Accidents by Sharp Instruments of Nursing Professionals in a Hospital Unit

ORIGINAL

Abstract

Objective: To analyze the records of work accidents involving nursing professionals by sharp instruments according to the Notifiable Diseases Information System (SINAN).

Method: Descriptive and documentary research with a quantitative approach, performed in an Emergency and Trauma Hospital in a Northeast Brazil city in May 2015. Data collection was conducted from work accident records maintained by the Epidemiology sector of the hospital, for the period from 2010 to 2014. The sample was the result of 152 forms.

Results: The highest prevalence year of accidents in nursing professionals with sharp instruments was 2014 with 57 cases. On the types of exposure involving biological materials, contact with blood remains the organic material where professionals are more vulnerable to contamination. Situations leading sharp injuries are intravenous drugs (14%), followed by a venous/arterial puncture for blood collection (14%), the venous/arterial puncture unspecified (17.5%) and by improper disposal of sharps in the workbenches, beds, or on the floor (12.25%). As regards the causal agent of biological material by accident, there is a prevalence of accidents involving lumen needles, especially between 2013 (51.3%) and 2014 (61.25%).

Conclusion: This study enabled to understand better the importance records with accidents caused by sharp instruments and the importance of the indicators analysis so preventive measures can be implemented and the occurrence of accidents are minimized through preventive actions.

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Introduction

Historically, workers have suffered many misfortunes in the workplace, with big repercussions in the social, economic and health area. Their exposure to physical, chemical, biological, ergonomic, psychosocial risks and accidents arising from their work can result in diseases and occupational problems [1].

The work-related injuries come from diseases and accidents affecting the population in general, but particularly acquiring different characteristics in certain workers categories [2].

Among the international organizations, the Center for Disease Control and Prevention (CDC) defines health workers as everyone (employees, students, office clerks, public health workers or volunteers) who perform activities that involve contact with patients or with blood or with body fluids of patients admitted in the laboratory or health surveillance [3].

Among the health professionals' workplaces, chemical, physical, biological, psychosocial, ergonomic agents and accidents [4] highlight the hospital because of the several work activities that expose workers to the risks caused. This diversity of risks predisposes to illness at work that causes the work accident.

In the hospital context, nursing professionals have been more susceptible to victimization by sharps injuries due to the large number of tasks they perform using needles, catheters and often not using Personal Protective Equipment (PPE), mainly gloves, which do not prevent the accident, but enshrine that large volume of blood comes in direct contact with the skin [5].

For reporting and analysis purposes, the sharps are responsible for serious accidents with biological material in hospitals, generating some consequences, since the individual has a risk of disease. Thus, data show high rates of accidents [6].

About diseases acquired through accidents with the biological material; hepatitis B is the greatest risk. The incidence of transmission among workers exposed to this virus ranges from 6% to 30%, rea-

ching up to 60% depending on the source patient situation, concerning hepatitis C, the risk of transmission of percutaneous exposure to the biological material, is approximately 1.8%, ranging from 0% to 7%. About HIV, it is estimated at 0.3% the risk of contamination after percutaneous 0.09% and the mucocutaneous risk exposure [7].

Even HIV, whose risk of occupational transmission is only 0.3% of percutaneous injuries caused infections in 57 health workers in the United States in 2001 [8].

In Brazil, the number of work accidents shows the growing form of illness and absenteeism among health professionals, so it is considered a major public health problem as well as causing damage to workers and employers, affecting the economy of the country. Thus, it is soon deserved analysis aspect for better understanding and control of risks. However, the knowledge of the magnitude of the problem is still quite limited and runs counter to the implementation of specific actions in the promotion and prevention of damage to the health of workers [9].

Within each context surrounding the occurrence and formal knowledge of occupational accidents in Brazil, the underreporting of such accidents is recognized as an obstacle to the planning of occupational health surveillance actions. Studies [10, 11, 12, 13] show that the published statistics do not correspond to the total number of accidents and deaths, and even the Ministry of Social Security states that the real figures are underestimated.

To avoid such underreporting, it is needed complete, updated and reliable information on the occurrence of accidents and illnesses to which workers are subject to the exercise of their profession, to the orientation of measures to minimize such events and subsidize the development of targeted policies on the working class so often victims of accidents and occupational diseases [9, 14].

