ORIGINAL ARTICLE

Accidental exposures to blood among dental health care workers in five Referral Hospitals in Yaoundé, Cameroon

Accidents d'exposition au sang chez le personnel des services dentaires de cinq Hôpitaux de Référence à Yaoundé, Cameroun

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Abstract

Introduction: Dental healthcare workers are at risk of being infected during their work due to exposure to blood.
Aims: To determine the prevalence of accidental exposure to blood and body fluids, to assess the knowledge, attitudes, and practices of these dental healthcare workers, and to identify factors associated with this exposure.
Methods: A cross-sectional hospital-based study was conducted between December 1st 2020 and June 1st 2021 in the dental services of five referrals hospitals. Dental healthcare workers present at the time of the study were recruited. Data were analyzed with R software. Multivariate analysis was used to determine factors associated with blood exposure, with their adjusted odds ratios and p-values. A p value < 0.05 was considered statistically significant.
Results: The frequency of accidental exposure to blood was 55% (95% CI: 47.9% - 67.2%), with needle stick injury (34.8%) being the main mechanism. Assessment of perceptions among victims revealed that those with average knowledge (84.6%), right attitudes (62.5%), and adequate practices (55.5%) were predominant. Factors statistically associated with accidental exposure were dental technician (adjusted Odds Ratio = 2.5; p = 0.02), length of employment greater than 10 years (adjusted Odds Ratio = 1.9; p < 0.01), insufficient knowledge (adjusted Odds Ratio = 2.5; p = 0.023), harmful attitudes (adjusted Odds Ratio = 3.5; p = 0.006), and inadequate practices (adjusted Odds Ratio =1.6; p = 0.008).
Conclusion: There is a high rate of accidental exposure to blood in dental units. Efficient strategies to protect dental healthcare workers should be identified and implemented.

Keywords: blood, dental service, exposure, hospital, worker, Yaoundé.

Résumé

Introduction : Les professionnels de la santé dentaire sont à risque d'être infectés en raison de leur exposition permanente au sang.
Objectifs : Déterminer la prévalence de l'exposition accidentelle au sang, évaluer les connaissances, attitudes et pratiques de ces professionnels et identifier les facteurs associés à cette exposition.
Méthodes : Une étude transversale a été menée entre le 1er décembre 2020 et le 1er juin 2021 dans les services dentaires de cinq Hôpitaux de Référence à Yaoundé. Les professionnels présents au moment de l'étude ont été recrutés. Les données ont été analysées avec le logiciel R. L'analyse multivariée a permis de déterminer les facteurs associés avec leurs rapports de côte et valeurs p ajustés. Le seuil de significativité était de 5 %.
Résultats : la fréquence de l'exposition accidentelle au sang était de 55 % (IC à 95 % : 47,9 % – 67,2 %) et les blessures par piqûre d'aiguille (34,8 %) étaient le principal mécanisme. Les facteurs statistiquement associés à cette exposition étaient les médecins dentistes (RC ajusté = 2,5 ; p=0,02), l'ancienneté supérieure à 10 ans (RC ajusté = 1,9 ; p<0,01), les connaissances insuffisantes (RC ajusté = 2,5 ; p=0,023), les attitudes erronées (RC ajusté = 3,5 ; p=0,006) et les pratiques inadéquates (RC ajusté = 1,6 ; p=0,008).
Conclusion : les accidents d'exposition au sang sont fréquents dans les services dentaires. Les stratégies spécifiques devraient être implémentées afin de protéger ces professionnels.

Mots clés : exposition, hôpital, sang, service dentaire, travailleur,Yaoundé.

