

To cite this article: PAMI KAKUNDA Liévin, KAKULE LWANGA, Dr BAFENO LYANDE Ley, TAGOTO TEPUNGIPAME Alliance, BASANDJA LONGEMBE Eugène, PANDA LUKONGO KITRONZA, and LOSIMBA LIKWELA Joris (2025). PREVENTION AND MANAGEMENT OF BLOODBORNE EXPOSURE INCIDENTS IN KISANGANI MILITARY HOSPITAL FACILITIES. RESEARCH PROTOCOL, International Journal of Applied Science and Engineering Review (IJASER) 6 (4): 48-55 Article No. 237 Sub Id 350

---

## PREVENTION AND MANAGEMENT OF BLOODBORNE EXPOSURE INCIDENTS IN KISANGANI MILITARY HOSPITAL FACILITIES. RESEARCH PROTOCOL.

PAMI KAKUNDA Liévin<sup>1</sup>, KAKULE LWANGA<sup>2</sup>, Dr BAFENO LYANDE Ley<sup>3</sup>, TAGOTO TEPUNGIPAME Alliance<sup>2</sup>, BASANDJA LONGEMBE Eugène<sup>2</sup>, PANDA LUKONGO KITRONZA<sup>2</sup>, LOSIMBA LIKWELA Joris<sup>2</sup>

<sup>1</sup>Military Hospital of the Third Defense Zone, Kisangani, Democratic Republic of the Congo.

<sup>2</sup>University of Kisangani, Faculty of Medicine and Pharmacy, Department of Public Health, Democratic Republic of the Congo

<sup>3</sup>Higher Institute of Medical Techniques of Yangambi, Democratic Republic of the Congo

DOI: <https://doi.org/10.52267/IJASER.2025.6403>

### ABSTRACT

**Introduction:** Bloodborne exposure incidents represent a permanent and major hazard for healthcare personnel. This study aims to assess the knowledge and factors associated with bloodborne exposure incidents among healthcare professionals in military healthcare facilities in Kisangani, Tshopo Province, Democratic Republic of Congo.

**Methodology:** A cross-sectional study will be conducted in four military healthcare facilities in Kisangani. Data will be collected using a questionnaire and an observation guide. The study population will include various categories of healthcare professionals, notably physicians, nurses, laboratory technicians, and administrative staff.

**Expected Results:** The expected results will focus on the sociodemographic characteristics of the respondents, the respondents' knowledge of bloodborne exposure incidents, the respondents' practices regarding the prevention of bloodborne exposure incidents, the prevalence of bloodborne exposure incidents, and institutional policies regarding bloodborne exposure incidents, as well as the analysis of factors associated with bloodborne exposure incidents among healthcare providers in military facilities in Kisangani.

**Conclusion:** The results of this study will provide a situational analysis of bloodborne exposure incidents in military healthcare institutions and will allow for the formulation of recommendations for their prevention.

