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Prevalence and Associated Factors of Blood Exposure Accidents among Healthcare Professionals in Health Centers of Bunia, DR. Congo

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Abstract:

- ***Background***

Blood exposure accidents (BEAs) represent a major occupational risk for healthcare workers, particularly in low-resource settings. In the Democratic Republic of Congo, and especially in Bunia, precarious working conditions and limited protective equipment heighten the vulnerability of health personnel.

- ***Objective***

To determine the prevalence and identify the factors associated with BEAs among healthcare professionals working in health centers in Bunia City.

- ***Methods***

A descriptive and analytical cross-sectional study was conducted among 123 healthcare professionals selected from 20 health centers in the Bunia health zone. Data were collected using a structured questionnaire and analyzed with SPSS version 27.0. Associations between variables were assessed using the chi-square test and logistic regression, with a significance level set at $p < 0.05$.

- ***Results***

The prevalence of BEAs during the past 12 months was 76.4%, indicating a high level of exposure among healthcare workers. Professional experience was significantly associated with the occurrence of BEAs ($p = 0.026$). The most risky activities were injections (42.6%) and blood sampling (31.9%). Nurses, laboratory technicians, and midwives were the most exposed categories, with no significant differences observed by age, sex, or department.

- ***Conclusion***

The high frequency of BEAs in Bunia reflects a considerable infection risk linked to inadequate preventive practices and insufficient availability of personal protective equipment. Strengthening continuous training, ensuring the provision of adequate protective materials, and establishing a systematic follow-up and reporting mechanism for exposures are essential measures to reduce this occupational hazard.

Keywords: *Blood Exposure Accidents, Healthcare Professionals, Associated Factors, Prevention, Bunia, Democratic Republic of Congo.*

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I. INTRODUCTION

Blood exposure accidents (BEAs) represent one of the most frequent and concerning occupational risks among healthcare workers, particularly in low-resource settings. These accidents mainly occur as a result of needle-stick injuries, cuts, or splashes of contaminated biological fluids, directly exposing healthcare personnel to blood-borne pathogens such as the Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV) (World Health Organization [WHO], 2020).

According to the WHO, approximately three million healthcare workers are exposed each year to infectious agents as a result of BEAs, with more than 90% of these exposures occurring in low- and middle-income countries (WHO, 2020). Such exposures not only pose a serious threat to the health and safety of healthcare workers but also represent a major challenge for health systems already weakened by resource shortages and insufficient prevention policies.

In sub-Saharan Africa, the high frequency of BEAs reflects a combination of systemic, structural, and behavioral factors: inadequate personal protective equipment, excessive workload, poor hygiene conditions, lack of continuous training in infection prevention, and low adherence to safety protocols (Yenesew *et al.*, 2021; Amare *et al.*, 2022). These factors reveal the lack of investment in occupational safety and the weak culture of prevention in many healthcare facilities.

Recent studies have confirmed the magnitude of this issue in several African countries. In Ethiopia, Amare *et al.* (2022) reported that 54.4% of healthcare professionals had experienced at least one BEA during their career, mainly due to contaminated needle-stick injuries. Similarly, *Yenesew et al.* (2021) observed a 63.1% prevalence of BEAs among healthcare staff at Gondar University Hospital, noting that lack of training and unavailability of gloves were significantly associated with exposure.

In other countries in the region, the rates remain alarming: in Uganda, Atukunda *et al.* (2021) found an annual prevalence of 46.5%, with very limited use of post-exposure prophylaxis (PEP). In Nigeria, Isa *et al.* (2020) reported that 57% of healthcare workers had experienced a BEA in the previous 12 months, mainly during injection and blood collection procedures. In Ghana, Donkor *et al.* (2021) reported a prevalence of 64.5%, while in Tanzania, Bimatee *et al.* (2023) found a prevalence of 51.2% among nurses and laboratory technicians, with substantial underreporting of incidents.

