

Biological Risks in the Professionals of Mobile Pre-Hospital Care

ORIGINAL

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Abstract

Introduction: Pre-hospital care professionals face situations in which they are very vulnerable to occupational risks of the biological type, due to direct and constant contact with patients in numerous adverse situations.

Objective: To analyze the biological risks inherent to the nursing team of the Mobile Emergency Care Service (MECS) in Patos-PB.

Method: The study was an exploratory, descriptive type, with a quantitative data approach. The research population was composed of all the nurses and nursing technicians employed in the MECS, Regional of Patos-PB who were available to participate in the research. Data were analyzed with SPSS software (version 21). Descriptive statistics of relative and absolute frequencies, central tendency (mean and median) and dispersion (standard deviation and minimum and maximum values) were used. Considering the small sample size, we adopted non-parametric inferential tests of Mann Whitney and Pearson's Chi-square test or Fisher's exact test, accepting as statistically significant that $p < 0.05$.

Results: The sample consisted of 45 professionals of the nursing team, with the majority (88.9%) being female and a prevalent age range from 27 to 33 years, a workload of 36 hours per week, with less than one year of performance in the service; 95.6% use the complete uniform; 97.8% make use of masks, and only 24.4% confirm wearing protective glasses; 31.1% perform reoccurrence of needles already contaminated, and 24.4% already suffered some type of accident with

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a sharp device. Only 24.4% said they had undergone some training on the part of the company.

Conclusion: It was evidenced that the occurrence of the accidents is directly related to the exhaustion of the professionals and their lack of experience in the area, besides the lack of training offered by the service. It can be noted that the company lacks in the area of employee protection, since they do not offer a professional training course, so there is no investment in continuing health education.

Keywords

Professionals; Pre-Hospital;
Biological Risks.

Introduction

Pre-hospital Care (PHC) aims to expedite care in order to maintain life and/or minimize possible sequelae to the victim's health. This service caters to clinic or trauma victims before arrival at the nearest referral health facility and can be performed by trained professionals, whether medical or not [1].

In order to establish a public emergency and emergency policy in Brazil, the PHC was created, which is an important resource in the care of victims of trauma. The initiative for the implantation of Mobile Emergency Care Services (MECS) in Brazil came in the year 2003 with the implementation of Portaria no. 1863 GM and 1864, and the service is intended for urgent and emergency care in homes, workplaces and public roads [2].

PHC workers perform emergency care, which involves procedures that are carried out under stressful conditions, with high risk of death of the victims, under fragile conditions of physical structure, which, in particular, makes PHC professionals more susceptible to accidents involving biological material (BM). Studies have shown high rates of MB accidents among these workers [3].

The complexity and the invasiveness of the procedures performed during prehospital care to the user have become increasingly frequent, such as intubation, aspiration of tracheal contents, raffia of vessels by traumatic amputation, containment of hemo-

rrhages by other injuries, access central and peripheral, open-heart massage, among others. Such procedures make the pre-hospital care professional as susceptible to occupational hazards and occupational accidents as any other health care provider. These risks of contamination increase, according to the professional's role on the team, in direct proportion with amount of contact with the patient [4].

In Brazil, work-related accidents with exposure to biological material are compulsory and must be registered in the Notification of Injury Information System (SINAN). Accidents are considered to be emergencies, since treatment needs to be started soon after the occurrence of the event in order to be effective [5].

The risks of contracting HIV and HBV are among the most feared by health professionals, especially as a result of puncture-sharp accidents, whose infection rates have been estimated between 0.25 and 0.4% for the HIV virus, among 6 and 30% for HBV and between 0.4 and 1.8% for Hepatitis C (HBC) [6].

Nursing professionals perform direct and continuous patient care, becoming susceptible to contamination by biological material, especially in percutaneous inoculation, needle-mediated or sharp-cutting accidents, which are majorly responsible for the occupational transmission of blood infections [7].

Thus, it is essential to discuss the professional training, aiming to awaken awareness of the health of workers, as well as the managers of health institutions prioritizing health promotion, prevention of diseases and diseases arising from the lack of adequate protection for risks to health professionals [8].

Several studies show that the risks related to occupational accidents with biological material are quite diverse, highlighting APH professionals who provide direct assistance to the patient outside the hospital for life support and minimization of sequelae and emergency situation arrivals to an institution for specialized care. In view of this context, the following question was raised: What are the biological risks inherent to the nursing team in the pre-hospital mobile service?

