

## OCCUPATIONAL ACCIDENTS INVOLVING BIOLOGICAL MATERIAL AMONG PUBLIC HEALTH WORKERS

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*This descriptive research aimed to recognize the occurrence of work accidents (WA) involving exposure to biological material among health workers at Public Health Units in Ribeirão Preto-SP, Brazil. A quantitative approach was adopted. In 2004, 155 accidents were notified by means of the Work Accident Communication (WAC). Sixty-two accidents (40%) involved exposure to biological material that could cause infections like Hepatitis and Aids. The highest number of victims (42 accidents) came from the category of nursing aids and technicians. Needles were responsible for 80.6% of accidents and blood was the biological material involved in a majority of occupational exposure cases. This subject needs greater attention, so that prevention measures can be implemented, which consider the peculiarities of the activities carried out by the different professional categories.*

DESCRIPTORS: nursing; work; occupational health; public health

## ACCIDENTES DE TRABAJO CON MATERIAL BIOLÓGICO ENTRE TRABAJADORES DE UNIDADES DE SALUD PÚBLICA

*La finalidad de esta investigación descriptiva con aproximación cuantitativa fue investigar la ocurrencia de accidentes de trabajo (AT) con exposición a material biológico entre trabajadores de salud que actúan en Unidades de Salud Pública del Municipio de Ribeirão Preto-SP, Brasil. Se registraron, mediante la Comunicación de Accidente de Trabajo (CAT), 155 accidentes durante el año de 2004. En 62 de estos accidentes (40%) ocurrió la exposición del trabajador a materiales biológicos que podrían causar infecciones como hepatitis y sida. Ante la proporcionalidad de las categorías expuestas, se observó un mayor número de víctimas en la categoría de auxiliares y técnicos de enfermería, con 42 accidentes. Las agujas fueron responsables por 80,6% de los accidentes y la sangre fue el material biológico involucrado en la mayoría de las exposiciones ocupacionales. El tema merece mayor atención para que medidas preventivas puedan ser implementadas, considerándose las peculiaridades de las actividades realizadas en las diferentes categorías profesionales.*

DESCRIPTORES: enfermería; trabajo; salud ocupacional; salud pública

## ACIDENTES DE TRABALHO COM MATERIAL BIOLÓGICO ENTRE TRABALHADORES DE UNIDADES DE SAÚDE PÚBLICA

*Pesquisa descritiva de abordagem quantitativa que teve como objetivo investigar a ocorrência de acidentes de trabalho (AT) com exposição a material biológico entre trabalhadores da saúde, atuantes em Unidades de Saúde Pública do Município de Ribeirão Preto, SP. Foram registrados por meio da Comunicação de Acidente de Trabalho (CAT) 155 AT no ano 2004, sendo que em 62 acidentes (40%) houve exposição do trabalhador a material biológico passível de ocasionar infecções como Hepatite e AIDS. Considerando a proporcionalidade das categorias expostas, foi constatado que a categoria de auxiliares e técnicos de enfermagem foi a mais vitimada, com 42 acidentes (67,7%). As agulhas foram responsáveis por 80,6% das injúrias e o sangue foi o material biológico envolvido na maioria das exposições ocupacionais. O tema merece maior atenção para que medidas preventivas possam ser implementadas, considerando-se as peculiaridades das atividades executadas nas diferentes categorias profissionais.*

DESCRIPTORES: enfermagem; trabalho; saúde ocupacional; saúde pública

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## INTRODUCTION

According to the Ministry of Social Security<sup>(1)</sup>, occupation accidents (OA) are defined as accidents that occur in performing work in a firm's service or yet by the exercise of work by especially insured workers, causing body injury or functional disorder that leads to death, to the permanent or temporary loss or reduction of work capacity. Occupational accidents are traditionally classified as type or typical accidents (those that occurred in the work environment and/or during the work journey), route accidents (those that occur in the trajectory from home to work and from work to home) and those related to work.

This is an issue of national and international relevance due to the losses it causes to health workers, employment institutions and governmental institutions.

