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## ORIGINAL ARTICLE

### USE OF ASEPTIC PROCEDURES AND MATERIAL IN A RESCUE UNIT FROM THE FIRE DEPARTMENT

#### USO DE PROCEDIMENTOS E MATERIAIS ASSÉPTICOS EM UNIDADE DE RESGATE DO CORPO DE BOMBEIROS

#### USO DE PROCEDIMIENTOS Y MATERIALES ASÉPTICOS EN UNA UNIDAD DE RESCATE DE LOS BOMBEROS

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#### ABSTRACT

**Objective:** to identify how the aseptic procedures and material are used by a rescue unit from the Fire Department. **Method:** field, observational, descriptive, exploratory, and quantitative study conducted with 32 rescuers in a capital city in Northeastern Brazil. Data were analyzed by means of the software *Epi Info*, version 3.5.1, and presented in table form. The study was approved by the Research Ethics Committee of the State University of Health Sciences of Alagoas (UNCISAL), under the Protocol 1,208/2009. **Results:** 84.37% of participants washed their hands after the occurrence. Before the occurrence, their hands were not washed and there was no use of alcohol gel or 70% alcohol for hand hygiene. Aseptic measures in the vehicle were restricted to the use of gloves. **Conclusion:** infection control requires an effective processing of material, since the final product is providing care, which should not be interrupted. It is expected that the Fire Department is based on the standardization of procedures aimed at the quality of services provided to the population. **Descriptors:** Search And Rescue; Asepsis; Decontamination.

#### RESUMO

**Objetivo:** identificar como são utilizados os procedimentos e materiais assépticos por uma unidade de resgate do Corpo de Bombeiros. **Método:** estudo de campo, observacional, descritivo, exploratório e quantitativo, realizado com 32 socorristas em uma capital da região Nordeste brasileira. Os dados foram analisados por meio do programa *Epi Info*, versão 3.5.1, e apresentados em tabelas. O estudo foi aprovado pelo Comitê de Ética em Pesquisa da Universidade Estadual de Ciências da Saúde de Alagoas (Uncisal), sob o Protocolo n. 1.208/2009. **Resultados:** 84,37% dos participantes lavaram as mãos após a ocorrência. Antes da ocorrência, suas mãos não foram lavadas e não houve uso de álcool em gel ou álcool a 70% para higienizar as mãos. As medidas de assepsia na viatura restringiram-se ao uso de luvas. **Conclusão:** o controle de infecção requer um eficaz processamento de materiais, uma vez que o produto final é a assistência, que não pode ser interrompida. Espera-se que o Corpo de Bombeiros tenha por base a padronização de procedimentos, visando à qualidade dos serviços prestados à população. **Descritores:** Busca e Resgate; Assepsia; Descontaminação.

#### RESUMEN

**Objetivo:** identificar cómo se utilizan los procedimientos y materiales asépticos por una unidad de rescate de los Bomberos. **Método:** estudio de campo, observacional, descriptivo, exploratorio y cuantitativo llevado a cabo con 32 socorristas en una capital en el Nordeste de Brasil. Los datos fueron analizados por medio del software *Epi Info*, versión 3.5.1, y se presentan en forma de tabla. El estudio fue aprobado por el Comité de Ética en Investigación de la Universidad Estatal de Ciencias de la Salud de Alagoas (Uncisal), bajo el Protocolo 1.208/2009. **Resultados:** 84,37% de los participantes se lavaron las manos después de la ocurrencia. Antes de la ocurrencia, no se lavaron las manos y no hubo uso de alcohol en gel o alcohol al 70% para la higiene de las manos. Las medidas asépticas en el vehículo fueron restringidas al uso de guantes. **Conclusión:** el control de la infección requiere un procesamiento eficaz de los materiales, ya que el producto final es el cuidado, que no debe ser interrumpido. Se espera que los Bomberos se basen en la estandarización de procedimientos, con vistas a la calidad de los servicios ofrecidos a la población. **Descriptores:** Búsqueda y Rescate; Asepsia; Descontaminación.

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## INTRODUCTION

Mobile prehospital care is available for many years throughout the world; according to the literature, it was created in France in 1792, in turn, it emerged in Brazil in the 1980s, with the Emergency Response Group (GSE), which belongs to a unit from the Military Fire Department of the State of Rio de Janeiro (CBMERJ).<sup>1</sup>

When considering the increased demand for services in this area within the last decade, due to the increased number of accidents and urban violence rates, and the deficient structuring of the healthcare network, which has contributed to overload of the urgency and emergency care services available to the population, there emerges the need to deploy a mobile prehospital care service.<sup>2</sup>

Rescuers should accept the responsibility to provide patient care so that it is as close as possible to perfection. This cannot be accomplished resorting to insufficient knowledge on the theme. It is worth recalling that the patient did not choose to be involved in a traumatic situation.<sup>3</sup>

