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Analysis of reported work accidents involving healthcare workers and exposure to biological materials

Análise dos acidentes de trabalho com exposição a material biológico notificados por profissionais da saúde

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ABSTRACT | Background: Work accidents pose the most risk to the health of workers and thus represent a considerable public health problem. **Objective:** To establish the epidemiological profile of healthcare workers who were victims of accidents involving biological materials in Canoas, Rio Grande do Sul, Brazil, in 2017. **Methods:** Cross-sectional descriptive study based on reports of work accidents involving exposure to biological materials included in the epidemiological surveillance database of the Municipal Secretariat of Health of Canoas. **Results:** 121 work accidents involving exposure to biological materials occurred in 2017. Accidents prevailed among females (93.4%), whites (69.4%) and workers aged 20 to 30 years old (40.5%). Percutaneous exposure was associated with 76.8% of accidents, blood was the most prevalent biological material involved (90%) and hollow needles the main causative agent (64.5%). Gloves were the most frequently worn piece of personal protective equipment (PPE) (75.2%). About 93.4% of the sample was vaccinated against hepatitis B. **Conclusion:** Habits long consolidated in daily practice need to be reviewed, including training on correct use of PPE and adoption of precautions in all stages of care delivery.

Keywords | accidents, occupational; occupational health; containment of biohazards.

RESUMO | Introdução: Os acidentes de trabalho são o maior agravo à saúde dos trabalhadores, tornando-se, assim, um importante problema de saúde pública. **Objetivo:** O presente estudo teve como objetivo identificar o perfil epidemiológico dos profissionais da saúde que sofreram acidentes de trabalho com material biológico no ano de 2017 no município de Canoas, Rio Grande do Sul. **Método:** Trata-se de um estudo transversal descritivo baseado nas fichas de notificações de acidentes de trabalho com exposição a material biológico, contidas na base de dados da vigilância epidemiológica da secretaria municipal de saúde de Canoas. **Resultados:** No ano de 2017 ocorreram 121 casos de acidente de trabalho com exposição a material biológico. Houve predomínio de acidentes em mulheres (93,4%), da raça branca (69,4%), na faixa etária de 20 a 30 anos (40,5%). Em relação ao tipo de exposição, as percutâneas correspondem a 76,8% dos casos, sendo o sangue o material orgânico mais prevalente (90%) e a agulha com lúmen, o principal agente causador (64,5%). A luva foi o equipamento de proteção individual mais utilizado (75,2%), e os trabalhadores estavam vacinados em 93,4% dos casos. **Conclusão:** Há a necessidade de reciclagem de hábitos profissionais consolidados pela prática diária, incluindo treinamento sobre o uso correto de equipamentos de proteção individual e adoção de precauções em todas as etapas da assistência.

Palavras-chave | acidentes de trabalho; saúde do trabalhador; contenção de riscos biológicos.

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INTRODUCTION

Work plays a central role in the social life of men and women. It is rated beneficial when it helps meet human needs and harmful when it involves exposure to hazards of physical, chemical, physical, mechanical, biological, ergonomic or psychosocial nature. In such case, work might directly or indirectly impair the health of workers[1]. Work accidents have an outstanding place within this context, because they are liable to cause health problems to workers and might interfere with the health-disease process[2]. The Brazilian Law no. 8,213, from 24 July 1991, defines work accidents as such which "occur during work performed for the employer and which cause body injuries or functional disorders leading to death or transient or permanent loss or reduction of the capacity for work.[3]"

Healthcare workers — who have the experience and skills needed to promote the recovery and maintenance of health — are continuously exposed to infectious waste and sharps, among other insalubrious factors present in healthcare facilities. For this reason, developing a strong safety culture is highly significant, whereby all workers, including the professionals who provide patient care and managers, assume the responsibility for their, their coworkers, patients and families' safety[4]. In addition, healthcare providers are responsible for reporting sharps injuries, monitor the state of health of patients and check the results of serological tests — for the human immunodeficiency virus (anti-HIV antibodies), hepatitis B surface antigen (HBsAg) and antibody (anti-HBsAg) and the hepatitis C virus (anti-HCB antibodies) — of patients and involved workers[1,5]. In turn, institutions are responsible for orienting and training teams to implement the measures required to ensure safety at organizations and afford conditions to minimize preventable hazards in the workplace.

