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WORK ACCIDENTS WITH EXPOSURE TO BIOLOGICAL MATERIALS BETWEEN WORKERS IN THE NORTH OF *MINAS GERAIS*

Acidentes de trabalho com exposição a materiais biológicos entre trabalhadores no norte de minas gerais

Accidentes de trabajo con exposición a materiales biológicos entre trabajadores en el norte de minas gerais

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ABSTRACT

Objective: To describe the profile of accidents with exposure to biological material that occurred in Minas Gerais. **Methods:** an epidemiological, descriptive and cross-sectional study carried out by consulting the Notification Disease Information System of the municipalities of northern Minas Gerais, from 2008-2012. **Results:** among the 56 municipalities investigated 28 reported 1025 accidents, 46.1% occurred among technicians and nursing assistants, 14.7% by students and doctors with 11.6% of occurrences. There was a predominance of accidents with professionals aged 30 to 39 years, in surgical procedures, improper disposal of sharps and administration of medication. Percutaneous exposure, blood as organic material and needles as agent were found. **Conclusion:** the causes of accidents most commonly are directly related to the way to perform activities during work, triggered by inefficiency of individual or collective protective equipment, it is perceived the weakness in compliance with the regulatory standard.

Descriptors: Accidents and biological events, Biological agent, Worker's health.

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RESUMO

Objetivo: Descrever o perfil dos acidentes com exposição a material biológico ocorridos em Minas Gerais. **Métodos:** estudo epidemiológico, descritivo e transversal realizado por meio da consulta do Sistema de Informação de Agravos de Notificação dos municípios do norte de Minas Gerais, no período de 2008-2012. **Resultados:** dentre os 56 municípios investigados 28 notificaram 1025 acidentes, 46,1% ocorreram entre técnicos e auxiliares de enfermagem, 14,7% por estudantes e pelos médicos com 11,6% das ocorrências. Houve predomínio dos acidentes com profissionais de 30 a 39 anos, em procedimentos cirúrgicos, descarte inadequado de materiais perfuro cortantes e administração de medicamentos. Verificou-se que a exposição percutânea, o sangue como material orgânico e agulhas como agente. **Conclusão:** as causas dos acidentes mais comumente estão diretamente relacionadas com a maneira em executar as atividades no decorrer do trabalho, desencadeadas por ineficiência dos equipamentos de proteção individuais ou coletivos, percebe-se a fragilidade no cumprimento da norma regulamentadora.

Descritores: Acidentes e eventos biológicos, Agente biológico, Saúde do trabalhador.

RESUMEN

Objetivo: Describir el perfil de accidentes con exposición a material biológico ocurridos en Minas Gerais. **Métodos:** un estudio epidemiológico, descriptivo y transversal realizado mediante la consulta del Sistema de Información de Enfermedades de Notificación de los municipios del norte de Minas Gerais, de 2008 a 2012. **Resultados:** entre los 56 municipios investigados, 28 reportaron 1025 accidentes, 46.1% ocurrieron entre técnicos y auxiliares de enfermería, 14.7% por estudiantes y médicos con 11.6% de incidentes. Predominaron los accidentes con profesionales de 30 a 39 años, en procedimientos quirúrgicos, eliminación inadecuada de objetos punzantes y administración de medicamentos. Se encontraron exposición percutánea, sangre como material orgánico y agujas como agente. **Conclusión:** las causas de accidentes más comúnmente están directamente relacionadas con la forma de realizar actividades durante el trabajo, desencadenadas por la ineficiencia de los equipos de protección individuales o colectivos, se percibe la debilidad en el cumplimiento de la norma reguladora.

Descriptores: Accidentes y acontecimientos biológicos, Agente biologic, Salud del trabajador.

INTRODUCTION

Public, private and similar agencies and institutions have been making efforts to reduce or minimize work-related causes of illness. In this context, there is a need to understand the circumstances in which work accidents occur. The illness of workers and the high number of accidents are directly related to the precarious working conditions.[1]

There is an expressive number of workers who are daily exposed to conditions that favor occupational accidents with exposure to biological material. The great interface that permeates the lives of workers most vulnerable to biological risk comes from the procedures, handling, the conditions in which the work is performed, as well as the lack of knowledge, lack of training or even negligence in carrying out their activities.[2]

The most frequent and most epidemiologically important diseases in terms of exposure to biological materials are: the human immunodeficiency virus (HIV), hepatitis B (HBV) and hepatitis C (HCV). The Ministry of Health already provides the vaccine against HBV infection, but there is still no immunization against HCV and HIV / AIDS.[3]

Due to the need to make the rates of accidents at work with biological materials notorious, such accidents started to be notified in the Notifiable Diseases Information System (SINAN) in force through Ordinance No. 1,271, of 6 June, of 2014, p. 67 in which "it defines the national list of compulsory notification of diseases, conditions and public health events in public and private services throughout the national territory, in accordance with the annex, and other measures".[4]