Portaria GM 2,048, enacted on September 3, 2009, which regulates this service, establishes that military firefighters work in identifying risk situations and controlling the actions taken to protect the environmental, the victim, and the professionals providing care; these professionals rescue victims from sites or situations that hinder access to the healthcare team. They can provide basic life support, through non-invasive actions, under on-site or remote medical supervision, complying with the regulation standards.<sup>4</sup> This *portaria* establishes rules ranging from team's expertise to vehicles' features and the equipment to be used in ambulances.<sup>2</sup>

The concepts of biosecurity and asepsis have been increasingly widespread and appreciated, as the awareness of the responsibility of a professional involved in activities with handling of biological, microbiological, chemical agents etc. increases. The concern is not limited to actions aimed to prevent risks in her/his specific activity, but it encompasses the actions of all other professionals involved in care.<sup>5</sup>

Biosecurity may be understood as a set of actions aimed at preventing, minimizing, or eliminating risks inherent to activities of research, production, teaching, technological development, and provision of services, risks that can compromise the health of human

beings, animals, and the environment, as well as the quality of the work done.<sup>6</sup>

Exposure to biological material containing pathogenic microorganisms can occur in an extra-hospital environment and it becomes a recurrent problem for healthcare professionals and healthcare service users, thus, there is a need to propose intervention measures in order to minimize this risk.<sup>7</sup>

The relevance of deploying material cleaning and disinfecting measures aimed at the prevention of infection, both for rescuers and victims is clear<sup>5</sup>, thus reinforcing the importance of conducting this study, whose guiding question is: "Which aseptic procedures and material are used by a rescue unit from the Fire Department?". To answer it, we defined as the objective:

- Identifying how the aseptic procedures and material are used by a rescue unit from the Fire Department.

## METHOD

This is a field, observational, descriptive, and exploratory study, with a quantitative approach, carried out with all professionals working at the rescue unit from the Fire Department, according to the inclusion criterion of the research, i.e. being an effective rescuer at the unit, and the exclusion criteria were being on vacation or sick leave within the survey period. The total was 32 rescuers.

Data collection was conducted within the period from May to August 2011, in the Emergency Response Group from the Military Fire Department, by means of a registration form, prepared by the researchers, which contains the variables: handwashing before and after the occurrence; use of alcohol gel or 70% alcohol before and after providing victims with care; use of a checklist of disposable and non-disposable material available in the vehicle; reuse of disposable material; decontamination of non-disposable material; use of individual protection measures; waste disposal; decontamination of immobilization material; cleaning of the vehicle and/or asepsis of the rescue unit during the transmission of service information.

Data were tabulated and analyzed by means of the software *Epi Info*, version 3.5.1.

The study was approved by the Research Ethics Committee of the State University of Health Sciences of Alagoas (UNCISAL), under the Protocol 1,208/2009.

RESULTS

For evaluating the procedures performed in the rescue unit, 16 cases of transmission of service information were observed. At each time, the procedure was performed by 2 rescuers.

We observed handwashing and the use of alcohol gel or 70% alcohol by rescuers before

and after an occurrence. Among the 32 professionals, none washed his/her hands or used alcohol gel or 70% alcohol before the occurrence. After providing the victim with care, more than 80% of the professionals washed their hands (Figure 1).



**Figure 1.** Handwashing and use of alcohol gel or 70% alcohol after providing the victims with care. Maceió, 2011.

**Table 1.** Procedures performed in the vehicle during the transmission of service information. Maceió, 2011.

Procedures performed	Professionals observed (%)
Cleaning the vehicle during the transmission of service information	100% performed the procedure
Reuse of disposable material	100% did not performed the procedure
Waste disposal	100% used appropriate waste bags
Individual protective measures	100% only used gloves
Vehicle checklist	100% performed the procedure

**Table 2.** Products used on the surface of the vehicle during the transmission of service information. Maceió, 2011.

Products	%
70% alcohol	12.50
Germicidal	31.25
Bleach and disinfectant	25.00
Enzymatic detergent	6.25
Germicidal enzymatic detergent and 70% alcohol	6,25
70% alcohol and enzymatic detergent	6.25
70% alcohol, enzymatic detergent, and sodium hypochlorite	12.50

70% alcohol was the most frequently used product for decontamination of immobilization material (Table 3).

**Table 3.** Products used for the decontamination of immobilization material. Maceió, 2011.

Products	%
Enzymatic detergent	16.67
Germicidal	33.33
70% alcohol	41.67
Water, soap, and sodium hypochlorite	8.33

## DISCUSSION

Contaminated hands of professionals are the main source of infection in healthcare settings. A major component of the rescuer's protection is hand hygiene. Hand hygiene includes the immediate use of antiseptic alcohol on hands before and after providing the patient with care and washing hands with soap and water. Handwashing is the act of washing hands with soap and water, followed by rinsing it under running water for 15 seconds.<sup>7</sup> Rescuers adhered to this practice after providing victims with care.

In this context discussed above, the healthcare institution should offer to its professionals, in addition to the optimal conditions, dermatologically tolerable products, considering cost-effectiveness, in order to increase adherence to such a key infection control practice.<sup>8</sup> 70% alcohol is regarded as an intermediate disinfectant, used both on surfaces and instruments and on the skin, as an antiseptic product<sup>9</sup>, constituting a complementary measure used in the rescue unit of the Fire Department in Maceió, Alagoas, Brazil.