A recent meta-analysis by Yassin *et al.* (2023), based on 24 African studies, estimated the average prevalence of BEAs at 55.2%, confirming the regional magnitude of the problem and the urgent need to strengthen preventive measures and post-exposure follow-up systems.

In the Democratic Republic of Congo (DRC), available data on BEAs remain fragmented and poorly documented, particularly in regions affected by humanitarian crises. In Ituri Province, and more specifically in the city of Bunia, the situation is exacerbated by insecurity, massive population displacement, and the deterioration of health infrastructure. Health centers often operate under precarious conditions characterized by insufficient personal protective equipment, lack of systematic Hepatitis B vaccination, absence of standardized post-exposure management protocols, and staff overload. This fragile environment greatly increases the vulnerability of healthcare workers to blood-borne infections, jeopardizing both their safety and the quality of patient care.

In such a context, understanding the extent and determinants of BEAs is essential for informing public health policies and strengthening the culture of occupational safety in healthcare facilities. Assessing the prevalence and associated factors of BEAs helps identify gaps in prevention systems, promote safe practices, and guide the implementation of effective protection strategies for healthcare personnel.

Therefore, the present study aims to assess the prevalence and associated factors of blood exposure accidents among healthcare professionals working in the health centers of Bunia City.

II. METHODOLOGY

This descriptive cross-sectional study was conducted between May and August 2025 in the Bunia Health Zone, located in the Democratic Republic of Congo a region affected by recurrent humanitarian crises that have weakened the working conditions of healthcare professionals. A total of 20 health centers were selected for this study.

The study population consisted of healthcare professionals working in these facilities, including mainly nurses, midwives, laboratory technicians, and nursing assistants. All professionals with at least six months of work experience in their respective facilities and who provided informed consent were included. Trainees, students in training, and professionals absent during the data collection period were excluded. The sample size was set at 123 participants, reflecting the availability and proportional distribution of healthcare workers across the selected centers.

Data were collected using a structured and pre-tested questionnaire administered face-to-face by trained interviewers. The questionnaire covered sociodemographic and professional characteristics, the history and frequency of blood exposure accidents (BEAs), as well as the circumstances surrounding these exposures. The dependent variable was the occurrence of a BEA (yes/no), while the independent variables included age, sex, professional experience, and department of assignment.

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Data analysis was performed using SPSS software version 27. Descriptive analyses were used to summarize the data in terms of frequencies, percentages, and means. The association between independent variables and the occurrence of BEAs was assessed using the Chi-square test or Fisher's exact test, as appropriate. A binary logistic regression model was applied to identify factors independently associated with BEAs, with a significance level set at $p < 0.05$.

III. RESULTS

Table 1. Prevalence of Blood Exposure Accidents During the Past 12 Months Among Healthcare Professionals

Variables	Categories	N = 123	Yes (n = 94)	%	No (n = 29)	%	OR (95% CI)	p-value
Age (years)	< 25	19	11	57.89	8	42.11	0.3479 (0.1243–0.9734)	0.207
	25–34	40	32	80.00	8	20.00	1.2537 (0.5012–3.1359)	
	35–44	39	29	74.36	10	25.64	0.8477 (0.3509–2.0478)	
	45–54	15	13	86.67	2	13.33	2.1667 (0.4593–10.2198)	
	≥ 55	10	9	90.00	1	10.00	2.9647 (0.3595–24.4463)	
Sex	Male	48	36	75.00	12	25.00	0.8793 (0.3766–2.0531)	0.766
	Female	75	58	77.33	17	22.67	1.1373 (0.4871–2.6554)	
Years of experience	< 1 year	12	6	50.00	6	50.00	0.2614 (0.0771–0.8863)	**0.026**
	1–5 years	33	23	69.70	10	30.30	0.6155 (0.2506–1.5118)	
	6–10 years	28	21	75.00	7	25.00	0.9041 (0.3396–2.4072)	
	> 10 years	50	44	88.00	6	12.00	3.3733 (1.2590–9.0387)	
Profession	Nurse	76	58	76.32	18	23.68	0.9846 (0.4176–2.3213)	0.685
	Laboratory technician	23	19	82.61	4	17.39	1.5833 (0.4917–5.0984)	
	Nursing aide	11	7	63.64	4	36.36	0.5029 (0.1362–1.8573)	
	Midwife	13	10	76.92	3	23.08	1.0317 (0.2640–4.0326)	
Department	Laboratory	31	21	67.74	10	32.26	0.5466 (0.2208–1.3532)	0.231
	Maternity	25	23	92.00	2	8.00	4.3732 (0.9648–19.8235)	
	Observation room	45	35	77.78	10	22.22	1.1271 (0.4710–2.6970)	
	Outpatient clinic	15	10	66.67	5	33.33	0.5714 (0.1782–1.8328)	
	Others	7	5	71.43	2	28.57	0.7584 (0.1392–4.1328)	