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Introduction

Accidental exposure to blood (AEB) is a major public health problem in healthcare settings (1,2). Health professionals, including dental healthcare workers (DHCWs), are at risk of being infected with disease transmitted by blood during their work due to exposure following injuries like cutting, biting, or splashing (3). Although numerous pathogens are involved, blood-borne viruses, human immunodeficiency virus (HIV), hepatitis C virus (HCV), as well as hepatitis B virus (HBV), are of greatest concern (3,4). The risk for transmission from a positive patient is 0.3%, 3% to 30%, and 1.8% to 3%, respectively, for HIV, HBV, and HCV (7). The World Health Organization (WHO) estimates that 3 million exposures occur annually among 35 million healthcare workers, with over 90% occurring in resource-constrained countries (3,6). Studies conducted in West Africa found prevalences between 67.6% and 88.3% (2,7). In Cameroon, a study conducted in 2024 showed that 62.8% of healthcare workers experienced at least one episode of AEB (1). On the other hand, the assessment and treatment of the consequences of such accidents is a huge burden on society in terms of the costs of treatment as well as the distress and anxiety at work (3).

In developing countries like Cameroun, contributing factors and planning interventions are still to be identified to decrease the morbidity associated with AEB in dental services. Moreover, working conditions, insufficient resource allocations, and diversity of tasks performed by DHCWs make it difficult to identify a particularly risky function of AEBs, and biological risk management is non-effective in dental services including those of referrals hospitals (1, 5). In the control of hazards facing by DHCWs, baseline and periodic assessment of exposure is an important strategy that can be used as a decision-making tool. Cameroon does not have a surveillance system for occupational exposure to blood, hence limiting the estimation of the magnitude of the problem, the management of the case, and a risk assessment of the AEB in dental services (3).

Then, identification of the gaps in knowledge, attitudes, and practices of blood exposure accidents among DHCWs could bring more insights on the circumstances of these accidents to improve compliance with standard precautions and protocols for their prevention (1). It could also help the infection control committees of the hospitals to provide specific recommendations on intervention and prevention measures for the dental services (1). The purpose of this work is to provide evidence that can be used as support for planning the prevention of AEBs in dental units. The objectives were to estimate the prevalence of AEBs, to assess knowledge, attitudes, and practices of DHCWs, and to identify the associated factors for AEBs in the dental units of some referral hospitals in Yaoundé.

Methods

Study design

We conducted a cross-sectional hospital-based study, a design that is appropriate as we are collecting data on the occurrence of accidental exposure to blood and body fluids and its potential factors such as participants knowledge, attitude, practices, and other characteristics at the same time on a group of DHCWs seen once during a period. The study was conducted according to the STROBE guidelines (8).

Study setting

Yaoundé is the country's second-largest city, with a population of up to 3.2 million (5). In Cameroon, our health system is organized at three levels (central, intermediate, and peripheral), with seven types of health care settings, ranking from seven to first categories. The first and second categories located at the central level deliver tertiary and secondary health care, respectively (9). They are considered as referral hospitals. Our study was conducted in Yaoundé between December 1st 2020 and June 1st 2021 in the dental services of the Yaoundé University Teaching Hospital (YUTH), Yaoundé General Hospital (YGH), Yaoundé Gyneco-Obstetrical and Pediatric Hospital (YGOPH) among the first category, the Yaoundé Central Hospital (YCH), and Yaoundé Military Hospital (YMH) in the second category group. These hospitals were chosen because of their high attendance rate; the average attendance was 100 patients seen per hospital each week.

Study population

The study population consisted of health care workers who could be potentially exposed to blood from patients during dental care. These dental care workers included dental physicians (full doctors and student doctors), nursing staff (nurses, assistant nurses, and student nurses), and dental technicians (full dental technicians and students). Those who were present at the time of data collection and gave their informed consent were included. All DHCWs with incomplete questionnaires or withdrew their informed consents were excluded from the study. During the study period, recruitment was consecutive, and the number of DHCWs seen in the five dental units during the study period determined the sample size.