**KEYWORDS:** bloodborne exposure incidents, Military healthcare facilities, prevention, management, Kisangani.

## INTRODUCTION

Bloodborne exposure incidents (BEIs) are defined as any contact with blood or a biological fluid containing blood through a skin breach (puncture, cut) or projection onto a mucous membrane (eye, mouth) or injured skin [1]. BEIs represent a permanent and major hazard for healthcare personnel. Healthcare workers can become victims of BEIs during their daily activities and be exposed to infectious risks. Indeed, numerous pathogens can be transmitted in the event of a BEI. Among these agents, the most feared are the hepatitis B virus (HBV), hepatitis C virus (HCV), and the human immunodeficiency virus (HIV). Their severity is linked to the possibility of inducing chronic viremia and the severity of the infections caused [2]. The World Health Organization (WHO) estimates that 3 million healthcare professionals worldwide are victims of BEIs through needlestick injuries each year. According to this organization, 40% of all viral hepatitis and 4.4% of HIV infections among these hospital workers are attributable to BEIs [3]. In Africa, the WHO has estimated the prevalence of hepatitis B, hepatitis C, and HIV in Algeria to be 11.5%, 2.6%, and 1.3%, respectively [4]. At the CNHU in Cotonou, two out of five people have been victims of BEIs at least once, and cases of repeated accidents are frequent [5]. In Ivory Coast, the prevalence of BEIs was 60% in a multicenter hospital survey conducted by EHOLIE in 1999 [6]. In Mali, Ouologuem [7] at the CHU du Point G reported that the victims of BEIs were mainly nurses (10.7%), laboratory technicians (10.7%), nursing assistants (14.3%), and cleaning staff or surface technicians (3.6%). Regardless of the continent, punctures with a hollow needle containing blood were mainly responsible (up to about 70% of cases in Africa) [8]. In a study conducted in Abidjan, Ivory Coast, on BEI victims, physicians were the most represented (29%), followed by nurses (20%). 51% of the victims were correctly vaccinated against hepatitis B, 83% were placed on antiretroviral therapy (ARV), including 45% on bitherapy and 55% on tritherapy. A policy of training healthcare professionals on BEI prevention was strongly recommended [9]. The results of a study conducted in the intensive care unit found that the risk of BEIs is high in this unit due to the high frequency of medical and paramedical procedures involving contact with blood. Prevention relies primarily on reducing the frequency of these accidents and, in some cases, resorting to post-exposure prophylaxis [10]. The mandatory vaccination of healthcare personnel against hepatitis B theoretically eliminates occupational risk in the event of BEIs, and the widespread use of anti-HIV chemoprophylaxis after exposure, taking into account various factors (severity of exposure, time to treatment, serological status of the source person), are now integral parts of BEI management [11]. In the DRC, as in all developing countries, the frequency of BEIs is high, but

contrasts with the low level of knowledge among healthcare providers about infectious risks and the inadequacy of prevention and management measures. A study conducted in Kinshasa showed that 89% of subjects cited vaccination of healthcare professionals against hepatitis B as an effective means of BEI prevention, needle recapping was observed in 54% of healthcare professionals, 54.9% had already been victims of BEIs, and the most frequent causes of these BEIs were accidental punctures with hollow needles (40.7%), projection of biological fluids onto mucous membranes (32.2%), unprotected contact with wounds (27.5%), and cuts (20.9%) [12]. In another study conducted at BIAMBA MARIE MUTOMBO Hospital in Kinshasa, DRC, 11% of healthcare professionals surveyed were informed of the risk of infection through blood exposure, 18% had already been victims of BEIs, the causes of which were accidental punctures during the administration of care [13]. A study conducted in Isiro in the former Orientale Province on the knowledge, attitudes, and practices (KAP) of healthcare professionals regarding BEIs found that overall knowledge of the three bloodborne viruses (HBV, HCV, HIV) was only 20%, with no difference by sex or department. 60% of professionals had good knowledge of the procedure to follow in case of injury or puncture with instruments [14]. In the city of Kisangani, the extent of this problem and the contributing factors are less elucidated, especially in military healthcare facilities. The objective of this study is to contribute to the preservation of the health of healthcare professionals by reducing the risk of bloodborne exposure incidents and other biological fluids in military healthcare settings in Kisangani. This article is a research protocol that will be implemented later to obtain results.

## II. METHODOLOGY

### 2.1. MATERIALS AND METHODS

#### 1.1.1. STUDY SITE

This study will be conducted in four (4) military hospital facilities in Kisangani. These include the Military Hospital of the 3rd Defense Zone, the Camp Lieutenant General BAHUMA Military Referral Health Center, the Sergeant KETELE Military Referral Health Center, and the Sergeant LOKOSA Training Center Military Referral Health Center in LUBUNGA. All of these military facilities have a package that can intervene in the event of BEIs.

#### 1.1.2. STUDY POPULATION

The study population will consist of healthcare professionals from military hospital facilities. The various military professional categories concerned are: Physicians, Nurses, Laboratory Technicians, biomedical waste managers, pharmacists, and administrative staff.

### 1.2. METHODOLOGY

#### 1.2.1. Study Type and Period

A cross-sectional study with an analytical aim will be conducted during the period from July 10 to September 30, 2023.