Safety and health at work in health services are guaranteed through Regulatory Standard No. 32 of the Ministry of Labor and Employment, through GM Ordinance No. 485, 11 November 2005, GM Ordinance No. 939, 18 November 2008 and GM Ordinance No. 1,748, August 30, 2011 p. 143 in which "it establishes the basic guidelines for the implementation of measures to protect the safety and health of health service workers, as well as those who carry out health promotion and assistance activities in general".[5, 6, 7]

It is essential to adhere to the principles of Standard Precautions, which are measures to prevent accidents when handling blood, secretion and excretions, contact with mucosa and unhealthy skin. These measures include the use of Personal Protective Equipment (PPE), control of work practice and, the appropriate post-exposure management when this exposure has already occurred, are measures of safety at work.[8]

The new approach to occupational health within the scope of the Unified Health System (SUS) aims to change the care paradigm by turning its attention to the work itself, in a perspective of health surveillance with a view to institutionalizing health promotion and prevention actions. worker.[9]

For these surveillance actions to take place effectively, it is necessary to understand the context in which work accidents occur, especially with regard to exposure to biological material. In this interim, the present study aims to describe the epidemiological profile of accidents that occurred with professionals exposed to biological materials in the north of Minas Gerais in the period from 2008 to 2012.

METHODS

This is a cross-sectional and descriptive epidemiological study with secondary data. A total of 1025 accident

notification forms with sharps were analyzed among workers in the different cities of northern Minas Gerais.

Data collection took place in the databases of the Regional Health Superintendence (SRS) of a city in northern Minas Gerais, along with the forms of the Information System for Notifiable Diseases (SINAN). The SRS of this city represents the North Macro Region of the State of Minas Gerais, composed of 53 municipalities that add up to approximately a population of 1,047,007 people, among these 28 made notification of work accidents with exposure to biological material. The data refer to the notifications that occurred in the period from June 2008 to June 2012. Forms with incomplete information in more than 50% of the data were excluded.

The data already provided by SRS were consolidated into a Microsoft Office Excel spreadsheet, version of Windows 07 and from there, they were subjected to non-analytical descriptive statistical treatments. This research was approved by the Research Ethics Committee of the AssociaçãoEducativa do Brasil (SOEBRAS) under the number of the substantiated opinion 235,946 and consequently obeyed all ethical precepts.

RESULTS

1025 notifications were found in the proposed study period. The results found show as a highlight in accidents with biological materials the nursing profession with 530 (51.7%) of accidents, young individuals between 30 and 39 years old are 537 (52.4%). The number of accidents by municipality of occurrence, in this item Montes Claros was the one that presented the massive majority of notifications for accidents with biological material, 797 (77.8%) cases, data found in **table 1**.

Due to performing direct and indirect activities, and seeking to understand these data, variables were used such as: age, sex, education level, occupation, municipalities where the notification occurred, type of exposure, organic material involved in the accident, the agent (s)), the use of personal protective equipment (PPE) and the circumstances of the accident.

Variable	Absolutefrequency(N)	Relativefrequency (%)
Yearsof age		
20-29	124	12,1
30-39	537	52,4
40-49	176	17,2
50-59	119	11,6
>61	21	2,0
Losses	48	4,7
Total	1025	100
Yearofnotification		
2008	134	13
2009	144	14
2010	182	17,8
2011	266	26
2012	299	29,2
Total	1025	100
Gender		
Female	666	65
Male	359	35
Total	1025	100
Schooling		
Middleschool	82	8,1
High school	530	51,7
University	192	18,7
Ignoredandunreported	110	10,7
Others	111	10,8
Total	1025	100
Countyofnotification		
Bocaiúva	57	5,6
Januária	75	7,3
Monte Azul	15	1,5
Montes Claros	797	77,7
Porteirinha	12	1,2
Salinas	12	1,2
Outros	57	5,6
Total	1025	100

Source: Notifiable Diseases Information System (SINAN) of the *Regional* Health Service of Northern Minas.

Table 2 shows an increase in notifications over the years, starting with 34 (13%) in 2008 and reaching 299 (29.2%) of the total notifications in the studied period. It is observed that there was an increase of 123.1% in the accident rates with exposure to biological materials during the five years of study, and these data may be associated with greater awareness of the performance of notifications.

It is important to highlight that women represented 666 (65%) of the injured. Among men, there are 359 notification forms, 35% of all cases. As for education, the professionals with the highest rate lead the way with 530 (51.7%) up to high school.

