

Characterization of Accidental Exposure to Blood (Aeb) and Their Occupational Determinants in Basic Health Care institutions in the Province of Larache

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Abstract

Accidental exposure to blood (AEB) are a risk faced daily by health personnel working in public health institutions, especially in institutions resident in the province of LARACHE. This study aims to evaluate the prevalence of AEB in health institutions in the province of LARACHE and to identify their main determinants.

We carried out a cross-sectional, descriptive study with an analytical aim over a period of one month. A total of 102 professionals agreed to participate in the study.

Sixty-two of them were victims of a blood exposure accident (BEE), 45.1 of them were nurses and only 46.1 of these victims were vaccinated against hepatitis B.

16% of the respondents are practicing in the department of medicine (many victims collected), regarding the most significant mechanism of occurrence of the accident was dominated by the prick during injections (23.5%).

The most frequent cause was overwork (35.3%), the reporting rate was very low. No contamination was recorded and several risk factors for the occurrence of AEB were revealed (technical, organizational, related to human reliability ...).

In conclusion: this study demonstrates the need to integrate health care personnel into a global safety approach within health care institutions (training cycle, evaluation of professional situations, notification and declaration of victim cases, etc.).

Keywords: Aeb, Organizational Aspects, Working Conditions, Hospital Environment, Bad Practice, Caregivers.

1 INTRODUCTION

An accidental exposure to blood (AEB) refers to any contact with blood or a biological fluid containing blood and involving either a skin break (puncture or cut) or a splash on a mucous membrane (eye, mouth) or injured skin (DE LAROCHE et al, 2019).

Accidental exposure to blood (AEB) are among the most frequent risks in hospitals. They are a real concern for healthcare professionals because of the seriousness of the conditions they cause.

The seriousness of the risk of transmission of an infectious agent during an AEB concerns all blood-borne germs (bacteria, viruses, parasites and fungi), but the human immunodeficiency virus (HIV), the hepatitis B virus (HBV) and the hepatitis C virus (HCV) (TARANTOLA, 2003; ABITEBOUL et al., 2010) represent most of the cases of occupational infection described in the literature.

However, the existence of certain factors related to hospital specificity increases the occupational infectious risk through exposure to biological products (blood). Indeed, the daily contact of some health care personnel with blood, the night work related to the obligation to ensure a permanent service, the involvement in the management of highly contagious infectious pathologies (HIV, HBV, HCV), invasive gestures (surgical interventions) with

high bleeding rates, the diversity and delicacy of some care acts and the pressure of emergency situations (DIEDHIOU *et al.*, 2019)

In addition, the absence of vaccination against hepatitis B, the lack of knowledge of patients' serological status and work overload reflect the most significant ergonomic constraints in the care setting (KASSBI *et al.*, 2020).

In this context, the evaluation of the socio-professional characteristics of blood exposure accidents is essential to classify, analyze and manage occupational situations at risk.

The objective of this work is to answer the following question: what are the socio-professional determinants that promote the exposure of caregivers to AEB?

2 MATERIALS AND METHODS

This cross-sectional and descriptive study was conducted over a period of one month (February 1-March 1, 2021) in the basic health care institutions residing in the delegation of LARACHE, located in the north of Morocco in the region of TANGIER-TETOUAN-ALHOCEIMA.

These institutions include 2 hospitals (Lalla Meriem Hospital in LARACHE and the local hospital in KSAR EL KEBIR) and 25 urban and rural health centers.

To carry out this study, we collected data using an anonymous questionnaire intended for the entire health care staff according to their different professional categories: doctors, surgeons, specialists, pharmacists, midwives, nurses and health care technicians.

This questionnaire included several sections providing information on the socio-professional characteristics of the victims, the context of blood exposure accidents (circumstances, mechanisms, place of occurrence), the vaccination status of the victims, the reporting system, the management procedure, and the factors favoring these accidents.

Our study population consisted of health care personnel working in public health care institutions in the province of LARACHE.