The table shows that the overall prevalence of occupational blood exposure accidents (OBEAs) among healthcare professionals is 76.4%**.** Age and sex were not statistically associated with OBEAs ($p = 0.207$ and $p = 0.766$, respectively), although professionals aged 55 years and above showed the highest prevalence **(**90%**).** In contrast, work experience was significantly associated with OBEAs ($p = 0.026$): professionals with less than one year of experience were less exposed (50%**,** OR = 0.26; 95% CI: 0.08–0.89), while those with more than 10 years of experience had an increased risk (88%**,** OR = 3.37; 95% CI: 1.26–9.04). Differences observed according to profession and department of assignment were not statistically significant ($p = 0.685$ and $p = 0.231$, respectively), despite a high prevalence in maternity wards (92%)**.**

Table 2. Frequency of Occupational Blood Exposure Accidents (OBEAs) Among Respondents

Variables	Categories	N = 94	Once n = 34 (36.17%)	2–3 times n = 33 (35.11%)	More than 3 times n = 27 (28.72%)	p-value
Age	< 25 years	11	2 (18.18)	4 (36.36)	5 (45.45)	0.293
	25–34 years	32	11 (34.38)	13 (40.63)	8 (25.00)	
	35–44 years	29	15 (51.72)	8 (27.59)	6 (20.69)	
	45–54 years	13	5 (38.46)	5 (38.46)	3 (23.08)	

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Variables	Categories	N = 94	Once n = 34 (36.17%)	2–3 times n = 33 (35.11%)	More than 3 times n = 27 (28.72%)	p-value
	≥ 55 years	9	1 (11.11)	3 (33.33)	5 (55.56)	
Sex	Male	36	13 (36.11)	15 (41.67)	8 (22.22)	0.455
	Female	58	21 (36.21)	18 (31.03)	19 (32.76)	
Years of experience	< 1 year	6	1 (16.67)	1 (16.67)	4 (66.67)	0.231
	1–5 years	23	10 (43.48)	10 (43.48)	3 (13.04)	
	6–10 years	21	6 (28.57)	7 (33.33)	8 (38.10)	
	> 10 years	44	17 (38.64)	15 (34.09)	12 (27.27)	
Profession	Nurse	58	24 (41.38)	21 (36.21)	13 (22.41)	0.322
	Laboratory technician	19	8 (42.11)	5 (26.32)	6 (31.58)	
	Nursing aide	7	1 (14.29)	3 (42.86)	3 (42.86)	
	Midwife	10	1 (10.00)	4 (40.00)	5 (50.00)	
Department	Laboratory	21	10 (47.62)	9 (42.86)	2 (9.52)	0.154
	Maternity	23	6 (26.09)	7 (30.43)	10 (43.48)	
	Observation unit	35	16 (45.71)	11 (31.43)	8 (22.86)	
	Consultation	10	1 (10.00)	4 (40.00)	5 (50.00)	
	Others	5	1 (20.00)	2 (40.00)	2 (40.00)	