Considering the magnitude and importance of this theme, it was aimed to present the study to

analyze the records of work accidents with active nurses caused by sharp instruments in a hospital in northeastern Brazil.

Method

Cross-sectional study with secondary data on sharps injuries that occurred in 2010 to 2014 in an Emergency and Trauma Hospital in the interior of Paraíba in northeastern Brazil, the data were derived from the epidemiology sector through the notification of this disease in SINAN is part of the UHS information system from an ongoing process of collection, transmission and dissemination of information in terms of reportable diseases and accidents, constituting a fundamental tool of the epidemiological surveillance system [15].

The Emergency and Trauma Hospital where the research was conducted has several specialties such as: Surgery, Internal Medicine, Dermatology, Physiotherapy, Gynecology, Neurology, Dentistry, Pediatrics, Psychology, Radiology, Social Services, Basic Services, Adult ICU, Children's ICU with reference units and Intensive Treatments ensuring the rehabilitation and recovery of patients who require 24 hours services. Around 300 new patients are assisted per day. Forms of SINAN were studied - Accidents with Exposure to Biological Materials in sharps injuries in the Epidemiology sector of the Hospital. This department operates 24 hours a day consisting of a multidisciplinary team.

The inclusion criteria were all cases of occupational accidents with sharp instruments recorded in SINAN between 2010 and 2014 with nursing professionals. Erased damaged forms or with any illegibility that prevented data collection were excluded. The resulting sample was 152 forms that met the inclusion criteria.

The data in the records were exported and tabulated by TabWin version 3.6, linked to SINAN-NET, and Microsoft Office Excel 2010. For the analysis, a descriptive statistics was performed through abso-

lute and relative frequency measures and presentation of data in tables.

The research was submitted to the Research Ethics Committee - REC of the State University of Paraíba - UEPB for consideration and it was approved by CAAE: 44388115.3.0000.5187. The main researcher signed the Commitment Agreement for Use Data File and the agreed to meet the standards of Resolution 466/12 of the National Health Council, highlighting the study purposes, identification, research contacts and ensuring confidentiality of information.

Results

A study was conducted to examine the records of work accidents caused by sharp instruments occurred with nursing professionals - nursing technicians and nurses - operating in a hospital in northeastern Brazil, which analyzed 152 case of work accidents reported in the System for Notifiable Diseases Information System (SINAN), in the period 2010-2014.

It was found in this study that 2014 was the highest prevalence year of accidents in nursing professionals with sharp instruments, obtaining 57 cases. It is noteworthy that in 2010-2014, the category with the highest number of accidents was nursing technicians with 114 cases. Regarding gender, there is a predominance in female professionals (**Table 1**).

On the types of exposure involving biological materials, materials that involve risks for the nursing team professionals are presented in **Table 2**. It is observed repetition of values regarding the exposed tissue (percutaneous and full skin).

About organic materials that professionals are exposed (**Table 3**), the contact with blood is the organic material that professionals are most vulnerable to contamination. It is observed that between 2012 and 2013, an increase of 10.47% while there was a considerable decrease in 2014 (61.25%).

Regarding the circumstances of the accident, the types of procedures performed by the nursing team

Table 1. Distribution of accidents by nurses and patients (n=152). Paraíba, Brazil, 2010-2014.

	Nursing team			Gender		
	N.T.	Nurse	Total	Male	Female	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
2010	2 (100)	- (-)	2 (100)	- (-)	2 (100)	2 (100)
2011	22 (78.54)	6 (21.42)	28 (100)	4 (14.28)	24 (85.68)	28 (100)
2012	24 (85.68)	4 (14.28)	28 (100)	- (-)	28 (100)	28 (100)
2013	30 (81)	7 (18.9)	37 (100)	3 (8.1)	34 (91.8)	37(100)
2014	36 (63)	21 (36.75)	57 (100)	2 (3.5)	55 (96.25)	57 (100)

N.T.: Nursing Technicians. **Source:** Research data

Table 2. Type of exposure involving biological material (n=152). Paraíba. Brazil. 2010-2014.

