C						0.071
] 2-5]	120	28.33	33.33	23.34	15	
] 5-10]	88	35.23	30.68	12.50	21.59	
] 10-15]	40	35	42.50	15	7.50	
] 15-20]	45	37.78	48.89	11.11	2.22	
] 20-25]	7	57.14	28.57	0	14.29	
] 25-30]	1	100	0	0	0	
Total	301	33.55	35.88	16.61	13.96	
COVID-19						0.316
] 2-5]	120	36.67	51.67	8.33	3.33	
[5-10]	88	34.09	45.45	17.05	3.41	
] 10-15]	40	47.50	40	12.50	0	
] 15-20]	45	28.89	62.22	8.89	0	
] 20-25]	7	71.43	28.57	0	0	
] 25-30]	1	100	0	0	0	
Total	301	37.21	49.17	11.30	2.32	
HIV/AIDS						0.400
] 2-5]	120	29.17	30.83	19.17	20.83	
] 5-10]	88	25	26.14	21.59	27.27	
] 10-15]	40	40	22.50	25	12.50	
] 15-20]	45	35.56	33.33	15.56	15.55	
] 20-25]	7	57.14	42.86	0	0	
] 25-30]	1	100	0	0	0	
Total	301	31.23	28.90	19.60	20.27	

This predominance is generally due to a feminization of the medical profession in most countries. This predominance is also due to the greater number of women among health professionals in each of the services and the large number of women who responded to our questionnaire.

Age
The average age of health professionals was 35.30 ± 8.49. In 2018, Gounongbé et *al* , made an observation along the same lines with an average age of the caregiver population of 37 ± 10 years in the Parakou-N'Dali health zone [5] . A similar result was found in 2015 by Codjo et *al* , among health professionals in Parakou hospitals (38.2 ± 8.1 years) [9] . This result is also close to that found among health workers in Lomé, Togo in 2013 by Bagny et *al* , (37.9 ± 10.7 years) [10] . Only Boutahiri et *al* , in Morocco in 2011 reported a high average age in all studies (45.65 ± 8.92 years) [11] . However, the age of the agents surveyed complies with the recommendations of the ILO on the minimum age for admission to employment, which is 18 years [12] .

Category of healthcare professionals surveyed
Nurses were in the majority and represented 32.23% . Gounongbé et *al* as well as Hien et *al* found an almost identical proportion, respectively 32.20% and 33.90% [5] , [13] .

Seniority
The average seniority of respondents was 8.18 ± 6.60 years. This seniority is higher than that found in Diallo's study in Bamako in 2008 which reported 4.5 years [14] . It is also higher than that found in the study by Lawson et

al, in Senegal in 2017 with 5 years of seniority [15] . On the other hand, it is lower than the professional seniority found in the study by Bagny et *al,* carried out in Togo in 2013, which was 13.7 ± 8.6 years [10] .

Knowledge of HAI
The main route of transmission of viral hepatitis B and C cited by health professionals was biological fluids (blood, sweat, saliva, etc.) in 94.35% of cases. Diallo found among health professionals in 2008 in Bamako a lower rate of 83.80% [14] . Vaccination against viral hepatitis B was 97.67% among our respondents. This result is higher than those found in the study by Dao in Bamako in 2018, Diallo in Bamako in 2008 and Bagny et *al* in 2013 in Togo with respectively 51.81%; 75.7% and 50.30% [16] , [14] , [10] . In this study, the level of knowledge of health professionals about COVID-19 was 49.17%. Oumarou et *al* in Niamey, Niger found among health professionals in 2020 a higher knowledge of COVID-19 with a rate of compliance with barrier measures at 67.00% and vaccination coverage at 93.36% [17] . This high vaccination rate could be explained by the vaccination pass against COVID-19 required of health professionals in most countries of the West African sub-region. The level of knowledge of HIV was 31.23% and that of BEA 38.87%. Lariqui et *al* in 2002 in Morocco found 89% knowledge of the transmission route but much less for hospital transmission and only 7% for reported BEA [18] .

CONCLUSION
Health workers in the city of Parakou have a good knowledge of healthcare-associated infections (HAIs)

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transmitted by blood, in particular by viral biological pathogenic factors, namely viral hepatitis B and C viruses, SARS-CoV-2 and HIV . SARS-CoV-2 (COVID-19) infection is best known through communication and awareness efforts by the media, non-governmental organizations (NGOs), technical and financial partners (TFPs), and the government of on the one hand and the fact that it is a new highly lethal infection on the other hand. Other nosocomial diseases tend to be relegated to second place in favor of COVID-19. Yet they are also topical and their prevalence continues to grow within populations. Hence the need to combine awareness, information, education, communications (IEC) of COVID-19 with those of viral hepatitis B and C, HIV and BEA in general.

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Conflicts of interest

All authors certify that the information and contents of this manuscript are true and obtained in compliance with ethical and legal rules. This manuscript has not been published, in whole or in part, in another medical or scientific journal, in French or in another language, and it is not the subject of another submission. There are no financial or other conflicts of interest that may have influenced the article. All co-authors appoint the corresponding author to sign the copyright assignment contract with the publisher on their behalf.

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