The data collected were processed with Microsoft Excel version 2017, the consent of the participants was obtained in a written, free and informed manner.

Ethical considerations such as voluntary participation and confidentiality of information were respected.

3 RESULTS

3.1 Socio-Professional Characteristics

A total of 102 of the healthcare professionals agreed to participate in this study; sixty-two of them had been victims of an AEB. Women represented 62.7% (n=64) and men only 37.3% (n=38).

The most representative socio-professional segmentation was nurses: 45.1% (n=46) (see Table 1); the most representative health care services in this study were general medicine (15.68%), maternity and obstetrics (9.8%) and vaccination units (8.82%) (see Table 2).

Table 1: Representation of the professional status of the participants in the survey

Professional Status	Number (n=)	Percentage (%)
Nurses	46	45,1%
Doctors	27	26,5%
Midwives	10	9,9%
Medical specialists	9	8,82%
Health technicians	5	4,9%
Pharmacists	3	2,9%

Administrators	2	1,9%
Total	102	100%

Table 2: representation of survey participants by care services

Services	Number (n=)	Percentage (%)
General medicine	16	15,68%
Obstetrical maternity	10	9,8%
Family planning	10	9,8%
Vaccination	9	8,82%
Operating room	8	7,84%
Emergencies	8	7,84%
Diagnostic centres	7	6,86%
Treatment room	6	5,88%
Surgery	5	4,9%
Hospital Management	5	4,9%
Chronic Disease	5	4,9%
Resuscitation	3	2,94%
Pharmacy	3	2,94%
Radiology - medical imaging	2	1,96%
Laboratory - medical biology	2	1,96%
Haemodialysis	2	1,96%
Paediatrics	1	0,98%
Total	102	100%

The distribution of respondents showed that 62.7% had had an AEB, trainees (Doctors and Nurses) were not affected in this study.

In relation to vaccination status, only 46.1% (n=47) of health care personnel had been previously vaccinated against hepatitis B.

3.2 Mechanisms Of AEB Occurrence

The most frequent mechanism of occurrence of AEB was by puncture and/or instrumental cut (53.5%), followed respectively by skin splashes (37.6%) and eye-mucosal splashes (8.9%).

The most common causes of AEB were injections (22.8%), needle recapping (20.8%) and surgical sutures (18.8%) (see Table 3)

Table 3: distribution of AEB according to the circumstances of their occurrence

Circumstance of occurrence	Number (n=)	Percentage (%)
Injections	24	23,5%
Recapping of needles	21	20,6%
Sutures	19	18,6%
Waste sorting	11	10,8%
Wound care	6	5,9%
Specimen collection	5	4,9%
Deliveries	5	4,9%
Catheter placement	3	2,9%
Medical examination	2	2%
Surgical procedure	2	2%

Dressings	1	1%
Patient serology	1	1%
Medical-technical instruments	1	1%
Oral care	1	1%
Total	102	100%

At the time of the mucocutaneous AEB, 46.1% of the victims were wearing gloves. However, other personal protective equipment is in short supply in most health care services.

In parallel, at the time of an AEB by accidental pricks, 68.6% of the victims were wearing gloves, this prevalence is caused by the overload of work (35.3%), the recapping of needles already used (17.6%), the maladjustment of syringes in the hand (16.7%).

3.3 Case Management Of Victims By AEB:

In the event of an AEB, 88.2% of respondents do not know the serological status of their patients, with 59.8% of respondents declaring the absence of a system for monitoring cases in the institutions where they operate.

With regard to the management of AEB, 100% of respondents stated that they received emergency care: washing and disinfection of the lesion immediately after the AEB occurred, without having declared the AEB or consulted the occupational physician.

Regarding the serological status of the health professionals, 75.5 had a biological examination including biological tests for HIV, HBV and HCV after the AEB had occurred.

3.4 Factors That Favour The Occurrence Of aeb:

Certain professional situations that favor the occurrence of AEB in the healthcare setting were reported by the victims, grouped into psychological, organizational, environmental and other constraints related to technicality (See Table 4).