	Type of Exposure					
	Percutaneous	Full skin	Not full skin	Other	Not informed	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
2010	1 (50)	1 (50)	- (-)	- (-)	- (-)	2 (100)
2011	18 (54.54)	11 (33.33)	- (-)	1 (3.03)	3 (9.09)	33 (100)
2012	18 (45)	16 (40)	3 (7.5)	3 (7.5)	- (-)	40 (100)
2013	24 (46.08)	26 (49.92)	1 (1.92)	- (-)	1 (1.92)	52 (100)
2014	32 (44.80)	35 (49)	- (-)	1 (1.40)	3 (4.2)	71 (100)

Table 3. Numerical distribution of organic materials that professional category is exposed (n=152). Paraíba. Brazil. 2010-2014.

	Organic Material						
	Blood	Cerebrospinal fluid	Cerebrospinal fluid with blood	Other	Ignored	Not informed	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
2010	1 (50)	- (-)	- (-)	- (-)	1 (50)	- (-)	2 (100)
2011	17 (60.69)	1 (3.57)	3 (10.71)	3 (10.71)	1 (3.57)	3 (10.71)	28 (100)
2012	19 (67.83)	- (-)	3 (10.71)	3 (10.71)	1 (3.57)	2 (7.14)	28 (100)
2013	29 (78.3)	- (-)	2 (5.4)	2 (5.4)	1 (2.7)	3 (8.1)	37 (100)
2014	35 (61.25)	- (-)	1 (1.75)	9 (15.75)	3 (5.25)	9 (15.75)	57(100)

that causes accidents with sharp instruments are exposed (**Table 4**).

According to the occurrence of sharp injuries, it is seen that mostly occurred in 2014, when nursing workers were administering intravenous drugs (14%), followed by venous/arterial puncture for blood (14%), the unspecified venous/arterial punctu-

re (17.5%) and the improper disposal of sharps in the workbench, beds, or on the floor (12.25%).

As regards the causing agent of the accident by biological materials (**Table 5**), there is the prevalence of accidents involving lumen needles, especially between 2013 (51.3%) and 2014 (61.25%).

Table 4. Distribution of the circumstances that caused the accident at work (n=152). Paraíba, Brazil, 2010-2014.

	Accident circumstances				
	2010	2011	2012	2013	2014
	n (%)	n (%)	n (%)	n (%)	n (%)
Intravenous medication administration	1 (50)	1 (3.57)	2 (7.14)	1 (2.7)	8 (14)
Intramuscular medication administration	- (-)	1 (3.57)	1 (3.57)	- (-)	- (-)
Subcutaneous medication administration	- (-)	2 (7.14)	- (-)	1 (2.7)	3 (5.25)
Venous/arterial puncture for blood	- (-)	1 (3.57)	1 (3.57)	1 (2.7)	8 (14)
Unspecified venous/arterial puncture	- (-)	1 (3.57)	4 (14.28)	9 (24.3)	10 (17.5)
Improper disposal of sharps materials like workbenches, bed, floor	- (-)	4 (14.28)	6 (21.42)	4 (10.8)	7 (12.25)
Not informed disposal of sharps materials	- (-)	3 (10.71)	- (-)	- (-)	- (-)
Disposal of sharp material in garbage bag	- (-)	- (-)	1 (3.57)	2 (5.4)	- (-)
Boxes handling with sharp equipment	- (-)	4 (14.28)	1 (3.57)	2 (5.4)	1 (1.75)
Surgical procedure	- (-)	- (-)	- (-)	2 (5.4)	1 (1.75)
Laboratory procedure	- (-)	- (-)	- (-)	1 (2.7)	- (-)
Dexterous	- (-)	- (-)	- (-)	- (-)	2 (3.5)
Recapping	- (-)	2 (7.14)	2 (7.14)	2 (5.4)	3 (5.25)
Other	- (-)	9 (32.13)	6 (21.42)	10 (27)	10 (17.5)
Other equipment	1 (50)	- (-)	- (-)	- (-)	- (-)
Not informed	- (-)	- (-)	4 (14.28)	2 (5.4)	4 (7)
Total	2 (100)	28 (100)	28 (100)	37 (100)	57 (100)

Source: Research data

Table 5. Numerical distribution of cause agents of occupational accidents (n=57). Paraíba, Brazil, 2010-2014.