Regarding health institution workers, the OA can be related to a series of predisposing factors, due to the peculiarities of human care activities. Among these, occupational violence, physical, chemical, biological, psychosocial and ergonomic factors stand out<sup>(2)</sup>.

A study performed at health units in Cuiabá-MT, Brazil, demonstrated that violence in the nursing work context in health units happens in two distinct ways: structural/institutional and behavioral/relational, which turn into the following types of violence: structural violence (imposition to workers of physical and mental overload); repressive violence (denying the right to implement care activities safely and to act in a safe work environment); violence alienation (explicitly impeding workers to perform competently, effectively and professionally and to be socially valued); and classic violence (physical and verbal aggressions by health team members and users)<sup>(2)</sup>.

The physical factors are related to several forms of energy workers might be exposed to, such as: noise, vibrations, abnormal pressures, extreme temperatures, ionizing radiations, non-ionizing radiations such as infrasound and ultrasound. Chemical factors are caused by chemical agents, that is, substances, compounds or chemical products that can penetrate the organism by the respiratory route, in the form of dust, smoke, haze, fog, gases or vapors, or yet which, by the nature of the activity and exposure, can be in contact with or absorbed by the organism through the skin or ingestion<sup>(3)</sup>.

Psychosocial factors can be associated to fatigue and tension; loss of control on the job; impact of night and shift work schedules, overtime, double shifts; subordinated work; disqualification of the worker; work interrupted by fragmented and repetitive tasks; accelerated pace of work<sup>(4)</sup>. Ergonomic factors are related to the adoption of an inadequate and/or prolonged posture during the transport and movement of users, equipment, materials and to non-adaptable furniture, work pace and shift work scheme among others<sup>(5)</sup>.

Biological factors are represented by biological agents like bacteria, fungi, bacilli, parasites, microorganisms and viruses<sup>(4)</sup>. These are the most evident due to the exposure to blood and body fluids that cause infection, due to bloodborne pathogens like the hepatitis B (HBV), hepatitis C (HCV) and Acquired Immunodeficiency Syndrome (AIDS) viruses, which can be lethal. This contamination occurs more frequently through the cutaneous route, due to OA with piercing and cutting material.

The main causes attributed to the occurrence of OA with piercing and cutting material are: discarding in inadequate sites or overloaded recipients, transport or manipulation of unprotected needles and disconnection of needle from the syringe, but the main associated factor is needle recapping which, although recommended for years through standard precaution measures, has been evidenced as a cause of between 15 and 35% of OA with piercing and cutting material<sup>(6)</sup>.

The OA have been addressed in several studies involving health workers in hospital institutions. However, little attention has been given to Primary Health Network Units: Primary Health Unit (PHU); District Primary Health Unit (DPHU); Family Health Center (FHC) and Urgency Medical Care Service (UMCS), which deserve attention due to the high number of workers acting in these institutions in Brazil, who compose the structure of the Single Health System (SUS), and also due to the peculiarities present in these work units, which differ from the hospital environment.

The work activities performed in the PHU are related to welcoming and emergency care of low severity or complexity. It is the entrance door to the SUS. At the DPHU, which functions 24 hours per day, the activities are directed to the delivery of care that corresponds to the first level of medium-complexity care (secondary level)<sup>(7)</sup>. At the FHC, the activities are directed at preventive actions, health promotion

and recovery of people in an integral and continuous way<sup>(8)</sup>.

The UMCS is available 24 hours per day for rescue calls from the entire city<sup>(9)</sup>. The workers' activities are related to health care in urgency and emergency situations. The workers go to the site of the occurrence, offer first aid and forward the patient to the institutions determined by the Regulation Central.

Most studies about occupational risks carried out in the Primary Health Network appoint the psychosocial risk as the most reported by workers<sup>(10)</sup>. In a research performed at a Public Health Unit in Ribeirão Preto, SP, Brazil, it was demonstrated that 46.7% of the workers population considered the work environment as the most stressing factor and that a majority identified the risk of infection due to exposure to biological material and the existence of dangerous situations in the work site, due the aggressiveness of the assisted clientele, as one of the triggering factors of stress<sup>(11-12)</sup>.