Study procedure

The data were collected with closed and open-ended questions for the purpose of this study (see supplementary file). It had 33 questions divided into four sections. The first section included sociodemographic and occupational characteristics such as age reported in years, gender (male and female), occupation (dental physician, nurse, and dental technician), and length of employment in the dental unit in years. The second section was related to AEB history with questions

on types and numbers AEB encountered within the previous three months. The third section assessed the DHCWs' knowledge of means of prevention, mode of transmission, and treatment of AEB. The fourth section enabled us to determine the socio-cultural specificities (beliefs, representations, motivations, and perceptions) that influence the adoption of good practices, and the fifth, the actions of workers who expose or limit the occurrence of AEB. The questions in the last three sections (knowledge, attitudes, and practices) were used to determine levels of perceptions using the Likert scale (10). This is an additive scale consisting of a series of statements for which the participant expresses his or her degree of agreement or disagreement by choosing between 5 (sometimes 7) responses for each statement.

Ethical approval

Ethical clearance and permission were obtained from the Ethics Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé 1, Cameroon, with authorization N°141/UY1/FMSB/VDRC/DAASR/CSD (see appendix). The administrative authorizations N°77521/HGY/DG/DPM/MA-TR from YGH, N°210295/DV/MINDEF/DSM/RSM1/HMR1/12 from MRH, N°261/21/AR/DHCY/CM/SM from YCH, N°4222/AR/CHUY/DG/DGA/CAPRC from YUTH, and N°076/CIERSH/DM/2021 from YGOPH were issued by all the directors. Written informed consent was obtained from all participants, and this study was performed in accordance with the Helsinki Declaration. All the information collected from the participants was kept confidential, with no trace of identification details in the final report.

Statistical analysis

Data were cross-checked, recoded, entered, and analyzed using R statistics version 4.2.3. A simple descriptive analysis was performed to estimate proportions of gender, age groups, occupational categories, number of years of service, DHCWs with AEBs and their mechanisms (percutaneous injury, splash, etc.) to describe age and number of AEBs. In addition, we determined the proportions of levels of knowledge, attitudes, and practices based on the work of Essi et al. (11) (Table 1).

Table 1. Scale used to categorize knowledge, attitudes and practices of dental health care workers in five referral hospitals, Yaoundé,2021.

Components	Score (%)	Interpretations
Knowledge	< 25	Poor
	25 to 50	Insufficient
	50 to 70	Average
	> 70	Good
Attitudes	< 25	Harmful
	25 to 50	Wrong
	50 to 70	Approximative
	> 70	Right
Practices	< 25	Harmful
	25 to 70	Inadequate
	> 70	Adequate

The Kolmogorov-Smirnov test was used for quantitative variables. Those with a normal distribution were summarized with the mean and standard deviation, while the median and interquartile range were used for variables presenting any other distribution. Bivariate analysis was performed with AEB as a dependent variable and sociodemographic characteristics, knowledge, attitudes, and practices as independent variables. Variables with a significant p value or close significance were subsequently included in the binary logistic regression model. The stepwise approach was used, and the model with the lowest Akaike information criterion was selected. The multicollinearity between variables was checked using the variable inflation factor. The chi-square and Fisher tests were used. The significance level was set at 0.05, and all tests were two-sided; the association was evaluated using crude and adjusted odds ratios (c/a ORs) with 95% confidence intervals (CI).

Results

In our study, participants were recruited following the diagram described in the figure below.

