

ADHERENCE TO STANDARD PRECAUTIONS AMONG HEALTH CARE WORKERS EXPOSED TO ACCIDENTS WITH BIOLOGICAL MATERIAL

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ABSTRACT

Objective: To analyze the adhesion to Individual Protection Equipment among health workers who have suffered accidents with biological material. **Method:** This is a retrospective, quantitative epidemiological study carried out in a hospital of medium complexity between October 2010 and December 2013. **Results:** The inadequacy of the use of the Individual Protection Equipment during the procedure was more prevalent in people aged up to 29 years-old and in professionals of the nursing team. Misuse of equipment was also more prevalent among people who suffered accidents during invasive and bloody procedures. **Conclusion:** The low adherence or inadequacy of the use of Personal Protective Equipment has been observed and can be linked to both individual and related aspects of employers' institutions.

Keywords: Personal protective equipment. Biological material. Work place accident.

INTRODUCTION

Occupational accidents involving potentially contaminated biological material may be risks to health professionals ⁽¹⁾. The exposure of these workers to pathogens with a high degree of transmissibility is greater than in the rest of the population, considering the handling of sharp objects and direct contact with debilitated patients with various pathogens, such as pneumonia, tuberculosis, Hepatitis B virus (HBV), Hepatitis C (HVC), human immunodeficiency virus (HIV) ⁽²⁾.

The *Centers for Disease Control* (CDC) determines that the risk of occupational contamination by the human immunodeficiency virus is 0.3%, the HBV virus is from 6% to 30% and for HCV it is from 0.5% to 2%. As the prevalence of hepatitis and HIV increases, health professionals have a greater chance of contact with these pathogens through occupational exposure ⁽³⁾.

In order to minimize the risk of contact with potentially contaminated biological material, safety measures have been implemented in the

health services, and in 1987 the CDC created the Universal Precautions (UP), which after review it was called Standard Precautions (SP) ⁽⁴⁾. Among these measures, the use of Personal Protective Equipment (PPE), whose purpose is to protect the worker's physical integrity, include gloves, eye and face protectors, respiratory protectors, aprons and protection for the lower limbs ⁽⁵⁾.

Health institutions should not only provide PPE for each professional category, but also provide access to knowledge by implementing training programs on the correct use of PPE and encouraging the worker to use them. It should be emphasized that not only the efficiency of PPE, but also the comfort offered should be considered, as this is more likely to be routinely used ^(5, 6).

In Brazil, occupational accidents with exposure to potentially contaminated biological material are considered to be aggravated by compulsory notification and must be reported in a form prepared by the Ministry of Health in the Notification of Injury Information System (Sistema de Informação de Agravos de

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Notificação/SINAN-NET) and in sentinel networks, as the Reference Centers for Occupational Health (Centros de Referência em Saúde do Trabalhador/CEREST)⁽⁷⁾. Notifications are essential for estimating the occurrence of biological accidents, as well as infection lethality, with the aim of better routing of injured workers to specialist services and the adoption of preventive measures for accidents at the workplace⁽⁸⁾.

This study aimed to answer the following research question: How does adherence to standard precautions among health care workers exposed to accidents with biological material occur? And to answer it, it was aimed to analyze the adherence to Individual Protection Equipment among health workers who suffered accidents with biological material.

MATERIAL AND METHOD

This is a retrospective, quantitative-based, epidemiological study developed in a hospital of medium complexity for the care of workers who suffered accidents with biological material in the public and private health services of the municipalities that compose the 17th Regional Health Paraná, from October 2010 to December 2013.

The population was composed of 1,061 records of workers attended at the institution. The inclusion criteria were the medical records of health service workers who suffered work-related accidents with biological material (ATBM) and had a notification form in the Aging and Notification Information System (SINAN).

Data collection occurred in three stages. Firstly, the information was obtained from patient records filed at the referral hospital, and it was decided to consider the consultations performed since the protocol was implemented, that is, in October 2010. In the second stage, the data were collected through the electronic medical records of workers assisted in the outpatient referral service, at this stage the information regarding the examinations carried out in the period between 2010 and 2013, the prescribed clinical course and the outcome of the case were considered. And in the third stage, SINAN was used in order to collect additional

information to complete the spreadsheet that was used in data collection.