The Brazilian Regulatory Standard (RS) no. 32[6] establishes some basic guidelines to contribute to the implementation of measures to safeguard the safety and health of workers at healthcare facilities, including those involved in general health promotion and care. Among the actions described in RS 32, the following stand out: use of personal protective equipment (PPE), hand hygiene and vaccination against hepatitis B, tetanus and diphtheria, among others. In turn, the Collegiate Board Resolution no. 306, from 7 December 2004[7], provides technical regulations for handling and proper disposal of waste at healthcare facilities, while the Administrative Ruling no. 939, from 2008[8], establishes the replacement of sharps by instruments with safety devices.[5]

To make data needed to ground surveillance actions for diseases affecting Brazilian workers available, work accidents involving exposure to biological materials should be reported to the System of Information on Notifiable Diseases (SINAN) created by the Administrative Ruling (AR) no. 777/GM, from 28 April 2004. This administrative ruling was later on revoked, and the health problems described were included in the AR no. 2,472, from 31 August 2010, which was eventually replaced by AR no. 104, from 25 January 2011, that brings a list of diseases and other health problems which must be mandatorily reported in Brazil[9].

AR no. 5, from 28 September 2017, namely, the latest that deals with Unified Health System (Sistema Único de Saúde—SUS) actions and facilities, created the National Committee of Occupational Health Promotion, which is responsible for designing strategies for surveillance and monitoring of workplace hazards and morbidity, including educational materials. Thus it represents one further advance in occupational health[4]. Although several documents include regulations for control and prevention of damage to the health of workers, work accidents are still frequent and a cause of considerable concern, as according to SINAN 284,877 work accidents involving workers with known occupation and exposure to biological materials were reported in the period from 2007 to 2014[10,11].

It is believed that accidents are actually underreported, probably due to lack of awareness of risks among healthcare workers and managers, fear of losing the job, feelings of guilt in regard to occurrences, lack of adequate organization of worker healthcare actions, difficulties inherent to the information system and denial of the relevance of this type of work accidents[2,5].

Facing this scenario, affording high-quality information on work-related health problems is essential to acknowledge urgency and priorities for actions to improve the working conditions of healthcare workers and thus reduce the occurrence of work accidents. Therefore, the aim of the present study was to identify and characterize sharps injuries in Canoas, Rio Grande do Sul, Brazil, in 2017.

METHODS

Since work accidents involving exposure to biological materials should be mandatorily reported, the epidemiological surveillance database of the Municipal Secretariat of Canoas is daily fed information in report forms issued at all the local healthcare facilities in which accidents occurred.

The present is a cross-sectional descriptive study in which we surveyed all the reports of work accidents involving healthcare professionals and exposure to biological materials issued in Canoas in 2017. The data were extracted from the reports included in the epidemiological surveillance database for the period from January through December 2017.

The following variables considered in the report forms were analyzed: work accidents involving exposure to biological materials (ICD-10 Z20.9); victims' profile (sex, ethnicity, age range); occupational characteristics (occupation, length in the job, employment relationship, accident location); exposure (type, involved biological material, causative agent, hepatitis B vaccination status), measures taken and case progression (accident circumstances, measures taken at the time of the accident, case progression), use of PPE, test results (of victims at the time of the accident — T0) and source-patient serological testing.

The data were analyzed with software Statistical Package for the Social Sciences (SPSS) version 18.0 and expressed as absolute and relative frequencies.

The present study was approved by the Municipal Unit of Collective Health Education (Núcleo Municipal de Educação em Saúde Coletiva) of Canoas, ruling no. 205, from 5 August 2014, and the research ethics committee of Universidade Luterana do Brasil (ULBRA), Canoas, CAAE 90026518.2.0000.5349.

RESULTS

A total of 121 work accidents involving healthcare providers and exposure to biological materials were reported in Canoas in 2017; 113 victims were female (93.4%), 69.4% white and 40.5% aged 20 to 30 years old, as shown in Table 1.

Table 2 describes the occupational characteristics of the sample. One hundred accidents victims were nursing technicians (82.6%), eight nurses (6.6%) and four physicians (3.3). Thirty victims had worked less than one year for the current employer (24.8%). One hundred and twenty-three victims had formal employment relationship (98.3%).

Table 3 provides information on exposure to biological materials. Upon filling the report forms, the professionals charged of this task may select more than one option for items type of biological material, type of exposure and causative agent. However, one single option was selected for each item in the reports we analyzed. Percutaneous exposure was the most frequent (76.9%), blood the biological material most often involved (90.1%) and hollow needles were the causative agent in 78 (64.5%) cases; 113 accident victims (93.4%) were duly vaccinated against hepatitis B. Twenty-nine victims (23.97%) were not wearing any piece of PPE at the time of the accident, while 92 (76.03%) were; gloves were the piece of PPE most frequently worn. It should be noticed that the results corresponding to this variable are over 100%, because each victim could have worn more than one type of PPE.

Sixty-four accident victims (52.9%) tested negative for sexually transmitted diseases. Seventy-eight (56.2%) had

Table 1. Epidemiological profile of healthcare workers who suffered sharps injuries in Canoas, Rio Grande do Sul, Brazil, in 2017 (n=121).