#### 1.2.2. Sampling

The sample size will be calculated using the SCHWARTZ formula, based on data on the utilization of all military healthcare providers from July 10 to September 30, 2023, with a proportion of subjects using these services of 21.3%. The significance level was 0.05. The following formula will be used to calculate the sample size:

$$n = \frac{z^2 \cdot p(1-p)}{d^2}$$

n = required sample size; z = 95% confidence level (standard value of 1.96); p = estimated proportion of service utilization (50%); d = margin of error at 5% (standard value of 0.05)

In the end, we took 10% of non-respondents, which is 38, in addition to 384, giving us a sample of 422 respondents, distributed as follows:

#### Proportional sampling of facilities

Structures	Agents	Proportion
Military Hospital of the 3rd Defense Zone	193	45,7%
LOKOSA Training Center Military Referral Health Center	91	21,6%
Lieutenant General BAHUMA Military Referral Health Center	72	17,1%
Sergeant KETELE Military Referral Health Center	66	15,6%
Total	422	100%

### 1.2.3. Inclusion Criteria

All healthcare professionals from military hospital institutions present on the day of data collection and available to answer our questionnaire will be included in this study.

### 1.2.4. Variables of Interest

- Dependent variable:
  - Experienced a bloodborne exposure incident (Yes or No)
- Independent variables:
  - Socio-demographic characteristics: sex, age, qualification, seniority in the service, professional category.
  - Level of knowledge: accidentally transmitted germs, BEI prevention measures, management measures.
  - Provider practices: needle recapping, use of rigid containers for sharps waste, waste disposal techniques.

### 1.2.5. Data Collection Technique

Data will be collected by observation using an observation guide and by interview using a questionnaire.

### 1.2.6. Data Analysis Techniques

Data will be entered into Excel and using STATA 13 software. The description of the socio-demographic characteristics of the providers, the level of knowledge, and practices in the prevention and management of BEIs will be done using proportions for categorical variables, and mean (SD) and median (p75-p25) for quantitative variables. The factors associated with poor adherence to BEI prevention and management measures will be analyzed using Pearson's chi-square test or Fisher's test, depending on the conditions of application. Multivariate analysis by logistic regression will be used.

To evaluate the categorization criteria:

- Provider knowledge: "GOOD" knowledge will correspond to providers who cite the 3 viruses (HIV, HBV, and HCV), at least three prevention measures, and 3 BEI management measures.
- To evaluate institutional policy, we will verify the existence of information on BEI prevention and management measures, the existence of a BEI reporting register, and a clear waste management circuit known to all.
- Good waste management at the institutional level will be evaluated by the presence of hygienic bins, no waste around, TRI organization, disposal by sanitary techniques (incineration or burial).

### 1.2.7. ETHICAL CONSIDERATIONS

Authorizations will be obtained from the military authorities of the various military camps to conduct this survey, along with the approval of UNIKIS and health authorities (DPS and ZS). Informed consent will be obtained from the respondents beforehand. Confidentiality will be respected.

## III. EXPECTED RESULTS

The expected results will focus on the following elements:

**2.1. Socio-demographic characteristics of respondents:** age, seniority in the position, sex, and professional category. These characteristics are indeed described in the literature as likely to influence the occurrence of BEIs among healthcare providers.

**2.2. Respondents' knowledge of bloodborne exposure incidents:** this will be evaluated as previously described in the Materials and Methods chapter.

**2.3. Respondents' practices regarding the prevention of bloodborne exposure incidents:** see the evaluation criteria previously described.

**2.4. Prevalence of bloodborne exposure incidents and institutional policies regarding bloodborne exposure incidents:** these results will determine the proportion of providers who have already been involved in a BEI, the circumstances of occurrence, the available means of protection, training on IPC, and the prevention measures in place.

**2.5. Analysis of factors associated with BEIs among healthcare providers in military facilities in Kisangani:** using factor association tests, socio-demographic characteristics, level of knowledge, and provider practices will be tested to evaluate their association with BEIs.

## CONCLUSION

The results of this study will provide a situational analysis of bloodborne exposure incidents (BEIs) in military healthcare facilities, and will allow for the formulation of recommendations.