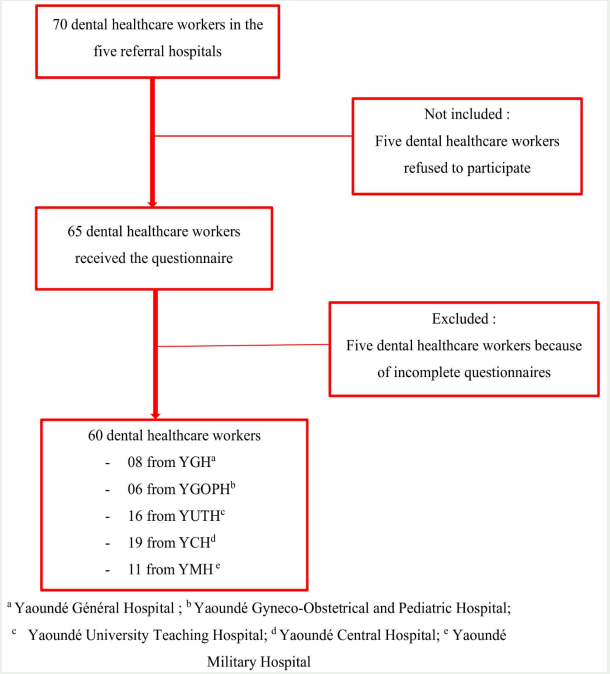

Figure 1. flow of dental healthcare workers of the five referral hospitals of our study in Yaoundé,2021.

Sociodemographic and occupational characteristics

In our study, females were predominant with a sex ratio of 1:1.72, and thirty-nine (65%) were dental physicians. The median age was 33 (21;58) years, and the median length of employment was 10 (3;25) years (Table 2).

Table 2. Sociodemographic and occupational characteristics of dental healthcare workers in five referrals hospitals in Yaoundé, 2021.

Sociodemographic and occupational characteristics	N= 60[a]
Gender	
Female	38 (63.33)
Male	22 (36.67)
Occupation	
Dental physicians	39 (65)
Nurses	16 (26.67)
Dental technicians	5 (8.33)
Age (in years) [b]	
< 33	35
≥ 33	25
Length of employment (in years)[c]	
< 10	37
≥ 10	23

[a] n (%) ; [b,c] : quantitative variables with p value > 0,05 when using Kolmogorov-Smirnov test and summarized with Median (Inquuartile Range).

Frequency and mechanism of occurrence of exposure to blood

Of the 60 DHCWs, 33 (55%, 95% CI: 47.9% - 67.2%) reported 46 AEB in the previous three months prior to data collection. Eighteen participants remembered being victims at least once, ranging from one to three. The relationship between being a victim of AEB and dental healthcare workers characteristics was statistically significant for occupation (p = 0.03), age (p = 0.025) and length of employment (p = 0.016), as seen in Table 3.

Table 3. frequency of accidental exposure to blood by type of health facility sociodemographics and occupational characteristics of dental healthcare workers in five referrals hospitals in Yaoundé, 2021.

Sociodemographic and Occupational characteristics	AEB victim n(%)	p value
Health facility		0.10
YGH	4 (12.1)	
YGOPH	6 (18.2)	
YUTH	7 (21.2)	
YCH	9 (27.3)	
YMH	8 (24.2)	
Occupation		0.03[a]
Dental physicians	18 (54.5)	
Nurses	12 (36.4)	
Dental technicians	3 (9.1)	
Gender		
Female	18 (54.5)	0.5
Male	15 (45.5)	
Age (in years)		0.025 [a]
< 33	20 (60.6)	
≥ 33	13 (39.4)	
Length of employment (in years)		0.016 [a]
< 10	15 (45.5)	
≥ 10	18 (55.5)	

[a] : significance of p value (< 0,05).

According to the participants, the most common mechanism of occurrence of AEB was needle stick injury (16, 34.8%), followed by blood splash on face (12, 26.1%), with a statistical difference (p = 0.01) as shown in table 4.

Table 4. frequency of Accidental exposure to blood by mechanism of occurrence among dental healthcare workers in five referrals hospitals in Yaoundé, 2021.

Mechanism of occurrence of AEB	Proportion (%)[a]	Mean number of AEB±S[b]b
Needle stick injury	16 (34.8)	8.5±2.1
Blood splashes on face	12 (26.1)	4.6±1.9
Cutting	10 (21.7)	3.1±1.1
Capping with a needle after use	8 (17.4)	1.5±0.3

[a]n(%) with N=46; [b]Standard deviation quantitative variables with p value < 0,05 when using Kolmogorov-Smirnov tests and summarized with Mean±Satndard Deviation.

knowledge, attitudes and practices of dental healthcare workers

Our study revealed that 42 (70%) participants had good knowledge and 16 (26,67%) approximative attitudes. Identification of practices showed that 12 (21.67%) had an inadequate practice (Table 5).