	Accidents causes						
	Needle with lumen	Needle without lumen	Blade	Other	Ignored	Not informed	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
2010	2 (100)	- (-)	- (-)	- (-)	- (-)	- (-)	2 (100)
2011	13 (46.41)	1 (3.57)	3 (10.71)	7 (24.99)	1 (3.57)	3 (10.71)	20 (100)
2012	16 (57.12)	3 (10.71)	4 (14.28)	- (-)	- (-)	5 (17.85)	28 (100)
2013	19 (51.3)	8 (21.6)	3 (8.1)	1 (2.7)	1 (2.7)	5 (13.5)	37 (100)
2014	35 (61.25)	1 (1.75)	9 (15.75)	4 (7)	- (-)	8 (14)	57 (100)

Source: Research data

Discussion

When analyzing the number of work accidents recorded in SINAN in 2010-2014 with nursing professionals, it was found higher occurrence in the category of nursing technicians. Regarding gender and marital status, the results are consistent with national studies showing that nursing is an essentially female profession [16]. This proves that the number of women is considerably higher in hospitals, since, before the historical process women are still a plurality in the care process, thus demonstrating their sensitivity [17].

During the care performance in the hospital, nurses and nursing technicians face hard work to exercise continuously and nursing care surveillance, sometimes acting quickly because of a big number of patients and clinical and emergency complications caused by the change of state of health and it facilitates the occurrence of accidents with sharps.

Studies [18, 19, 20, 21, 22] conducted in health professionals in Brazil and other countries highlighted the nursing staff as the most injured during professional practice, with the greatest risk factor contact with sharps and potentially contaminated biological materials. Among the reasons given for greater vulnerability of nursing staff are the characteristics of the profession, as being the largest individual group of health professionals responsible for uninterrupted 24 hours a day service and perform a higher volume of direct patient care.

A study [23, 24] performed with medical professionals of an emergency service highlights that the higher the workload shift, the greater the risk of accidents. Among the work accidents caused in the medical staff, those to the emergency scene (n=454, 51.7%) and during transportation of the victim (n=256) were highlighted.

The Occupational Safety and Health Administration (OSHA) define a normal work shift as a work period of no more than eight consecutive hours during the day, five days a week with at least an eight-hour period of rest [25]. EMS workers are of-

ten scheduled to work extended shifts of >12 hours. Extended shifts increase the risk of adverse events, medical errors and attention deficits in diverse settings, including healthcare [26].

The working conditions offered by many hospitals is a determining factor for the increase in cases, causing the risk of accidents present in the activities of health professionals, making nursing workers the most vulnerable class [27].

The work environment offers multiple risks to nursing professionals, especially the danger of sharp materials in the type of exposure to biological material observed in Table 2 the great problem of exposure to biological fluids, percutaneous being the predominant among these workers.

Percutaneous exposures are injuries caused by perforating or cutting instruments that are common in the nursing team from the handling of needles, blades and objects that pierce or cut [28].

Biological materials which nursing professionals are more exposed are blood, cerebrospinal fluid and cerebrospinal fluid with blood. This demonstrates that the biological risks have extreme relation to the procedures that nursing performs.

Therefore, the adoption of safe practices in the exercise of nursing activities needs to be a subject to be thoroughly discussed by the team responsible for the continuing education actions, as also, they need to discover the reason for not following the recommendations standard by professionals who know them, however, not properly practice [29].

In the distribution of the circumstances that caused the accident at work in this study, seems that administration of intravenous drugs (14%) had a higher percentage, followed by venous/arterial puncture for blood collection (14%), unspecified venous/arterial puncture (17.5%) and improper disposal of sharps in the workbenches, beds, or on the floor (12.25%).

Several studies [30, 31, 32] reported that most of the activities performed by the nursing team focus on direct patient care with invasive nature, which

can increase the risk of accidents, for example, during venipuncture, dilution and administration of medicines, which involve needles or sharps material.

Table 5 showed that the sharp materials are causing most accidents are needles with the lumen justified that among the activities carried out by nursing professionals, this equipment is essential for medication administration. Injuries involving needles are considered harmful and with great potential for disease transmission.

