

Under-Reporting of Accidents Involving Biological Material by Nursing Professionals at a Brazilian Emergency Hospital

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Background. Pathogens can be transmitted to health professionals after contact with biological material. The exact number of infections deriving from these events is still unknown, due to the lack of systematic surveillance data and under-reporting. **Methods.** A cross-sectional study was carried out, involving 451 nursing professionals from a Brazilian tertiary emergency hospital between April and July 2009. Through an active search, cases of under-reporting of occupational accidents with biological material by the nursing team were identified by means of individual interviews. The Institutional Review Board approved the research project. **Results.** Over half of the professionals (237) had been victims of one or more accidents (425 in total) involving biological material, and 23.76% of the accidents had not been officially reported using an occupational accident report. Among the under-reported accidents, 53.47% were percutaneous and 67.33% were bloodborne. The main reason for nonreporting was that the accident had been considered low risk. **Conclusions.** The under-reporting rate (23.76%) was low in comparison with other studies, but most cases of exposure were high risk.

healthcare worker infection control emergency department occupational exposure

1. INTRODUCTION

Various pathogens can be transmitted through occupational contact with potentially contaminated biological material [1]. The most relevant in epidemiological terms are viruses of human immunodeficiency (HIV), hepatitis B (HBV) and hepatitis C (HCV). However, the exact number of infections deriving from these events is still unknown, due to the lack of systematic surveillance data and under-reporting.

Until September 1997, according to available data, 264 cases of occupational HIV transmission

were identified among health workers around the world [2]. In the USA, based on an analysis of data registered during 20 years of occupational surveillance (until December 2001), 57 documented cases of occupational HIV infection were identified [3]. The same authors found that most accidents were percutaneous and affected the nursing team.

Under-reporting rates can vary according to the professional category [4] and exposure type [5], with higher rates in case of nonintact skin (87%) and mucous tissue (77%) exposure to blood and 51% in case of percutaneous injuries. In addition,

the way these data were collected could also interfere with the rates [6].

Although knowledge about biological risk in recent decades has advanced, and concerns with the under-reporting of accidents involving biological materials have been discussed in scientific literature even before the identification of HIV [7], accident under-reporting represents a great challenge in infection control and occupational health, as it impedes knowledge of the actual epidemiological situation and, consequently, hampers the proposal and practice of specific safety policies and preventive strategies.

In Brazil, after occupational exposure to biological material, the compulsory procedure includes two distinct aspects. The first one is related to occupational health, i.e., professionals who are victims of accidents, need to receive specialized care to assess seroconversion and, if necessary, chemoprophylaxis needs to be indicated against HIV, vaccination and/or specific immunoglobulin treatment against HBV, and clinical follow-up for cases of exposure to HCV. The second aspect concerns labor and social security aspects as, to gain legal recognition, the event should be reported to the social security service through an occupational accident report (OAR).

Therefore, this study was to determine the rate of under-reporting of accidents involving biological material by the nursing team and to identify the factors that contribute to the reluctance of nursing professionals to report their exposure.

2. METHODS

A cross-sectional study was carried out through an active search for under-reporting of occupational accidents that involve biological material by the nursing team at the emergency unit of a tertiary teaching hospital in the interior of São Paulo State, Brazil. Approval for the project was obtained from the Institutional Review Board at the study hospital, process No. 8907/2008.

The study population initially comprised all 512 nursing professionals at the hospital who were professionally active at the time of data collection (April–July 2009), working there as nurses, nursing technicians and nursing auxilia-

ries. However, 31 of them were on health or maternity leave and another 30 professionals refused to participate. Thus, ~12% of the initial study population were lost and finally 451 subjects signed the informed consent form.

Data were collected through individual interviews that lasted 5–15 min each. A list was developed with questions on sociodemographic data, work-related aspects, accident characteristics and factors related to the absence of reporting. The resultant database was structured and analyzed statistically with SPSS version 17.0 for Windows. Double data entry was used and, after identifying and correcting typing errors, the final database was developed, including final variable categorization, variable grouping, creation of new variables and other operations included in the study.