Table 5. knowledge, attitudes and practices of dental healthcare workers in five referral hospitals in Yaoundé, 2021.

Components	N = 60[a]
Knowlegde	
Poor	10 (16.7)
Insufficient	12 (20)
Average	18 (30)
Good	20 (33.3)
Attitudes	
Harmful	12 (20)
Wrong	15 (25)
Approximative	14 (23.3)
Right	19 (31.7)
Pratices	
Harmful	13 (21.7)
Inadequate	17 (28.3)
Adequate	30 (50)

[a] n (%).

Factors contributing to the occurrence of accident exposure to blood

Our study found that the factors statistically associated with AEB among DHCWs were dental physicians (aOR = 2.5; p = 0.02) as well as length of employment more than 10 years (aOR = 1.9; p<0,01), those with insufficient knowledge (aOR = 2.5; p = 0,0023), harmful attitudes (aOR = 3.5; p = 0,006), and inadequate practices (aOR = 1.6; p = 0,008), as presented in table 6.

Table 6. factors contributing to the occurrence of accidental exposure to blood among health care workers in five referrals hospitals in Yaoundé, 2021.

Variables	Accidental exposure to blood		Crude Odds Ratio	Adjusted Odds Ratio	Adjusted
	Yes, N = 33 [a]	No, N =27 [a]	(95% CI[b])	(95% CI [b])	p value [c]
Gender					
Male	15 (68,2)	7 (31.8)	1	-	-
Female	18 (51.5)	20 (48.5)	0.42 (0.2-2.3)	-	-
Occupation					
Dental technicians	3 (60)	2 (40)	1	1	
Dental physicians	18 (46.2)	21 (53.8)	0.57 (0.10-2.7)	2.5 (1.05-4.7)	0.02[d]
Nurses	12 (75)	4 (25)	2 (1.4-5.9)	1.2 (0.07-3.6)	0,6
Age (in years)					
< 33	20 (57.1)	15 (42.9)	1	-	-
≥ 33	13 (52)	12 (48)	0.81 (0.1-2.8)	-	-
Length of employment (in years)					
< 10	15 (75)	5 (25)	1	1	-
≥ 10	18 (45)	22 (55)	3.67 (1.6-5.5)	1.9 (1.02-3.43)	< 0.01[d]
knowledge					
Good	12 (60)	8 (40)	1	1	
Poor	5 (50)	5 (50)	0.67 (0,01-2.9)	0.99 (0.02-2.2)	-
Insufficient	8 (66.7)	4 (33.3)	1.33 (1.03-4.3)	2.5 (1.05-4.3)	0.023[d]
Average	8 (44.4)	10 (55.6)	0.53 (0.05-3.3)	0.3 (0.09-2.5)	0.21
Attitudes					
Right	6 (31.6)	13 (68.4)	1	1	
Harmful	9 (75)	3 (25)	4,9 (1.2-7.5)	3.5 (1.05-6.5)	0.006[d]
Wrong	10 (50)	5 (50)	0.5 (0,02-3.1)	0.1 (0,01-2.6)	0.12
Approximative	8 (57,1)	6 (42.9)	2.9 (0.09-5.8)	1,9 (0.02-4.2)	0.99
Practices					
Adequate	14 (46.7)	16 (52.3)	1	1	-
Harmful	8 (57,1)	5 (42.9)	1.82 (0.09-3.7)	1.1 (0.09-2.7)	0.77
Inadequate	11(64.7)	6 (35.3)	2.1 (0.004-4.4)	1.6 (0.001-3.4)	0.008[d]

[a] n (%) ; 95 % IC[b] : Confidence Interval at 95 % ; [c] Fisher's exact (n < 5) and Chi² Tests (n>5) ; [d] : significance of p value (< 0,05).