What motivated us to perform this study was the fact that, in 2001, 52% of the total number of OA notified by Nursing professionals from the health units of the Municipal Government of Ribeirão Preto-SP<sup>(13)</sup> involved exposure to biological material.

## OBJECTIVE

Investigate the occurrence of occupational accidents involving exposure to biological material among health workers in Public Health Units.

## MATERIAL AND METHOD

It is an exploratory research with a qualitative approach for data analysis. Communications of Occupation Accidents (COA) were surveyed, involving exposure to biological material in 2004, at the District Primary Health Units, Family Health Centers and Urgency Medical Care Services of Ribeirão Preto - SP. The authors collected data in the files of the Occupational Medicine and Safety Division (OMSD) of the Municipal Government of Ribeirão Preto - SP in May 2005. The data were recorded in a script elaborated by the authors, with information regarding the injured workers' characteristics (gender, age, marital status, place of work and professional

category) and OA characteristics (injured body part, biological material involved, what object caused the accident; activity performed when the accident occurred; accident motive).

The study was performed in accordance with the requirements of Resolution 196/96 on research involving human beings and approved by the institutional review board from the University of São Paulo at Ribeirão Preto College of Nursing/USP.

## RESULTS AND DISCUSSION

### Study site characteristics

The OMSD is responsible to register OA that occur in all health units from the Primary Health Network of Ribeirão Preto-SP, divided in five regions called Health Districts. They are located in the following regions: North - Simioni District, South - Vila Virginia District, East - Castelo Branco District, West - Sumarezinho District and Central - Central District. There is a District Primary Health Unit in each Health District which, in addition to primary care in its coverage area, is also a referral unit for some specialties for the entire district. The Districts are also composed by several Health Primary Units, aimed at delivering primary care in the medical, dental and nursing areas to the population in its coverage area<sup>(14)</sup>.

In 2004, 2818 workers were active in the Ribeirão Preto Health Secretary<sup>(14)</sup>. A total of 155 occupation accidents were registered in this period and, in 40% of them, the worker was exposed to biological material. The incidence of OA represented a coefficient of 22 OA per 1000 exposed workers per year.

These results suggest the occurrence of OA undernotification when we consider the number of workers exposed and the high number of tasks performed with piercing and cutting material and exposure to secretions, which are vehicles of infections among health workers, especially from the nursing area.

The OA undernotification among nursing workers was already identified in the hospital area, where it reaches alarming levels. In a study performed in a hospital in Ribeirão Preto-SP, OA undernotification was revealed in 91.9% and accidents with piercing and cutting material represented the highest rate (34.4%), while non notification of accidents was

justified by workers because they considered the injury very small (53.1%) and also due to a lack of knowledge about the obligation to communicate the OA<sup>(6)</sup>.

During data collection, we observed that the majority of the COA was not properly filled out and that the records contained blanks. Such information is important to identify the actual accident situation at the service. This fact indicates that the service under study needs to adopt new strategies in order to improve the information records.

#### Characteristics of the injured worker

Data indicated that 82.3% of the OA occurred with female workers. This result is related to the fact that most (75.6%) workers in the PHU and DPHU in Ribeirão Preto are women<sup>(12)</sup>. The nursing profession in Brazil is composed by 88.26% of women, according to data by the Federal Nursing Council<sup>(15)</sup>.

Regarding the characteristics of the injured workers, the average age was 41 years, with 23 years as the minimum and 61 as the maximum age; 51.6% of them were between 40 and 61 years and 48.4% between 20 and 39 years old. Regarding marital status, 61.3% of them were married.

The following table shows the data related to the number of workers exposed according to the professional category and the number of injured workers in the study period.