Given the relevance of issues related to the reuse of medical products, the nation States seek to organize their regulatory systems in order to prevent, eliminate, or reduce actual or potential risks in healthcare practices.<sup>10</sup>

The infection risks after reusing and reprocessing; the infection risks with repeated procedures on the same patients without changing the material<sup>11</sup>, something which corroborates the data presented in this study.

An effective infection control permeates an efficient processing of hospital supplies. It is known that there are many controversies in relation to reusing and reprocessing single-use material, something which involves considerations such as the high cost, environmental issues related to waste disposal in health services, among others.

We observed in some of this material a difficulty in cleaning, key processing step. Considering that the previous cleaning of material can establish a significant reduction of bacteria, there is a need to think through alternatives to improve this practice.<sup>12</sup>

Regarding the use of a checklist of disposable and non-disposable material in the vehicle, we observed that all professionals performed such a procedure, given that this variable is mandatory during the transmission of service information between professionals. At end of shift, daytime and nighttime teams meet in the ambulance to shift change, a time

when the material and equipment is checked by the professionals who are taking on the service. According to a survey conducted<sup>13</sup>, checking and organizing material take place after each occurrence, corroborating the data obtained in this study.

It is worth highlighting the importance of control on the part of professionals with regard to the management of material resources, since the final product of their work is care and it cannot be interrupted, either due to the lack or poor quality of a given material, especially in urgency or emergency situations. Thus, this control must be understood as a way of providing healthcare professionals with material in adequate quantity and quality.<sup>2</sup>

Regarding the use of individual protective equipment, some studies<sup>14</sup> show that 95% of professionals directly refer to equipment as a precaution to avoid occupational accidents or diseases. A study<sup>15</sup> mentions that, in spite of the fact that all institutions provide their workers with masks and 85.7% consider this equipment as important for the sector, 76.2% of professionals used them.

We did not observe the use of mask or protective eyewear during asepsis in the vehicle, the individual protection equipment was restricted to using gloves. The latter were inappropriate for manual cleaning of material, although better fitting hands and enabling greater dexterity.<sup>15</sup> The type that might be indicated is long sleeve latex glove, which is of paramount importance to protect workers during contact with chemicals and organic matter<sup>16</sup>; also regarding the difficulties faced to take the standard preventive measures, it was observed that 45.2% of professionals, according to a study<sup>7</sup> pointing out "lack of familiarity" as a difficulty in adhering to these measures. It is noteworthy that, for encouraging the use of personal protective equipment (PPE), there is a need to establish standards and routines.

It is observed that rescuers and managers of institutions should be aware of the right and duty to comply with the principles of standard precautions, considering them as prophylactic measures that apply not only blood, but also to all body fluids, secretions, excretions, intact skin, and mucosa, with or without visible blood.<sup>18</sup>

Disinfection is a process of short duration, which can vary from a few seconds to 30 minutes. For disinfection of instruments, the most recommended solutions are 2% glutaraldehyde, 38% formaldehyde, synthetic phenol, and 70% alcohol. However, only



glutaraldehyde may be considered as a high level disinfectant for semi-critical material. For non-critical material, intermediate disinfectants may be used<sup>9</sup>, collaborating with the results obtained in the study.

Working on pre-hospital care is something dynamic; while the team conveys service information to the professional responsible for receiving the patient in the hospital, it also takes, whenever possible, the equipment used in immobilization and transportation, cleans the material that is visibly dirty (collar, strips of rigid stretcher), and organizes them again in the ambulance.<sup>13</sup>

As for the decontamination of immobilization material, which consists of instruments used to remove the victim from the scene of an accident, preventing future damage to her/his health, such as the cervical collar and long board<sup>9</sup>, there was a predominance of 70% alcohol, as this is a very popular disinfection method, due to the fact that it is a simple process, relatively quick and inexpensive, in order to destroy microorganisms.<sup>19</sup>

Although 1% sodium hypochlorite is indicated at various stages of routine cleaning, after daily cleaning of the units with soap and water, even in the presence of organic secretion, the use of peracetic acid seems to offer many advantages, among which there are high stability, no need to analyze the content of the active principle, no need to remove after use, effectiveness against spores, bacteria, and viruses, keeping action even in the presence of organic matter, and good compatibility with material damaged by sodium hypochlorite.<sup>20</sup> The use of peracetic acid in the procedures performed for decontamination of material was not observed, however, sodium hypochlorite was an alternative used in combination with other agents.

## CONCLUSION

The need for standardizing procedures with the use of specific and mandatory products for the decontamination of material is indispensable. In order to perform the procedures by minimizing risks to firefighters and victims, it becomes necessary to ordering and systematizing the use of aseptic material and procedures within the rescue unit.

It is imperative to qualify the human resources, since deploying the protocols directly depends on workers, who have a responsibility to enable safe material for use. We must think of continued in-service education, which is characterized as a turn in

the thought on professional education, where the working process is appreciated as the privileged learning center.

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