## REFERENCES

1. Deuffic-Burban S, Delarocque-Astagneau E, Abiteboul D, et al. Blood-borne viruses in healthcare workers: Prevention and management. *Journal of Clinical Virology*. 2011;52(1):4-10.
2. Tarantola A. Les risques infectieux après accident exposant au sang ou aux liquides biologiques [Infectious risks after accidents exposing to blood or biological fluids]. *Revue d'hygiène et de médecine sociale*. 2007;10.
3. Bouzgarrou L, Kacem I, Henri MA, Kraim A, Kammoun S, Omrane A, et al. Les accidents d'exposition au sang dans le centre hospitalo-universitaire de Mahdia: étude sur sept ans [Blood exposure accidents in the Mahdia University Hospital Center: a seven-year study]. *Revue Tunisienne de Pathologie Pratique et de l'Environnement*. 2015;5.
4. Rapiti E, Pruss-Ustun A, Hutum Y. Sharp's injuries: Assessing the burden of disease from sharp's injuries to health-care workers at national and local levels (Environmental Burden of Disease Series, No. 11). WHO Protection of the Human Environment; 2005.
5. Zannou DM, Ade G, Hougbe F, Fanou SP, Fayomi B, et al. Facteurs épidémiologiques liés aux accidents exposants au sang en milieu hospitalier à Cotonou [Epidemiological factors related to blood exposure accidents in a hospital environment in Cotonou]. *Médecine d'Afrique Noire*. 2006;53(6).
6. Eholie SP, Ehui E, Vebouet-Kouame BY, Simo TA, Tanon A, Coulibaly-Dacoury C, et al. Analyse des pratiques et connaissances du personnel soignant sur les accidents d'exposition au sang à Abidjan (Côte d'Ivoire) [Analysis of practices and knowledge of healthcare personnel on blood exposure accidents in Abidjan (Ivory Coast)]. *Médecine et Maladies Infectieuses*. 2007;37(7):359-68.
7. Ouologuem D. Étude épidémiologique et pronostique des accidents d'exposition au sang dans les services du CHU du Point G [Epidemiological and prognostic study of blood exposure accidents in the departments of the Point G University Hospital Center] (Doctoral dissertation). Université de Bamako; 1995.
8. Tarantola A, Koumare A, Rachline A, Sow PS, Diallo MB, Doumbia S, et al. Descriptive, retrospective study of 567 accidental blood exposures in health-care workers in three West African countries. *Journal of Hospital Infection*. 2005;60(3):276-82.
9. Ehui E, Kra O, Ouattara I, Eholie S, Kakou A, Bissagnéné E, & Kadio A. Management of accidental exposure to blood in the Treichville teaching hospital, Abidjan. *Médecine et Maladies Infectieuses*. 2007;37:S251-S6.

10. Casalino E. Les accidents d'exposition au sang en réanimation: épidémiologie, prévention et prise en charge [Blood exposure accidents in intensive care: epidemiology, prevention and management]. *Médecine Intensive Réanimation*. 2012;21(6):681-7.
11. Raffenne L, Bodard L, Meudec A. Accident d'exposition au sang [Blood exposure accident]. *EMC-médecine*. 2005;2(3):291-9.
12. Di Masuangi EB, Kisaku LB, Nkodila A, & Nsenga JN. Connaissance, attitude et pratiques du personnel soignant sur le risque de contamination par le virus de l'hépatite B à l'Hôpital Général de Référence de l'Institut Médical Evangélique/Kimpese [Knowledge, attitudes and practices of healthcare personnel on the risk of hepatitis B virus contamination at the General Reference Hospital of the Evangelical Medical Institute/Kimpese].
13. Kayembe JM, Mputu P, & Mupepe D. Accidents d'exposition au sang chez les professionnels de santé à l'Hôpital Biamba Marie Mutombo [Blood exposure accidents among healthcare professionals at Biamba Marie Mutombo Hospital]. *Annales Africaines de Médecine*. 2011;10:690-6.
14. Mandanda BN, & Losimba LJ. Connaissances, attitudes et pratiques des professionnels de santé face aux précautions standards en milieu hospitalier [Knowledge, attitudes and practices of healthcare professionals regarding standard precautions in hospitals]. *Santé Publique*. 2013;25(5):663-73.