Table 1 - Distribution of the number of injured workers exposed to biological material according to the professional category and number of registered workers. Ribeirão Preto, SP, 2004

Professional Category	No of workers registered in Municipal Health Secretary	No workers injured	Coefficient of risk per 1000 exposed workers
Nurses	202	3	14.85
Technicians, Nursing Aids	597	42	70.35
Dentists	362	11	30.38
Physicians	642	5	7.78
Not informed	-	1	-
Total	1803	62	34.38

The nursing workers registered 45 OA (72.5 %) with exposure to biological material. Forty-two of these (67.7%) belonged to the nursing technician and aid\* category and three victims (4.8%) were nurses. These data were expected due to the high contingency

of workers in the nursing aid category at the study institution. This professional category is also responsible for the highest number of OA records in the hospital sector according to the results of a study performed in Ribeirão Preto-SP, where 62.99% of the notified OA occurred among nursing aids<sup>(16)</sup>.

In Brazil, nursing aids represent more than half of the total number of nursing workers in the country. According to data informed by the Federal Nursing Council (COFEN), the nursing work force is composed by: nurses (13.35%), nursing technicians (24.47%), nursing aids (59.04%) and nursing attendants (3.12%)<sup>(15)</sup>.

Dental surgeons were the second professional category in terms of injured professionals, with 11 (17.7%) registered accidents, followed by physicians with 05 (8.1%) exposures. One (1.6%) of the injured professionals did not inform the professional category.

When the risk coefficient was calculated for the OA per 1000 workers exposed per year, it was verified that nursing technicians and aids were the category with the highest occurrence of accidents (70.35), followed by dental surgeons (30.38), nurses (14.85) and physicians (7.78). In one of the records analyzed, one of the injured professionals did not inform the professional category.

The places of work corresponded to the public health units of the city. Figure A shows the results obtained in the analysis of this referred variable.

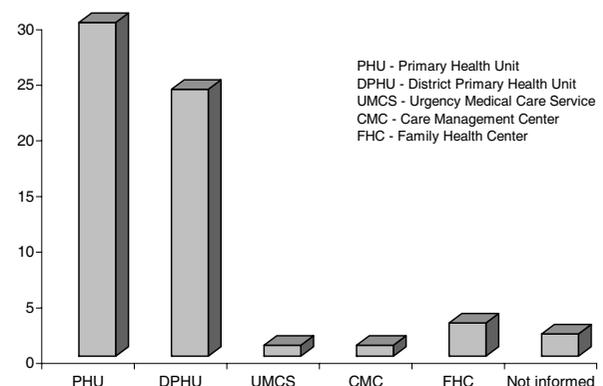


Figure 1 - Number of WA according to work site

A total of 30 OA was registered at the PHU (48,38%). These data differ from those presented in a study carried out earlier at the same institution<sup>(13)</sup>, where DPHU were responsible for the highest number of registered OA, with 43.2%.

\* Technicians and aids are considered as the same category since they execute the same work activities.

Regarding the accident characteristics, the following variables were analyzed: injured body part; biological material involved; object that caused the accident; activity performed at the moment of the accident; reason the person got injured. These variables were selected for analysis since they permitted showing the circumstances in which the OA occurred, with a view to planning strategies for the prevention of these OA.

Regarding the injured body part, the superior limbs corresponded to 93.5% of the OA, while the fingers were injured in 80.6% of the events. The data corroborate with other studies and with the most recent national statistics, where more than 1/3 of occupational accidents in Brazil affect the workers' hands. In 2004, for example, in 161,000 accidents, hands, wrist and fingers were injured<sup>(17)</sup>.

Regarding the biological material involved in the exposure, 82.3% of the workers had contact with blood. The contact with blood can be responsible for the transmission of the HIV and hepatitis viruses. The literature shows that, due to OA involving exposure to blood, 99 health workers were infected with HIV as consequence of accidental inoculations<sup>(6)</sup>.

In 80.6% of the OA, needles caused piercing injuries and, in 4.8%, scalpel blades caused cuts. These figures are similar to those found in studies performed in the hospital area of the same city, where 89.35% of the OA were caused by needles and 6.4% by scalpel blades<sup>(18)</sup>. These objects, called piercing and cutting material, also caused 52.01% of the OA according to a study previously performed at the WMSD<sup>(13)</sup>. Table 2 shows the distribution of OA according to the object that caused the injuries.