This table shows that among the 94 healthcare professionals who reported an occupational blood exposure accident (OBEA), the majority had been exposed once or two to three times in the past 12 months, representing 36.2% and 35.1%**,** respectively, while 28.7% experienced more than three episodes. The frequency of OBEAs did not vary significantly by age (p = 0.293), sex (p = 0.455), work experience (p = 0.231), profession (p = 0.322), or department of assignment (p = 0.154), although some trends were observed. Repeated exposures were proportionally more frequent among participants under 25 years and those aged 55 years and above, among professionals with less than one year of experience**,** midwives, and those working in maternity and consultation departments**.**

Table 3. Occupational Blood Exposure Accidents by Clinical Activities and Respondent Characteristics

Variables	Categories	N = 94	Injection n=40 (42.55%)	Blood Sampling n=30 (31.91%)	Surgery n=2 (2.13%)	Post-Procedure Cleaning n=22 (23.40%)	p-value
Age	< 25 years	11	6 (54.55)	4 (36.36)	0 (0.00)	1 (9.09)	0.553
	25–34 years	32	14 (43.75)	10 (31.25)	1 (3.13)	7 (21.88)	
	35–44 years	29	12 (41.38)	10 (34.48)	0 (0.00)	7 (24.14)	
	45–54 years	13	7 (53.85)	3 (23.08)	0 (0.00)	3 (23.08)	
	≥ 55 years	9	1 (11.11)	3 (33.33)	1 (11.11)	4 (44.44)	
Sex	Male	36	15 (41.67)	14 (38.89)	2 (5.56)	5 (13.89)	0.095
	Female	58	25 (43.10)	16 (27.59)	0 (0.00)	17 (29.31)	
Years of Experience	< 1 year	6	3 (50.00)	1 (16.67)	0 (0.00)	2 (33.33)	0.754
	1–5 years	23	9 (39.13)	10 (43.48)	1 (4.35)	3 (13.04)	
	6–10 years	21	7 (33.33)	7 (33.33)	0 (0.00)	7 (33.33)	
	> 10 years	44	21 (47.73)	12 (27.27)	1 (2.27)	10 (22.73)	
Profession	Nurse	58	32 (55.17)	14 (24.14)	1 (1.72)	11 (18.97)	0.000

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Variables	Categories	N = 94	Injection n=40 (42.55%)	Blood Sampling n=30 (31.91%)	Surgery n=2 (2.13%)	Post-Procedure Cleaning n=22 (23.40%)	p-value
	Laboratory Technician	19	3 (15.79)	13 (68.42)	0 (0.00)	3 (15.79)	
	Nursing Assistant	7	4 (57.14)	2 (28.57)	0 (0.00)	1 (14.29)	
	Midwife	10	1 (10.00)	1 (10.00)	1 (10.00)	7 (70.00)	
Department	Laboratory	21	8 (38.10)	8 (38.10)	1 (4.76)	4 (19.05)	0.856
	Maternity	23	12 (52.17)	7 (30.43)	1 (4.35)	3 (13.04)	
	Observation Ward	35	14 (40.00)	12 (34.29)	0 (0.00)	9 (25.71)	
	Consultation	10	4 (40.00)	2 (20.00)	0 (0.00)	4 (40.00)	
	Others	5	2 (40.00)	1 (20.00)	0 (0.00)	2 (40.00)	

This table shows that blood exposure accidents (BEAs) related to injections represented the highest proportion (42.6%), followed by blood sampling (31.9%), post-procedure cleaning (23.4%), and, to a lesser extent, surgical procedures (2.1%). By age group, injection-related BEAs were most common among healthcare workers aged under 25 years (54.6%) and 45–54 years (53.9%)**.** Regarding sex, male professionals reported more accidents during blood sampling (38.9%) and surgery (5.6%), whereas female workers were more frequently exposed during cleaning activities (29.3%), though the difference was not statistically significant (p = 0.095).