Table 2 shows the distribution of occupational accidents among professionals. More than half of the accidents occurred with nursing professionals, totaling only professionals in this area 530 (51.7%) of accidents followed by students representing 151 (14.7%) of notifications. Physicians were responsible for 119 (11.6%) notifications. In line with the information mentioned above, we also identified the need to work with students.

Table 2. Distribution of accidents according to occupation, between 2008-2012. Municipalities North of *Minas*, 2012.

Occupation	Frequency	Percentage
Attendants / Receptionists	15	1,5
Assist office, staff, dental prosthesis, export and import services.	07	0,7
Nursingassistant	215	21
Assistantclinicalanalysislaboratory	28	2,7
Laundryassistant	15	1,5
Biologists / biotechnology	6	0,6
Dentists	6	0,6
Student	151	14,7
Nurse	57	5,6
Pharmaceutical / biochemical	6	0,6
Physiotherapist	6	0,6
Janitor	55	5,4
Surgicalinstrumentation	14	1,4
Doctors	119	11,6
Veterinarian	1	0,1
Maintenance / renovations	13	1,3
Drivers	5	0,5
Others	18	1,8
Psychologists	1	0,1
Police, Penitentiary, Security, Firefighters	5	0,5
General Services	10	1
Nursingtechnician	258	25,2
Health technicians	14	1,4
Total	1025	100

Source: Notifiable Diseases Information System (SINAN) of the *Regional* Health Service of Northern *Minas Gerais*.

Table 3 shows data related to the characteristics of the accidents. It is relevant to note that the highest incidence comes from surgical procedures with 18.8% (193) notifications. However, there was a high frequency of filling in the circumstance of the accident field as "other" 23.1% (237) and, still, in 24.6% (252) of the forms there was a loss of information in this item, due to not filling in, or for inadequate filling.

Still in the same table 3, it is also observed that the majority of accidents occurred by percutaneous route 747 (64.9%). Blood was the most common type of organic material in accidents, responsible for 821 (80.1%) notifications. Losses of information were also significant, representing 158 (15.4%) of notifications for the same reasons explained above.

Table 3. Distribution of data according to the characteristics of accidents in the forms provided by the Regional Health Secretariat (SRS) in a city in the north of *Minas Gerais*.

Variable	Absolutefrequency	Relativefrequency (%)
Typeofexposure		
Mucosa	147	12,8
Other	08	0,7
Percutaneous	747	64,9
Skinintact	204	17,8
Unhealthyskin	45	04
Total	1149	100
Organic material		
Blood	821	80,1
Bodilyfluids	46	4,5
Losses	158	15,4
Total	1025	100
Agent		
Needle	670	65,3
Intracath	07	0,7
Glasses	21	02
Blade	84	8,2
Losses	243	23,7
Total	1025	100
Accidentcircumstance		
Medicationadministration	129	12,6
Improperdisposal	166	16,2
Dextro	33	3,2
Laundry	43	4,2
Piercing-cutting box handling	44	4,3
Surgical procedures	193	18,8
	38	3,7
Laboratory / dental procedures	96	9,4
Venouspuncture	31	03
Reencap	252	24,6
Total	1025	100
EPI		
Apron	305	17,3
Boot	175	10
Glove	753	42,8
Mask	304	17,2
Glasses	166	9,4
Facial Protection	56	3,2

Source: Notifiable Diseases Information System (SINAN) of the Regional Health Service of Northern *Minas*.

Also in **Table 3**, the needle was the most common agent in the causes of accidents, this being the most common material used to carry out activities such as medication administration and represented 670 (65.3%) of the notifications.

Regarding the use of Personal Protective Equipment (PPE), the data showing that less than half 440 (42.9%) of the professionals wore gloves at the time of the accident and that only 305 (29.8%) wore an apron is worrying. only 304 (29.7%) wore a mask, with low adherence in the use of all PPE. Such data are of great relevance in a scenario in which the significant majority of accidents occurred with health professionals, who deal with sharp cutting materials and people with serious and contagious diseases on a daily basis. It is necessary to reflect more deeply on the practices of professionals and on the actions of health surveillance of workers practiced by the institutions that employ them.

DISCUSSION

A study previously carried out corroborates what was found in this study, pointing out an average of 36 years of age for the occurrence of work accidents involving the same circumstances, discussed here. Such authors justify this finding by stating that this age makes up the most productive age group, where it is common among workers with more than one job and with weekly work overload, a very common point for health professionals throughout Brazil, as well as also presented in this study the most incident in this audience.[10]

Several are the vulnerable professionals in the multiprofessional team who have accidents with biological material, with greater risk for health professionals, including nurses and doctors. The public with the highest rates is the nursing team, resulting from the constant manipulation of piercing - cutting materials contaminated by blood such as needles, lancets, scalpels and broken glass. Thus, these risks added to self-confidence for working years with the same activity, exhaustion, lightness, nervousness, distraction, failure to follow protocols, standard operating procedures (SOP), flows, patient non-cooperation, and attempts made in the execution of a certain procedure.[11]