Table 2 - Distribution of the number of OA involving exposure to biological material at the Public Health units of Ribeirão Preto, SP, 2004

Piercing and cutting objects	N	%
Needle	50	80.6
Scalpel blade	04	6.5
Espherical drill	01	1.6
Endodontic file	01	1.6
Unknown	02	3.2
Does not apply	04	6.5
<b>Total</b>	<b>62</b>	<b>100</b>

The activities performed at the moment of the OA were of professional competence and all of them contained the risk of exposure to biological material, especially blood. Twenty-one percent of the OA occurred during venipuncture; 15.1% in the

execution of glucose and penicillin tests and 9.7% in medication administration. These data corroborate findings of a study performed in hospitals of Ribeirão Preto - SP<sup>(19)</sup>, where 89.5% of the OA occurred when these same activities that involved the constant handling of needles were performed.

Dental surgeries were responsible for 17.74% of the OA. Sutures corresponded to 11.29% and discarding cutting material to 9.68% of the OA. Regarding the discarding of piercing and cutting material, other studies report this occurrence, with an average of 10 to 20% of OA<sup>(6)</sup>. The cleansing of the work place affected 4.84% of workers, 3.22% occurred during wound dressing and 1.61% in the placement of nasogastric tubes.

As to the motive why the worker got injured, in 59.68% of the COA, there was no information about the reason attributed to the OA. Among the motives informed, 16.13% indicated the user as responsible for the OA, due to moving during care delivery and, in 3.22%, the motive was the accidental collision between workers.

Among the notified accidents, 6.45% of the workers got injured when they were disconnecting the uncapped needle from the syringe and 9.68% when actively recapping the needle, procedures not recommended by safety norms and internationally recommended standard precautions. There is evidence in literature that the non use of standard precautions favors the occurrence of OA involving exposure to potentially contaminated material among nursing workers<sup>(6)</sup>. The implementation of in-service education strategies is recommended in this situation.

## CONCLUSIONS

The workers active in Public Health Units are exposed to the risk of OA involving exposure to biological material because they handle several piercing and cutting materials and are in contact with material and patients contaminated by pathogenic microorganisms, including HIV (AIDS), HBV and HCV (hepatitis). This risk of exposure is a source of concern because of the high incidence of patients with these viruses in Brazil. However, a literature review revealed little research studying this population of workers.

It was found that, in 2004, from the 155 OA registered among the 2818 workers from the Ribeirão

Preto Health Secretary, 62 were exposed to biological material. When considering the number of workers exposed, the number of OA and the variety of tasks involving risk of exposure to biological material, it is inferred that accidents must have been undernotified, which should be investigated more thoroughly in another research. This study should attempt to discover the motives that make Health Secretary workers notify the occupational injuries they are victims of or not.

The accidents that occurred in the work situation under study can be characterized as follows: women were victims in 82.3% of the events registered in the public health units; 51.6% of the injured workers were more and 48.4% less than 40 years old; 61.3% married; belonging to the nursing technician or aid category (coefficient of accident occurrence 7.04); worked in the District Primary Health Units; suffered percutaneous lesions (95%), especially in the fingers (80.6%), and involving exposure to blood (82.3%).

Although less frequent, mouth, eye and face were also sites of contact with biological material. This warns us about the need to use Individual Protection Equipment (IPE) like glasses and masks.

The objects that caused the accidents were needles (80.6%). Unfortunately, in Brazil, the needles

available in the primary health network and in many hospitals do not have safety devices. The discarding of piercing and cutting material caused 9.68% of the injuries.

The registered OA occurred while performing venipuncture (48.4%), medication administration (9.7%). The results of this study call attention to dental surgeries, where 17.7% of the OA occurred. Among the motives for the OA, in 59.7% of the COA, this important information was not provided, which is considered a hindering factor to plan preventive measures.

Among the registered motives, 16.1% occurred due to the patient and 3.2% due to work colleagues. Around 10% of the OA occurred due to active needle recapping, without following standard precautions.

The data obtained in this study indicate that the strategies to prevent the occurrence of OA with piercing and cutting material must include actions established between workers and service management and must focus on the improvement of work conditions, especially work organization, supply of material with safety devices, implementation of educative programs and change of work behaviors. Isolated actions are considered ineffective to minimize such injuries.

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