3. RESULTS

Of the 451 interviewed subjects, 237 (52.5%) reported being victims of occupational exposure to biological material during their professional experience at the institution, 56 (23.6%) of whom indicated they had not completed the OAR. Among subjects who had not report the accident, 67.9% were female, 71.4% were over 40 years old and 80.4% worked as nursing auxiliaries. However, these characteristics do not differ from the study population's general characteristics. Regarding the work shift, subjects who had not completed the OAR were distributed homogeneously. It is noteworthy that 83.9% had over 10 years of nursing experience, 75.0% had worked at the institution for over 10 years and 78.6% worked 37 h per week or more.

The highest rates of under-reporting were found at the surgical, neurological and pediatric wards, and the surgical center. There was no difference in terms of reporting between subjects who had participated in training on accident prevention and conduct involving biological material and those who had not. Sixteen workers declared they had been victims of occupational exposure to biological material but did not remember whether they had completed the OAR or not (Table 1).

TABLE 1. Distribution of Nursing Professionals (N = 237) Who Had Been Victims of Accidents Involving Biological Material by Sociodemographic Characteristics and Occupational Accident Report (OAR) Issued

Sociodemographic Characteristics	OAR Issued					
	Yes (N = 165)		No (N = 56)		Don't Remember (N = 16)	
	n	%	n	%	n	%
Gender						
female	137	83.0	38	67.9	10	62.5
male	28	17.0	18	32.1	6	37.5
Age (years)						
20–29	17	10.3	4	7.2	1	6.2
30–39	56	33.9	12	21.4	3	18.8
40–49	61	37.0	20	35.7	7	43.8
≥50	31	18.8	20	35.7	5	31.2
Function						
nurse	50	30.3	8	14.3	0	0.0
nursing technician	8	4.8	3	5.4	3	18.8
nursing auxiliary	107	64.9	45	80.3	13	81.2
Education						
complete primary	6	3.6	3	5.4	1	6.2
incomplete secondary	7	4.2	2	3.6	1	6.2
complete secondary	72	43.7	28	50.0	11	68.8
incomplete tertiary	20	12.1	9	16.0	3	18.8
complete tertiary	60	36.4	14	25.0	0	0.0
Work shift						
fixed day	54	32.7	18	32.1	7	43.8
fixed night	61	37.0	20	35.7	6	37.5
rotating	50	30.3	18	32.1	3	18.8
Nursing experience (years)						
≤5	17	10.3	3	5.4	1	6.2
6–10	36	21.8	6	10.7	3	18.8
11–20	52	31.5	21	37.5	3	18.8
>20	60	36.4	26	46.4	9	56.2
Experience at the institution (years)						
≤5	26	15.8	6	10.7	2	12.5
6–10	40	24.2	8	14.3	4	25.0
11–20	56	33.9	20	35.7	2	12.5
>20	43	26.1	22	39.3	8	50.0
Work week (hours)						
≤36	52	31.5	12	21.4	8	50.0
≥37	113	68.5	44	78.6	8	50.0
Workplace						
surgical center	24	14.5	11	19.6	6	37.5
burns unit	9	5.4	1	1.8	0	0.0
emergency room	38	23.0	2	3.6	3	18.8
adult intensive care unit	30	18.2	6	10.7	1	6.2
pediatrics	20	12.1	8	14.3	1	6.2
pediatric intensive care unit	8	4.9	6	10.7	1	6.2
neurological clinic	25	15.1	9	16.1	1	6.2
surgical clinic	11	6.7	13	23.2	3	18.8
Training						
yes	88	53.3	29	51.8	5	31.2
no	77	46.7	27	48.2	11	68.8

The number of cases of exposure to biological material per subject ranged from one to eight. In total, 237 professionals remembered 425 occupational accidents. Regarding accident type, 54 (17.4%) out of 311 cases of percutaneous exposure had not been reported, compared to 68 (21.0%) out of 323 cases of under-reported exposures involving blood (Table 2). Tables 3–4 show that considering the accident as low risk had been the most frequent motive to justify accident under-reporting, including both percutaneous accidents (44%) and accidents involving blood (57%).