Direct patient care associated with the administration of drugs and, consequently, to contact with sharps, predisposes to the occurrence of accidents, especially when patients exhibit aggressive behavior and customer condition requiring emergency assistance [33].

The nursing professionals for working in an unhealthy environment perform procedures with a risk of accidents when handling sharps improperly, leaving them on workbenches, beds, floors, performing unnecessary recapping, discarding materials in inappropriate places and other favorable situations for accidents. Also, the high complexity of activities performed within the hospital makes the nursing professional vulnerable to accidents [34].

The work accident with needles and sharp instruments originates changes in professional physical structure by the perforations and cuts caused by such materials. Indeed, it can cause biological changes due to possible infection with hepatitis B, C, and AIDS. These experiences can provide the manifestation of feelings such as fear, anguish, despair, anxiety and stress [35].

The PPE (Personal Protective Equipment) aims to protect against risks that threaten the safety and health while reducing the exposure of professional biological agents, recommended for the use and disposal of sharps [36]. Thus, health education activities need to emphasize the correct use of personal protective equipment (PPE) [9, 37], the discussion of each function and the essentiality of its use. They also need to explain why there are containers for

the disposal of sharps and needles instruments and the need to prevent their overcrowding, as preventing accidents.

Prevention of Work Accidents in the hospital

The main objective of a hospital is to provide services in the health are with quality, efficiency, and effectiveness. This goal cannot be achieved without the effective administration of an accident prevention program that provides safe environmental conditions for the patient and the professional. All levels of management must constantly strengthen the rules and safety regulations, be alert and identify unsafe practices and conditions, taking immediate action to correct irregularities [38].

The organization of work reduces the chances of avoiding risks, mitigating them or eliminating them while performing its duties. Occupational Risk is any possibility that some element or existing circumstances in a given process or work environment can cause damage to health, whether through accident, disease or the suffering of workers [39].

According to the International Labor Organization, the detection of risks and risk assessment must be considered to identify what could affect the employees and the property, to develop and implement appropriate prevention and protection measures [40].

Ordinance number. 3214 of June 8, 1978, of the Ministry of Labor and Employment -MTE ensures the right of workers to the Occupational Safety and Health at Work in Brazil. Through the Regulatory Standards- RS, the Specialized Safety and Medical Engineering work (SESMT) and Internal Commissions for accident prevention (CIPA) were established that are instruments that workers and companies have to deal with the prevention of accidents and the conditions of the working environment. These bodies protect the physical integrity of the employee and every aspect that can potentially affect his health.

Hospital managers and health professionals gui-

ded by the technical team of SESMT need to adopt reduction of occupational accidents policy in the hospital. Thus, they need to adopt the following strategies to help minimize occupational risks: Periodically review the equipment and personal protection equipment – PPE; Schedule preventive maintenance of machinery and equipment; Implement accident prevention lecture programs; Unify health and safety procedures in the hospital; Create calendar support to prevent accidents; Improve the internal policies of occupational safety; and Creating a culture of safety at work.

The effective workers' participation in the adoption of measures to prevent accidents to their integrity reduces costs of prevention, improves working conditions, product quality, and process productivity. The educational practice should be held in accessible language emphasizing the activities that the company develops and its inherent risks. Thus, the worker shall be able to collaborate in the promotion of working conditions and provide hospital company grants to improve the tactical, strategic and operational planning. The awareness by workers and hospital managers regarding health and safety in the production process can come to ensure the best quality of the work environment. Thus, a network of solidarity is installed, creating conditions for other health actions, adding quality of life to the worker [41].

Conclusion

It was found in this study that the work done by nursing professionals gives various occupational risks, especially accidents with sharps.

Given this problem, it is pertinent to point out that a good working condition can become timely and provide a decrease in the number of accidents involving the use of needles and sharps.

There is also the need for implementation of ongoing education of these professionals and to workers' health, including the risks and prevention

of occupational accidents, use of personal protective equipment and collective importance of prompt reporting and serologic follow-up within the institution. This will involve directly in decreasing the rates of accidents and/or occupational diseases.

Therefore, it is important that the hospital and the healthcare professional are united in the creation of prevention and elimination of risks by continuing educational activities that enlighten and sensitize the workers to know their work environment and the factors that interfere with their health. It is understood that security is a responsibility of all.

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