In relation to professional experience**,** no significant association was observed (p = 0.754), although injection-related BEAs were more frequent both among professionals with less than one year of experience (50%) and those with over 10 years (47.7%)**.** Conversely, a highly significant difference was noted according to profession (p < 0.001)**:** nurses were most affected during injections (55.2%), laboratory technicians during blood sampling (68.4%), and midwives during cleaning activities (70%).

Finally, the distribution by department showed no significant difference (p = 0.856), although injection-related BEAs were more frequent in maternity wards (52.2%)**,** while cleaning-related exposures were more often reported in consultation units (40%)**.**

IV. DISCUSSION

- *Prevalence of Blood Exposure Accidents Among Healthcare Professionals in the Past 12 Months*

The findings of this study revealed that the prevalence of blood exposure accidents (BEAs) among healthcare professionals in Bunia over the past 12 months was 76.4%**,** indicating an alarmingly high level of occupational exposure. This rate far exceeds the averages reported in several studies conducted in similar contexts across sub-Saharan Africa, where prevalence typically ranges between 40% and 65% (Amare *et al.*, 2022; Atukunda *et al.*, 2021; Donkor *et al*., 2021; Yenesew *et al.*, 2021).

In Ethiopia, Amare *et al*. (2022) reported a prevalence of 54.4%**,** while in Uganda, Atukunda *et al*. (2021) found an annual exposure rate of 46.5%**,** mainly during invasive procedures. Similarly, Donkor *et al*. (2021) reported 64.5% in Ghana, Isa *et al.* (2020) recorded 57% in Nigeria, and Bimatee *et al*. (2023) observed 51.2% in Tanzania. Furthermore, a recent African meta-analysis by Yassin *et al*. (2023) estimated the average prevalence at 55.2%**.**

Thus, the rate recorded in Bunia (76.4%) is markedly higher than these regional estimates, suggesting increased vulnerability in this fragile humanitarian setting, characterized by insecurity, lack of protective equipment, and excessive workload. The absence of a statistically significant association between age**,** sex, and BEA occurrence (p = 0.207 and p = 0.766, respectively) aligns with findings from Yenesew *et al.* (2021) in Ethiopia and Donkor *et al*. (2021) in Ghana, who also found no significant relationship between these demographic variables and exposure risk. This suggests that BEAs are not directly determined by demographic factors but rather by working conditions and safety practices**.** However, the particularly high prevalence among professionals aged 55 years and above (90%) may reflect cumulative exposure over time or a possible relaxation in adherence to safety measures among experienced workers, as also noted by Sarki *et al*. (2020) in Nigeria.

The significant association between professional experience and BEA occurrence (p = 0.026) observed in this study supports this interpretation. Professionals with more than 10 years of experience were at significantly higher risk (88%, OR = 3.37) compared to those with less than one year (50%, OR = 0.26). This finding corroborates the observations of Bimatee et al. (2023) and Amare *et al*. (2022), who noted that experienced workers often engaged in complex procedures are more frequently exposed, possibly due to professional

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overconfidence or the nature of high-risk clinical tasks they perform. Conversely, newly recruited staff, still in a learning phase, may exhibit greater vigilance and better compliance with standard precautions.

Although differences by profession and work department did not reach statistical significance ($p = 0.685$ and $p = 0.231$, respectively), the particularly high prevalence in maternity wards (92%) deserves attention. These findings echo those of Atukunda *et al.* (2021) in Uganda and Donkor *et al.* (2021) in Ghana, who highlighted the high exposure of midwives and nurses working in obstetrics especially during deliveries, episiotomies, and postpartum care where contact with blood is frequent and often unpredictable.

