

	<p>Global Journal of Clinical Medicine and Medical Research [GJCMMR] ISSN: 2583-987X (Online) Abbreviated key title: Glob.J.Clinic.Medici.Medica.Res. Frequency: Monthly Published By GSAR Publishers Journal Homepage Link- https://gsarpublishers.com/journal-gjemmr-home/</p>	
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Blood Exposure Accidents among Healthcare Workers at the Hassan II University Hospital in Fez, Morocco

BY

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Article History

Received: 12/11/2023

Accepted: 24/11/2023

Published: 28/11/2023

Vol – 1 Issue – 5

PP: -42-46

Abstract

Introduction and Objective: Blood exposure accidents (BEA) remain a current problem in the healthcare field. Its prevention must remain a top priority in healthcare facilities. The purpose of this study is to analyze blood exposure accidents that have been recorded in occupational medicine department, in order to determine the profile of these accidents and the mechanisms involved, with the aim of improving and correcting the prevention methods used by healthcare workers.

Materials and Methods: This is a descriptive cross-sectional study of surveillance based on the reporting of blood exposure accidents (BEA) by healthcare worker providers to the occupational physician at Hassan II University Hospital. Our objective is to describe the risk factors associated with BEA, their preventability through compliance to standard precautions, the involved procedures, the used prevention methods, as well as the potential prescription of antiretroviral chemoprophylaxis. The survey was carried using a standardized anonymous questionnaire, allowing the exploitation of the declaration files of the nursing staff working at Hassan II University Hospital between 2021 and January 2023.

Results: A total of 43 blood exposure accidents (BEA) were reported to the occupational medicine department. Among them, 26 cases (60.2%) were needlestick injuries, while 17 cases (39.8%) were cuts. The observed deficiencies are concerning in terms of non-compliance with standard and universal precautions, particularly the recapping of contaminated needles (57.5% of cases). Additionally, 29.3% of the staff do not dispose of contaminated instruments in the designated safety containers. In 2.3% of cases, gloves were not being worn at the time of the injury. These results show a lack of risk awareness due to insufficient training and awareness, as well as a lax attitude of the personnel towards BEA risks. The reported BEA cases only represent a small percentage of the circumstances at Hassan II University Hospital. These numbers are underestimated due to underreporting.

Conclusion: Faced with the systematic underreporting of blood exposure accidents, it is essential for occupational physicians to undertake a crucial task of providing good information to healthcare workers. This information must be continuous and renewed during each medical visit.

Keywords: Blood exposure accidents, healthcare workers, hygiene, safety, prevention.

INTRODUCTION

Blood and body fluid exposures accidents are defined as accidental contact with blood or biological fluid contaminated with blood, resulting from skin penetration (needlestick, cut,

scratch, bite...), exposure to mucous membranes (conjunctiva, mouth...), or injured skin (dermatosis, wound...) [1].

Blood exposure accidents (BEA) are the most frequent work-related accidents in healthcare facilities. The risk of transmitting infectious agents during a BEA involves to all

germs carried by blood or other biological fluids (bacteria, viruses, parasites, and fungi). However, the latter are particularly feared in daily medical practice due to their prevalence in the treated patient, the existence of chronic viremia, the seriousness of infections caused by the hepatitis B (HBV) and C (HCV) viruses, as well as the human immunodeficiency virus (HIV) [1].

Therefore, the prevention of BEA must remain one of the main priorities in healthcare facilities. It is therefore important to rapidly implement a possible post-exposure treatment for healthcare workers who have suffered aBEA in order to avoid the development of seropositivity. Regular biological monitoring is also important, emphasizing the significance of appropriate, effective, and efficient initial management.

In the context of the retrospective evaluation of occupational risks, the objective of this work is to analyze the blood exposure accidents recorded in occupational medicine department in order to determine the profile of these accidents and the mechanisms involved, with the aim of improving and correcting the prevention methods used by healthcare workers.

Methodology

This is a descriptive cross-sectional study focusing on surveillance based on the reporting of blood exposure incidents (BEA) by healthcare workers to the occupational physician at HASSAN II University Hospital. The objective was to record the frequency and type of BEA, the circumstances of their occurrence, and their preventability through compliance to standard precautions, the actions involved, the adopted prevention methods, as well as the potential prescription of antiretroviral chemoprophylaxis.