This study will serve as a warning for nurses who are part of the pre-hospital care team about biological risk factors and about preventive measures through the simple use of personal protective equipment. However, this study aimed to analyze the biological risks inherent to the nursing team of the Mobile Emergency Care Service (MECS) in Patos-PB.

Materials and Methods

The research was descriptive of the exploratory type, with a quantitative approach. The study was carried out at the Mobile Emergency Service – SAMU of the municipality of Patos-PB, located at Rua Lima Campos, 431, Bairro São Sebastião. The MECS Regional de Patos-PB was implemented in October 2005 and since then has been performing pre-hospital care in the city and region; its decentralized bases are: São José do Sabugi, São Mamede, Santa Luzia, Várzea, Passagem, Areia de Baraúnas, Quixaba, Sand Cacimba, São José de Espinhinhas, County, Malta, Serrana View, São José do Bonfim, Maturéia, Desterro, Teixeira, Cacimbas, Mother of water, Santa Terezinha and Tabira. In general, the Patos plant regulates 15 Basic Support Units (BSU)

and 4 Advanced Support Units (ASU), where it serves 26 municipalities.

The research population consisted of all nurses and nursing technicians. According to the probabilistic criterion, the sample was defined using the formula for calculating the finite population sample: adopting a 95% confidence level, $\alpha = 5\%$ and a sample error $\varepsilon = 5\%$. Thus, considering 55 nurses, the sample totals 45 participants.

We included in the sample all nurses and nursing technicians who were on call on the day of data collection and who agreed to participate in the study by signing the Informed Consent Term. Professionals who were on vacation of service or medical license or who were not willing to participate in the survey were excluded from the sample.

The data collection instrument was a questionnaire containing objective, non-inductive questions consisting of two parts: the first presenting the data related to the characterization of the participants and the second presenting the information on the biological risks and the use of personal protective equipment (PPE). The data were collected in the months of August and September of 2016.

Data were analyzed using SPSS software (version 21). Descriptive statistics of relative and absolute frequencies, central tendency (mean and median) and dispersion (standard deviation and minimum and maximum values) were used. Considering the small sample size, we adopted non-parametric inferential tests of Mann Whitney and Pearson's Chi-square test or Fisher's exact test. Accepting $p < 0.05$ was statistically significant.

The research was carried out with the authorization of the General Coordinator of SAMU Regional de Patos-PB, taking into consideration the ethical aspects in research involving human beings, as described in Resolution No. 466/2012 of the National Health Council, which regulates research involving human beings [9]. The research project was sent to the Research Ethics Committee of the Integrated Colleges of Patos, located in the city of Patos-PB,

which obtained an opinion nº 1,775,833 CAAE nº 58596216.2.0000.5181.

Results

Table 1 shows that the majority of the sample (88.9%) is female, with ages ranging from 27 to 33 years (56.1%), with a weekly workload of 36 hours (82.2%) and 73.3% in both BSU and ASU drives. The high rate of women working in the profession can be noted; even nowadays nursing is a profession in which there is a predominance of women. Nearly half of the sample (48.9%) has worked less than one year in the service.

Table 2 presents the description of the biological risks of the professionals. Most professionals use gloves, masks and complete uniforms and discard

Table 1. Description of the sociodemographic data of the sample.

Variables	n	%
Sex		
Male	5	11.1
Female	40	88.9
Age (years)		
From 21 to 26	7	14.6
From 27 to 33	24	56.1
From 34 to 39	7	14.6
From 40 to 45	7	14.6
Weekly workload		
24h	4	8.9
36h	37	82.2
40h	4	8.9
Drive on which works		
BSU	10	22.2
BSU and ASU	33	73.3
CME	2	4.4
Time in service		
Less than 1 year	22	48.9
1 to 3 years	16	35.6
4 to 7 years	5	11.1
8 to 10 years	2	4.4

Source: Research data, 2016.

Table 2. Description of the biological risks of the sample.

Variables	n	%
Wear gloves	45	100.0
Wear masks	44	97.8
Wear glasses	11	24.4
Wear full uniform	43	95.6
Needle resurfacing	14	31.1
Disposes of sharps at an appropriate location	45	100.0
Has had a piercing injury	11	24.4
Institution provides PPE to professionals	45	100.0
Difficulty with using PPE	3	6.7
Training conducted with professionals on use of PPE and biological risks	11	24.4

Source: Research data, 2016.

Table 3. Description of difficulties in using PPE.