In 2017, due to the high incidence of accidents with health professionals, and mainly to the risks exposed to them, it was necessary to establish policies that value the safety of workers, and among them, NR 32 was created, which aims to establish safety standards for employees assist the patient / client, in order to mitigate the occurrence of these accidents, thus minimizing the risks to the worker's health. However, it is necessary that the implementation of these good practices and preventive measures, which corroborates with the activities performed, will be a constant culture in the life of the health professional.[12]

It is evident how much the number of notifications has increased over the years studied, about 123.1%. This increase may be associated with negative situations such as absence or inadequacy in the use of Individual Protection Equipment (PPE) / EPCs (Collective Protection Equipment), and even the culture in their use, in addition to training in companies, inadequate environments or which makes it difficult to protect these professionals during long working hours.[13 - 16]

The expressive curve in female participation shows

an incidence of increasing value represented by (65%) of the injured and can be explained by having more women working in the nursing area, where the highest incidence of accidents is concentrated. Other studies on the profile of accidents with exposure to biological material registered at SINAN also identified higher rates of notifications among female professionals, more than 70%.[17 - 19]

The high incidence of occupational accidents was among professionals with less education. In this study, technical training professionals stand out, together with nursing assistants, representing more than 46% of notifications, data corroborated by the literature.10, 20 Such an explanation is explained due to the greater exposure, they are the ones who perform a series of procedures , stay closer and for longer with patients, which makes them more susceptible to accidents.[18, 21]

The Regional Nursing Council (COREN) of Minas Gerais corroborates the large number of accidents with nursing technicians, since they are the most present in the job market, corresponding to 58.1% of the 168,624 active enrollments of all professionals in this class.[22]

Students represented 14.7% of notifications. This finding strengthens the study carried out where students were also in the 2nd place in the occurrences with biological materials with 12 notifications 19% of the analyzed cases. The high occurrence of accidents among students can be explained due to the lack of information and inexperience.[13]One study showed that of 270 students interviewed 139 (51.4%) reported not having received information on how to dispose of sharp drilling waste or how deal with them.[15]

In another survey 74.3% of the academics studied did not receive any information regarding the prevention of accidents with biological material. As for the conducts to be taken after exposure to biological material, 212 (83.8%) and 127 (85.2%) were not known or relatively known by medical and nursing students, respectively.[23]

When analyzing the circumstances of accidents, adding all the actions that are routine in nursing praxis, such as medication administration, venipuncture, among others, it is observed that these make up the majority of accidents, 48.7%. The occurrences by percutaneous route, the manipulation of needles and the exposure to blood also refer to the making of this profession. Other works make the same association, reinforcing the fragility in the occupational safety of these professionals.[10, 17, 25]

This research shows the low adherence to PPE. It is essential that health institutions invest in the acquisition of PPE, EPCs as well as in the training of professionals regarding the importance of using these materials, as assessed in the research. According to Ordinance No. 452 of 2014, this equipment must be available to all professionals as in good condition to protect from contamination in the event of an accident.[14, 25]

The incidence of occupational accidents is commonly associated with the absence of PPE's, and the negligence of professionals in the use of gloves, caps, glasses, aprons or even carelessness in the final process of disposal of materials after use, where during manipulation have accidents, exposing your health to serious risks.[26]

However, it is worrying the absence of the use of these PPE's, since the health of the employee is essential to prevent the occurrence of this event, after their exposure with biological material, the risk of transmission of pathogens bound by fluids or the presence of secretions can bring serious risks to the individual's life, and is the only means of preventing the transmissibility of diseases such as HBV, HCV and HIV / AIDS.[27]

Most health professionals neglect post-accident notification, and most of the time the medical evaluation is not carried out and the communication of the accident at work is not generated and / or issued, thus consequently the assessment of the immunization status of this employee also does not is investigated, thus becoming one more possibility of transmissibility of diseases. It also emphasizes that after the accident, this employee must be accompanied by a qualified professional, who is an occupational physician.[27]

CONCLUSION

It is evident in the study that the causes of accidents most commonly are directly related to the way in which activities are performed during work, triggered by inefficiency of PPE / EPCs. Thus, causing a correlation with a possible lack of training, as well as work overload or negligence at work. Such facts show the fragility in the fulfillment of the regulatory norm n ° 32. Thus, through this research, it is possible to rethink and redefine its functions, in order to ensure its commitment to the health of the patient and also of the worker who, at that moment, aspires for greater and better working conditions, which will also lead to a lower incidence of these accidents. The present study is relevant for collecting the necessary data. The production of new research is encouraged in this respect, since through this it can enable the taking of appropriate and necessary attitudes for the prevention of such injuries.

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