These results carry several important implications. First, they underscore the urgent need to strengthen BEA prevention programs in Bunia's health facilities through regular staff training on standard precautions**,** proper use of personal protective equipment (PPE)**,** and implementation of post-exposure reporting and management protocols**.** Second, they call for greater institutional and governmental commitment to prioritizing healthcare worker safety, particularly in humanitarian crisis zones where working conditions are severely compromised. Finally, the findings support the adoption of a zero-tolerance policy for preventable exposures**,** supported by systematic hepatitis B vaccination**,** availability of post-exposure prophylaxis (PEP), and robust monitoring and follow-up systems in all health facilities.

- *Frequency of Blood Exposure Accidents (BEAs) Among Respondents*

Among the 94 healthcare professionals who reported at least one blood exposure accident (BEA), the majority experienced one or two exposures during the previous 12 months (36.2% and 35.1%, respectively), while 28.7% suffered more than three incidents. These results indicate a high frequency of recurrent exposures, highlighting the persistent biological risk to which healthcare workers in the studied facilities are subjected.

Comparable findings have been reported in other African contexts. In Ethiopia, Kebede *et al.* (2020) found that 34.5% of healthcare workers had experienced at least two exposures within the previous year, while Ngugi *et al.* (2021) in Kenya observed 29% of professionals exposed repeatedly over a 12-month period. Similarly, Atukunda *et al.* (2021) in Uganda reported that nearly one-third of hospital staff had experienced multiple exposures, illustrating the ongoing vulnerability of healthcare workers handling blood and sharp instruments in East African hospitals.

In the present study, no statistically significant association was found between BEA frequency and age, sex, professional experience, occupation, or department ($p > 0.05$). This absence of association is consistent with the findings of Amare *et al.* (2022) in Ethiopia and Tetteh *et al*. (2020) in Ghana, who reported that no major sociodemographic variable significantly predicted the occurrence of BEAs. Nonetheless, some notable trends emerged: higher exposure frequencies among professionals under 25 years and those aged 55 and above, as well as among midwives and maternity staff.

These trends may be explained by differing work conditions. Younger professionals often lack adequate experience and practical infection prevention training (Alemayehu *et al.,* 2021), whereas older workers may experience fatigue or complacency in adhering to safety practices (Bekele *et al.*, 2020). The overrepresentation of BEAs in maternity and outpatient departments aligns with the observations of Iliyasu *et al.* (2022) in Nigeria, who found significantly higher exposure rates in obstetric units due to frequent handling of contaminated instruments and heavy workloads. These patterns highlight the complex relationship between workload pressure, limited availability of personal protective equipment (PPE), and the risk of accidental exposure (Yenesew *et al.*, 2021).

The findings emphasize the urgent need to strengthen continuous training programs, particularly targeting newly recruited staff and those working in high-risk departments. Establishing a systematic surveillance and reporting mechanism for BEAs, ensuring uninterrupted access to PPE and post-exposure prophylaxis (PEP), and promoting a strong institutional safety culture are critical measures. Furthermore, proactive supervision and leadership commitment are essential to ensure the consistent application of safety protocols and to reduce the recurrence of BEAs among healthcare workers in resource-limited and crisis-affected settings.

- *Blood Exposure Accidents (BEAs) by Clinical Activities and Respondent Characteristics*

Blood exposure accidents (BEAs) related to injections represented the highest proportion (42.6%), followed by blood sampling (31.9%), post-procedure cleaning (23.4%), and, to a lesser extent, surgical procedures (2.1%). These patterns confirm that handling needles and sharp instruments remains the primary source of blood exposure in healthcare facilities across Ituri.

Comparable findings have been reported in several African contexts. In Ethiopia, Amare *et al.* (2022) found that 47.3% of BEAs were associated with injections and 28.5% with blood draws. Similarly, Ngugi *et al.* (2021) in Kenya identified injections (41.8%) and laboratory procedures (33.2%) as the main high-risk activities. In Nigeria, Iliyasu *et al.* (2022) also reported a predominance of BEAs linked to the handling of used needles, often due to improper management of sharps waste and the absence of safety-engineered devices.