Difficulty in using PPE	n	%
Is there any difficulty in using PPE?	3	6.7
What?		
Glasses	1	33.3
Glove	1	33.3
Mask	1	33.3

Source: Research data, 2016.

the sharps in an appropriate place; they report that the institution provides the PPEs to professionals. The glasses were the least used PPE, with only 24.4% affirmed making use; 31.1% did needle resurfacing, and almost one-fourth of the sample had already had a sharps injury or received some training on the use of PPE and biological risks (24.4%).

Table 3 shows that only three professionals (33.3%) reported difficulties in using PPE – one with the use of glasses; one with the glove; and one with the mask.

Table 4 shows that 77.8% of the interviewees used alcohol; 46.7% used water and soap; and 68.9% used 1% sodium hypochlorite in cleaning ambulance surfaces. No professional reported using hydrogen peroxide and enzymatic detergent.

Table 4. Description of solutions used to clean surfaces of VTR with presence of soils by biological material.

Solutions used	n	%
Hydrogen peroxide	0	0.0
Water and soap	21	46.7
Alcohol 70%	35	77.8
1% sodium hypochlorite	31	68.9
Enzyme detergent	0	0.0

Source: Research data, 2016.

Table 5 presents the age comparison between the presence of biological risks. There were no statistically significant differences. The professionals who reported not using glasses, re-engineering needles, who suffered a perforation with piercings and who reported difficulties in using PPE presented a higher median age.

Table 6 presents the comparison of service time and presence of biological risk. Professionals who reported that they did not wear glasses and those who did needle re-nasal surgery who had a perforation.

Table 5. Comparison of age between presence of biological risk.

	Average	Standard deviation	Median	p
Wears glasses				
Yes	32.22	6.43	30.00	0.82
No	31.88	5.69	31.50	
Needle resurfacing				
Yes	31.07	5.41	30.50	0.54
No	32.41	6.01	31.00	
Has had a piercing injury				
Yes	32.18	3.06	33.00	0.27
No	31.87	6.54	30.00	
Difficulty with using PPE				
Yes	36.00	7.93	33.00	0.30
No	31.63	5.59	31.00	
Training conducted with professionals on use of PPE and biological risks				
Yes	31.50	6.75	30.00	0.50
No	32.10	5.55	31.00	

Source: Research data, 2016.

Table 6. Comparison of service performance time and presence of biological risk.

	Average	Standard deviation	Median	p
Wears glasses				
Yes	1.55	0.68	1.00	0.59
No	1.76	0.89	2.00	
Needle resurfacing				
Yes	1.86	0.94	2.00	0.49
No	1.65	0.79	1.00	
Has had a piercing injury				
Yes	1.91	0.94	2.00	0.43
No	1.65	0.81	1.00	
Difficulty with using PPE				
Yes	2.33	1.52	2.00	0.44
No	1.67	0.78	1.50	
Training conducted with professionals on use of PPE and biological risks				
Yes	2.00	1.00	2.00	0.28
No	1.62	0.77	1.00	

Source: Research data, 2016.

Table 7. Association between sex and biological risks.

Biological risks	Sex				P
	Male		Female		
	n	%	n	%	
Wears glasses					
Yes	0	0.0	11	27.5	0.17
No	5	100.0	29	72.5	
Needle resurfacing					
Yes	1	20.0	13	32.5	0.99
No	4	80.0	27	67.5	
Has had a piercing injury					
Yes	2	40.0	9	22.5	0.58
No	3	60.0	31	77.5	
Difficulty with using PPE					
Yes	1	20.0	2	5.0	0.30
No	4	80.0	38	95.0	
Training conducted with professionals on use of PPE and biological risks					
Yes	2	40.0	9	22.5	0.39
No	3	60.0	31	77.5	

Source: Research data, 2016.

rating puncture, reported difficulties with PID and who underwent training on the use of PID had higher median lengths of service. There are no statistically significant results.

Table 7 shows the association between sex and biological risks. Proportionally, males reported using fewer glasses and needle re-sizing. Women reported more accidents with puncture sharps, fewer difficulties with using PPE and not undergoing training to use PPE.

Discussions

A worrisome factor is the overload in the hours of work that the professional takes for himself, since his fixed workload is 36 hours per week and he acquires other connections, having a link accumulation and increasing for himself the risk of a possible accident with contaminated material; since your body is not prepared to face such a long working day, the body does not respond efficiently to the delicate and meticulous work that is charged to the health professional.

In the literature, studies confirm these findings and suggest the need for changes in the schedule of shift changes that coincide with the exchange from shifts, reinforcing the fact that organizational factors may interfere with the health conditions of the professionals, as well as the need for adaptations to the improvement of work organization [10].