Table 4: the factors that contribute to the occurrence of AEB

Risk Factors	Number (n=)	Percentage (%)
Psychological factors		
Professional exhaustion	44	43,1%
Fatigue	34	33,3%
Stress	20	19,9%
Others: Overwork, poor concentration ...	4	3,7%
Organizational factors		
Work overload	50	49%
Shortage of human resources	31	30,4%
Defective materials	20	19,6%
Other: Shortage of updated material, ...	1	1%
Environmental factors		
Unsuitable materials	66	64,7%
Unsuitable premises	23	22,5%
Insufficient lighting	10	9,8%
Others: accompanying persons, agitated patient...	3	3%
Factors related to technical defects		
Poor quality syringes (unsuitable...)	33	32,4%
Poor quality gloves (perforated...)	32	31,4%
Inadequate scalpel blades (without blade holder...)	28	27,5%

Other: lack of mastery of techniques...	9	8,82%
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Adding that the respondents add some factors related to the human factors that can be in cause of the occurrence of AEB : the management of emergency situations (47.1%), the crossing of hands (25.5%) and the interruption of the task by someone or an event (23.5).

3.5 Assessment Of Knowledge About AEB

Of the 102 respondents, 81.4% had not received training on AEB, 63.7% had neither training materials nor posters and leaflets to raise awareness of AEB 72.5% did not know the national procedure for reporting and managing AEB.

Regarding the assessment of knowledge about the seriousness of AEB, 95.05% of respondents stated that this risk can be the cause of an infectious disease in health care workers, failing which: HIV, hepatitis B, hepatitis C and other infectious diseases.

3.6 Assessment Of Care Practice Patterns In Relation To AEB

Among the very high-risk tasks that may be responsible for the occurrence of AEB is recapping, an action that consists of replacing the protective cap on a previously used needle before disposing of it in waste containers.

61.8% of respondents recapped needles after use, 76.5% trivialized AEB and their consequences, and 40.2% wore appropriate personal protective equipment (gloves, gowns in the operating room, protective glasses in the laboratory and masks systematically in all departments).

4DISCUSSION

4.1- Socio-Professional Characteristics

In our work, we have observed that AEB in health care institutions can affect all operators, regardless of the work department (general medicine, obstetrics maternity, family planning unit, etc.), the age of the workers (even young people are affected) and the work schedule (LARAQUI, 2008).

The predominance of women in our study (62.7) is superimposed on the overall predominance of women in health care institutions, this finding is similarly found in some studies: 56.5% in France (FLORENTIN *et al.*, 1997), 65.5% in Senegal (DIEDHIOU *et al.*, 2019), 76.9% in Côte d'Ivoire (EHOLIE *et al.*, 2002).

Seroconversion to hepatitis B during a blood exposure accident can be prevented by vaccination (WHO, 2015), but despite this guideline the majority of AEB victims are not vaccinated against hepatitis B (64.9%), so the implementation of a vaccination strategy for health professionals against hepatitis B reflects an emergency.

However, this vaccination coverage rate of health professionals against hepatitis B is relatively decreased compared to Senegal: 55.5% (DIEDHIOU *et al.*, 2019) and 88.8% in France (LAUNAY and FLORET, 2015).

4.2- Mechanisms Of Occurrence Of AEB

The most significant mechanism for the occurrence of AEB was by puncture and/or instrumental cut (53.5%), this frequency is explained by the daily hospital routine carried out in the care services, especially during the realization of tasks based on: injections (23.5%), sutures (18.8%) and the taking of biological fluids and placing of catheters (9%), are occasions highly likely to generate AEB of the puncture type.

In addition, certain tasks related to waste disposal, specifically recapping (21%) and collecting needles that have already been used (11%), are the most likely to result in an AEB (AZZOUZI *et al.*, 2014).