A standardized anonymous questionnaire was used to analyze the declaration records of healthcare workers employed at HASSAN II University Hospital with the occupational medicine department between 2021 and January 2023.

The questionnaire included five items:

1. Sociodemographic data: age, gender.
2. Professional categorical data: department, job position, professional experience.
3. Characteristics of working conditions related to hygiene and safety: perception of hygiene and safety, use of single-use gloves, hand washing, and disinfection, availability and use of containers, accident mechanism, and action involved.
4. Number of BEA reports.
5. Post-exposure follow-up and potential use of post-exposure chemoprophylaxis.

Results

A number of 43 BEA have been reported to the occupational medicine department: 7 in 2021, 34 in 2022, and 2 in January 2023. The majority of cases (72.1%) involved females. In 45.2% of the cases, the professional experience was between 1 and 2 years, and in 7.1% of the cases, it was greater than 10 years. The distribution of the functions of the exposed victims and their departments is presented in Table 1 and Table 2,

respectively. Needlestick injuries represent 26 cases (60.2%) and cuts represent 17 cases (39.8%).

Table 1: Distribution of personnel affected by BEA in the professional category

Category	Number	Percentage
Resident	23	53.5%
Nursing staff	11	25.6%
Intern	3	7
Extern	3	7
Nursing assistants	1	2.3
Housekeepers	1	2.3
University Hospital	1	2.3

Table 2. Distribution of personnel affected by BEA in the practice department.

Department	Number	Percentage
Resuscitation	4	9.1 %
ORL	6	14.3%
Endocrinology	2	4.8%
Emergency	3	7.1%
Cardiovascular surgery	2	4.8%
Visceral surgery	2	4.8%
Hepato-gastro-enterology	2	4.8%
Central radiology	2	4.8%
Pneumology	1	2.4%
Internal medicine	1	2.4%
Nephrology	2	4.8%
Urology	1	2.4%
Dermatology	4	9.1 %
Neurology	2	4.8%
Pediatrics	3	9.6%
Pathological anatomy	1	2.4%
Neonatal Resuscitation	2	4.8%
Pediatric surgery	1	2.4%
Obstetrics and Gynecology	1	2.4%
Radiotherapy	1	2.4%

Actions involved and mechanisms:

75.5% of these percutaneous accidents occur after needle recapping once the procedure is completed. Needlestick with blood-stained syringes were found on the medical cart (10.75%), on the consultation desk (2.32%), and in one case

forgotten by mistake in the bag after the procedure was performed (2.32%). Other incidents occurred during facility cleaning (6.79%) and during the removal of ill-fitting biopsy trocars (2.32%).

Safety containers were available in all departments where reported BEA cases victims but were not used in 29.3% of cases.

An analysis of the actions involved (Table 3) shows that the majority of recorded BEA are preventable if staff had followed standard precautions.

Table 3: Actions and equipment involved in recorded BEA.

Actions involved	Percentage
Venous sampling	40.5%
Sutures	10%
Placement or removal of perfusion	5%
Intramuscular injection	5%
Subcutaneous injection	2.5%
Removal of a needle from an arteriovenous fistula	5%
Scalp infiltration	5%
Ascites puncture	2.5%
Surgical procedure	2.5%
Placement of a central line	5%
Needlestick injury	2.5%
Lumbar puncture	2.5%
Pleural drainage	2.5%
Placement of a dialysis fistula	2.5%
Blood gas	6.7%
Cleaning of premises	3.3%

At the time of the occurrence, 97.7% of the exposed healthcare workers reported wearing gloves. Following the BEA, 11.9% merely cleaned their hands with soap and water, 28.6% disinfected, and 59.5% followed the washing and disinfection processes.

The serological status of source patients was collected in all departments and revealed a significant prevalence of HBV and HCV: 4 cases (9.3%) of HBV and 3 cases (6.9%) of HCV, compared to 1 case (2.32%) of HIV seropositivity in source patients.

33 (78.6%) of the 43 exposed healthcare workers with HBV immunity status were immunized against hepatitis B. Among them, 15 cases (93.8%) were immune, with an anti-HBS antibody titer exceeding 100 for 56.3% of them and between 10 and 100 for 37.5%. However, 6.3% of the cases were not immune and initiated vaccination against viral hepatitis B, including one pregnant healthcare worker.