The variables selected for this study were sociodemographic (age, sex, occupation/profession), accident data (accident site, exposed region, type of organic material and accident circumstances), and types of PPE used at the time of material accident biological.

The initial study population consisted of 1,061 professionals, however, in order to verify the variables of relevance of the study according to the adequacy of the PPE used by health service workers in the scope of their work activities, 149 professionals were excluded, because they did not answer the questionnaire correctly in the items which indicated the PPE used at the time of the accident. Workers who did not disclose this information were categorized as ignored in this aspect and excluded from this analysis, so the population of this study totaled 912 professionals.

Subsequently, the manual prepared by the Ministry of Health in 2004, entitled "Recommendations for Care and Follow-up of Occupational Exposure to Biological Material: HIV and Hepatitis B and C", was used to categorize the adequacy of PPE according to the type of procedure performed by workers⁽⁹⁾.

Statistical analyzes were performed using the Statistical Package for the Social Sciences (SPSS) 21.0. The measure of association used was the prevalence ratio (PR). The significance level of 5% was adopted in the chi-square test of Wald and the p value and the 95% confidence interval (95% CI) were presented.

The proposed study was presented and approved by the Research Ethics Committee involving Human Beings, according to National Health Council resolution 466/2012, approved by CAAE nº19885813.1.0000.5231 and opinion no. 364.517.

RESULTS

In the analysis related to adherence to PPE in the ATBM, carried out in medical records of 912 workers, the inadequacy (62.5%) of the use during the procedure was more prevalent in people aged up to 29 years-old (PR = 1.10 / IC95 And from 30 to 39 years-old (PR = 1.19/95% CI 1.11-1.20/p-value 0.011) and in nursing

professionals (PR = 1.10/IC 95% 1.05-1.14/w-value 0.000). To persons who suffered accidents during invasive procedures (PR = 1.37/95% CI 1.31-1.43/p-value 0.000) and with blood (PR = 1.12/95% CI 1.05-1.19/p-value 0.001) also had a higher prevalence of incorrect use of PPE (Table 1).

Also, regarding the educational variable, the category most affected by work accidents involving biological material was the middle/fundamental level professionals (76.2%),

being the nursing technicians and radiology technicians, nursing assistants, dental technicians, laboratory technicians, general service aides, pharmacy technicians, funeral service professionals, health students, lifeguards/drivers and community health agents. The professionals of higher level (23.8%) who suffered ATBM were nurses, doctors, dentists, pharmacists/biochemists, physiotherapists and nutritionists (Table 1).

Table 1. Distribution of the study variables according to the adequacy of the Individual Protection Equipment at the time of the accident. Londrina/PR, 2010-2013.

Variables	Total		Adequate PPE		p-value	PR	IC _{95%}
	N	%	N	%			
Sex							
Female	769	84,3	289	37,6	0,906	0,99	0,94-1,05
Male	143	15,7	53	37,1		1	-
Age (years)							
Upto 29 years-old	326	35,7	112	34,4	0,014	1,10	1,10-1,18
30 – 39	324	35,5	116	35,5	0,011	1,19	1,11-1,20
40 – 49	175	19,2	71	40,6	0,070	1,05	0,97-1,15
50 years-old or older	87	9,5	43	49,4		1	-
Occupation							
Nursing	524	57,5	148	28,2	0,000	1,14	1,10 - 1,19
Other categories	388	42,5	194	50,0		1	-
Education							
Complete graduation	212	23,2	72	34,9	0,365	1,02	0,97-1,06
Elementary and High	700	76,8	268	38,3		1	-
Accident site							
Hospital	510	55,9	181	35,5	0,160	1,02	0,98-1,07
Other services	402	44,1	161	40,0		1	-
Accident Circumstance							
Invasive Procedures	646	70,8	152	23,5	0,000	1,37	1,31-1,43
Non-Invasive Procedures	266	29,2	190	71,4		1	-
Organic material							
Blood	793	87,0	279	35,2	0,001	1,12	1,05- 1,19
Other organic materials	119	13,0	63	52,9		1	-

In relation to the body region exposed to the biological material, the percutaneous exposure was observed (88.2%), followed by exposure involving ocular and oral mucosa (10.3%) and non-integral skin exposure (1.2%), and full (0.3%). About these, it was found that 84.1% occurred with blood as the main organic material and 15.9% involved other organic materials such as: CSF, body fluids with blood, serum/plasma, saliva, vaginal, tracheal and gastric secretions, urine, pus and feces.