Discussion

The frequency of accidental exposure to blood was 55% (95% CI: 47.9% - 67.2%), with needle stick injury (34.8%) being the main mechanism. Factors statistically associated with accidental exposure were dental technicians (adjusted odds ratio = 2.5; p = 0.02), length of employment greater than 10 years (adjusted odds ratio = 1.9; p < 0.01), insufficient knowledge (adjusted odds ratio = 2.5; p = 0.023), harmful attitudes (adjusted odds ratio = 3.5; p = 0.006), and inadequate practices (adjusted odds ratio = 1.6; p = 0.008).

Out of the 70 DHCWs present at the time of the study in five referral hospitals in Yaoundé, 60 (85.7%) fully participated. This percentage is comparable to that of studies conducted in similar health facilities in west and central African countries, with a participating rate between 69.9% and 99. 1 % (1, 6, 7, 12-17). This high percentage of our study shows the interest of the DHCWs and demonstrates the concern and the need to equip them to contribute to the improvement of their working conditions (1). The study population was relatively young, with a median age of 33 (21;58) years, with 38 (63.33%) being females. Similar trends have been reported in the literature [6, 18-20]. This young demographic could be due to the training and recruitment of younger healthcare workers by the Ministry of Health. If training of nursing staff has been done for the past twenty years in Cameroon, training of dental physicians started in 2007 with the first batch graduating from the Faculty of Medicine and Biomedical Sciences and Université des Montagnes in 2014. This could also explain the fact that the median of working experience in this study was 10 (3;25) years, and dental physicians were represented among the healthcare workers with 39 cases (65%). Thirty-three (55%, 95% CI: 47.9% - 67.2%) DHCWs reported having been exposed to blood and body fluid at least once in the 3 months preceding the study. The frequency of AEB (55%) observed in this study is close to those reported in similar health facilities in Morocco in 2020 and in Togo in 2019 with 64.2% and 67.6%, respectively (2,20). However, our frequency is significantly lower than those found in two localities in Cameroon: 87.7% in Bertoua, Eastern Region, and 93% in Buea, Southwest Region (11, 16). Many reasons could explain the difference. The last two studies were conducted in