In view of recommended postexposure conduct in case of accidents that involve potentially contaminated biological material, including OAR completion and care at a specialized service, in 63.76% of cases these recommendations had been fully complied with. In 21.88% of cases, however, none of the measures had been adopted (Table 5).

4. DISCUSSION

The rate of under-reporting of accidents involving biological material by the nursing team in this study was 23.76%. A previous study at the same institution found a nursing team under-reporting rate of percutaneous accidents corresponding to 29.92%, but that estimate was obtained from secondary sources [8].

It should be emphasized that the institution has been investing in a safety culture through joint actions among the Hospital Infection Control Commission, the Specialized Safety Engineering, and Occupational Medicine Service and the Out-patient Clinic specialized in care delivery to professionals who have been victims of accidents involving biological material. All this may have contributed to a decrease in the under-reporting rate.

It is highlighted that the rate of under-reporting can considerably vary depending on the study

TABLE 2. Distribution of Accidents ($N = 425$) Involving Biological Material Within the Nursing Team by Exposure, Body Fluid and Reporting

Accident Characteristics	Reported Accident					
	Yes ($N = 301$)		No ($N = 101$)		Don't Remember ($N = 23$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Exposure						
percutaneous	239	79.40	54	53.47	18	78.26
cutaneous-mucous	55	18.27	11	10.89	4	17.39
intact skin	7	2.33	36	35.64	1	4.35
Body fluid						
blood	238	79.07	68	67.33	17	73.91
fluid with visible blood	18	5.98	6	5.94	2	8.70
fluid without visible blood	45	14.95	27	26.73	4	17.39

TABLE 3. Distribution of Under-Reported Accidents ($N = 101$) Involving Biological Material by Motive and Exposure

Motive	Exposure					
	Percutaneous ($N = 54$)		Cutaneous-Mucous ($N = 11$)		Cutaneous ($N = 36$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Considered the accident low risk	24	44.44	2	18.18	30	83.34
Lack of knowledge	7	12.96	1	9.09	0	0
Orientation from another professional	3	5.56	2	18.18	0	0
Fear of informing the head	0	0	1	9.09	0	0
Excessive bureaucracy	3	5.56	1	9.09	3	8.33
No reported motive	17	31.48	4	36.37	3	8.33

TABLE 4. Distribution of Under-Reported Accidents (N = 101) Involving Biological Material by Motive and Body Fluid

Motive	Body Fluid					
	Blood (N = 68)		Fluid With Blood (N = 6)		Fluid Without Blood (N = 27)	
	n	%	n	%	n	%
Considered the accident low risk	39	57.35	3	50.00	14	51.85
Lack of knowledge	7	10.30	1	16.67	0	0
Orientation from another professional	2	2.94	0	0	3	11.11
Fear of informing the head	0	0	0	0	1	3.70
Excessive bureaucracy	4	5.88	0	0	3	11.11
No reported motive	16	23.53	2	33.33	6	22.23

TABLE 5. Distribution of Specialized Care Among Accidents (N = 425) Involving Biological Material by Postexposure Conduct

Specialized Care	Reported Accident							
	Yes		No		Don't Remember		Total	
	n	%	n	%	n	%	n	%
Yes	271	63.76	8	1.88	10	2.35	289	68.00
No	28	6.59	93	21.88	8	1.88	129	30.35
Do not remember	2	0.47	0	0	5	1.18	7	1.65
total	301	70.82	101	23.76	23	5.41	425	100

Notes. OAR = occupational accident report.

population, exposure type and each health institution's reporting policies. Regarding exposure type, there was a difference in the rate of under-reporting of accidents involving biological material by surgical centers nurses: 97% for mucous-cutaneous and 77% for percutaneous accidents [9].