Regarding the circumstance of the accident, it was found that 63.4% ATBM occurred when the professionals performed invasive procedures,

and 36.6% performed noninvasive procedures. Invasive procedures were considered: medication administration, venous/arterial puncture for blood or nonspecific collection, surgical, laboratory and dental procedures, and non-invasive procedures: improper disposal of puncture material in garbage bags or surfaces, washing of material, handling of box of puncture material and reattach the needles.

Among the ATBM sites, 56.9% of the cases were in hospital institutions, followed by 43.1% of the cases in services such as basic health units, dental clinics, laboratories, prehospital services, rest homes, funeral homes, home

hospitalizations, prisons and educational institutions.

DISCUSSION

The proper use of PPE is considered the main measure to protect the health of the worker in the scope of his work activities. The present study reveals the predominance of inappropriate use of PPE at the time of occurrence of ATBM in workers aged up to 29 years-old and from 30 to 39 years-old.

The results presented are similar to other studies^(10,11), and it can be inferred that the main cause of occupational accidents in this category can be justified by the absence of manual dexterity, professional inexperience, lack of knowledge about biosafety norms and risks of biological exposure⁽¹¹⁾.

The predominance of the female population in the occurrence of ATBM was also observed in other studies^(4,7,12). The workforce of the health services, as well as of nursing by tradition and culture, is predominantly female, despite a masculinization in the profession, nursing is still mainly composed of women⁽¹³⁾.

The nursing team is also recognized as the largest professional category that makes up the institutions health team. Considering their work activities and direct contact with patients, they keep the risk of exposure to constant ATBM⁽⁴⁾. In this study, the nursing team predominated among the injured professionals. The non-use of preventive measures and consequent occupational accident was also evidenced in other studies, presenting factors such as emergencies, absence of human resources, reduction of nurse's ability, intense rotating journeys, stress, mental fatigue and lack of attention as the main influences non-adherence to PPE⁽¹⁴⁻¹⁶⁾.

The essential role of nurses as a link within the multi-professional team in the prevention and reduction of accidents with biological material and awareness about the importance of the use of PPE for worker's health and safety is highlighted⁽¹⁵⁾.

Regarding the type of procedure, many accidents occurred when professionals performed invasive procedures and did not adequately use PPE. It is assumed that lack of

attention, technical unpreparedness, insufficient knowledge about the importance of using standard precautions, educational actions and biosafety are the main causes of non-use of PPE and consequent accident with biological material^(17, 18).

As for the place where the professionals did not adequately use PPE, the hospital institutions stood out, it is believed that this result is associated to the complexity of patient care, the intense work pace, the lack of human resources to develop the work activities and the lack of material resources in the institutions⁽¹⁹⁾.

However, it is also assumed that the notification of ATBM in out-of-hospital services is underreported in terms of the service flow chart, since workers, in most cases, have to move to receive assistance, even to another city, as actually found in this study. In addition, educational actions of prevention and care in cases of ATBM are more frequent in hospitals than in other services⁽¹⁹⁾.

Another aspect to be highlighted in this research was the underreporting of accidents with biological material and the inadequate completion of notification forms. Results from a study carried out in a university hospital showed that the main reason for underreporting was the belief that the accident was low risk, not being percutaneous or having as a source patient a child or elderly without risks for infectious diseases⁽²⁰⁾.

Underreporting is a complex and multifactorial problem, but there are some organizational principles that drive it, such as the veiled punishments for the injured worker, post-exposure bureaucratization, the high workload of professionals, and the devaluation as the notification importance⁽¹⁶⁾.

The inadequate completion of the notification forms can be related to lack of time, difficulty in understanding some of the issues addressed in the paper, and devaluation as to the importance of filling⁽²⁰⁾.