4.3- Management Of Cases Victimized By AEB

During an AEB, the notification and the systematic and rigorous declaration of the accident, guarantee to the victim an adapted serological follow-up, an effective prophylactic treatment, a medico-legal recognition for a possible compensation within the framework of a work accident (LEBRUN *et al.*, 2017).

The transmission of an infectious agent during an AEB concerns all blood-borne germs (bacteria, viruses, parasites and fungi) but the human immunodeficiency virus (0.32%), the hepatitis B virus (10-40%) and the hepatitis C virus (2.1%)(TARANTOLA, 2003; ABITEBOUL *et al.*, 2010).

In our study, no seroconversion is reported, the cumbersome management procedure puts an end to adequate follow-up of victim cases, even though the risks incurred by health professionals during an AEB are fatal.

4.4- Factors That Favour The Occurrence Of AEB

The health personnel practicing in the province of LARACHE is faced with difficult working conditions, enormous ergonomic constraints and a shortage of personal protective equipment. Psychologically: The frequency of burnout (44.1%), fatigue (33.3) and stress (19.1) demonstrate the impact of psychological pressures on the level of alertness of health professionals, which may promote the occurrence of AEB.

This can be explained by the daily confrontation of caregivers with work pressure, work overload, suffering, emotional distress and death by heart attacks (HUTRI and LINDEMAN, 2002).

At the organizational level: our study states that work overload (49%), shortage of human resources (30.4%) and the existence of defective materials (19.6%) negatively affect the safety of health professionals in relation to AEB, during the exercise of their jobs.

Generally, the organization of work in the hospital environment is affected by the twin: work overload and shortage of human resources (AMAATI, 2014), which the purpose of improving working conditions, the rate of satisfaction of health personnel towards ergonomics is low, since doctors and nurses are in permanent exposure to the various risks characterizing the nursing profession (the AEB in our case) (J.F Ferrand *et al.*, 2012).

On the environmental level, unsuitable materials (64.7%) are considered the main cause of environmental origin by the majority of respondents, without forgetting that workers in the night shift system are confronted with various problems related to lighting defects (9.8%) which is a likely exposure factor.

The environmental factor in the hospital environment represents an inescapable issue that alters the quality of care, poor lighting, accompanying patients and old materials promote the exposure of professionals to various threats among them AEB (HEYDEN and MOLLO, 2013).

On the technical level, certain acts performed due to a lack of competence and training increase the risk of accidents. These are the incorrect use of gloves (31%), the interruption of the task by a third party (23.5%) reflecting a lack of professional experience, hence the need to strengthen the training of caregivers (INRS, 2018).

4.5- Assessment Of Knowledge Towards AEB

81.4% of caregivers announce the absence of awareness about AEB (preventive measures, management and follow-up procedures). Despite this, 95.05% were aware of the infectious risks in case of an AEB.

This lack of information and involvement had a negative impact on the timeliness and quality of care for victims of AEB. It also contributed to an increase in the risks involved and under-reporting.

4.6- Evaluation Of Care Practices In The Face Of AEB

Certain care practices, such as recapping, are commonly observed, as well as the non-systematic use of gloves during care.

Concerning the trivialization of AEB, it is often unconscious; the health professionals who responded consider it to be a non-serious event and others link it to a lack of skills.

5 CONCLUSIONS

Accidents of exposure to blood constitute a reality during the practice of care in the province of LARACHE. They expose the staff to various contaminations (HIV, hepatitis B and C).

As a result, this risk generates anxiety in this staff and a feeling of demotivation requiring a close involvement between professionals and managers.

In this sense, we recommend a number of strategic actions to reduce the prevalence of these AEB.

The creation of an occupational medicine department to steer the policy of raising awareness in the establishments about blood exposure accidents (AEB).

Similarly, the permanent availability of personal protective equipment is essential.

Most accidents involving exposure to blood (AEB) can be avoided by applying standard precautions, hence the need to involve all the actors in the structure to minimize this scourge.

In addition, the generalization of antiviral vaccination against hepatitis B is of paramount importance in the fight against viral hepatitis B of occupational origin.

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