As for the professional category, it was evidenced that nurses not only reported their accidents involving biological material more frequently, but also tended to adopt safer work practices and were more likely to follow protocols and guidelines in their clinical practice [10]. Elmiyeh, Whitaker, James, et al. [11] and Tabak, Shiaabana and Shasha [12] detected higher under-reporting rates among physicians and explained that those professionals could be more inclined to assess their own risk before they decided to report, as they could request serology tests themselves and knew more about the nature of the lesion and the patient's serological condition.

Besides, the following two factors can influence under-reporting rates: lack of regulation for the reporting of cases of exposure, and professionals' knowledge level on the use of standard precautions and bloodborne diseases [13, 14]. A

study at an emergency service, however, evidenced that professionals' knowledge about adequate precautions, infection control and occupational risks was not sufficient to enhance attitudes aimed at reducing transmission risks of infectious agents and occupational accident ratios [15].

Research on home care nurses' accident under-reporting found that, although 86% of the nurses had received recent training on infection control, 35% of percutaneous accidents and 83% of blood and bodily fluid spots on mucous tissues had not been reported [16].

A study of Iranian nurses found that 63% had not reported percutaneous accidents they had suffered the year before. The main reasons they listed were dissatisfaction with follow-up (considering that the patient had represented a low risk) and lack of knowledge on the reporting process [17].

Perceived susceptibility to diseases did not modify reporting rates, although professionals who reported accidents showed higher perceived severity levels of diseases that can be transmitted after exposure to biological material [12].

Risk self-assessment is a variable that deserves further investigation when studying accidents that

involve biological material. A study of risk factors for the occurrence of percutaneous accidents in the nursing team identified higher chances of accidents among nursing workers who assessed the risk of suffering percutaneous accidents at their workplace as low than among those who assessed it as high [18].

Health professionals' underestimation of the risk of bloodborne pathogen transmission has been reported in different studies as a motive for accident under-reporting [4, 14, 16, 19]. As HIV, HBV and HCV prevalence rates can be very different, depending on the study region, the population attended at each institution and the fact that many patients are hospitalized due to other causes, not related to the infections these viruses cause, it is dangerous for professionals themselves to judge accident severity, which should be the responsibility of specialized and experienced professionals.

To determine accident incidence and prevalence rates involving biological material among health workers, and to acknowledge the environments and professional activities that entail the highest risk, official reporting of these events is essential. Health institutions should depart from real data to assess the need to put in practice specific training programs, purchase devices with safe technology and even reorganize their staff. Thus, under-reporting represents a considerable bottleneck to propose accident prevention measures because it hampers the precise diagnosis of accidents involving potentially contaminated biological material.

In this study, 88.1% of the initial study population participated. The researchers chose the active search for accident under-reporting through individual interviews, with a view to obtaining higher participation rates and better information quality. In a comparison between data collected through questionnaires and individual interviews, Blatter, Roeleveld, Zielhuis, et al. observed that interview data were more precise and minimized interpretation errors [20].

Nevertheless, some considerations are due regarding the limitations of this study. As the subjects were asked to report their exposure to biological material since their admission date, there may have been a memory bias, i.e., some

events may have not been mentioned as they could have been forgotten, especially events that were considered less important and, therefore, were not reported.

In this study, the rate of under-reporting of accidents involving biological material by the nursing team was lower than the rates reported in literature. Nevertheless, cases of exposure that are considered as high risk for pathogen transmission, such as percutaneous and blood accidents, were not reported [2, 21].

Knowledge of the rate of accident under-reporting when biological material is involved and its motives is the first step to enhance a safe working environment, as using reliable data can stimulate and sustain adequate safety policies and, thus, decrease health professionals' exposure to the biological risk inherent in their work.

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