It can also be noted that the risks of accidents with biological material indicated in the article are related to a lack of adequate training for health professionals and the risks and methods to combat them, besides the routine that is acquired at the moment of the attention taking the distraction of the professional and the realization of the reupholster needles after use.

There are also institutional constraints, such as a lack of training and training offered by managers of professionals, agitation of the service, stress, lack

of human resources and inadequate containers for disposal of contaminated materials, among others [11-12].

It could be noted that 48.9% of the employees have less than a year of service and only 4.4% have more than 7 years; that is, the constant exchange of professionals with no experience only increases the risks already existing in the area. According to Canalli et al. (2010) [13], lack of experience and anxiety can contribute to the occurrence of accidents. Being constantly in situations of learning, supervision and evaluation favours the increase of anxiety and stress.

Regarding the use of personal protective equipment (PPE), 6.7% say they have difficulty using it. It may be noted that even with the provision of the product by the employer, as established by the Regulatory Standard NR-6, there is a rejection by the team, which in turn contravenes the NR, increasing in itself the risk of contamination by contact with corporeal fluids.

It is extremely necessary to include PPE as a part of everyday life, avoiding new accidents of this nature, which are present, especially when professionals do not use equipment properly (masks, glasses and gloves), becoming more susceptible to contamination. Only gloves, masks and full uniforms were detected by the professionals participating in the survey, where only 24.4% of respondents stated that they wear safety goggles.

According to Suarte, Teixeira and Ribeiro (2013) [14], the nursing team is the main category that is subject to exposure by biological material. This is explained by being in direct contact with the patient 24 hours a day, and many of these professionals lack awareness of the need to use personal protective equipment (PPE), often for lack of guidance and even communication within the team itself. Where there is good teamwork, there is also good communication among professionals, providing effective assistance and thus reducing the number of accidents.

The professionals performing the pre-hospital care have to take into account the basic needs of safe care for themselves, putting their safety before starting the care itself and not causing another accident at the time of care. Assessing the risks to which your team is exposed is of utmost importance at the first moment. The potential for contamination of biological material with infectious material is directly related to the quality of health care, especially for the most vulnerable and most frequent nursing professionals, from their training to health care to the population [15].

It is necessary and it is important the identification of the existing risks and factors harmful to health in a work environment in which the worker is inserted, with the objective of not only preventing and/or eliminating risks, but also to effectively guide the employer and the workers themselves [16].

Considering the sex, it was verified that, of the 11 professionals who reported having suffered some type of accident with contaminated material, nine were female. According to Vieira, Padilha and Pinheiro (2011) [11], this greater occurrence of accidents among female professionals can be justified, considering that nursing is mainly a female category and with significant representation in health services.

It is noted that the routine in the work environment of the participating professionals generates a category of biological risk, in which the professional is no longer protected, to give the patient a greater chance of survival, since the mobile emergency service is faced with different situations. The professional who is caught in a situation that requires quick and effective conduct for the benefit of the user who needs the service ends up giving less attention to himself at the moment of care, returning his main concern to the victim, leaving his own security in the background. This conduct deserves to be re-evaluated.

Several circumstances predispose the occurrence of work accidents with biological material. There are individual conditions, such as non-adherence to

the use of PPE, the re-emergence of contaminated needles, the inadequate disposal of contaminated material, as well as the double working day that leads to fatigue and lack of attention [11].

Conclusions

It was identified throughout the study that biological risks are present in the daily routine of the nursing profession. However, it is not up to the nurse alone to identify and protect himself from possible biological contamination, considering that this depends on a series of factors to minimize the existing risk. Investing in health education policy and ways of preventing accidents was the initial step, since there is a shortage of staff and a lack of commitment to the service, which does not routinely provide professional development courses for new members, having no care with the professional employed in the service and leaving the exclusive responsibility to the same.

The high rate of negligence on the part of the team with the use of PPE is directly linked to the constant exchange of professionals, as well as the lack of experience of the new team members. Even with the provision of PPE for the service, it may be noted that there is a rejection by the team, as they do not adequately use PPE, to ensure greater safety for themselves.

It is possible to affirm that, among the accidents with risks of biological contamination, the most frequent occurrences are with puncture-cutting material, considering that the professional is exposed daily to the infected material. Professionals constantly carry out needle re-shaping, once contaminated.

Hopefully this research may open space to investigate a possible improvement in the highlighted fields, considering the high degree of health risks that the mobile PHC professional faces in his work.

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