Findings from the present study further indicate that younger professionals (<25 years) and those aged 45–54 years were more frequently involved in injection-related BEAs. This dual trend may reflect, on one hand, the lack of experience and

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haste among younger healthcare workers, and on the other, work overload or reduced attention among older ones. These results align with those of Kebede *et al.* (2020), who reported a higher frequency of percutaneous injuries among early-career nurses, and Bekele *et al.* (2020), who emphasized the role of occupational fatigue and complacency in safety practices among long-serving staff.

Regarding sex, no statistically significant difference was observed ($p = 0.095$), although men reported more accidents during blood sampling and surgical procedures, while women were more exposed during cleaning tasks. These findings are consistent with those of Tetteh *et al.* (2020) in Ghana, who also found no significant association between sex and BEAs, though similar trends were noted in the distribution of clinical duties.

Analysis by profession revealed a highly significant difference ($p < 0.001$). Nurses were most frequently exposed during injections (55.2%), laboratory technicians during blood sampling (68.4%), and midwives during post-procedure cleaning (70%). These findings confirm the high exposure risk among paramedical staff directly involved in invasive procedures, as previously reported by Atukunda *et al.* (2021) in Uganda and Yenesew *et al.* (2021) in their systematic review on adherence to standard precautions. In those studies, nurses were consistently identified as the most exposed group, owing to their frequent engagement in high-risk procedures and repeated handling of contaminated materials.

Although the distribution of BEAs by department was not statistically significant ($p = 0.856$), a higher frequency was observed in maternity wards (52.2% for injections) and outpatient departments (40% for cleaning activities). This trend is consistent with findings by Iliyasu *et al.* (2022) and Alemayehu *et al.* (2021), who linked the occurrence of BEAs in maternity and outpatient services to high workloads, occupational stress, and limited availability of personal protective equipment (PPE).

These findings underscore the need for a targeted prevention approach to BEAs based on professional category and activity type. Strengthening practical training on the safe handling of needles and sharp instruments, ensuring the continuous availability of PPE, and promoting a strong workplace safety culture are essential measures. Moreover, the development of service-specific protocols (e.g., for maternity and laboratory units) and routine monitoring of exposure events should be institutionalized to reduce risks. Additionally, the introduction of safety-engineered devices (e.g., auto-disable needles, safety boxes) and the continuous supervision of best practices should be established as priorities for hospitals in the Ituri region.

V. CONCLUSION

This study highlights an alarming prevalence of blood exposure accidents 76.4% among healthcare professionals in the health centers of Bunia, revealing a persistent vulnerability of health workers to biological risks. Professional experience emerged as a key determinant: senior staff, often involved in repeated invasive procedures, faced a higher risk, while less experienced workers were vulnerable due to limited practical training and insufficient mastery of safe techniques. The most hazardous activities included injections, blood sampling, and post-procedure cleaning, confirming the predominance of percutaneous exposures. Nurses, laboratory technicians, and midwives represented the most exposed categories due to their frequent and direct contact with blood and other biological fluids.

In the fragile context of Bunia characterized by the aftermath of armed conflict and resource scarcity this high prevalence reflects systemic deficiencies, including insufficient personal protective equipment (PPE), limited continuing education, and low adherence to safety protocols. These conditions heighten the risk of transmission of major pathogens such as HIV, HBV, and HCV, endangering both healthcare workers and patients.

To address these challenges, it is crucial to strengthen training and supervision on BEA prevention and management, ensure the continuous availability of protective and safety equipment, and establish an effective reporting, monitoring, and post-exposure prophylaxis system, including systematic hepatitis B vaccination. Furthermore, promoting an institutional culture of occupational safety, based on accountability and continuous awareness, remains essential.

In summary, this study underscores the urgent need to develop local, sustainable, and context-adapted strategies in the humanitarian setting of Ituri to reduce BEAs and safeguard the health of healthcare personnel the central pillar of the health system.

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