The victims of BEA underwent an initial assessment within 12 hours for 46.3% of them, within 48 hours for 29.3%, and within 4 to 6 hours for 24.4%. If no HIV chemoprophylaxis was used, they were also prescribed serological follow-up at one month, three months, and six months, and at two months, four months, and six months if HIV chemoprophylaxis was taken according to the protocol.

In addition, 34.1% of the healthcare workers received chemoprophylaxis. Among these 43 exposed healthcare workers, there were no records of any potential occupational contamination.

Furthermore, 62.8% of those who were contaminated did not begin the administrative process for reporting the occupational accident.

Discussion

The reported BEA incidents reflect the situation at the Hassan II University Hospital to a relatively low extent. These numbers are underestimated due to underreporting, as not all BEA incidents are reported to occupational medicine. In our study, residents (23%) and Nursing staff (11%) reported their incidents more frequently than others, and the declaration rate of BEA incidents is very low compared to the number of incidents observed. This issue was already reported in a survey conducted in 2000, where D. Nidegger et al observed that the most represented professions were nurses (39.5%), doctors (21.8%), and students (13.6%). The majority of these accidents occurred in the surgery (29.2%) and medicine (24.3%) departments [2].

A multicenter survey was conducted in March 2000 in Morocco with a representative sample of 420 participants. The study involved healthcare workers from hospitals and dispensaries in Taza and Témara, as well as a large public medical laboratory in Rabat. The analysis of practices in three healthcare facilities in Morocco showed that the reporting rate probably increases with the specialized nature of the departments, with a reporting rate of 25.6% in surgery, 46.4% in the emergency department, and 66.7% in HIV-oriented department [3]. In our study, 13 (30.23%) cases were reported in surgical, 27 (62.7%) cases in medical, and 3 (6.9%) cases in emergency departments.

A French national survey was conducted among 5,000 randomly selected surgeons to assess their knowledge of risk factors for blood exposure in the operating room and their attitudes in case of an accident [4]. According to this survey, the reasons for underreporting were complex for 57.6% of participating surgeons, medically private for 8.6%, and other reasons for 20.4% [4]. Another cross-sectional descriptive study was conducted in the gynecology and psychiatry departments of a university hospital center in central Tunisia in order to identify factors for non-reporting. Reported elements included lack of perception of the real risk of contamination (16%), length of procedures, and lack of available time (10.6%). Vaccination coverage for hepatitis B and an assessment of vaccination status were ensured for all

participants during the hiring consultation, and the serological profile was known for 70.2% of respondents [5].

Our work did not aim to specify the circumstances of BEA (type of needle involved, work schedules, etc.), but rather to describe the risk factors for the occurrence of BEA. The shortcomings observed remain concerning with regard to non-compliance with standard and universal precautions, in particular, the recapping of contaminated needles (57.5% of cases), especially as 29.3% of healthcare worker do not dispose of contaminated materials in the designated safety containers. Furthermore, in 2.3% of cases, gloves were not worn at the time of the accident. These results indicate a lack of awareness of risks due to a lack of training and education or a lax attitude of healthcare worker towards the risk of BEA.

Our collected data are consistent with the results of the multicenter study conducted in Morocco by Djirri et al [3]. Recapitulation of contaminated needles is still practiced in 75% of cases (199/267 responses) regardless of the site or professional category [3]. Material contaminated with blood is left on the work surface in 15.5% of cases (39/252). In our study, we observed needlestick injuries caused by contaminated syringes found on the medical cart in 10.75% of cases, on the consultation desk in 2.32% of cases, and in a single case, the syringe was accidentally left in the pocket after the procedure.

As part of the surveillance conducted by the BEA network of the Paris Coordination Center for the Control of Nosocomial Infections, data on 121 BEA reported to occupational medicine by healthcare workers in dialysis departments between January 1995 and December 1999 in 54 hospitals show that the connection and disconnection of dialysis, blood sampling, and injections were responsible for about three out of four reported accidents (46.3%, 14.9%, and 11.6% respectively for a total of 72.8%) [6]. In our study, the most involved procedures were venous blood sampling (40.5%), sutures (10%), and blood gas (6.7%).

Regarding waste management and disposal of contaminated objects, safety containers are available in all declared BEA victim departments, but they are not used in 29.3% of cases. Similar results were observed in a multicenter study conducted in Morocco, where it was found that containers designed to collect and facilitate the disposal of contaminated objects and needles were very insufficient for 78% of those surveyed. With regard to waste disposal, this operation is carried out in 98% of cases in Taza, 79% in Témara, and 66% in Rabat, according to the designated circuit for this operation [3]. Additionally, the effectiveness of disinfection procedures after a BEA is only satisfactory in 42.5% of the studied population [3]. In our study, we found that 59.5% of cases comply with washing and disinfection procedures.