Thus it is needed educational strategies and reflections that should cover all equitably professionals, both for those with experience, and for the newly admitted, must be innovative and aimed at promoting culture, health and safety of the worker and the patient⁽¹⁸⁾. Training in biosafety is essential for the adoption of

standard precautionary measures, and especially, changes in the habits of professionals working in the different scenarios⁽¹⁷⁾.

The safety culture in organizations is crucial to promote capacity building and sensitization of human resources as the magnitude that the proper use of PPE has, as well as actions to prevent accidents that foster positive changes in quality of care and the adoption of practices by the worker⁽¹⁴⁾.

Limitations of this study emphasizes the lack of detailed information from the charts of the workers on the ATBM, requiring the exclusion of 149 records data, which may indicate gap filling these documents and loss of essential information. Another limitation is that as it is a research in medical records there were no interviews with the victims to identify the difficulties of the institutions regarding the structure and the work process.

CONCLUSION

Younger professionals, nursing staff workers

who had experienced invasive procedures with blood manipulation had a higher prevalence of inappropriate PPE use when they underwent ATBM. It is concluded that the work accident involving biological material is a worrying reality in health services.

Based on this reality, it is considered necessary to implement the National Policy of Permanent Education in Health (PNEPS), carrying out educational actions through training, lectures, technical demonstrations and refresher courses focusing on topics related to the use of PPE, standard precautions, exposure to biological materials and puncturing, biosafety, among others.

Thus, it is believed that institutional managers should plan strategies to increase adherence to standard precautions and to address the underreporting of work-related accidents involving biological material. With the reduction of risks and the knowledge of the daily situations that represent threats, a greater promotion of safety and health to the worker and patient is possible.

ADESÃO AOS EQUIPAMENTOS DE PROTEÇÃO INDIVIDUAL ENTRE TRABALHADORES DE SAÚDE QUE SOFRERAM ACIDENTES COM MATERIAL BIOLÓGICO

RESUMO

Objetivo: Analisar a adesão aos Equipamentos de Proteção Individual entre trabalhadores de saúde que sofreram acidentes com material biológico. **Método:** Trata-se de um estudo epidemiológico, retrospectivo, quantitativo, realizado em um hospital de média complexidade, no período de outubro de 2010 a dezembro de 2013. **Resultados:** A inadequação do uso dos Equipamentos de Proteção Individual durante a realização do procedimento foi mais prevalente em pessoas com idade até 29 anos e em profissionais da equipe de enfermagem. O uso incorreto dos equipamentos também foi mais prevalente entre as pessoas que sofreram acidentes durante os procedimentos invasivos e com sangue. **Conclusão:** A baixa adesão ou a inadequação na utilização dos Equipamentos de Proteção Individual foi observada e pode estar vinculada tanto a aspectos individuais como a relacionados as instituições empregadoras.

Palavras-chave: Equipamento de proteção individual. Material biológico. Acidentes de trabalho.

ADHESIÓN A LOS EQUIPOS DE PROTECCIÓN INDIVIDUAL ENTRE TRABAJADORES DE SALUD QUE SUFRIERON ACCIDENTES CON MATERIAL BIOLÓGICO

RESUMEN

Objetivo: analizar la adhesión a los Equipos de Protección Individual entre trabajadores de salud que sufrieron accidentes con material biológico. **Método:** se trata de un estudio epidemiológico, retrospectivo, cuantitativo, realizado en un hospital de media complejidad, en el período de octubre de 2010 a diciembre de 2013. **Resultados:** la inadecuación del uso de los Equipos de Protección Individual durante la realización del procedimiento fue más prevalente en personas con edad hasta 29 años y en profesionales del equipo de enfermería. El uso incorrecto de los equipos también fue más prevalente entre las personas que sufrieron accidentes durante los procedimientos invasivos y con sangre. **Conclusión:** la baja adhesión o la inadecuación en la utilización de los Equipos de Protección Individual fue observada y puede estar vinculada tanto a aspectos individuales como a relacionados a las instituciones empleadoras.

Palabras clave: Equipo de protección individual. Material biológico. Accidentes de trabajo.

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