the third category of health facilities of our health system, Bertoua and Buea Regional Hospitals, and they represent the referral hospitals of their entire administrative regions (8). Moreover, these two healthcare settings are training hospitals for students attending nursing schools in both regions and the Faculty of Health Sciences in the Southwest region. But the more likely explanation could be the methodological difference, notably the duration of the observed period, which was three months in our case and twelve in those studies (3). Needle stick was the most reported injury mechanism (16; 34.8%), followed by splashes on face (12; 26.1%) and cutting (10; 21.7%). Many authors in the literature had similar trends despite variations in frequencies. A study conducted in Northern Cameroun in 2022 found needle stick injury (97.10%), skin cut with a sharp object (82.60%), and contact of a wound with infected blood (79.10%); similarly, a Congolese study in 2018 showed needle stick with blood or blood-contaminated biological fluid (85.8%), contact of a wound with infected blood (70.7%), and skin cut with a sharp object (62.20%) (1,17). However, these findings differ from those reported in Togo in 2019, where cutting (17.4%) was second to needle stick injuries (71.7%) of all AEB in their setting (2). Nevertheless, needlestick injuries remain the main risk factor in the occurrence of AEB reported frequently in the literature (3, 7, 13, 16, 21, 7). In our study, dental physicians (18; 54.5%) had accidents more often than nurses, what is like the published papers in both developed and less developed countries, reporting usually that physicians are more prone to injuries involving exposure to blood (3,7,11,19). In our study, dental physicians were significantly 2.5 times more likely to have AEB compared to dental technicians (p = 0.02). However, there are studies with results contrary to ours that have shown that nurses had the highest rate of accidents in comparison to other occupational categories (1, 2, 22, 28, 32). Our findings could be explained by our sample size and need further investigations, for example, through a national survey encompassing all the dental units of public health facilities (only the first to fourth categories are authorized to have dental units) of our health system. Also, workers with length of employment more than 10 years (18; 55.5%) were more affected, and they were significantly 1.9 times more likely to have AEB than those less than 10 years (p < 0.01). Assessment of perceptions among dental health care workers who were victims of AEB revealed that those with insufficient knowledge were predominant (66.7%);; they were significantly 2.5 times more likely to have AEB than those with good knowledge (p=0,023).A study in Congo Brazzaville in 2018 on the contrary revealed insufficient knowledge among their healthcare workers (17). The reason for our results could be the gap when considering diseases that can be transmitted following AEB and identification of protective measures against the pathogens involved due to the lack of training as well as information and sensitization messages to what to do in the event of AES. In the literature, authors identified training on AEB as a protective factor for having AEB. Increased incidence of AEB has been explained by the absence of displayed protocols and inadequate behavior of caregivers (1, 3). Thus, initial and continuous training, supervision, availability of displayed protocols within the services, routine supply of personal protective equipment (goggles or visor, single-use gown, single-use mask, single-use gloves, hydroalcoholic solution) appear as interventions that could greatly contribute to observing safety measures and preventing AEB (1, 3). Also, it is necessary to know the universal precautions to apply during care, and health facilities should organize free screening and vaccination campaigns for their staff because effective vaccination remains the best means of prevention against some pathogens like this hepatitis B virus (1, 3, 11, 16, 17). Attitudes represent the socio-cultural specificities such as beliefs, representations, motivations, and perceptions that influence the adoption of good practices by healthcare workers (10). This could explain the fact that 75% of DHCWs who victims of AEB were had harmful attitudes in our study; there were significantly 3.5 more times likely to have been victims of AEB compared to those with right attitudes (p = 0.006). Our results differed from those of a Congolese 2021 study, which reported that their healthcare workers had wrong attitudes (19). Also, among DHCWs who victims of AEB were, those with inadequate practices were predominant with 64.7% and were significantly 2.1 times more likely to have been exposed to blood and body fluids than those with adequate attitudes (p = 0.008). Practices represent actions performed by people in their environment; they are what expose or protect against the health problem (8). They may be objective or subjective, but they are the main indicator of health promotion (8). This could be a possible explanation of our results, meaning DHCWs in their routine activities, despite their knowledge, are still showing some risky behavioral skills in their dental units. Some authors stated that the practices of a population are the result of their attitudes, which in turn rely on their knowledge of phenomena (8).

Our study is among the first to analyze blood exposure accidents among dental health care workers in our context and to research the individual factors explaining their occurrence. The main limitation is the design used, which only allowed us to see the participants once. Then, the size of our sample was not large because the number of employees in these structures is limited.

Conclusion

Accidental exposure to blood is very common, with blood needle stick injury being the most common mechanism of exposure. DHCWs are contributing to their occurrences in many ways. Efficient strategies to protect dental healthcare workers from occupational exposures to blood and body fluids should be identified and implemented. In addition, education of workers on risks and the institution of standard operating procedures are crucial to safeguarding their health; they should be trained, sensitized, and updated on issues related to infection prevention and occupational risk reduction.

ABBREVIATIONS
AEB : Accidental exposure to blood and body fluids
a/cOR : Adjusted / Crude Odds Ratio
CI : Confidence Interval
DHCWs : dental healthcare workers
HBV : hepatitis B virus
HCV : hepatitis C virus
HIV : human immunodeficiency virus
WHO : World Health Organization
YCH : Yaoundé Central Hospital
YGH : Yaoundé General Hospital
YGOPH : Yaoundé Gyneco-Obstetrical and pediatric Hospital
YMH : Yaoundé Military Hospital
YUTH : Yaoundé University Teaching Hospital

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