Currently, healthcare workers who are vaccinated and immunized against hepatitis B virus are mainly exposed to hepatitis C virus (HCV) and human immunodeficiency virus (HIV). In addition, according to the UK Center for Disease Surveillance and Control, seven out of 35 confirmed cases of HCV seroconversion among healthcare workers in France

occurred in the dialysis department, and one case of confirmed contamination and three possible cases of occupational HIV contamination also occurred in the dialysis department [6].

It should be noted that the risk of transmission between healthcare workers and patients must also be considered. This risk is very low for HIV (three published episodes) and HCV (at least ten episodes of contamination) [1]. However, it is more important for HBV (at least 50 published episodes) and can pose a problem of fitness for work when a worker is in the active viral replication phase during professional activities [1]. The prevention of BEA is a priority in terms of health and safety in healthcare environment. The consequences of BEA are significant in terms of healthcare costs for workers and financial costs for hospitals [2].

The management of BEA has a significant economic impact. Few studies have evaluated the actual cost generated by these accidents. A retrospective study included all BEA occurred at the University Hospital Center of Poitiers during the year 2000. The elements involved in the cost of BEA showed that the management of these accidents included consultations, antiretroviral treatments, biological exams, and the time lost by the agent. This evaluation showed that the management of these accidents at the University Hospital Center of Poitiers represented a significant cost for the year 2000 (68,310 euros), both in terms of consultations (11,122 euros), biological exams (45,995 euros), and antiretroviral treatments (5,067 euros). The cost related to the time spent by the agent for the management of his accident amounted to 6,126 euros [2].

Hence, the implementation of a prevention approach based on the compliance with standard precautions in healthcare is of great interest. These precautions, set by the CDC to prevent the risk of blood exposure accidents, are easy to implement, require acceptable financial investments, and significantly reduce the incidence rate of BEA [6;7]. These measures prevent a priori the risk of nosocomial infection in patients and the risk of occupational contamination in healthcare workers. It should be noted that employers must train healthcare workers in BEA prevention and provide them with means of protection [8].

To address these dysfunctions, simple solutions can be adopted [1]:

- The management of BEA should be adapted to the reality of the risk generated by healthcare activities, reflect the consensus followed by the multidisciplinary care team (HIV reference physician, occupational physician, biologist, etc.), and be the subject of a written protocol displayed in all relevant departments.
- Systematic consultation with the HIV reference physician in case of doubt about the need to initiate antiretroviral triple therapy. the establishment of support systems such as a free telephone line (toll-free number) accessible to all caregivers wishing to learn about post-exposure chemoprophylaxis [9].

- The systematic consultation of victims with the occupational physician to review together the circumstances of the occurrence of the BEA and to prescribe appropriate serological follow-up.
- Raising awareness among staff about the importance of preventive measures and serological follow-up. Among the factors contributing to under-declaration, we can cite under-estimating the risk, the restrictive nature of the administrative declaration, and the follow-up virological. Factors external to the establishment are involved; impact on life as a couple, constraints of the anti-retroviral prophylaxis, difficulty in considering the possibility of a chronic viral infection, the prognosis of which remains pejorative[10]. Furthermore, there is also an association between seniority inferior to 2 years and an BEA [11].

The commitment of the establishment's management, especially through the purchase of safety equipment, is essential. They must also make every effort to make BEA largely avoidable through compliance with standard precautions, proper organization of care, and the provision of safety equipment [1]. The creation of occupational health services in hospital facilities should contribute to improve working conditions, make hepatitis B vaccination, and lead to more information and education on hazards related to occupational blood exposure for healthcare personnel[12].

In order to evaluate this management, a questionnaire can easily be filled out by occupational physicians to identify the essential steps for an appropriate, effective, and efficient management. It can be considered as a simple follow-up indicator to assess the compliance and adherence to the procedure for the management of BEA [1].

Conclusion

The data from this study requires reflection on the practices and prevention of safety risks among healthcare workers at Hassan II University Hospital. The implementation of adequate preventive measures should significantly reduce the occurrence of work accidents that could lead to contamination among healthcare worker and exceptionally among patients.

Référence

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