Variables	n (n=121)	%
Sex		
Female	113	93.4
Male	8	6.6
Ethnicity		
White	84	69.4
Black	6	5.0
Brown	1	0.8
Asian	3	2.5
Unknown	27	22.3
Age range (years)		
20 to 30	49	40.5
31 to 40	41	33.9
41 to 50	22	18.2
Over 50	5	4.1
Not reported	4	3.3

Table 2. Occupational characteristics of healthcare workers who suffered sharps injuries in Canoas, Rio Grande do Sul, Brazil, in 2017 (n=121).

Variables	n (n=121)	%
Occupation		
Nursing technicians	100	82.6
Nurses	8	6.6
Physicians	4	3.3
Laboratory assistants	2	1.7
Nursing assistants	1	0.8
Oral health assistants	1	0.8
Pharmacists	1	0.8
Physical therapists	1	0.8
Surgical nurses	1	0.8
Oral health technicians	1	0.8
Radiology technicians	1	0.8
Length in the job (years)		
Less than 1	30	24.8
1 to 5	27	22.3
6 to 10	4	3.3
11 to 20	6	5.0
21 to 30	1	0.8
Not reported	53	43.8
Employment relationship		
Formal	119	98.3
Informal	1	0.8
Unknown	1	0.8
Accident location		
Philanthropic hospital	50	41.3
University hospital	50	41.3
Hospital emergency department	20	16.5
Health Basic Units	1	0.8

negative results in all the serological tests, and 16 (9.9%) tested positive for HIV (Table 4).

Inadequate disposal of sharps was the most frequent circumstance associated with accidents (14.9%). The largest proportion of victims (12.4%) was immediately treated with zidovudine (AZT) + lamivudine (3TC) + indinavir, but 46 of them (38%) dropped out, as shown in Table 5.

Table 3. Accidents involving healthcare workersand exposure to biological materials in Canoas, Rio Grande do Sul, Brazil, in 2017 (n=121).

Variables	n (n=121)	%
Type of exposure		
Percutaneous	93	76.8
Mucosal (oral/ocular)	22	18.2
Intact skin	3	2.5
Non-intact skin	3	2.5
Biological materials		
Blood	109	90.0
Bloody fluids	3	2.5
Other	6	5.0
Unknown	3	2.5
Accident circumstances		
Improper sharps disposal	18	14.9
Surgical procedures	17	14.0
Subcutaneous administration of medication	11	9.1
Unspecified venous/arterial puncture	8	6.6
Intravenous administration of medication	7	5.8
Materials washing	6	5.0
Intramuscular administration of medication	5	4.1
Venous/arterial puncture for blood collection	5	4.1

Continue...

Table 3. Continuation.

Variables	n (n=121)	%
Handling boxes with sharps	4	3.3
Capillary blood glucose	3	2.5
Recapping	3	2.5
Intradermal administration of medication	2	1.7
Laboratory procedures	2	1.7
Improper sharps disposal into trash bags	1	0.8
Not reported	1	0.8
Other	28	23.1
Causative agents		
Hollow needles	78	64.5
Non-hollow needles	1	0.8
Intracath	4	3.3
Blades/lancets	7	5.8
Glass	1	0.8
Other	30	24.8
Use of PPE		
Yes	92	76.03
No	29	23.97
Type of PPE*		
Gloves	91	75.2
Coats	15	12.4
Masks	9	7.4
Glasses	10	8.3
Boots	6	5.0
Face protection	2	1.7
Victims' hepatitis B vaccination status		
Vaccinated	113	93.4
Non-vaccinated	1	0.8
Unknown	7	5.8

PPE: personal protective equipment; *multiple choice.

DISCUSSION

The results show that exposure to biological materials prevailed among females, age range 20 to 30 years old and nursing technicians. These findings agree with those of a study performed in Bauru, Sao Paulo, Brazil, which fact is understandable, since women predominate in healthcare teams. Also the fact that nursing technicians were the most affected occupational group can be explained, since they are the ones who most frequently provide direct patient care and thus are at higher risk of exposure[12].

The higher frequency of accidents among workers aged 20 to 30 years old might be due to the fact these are young professionals with little experience, since they are in the beginning of their career and often feel insecure when performing procedures[6]. The fact that 90% of the accidents corresponded to nursing staff (nursing assistants, technicians and nurses) corroborates the concern expressed in the vast literature on the involvement of this occupational group in work accidents. Indeed, they are the category most frequently exposed to occupational hazards as a function of their job and the aspects inherent to continuous direct patient care[12-14].

Most accidents took place within the hospital setting. Most victims had less than one year in the job at the time of the accident; however, this item was very often left blank in the report forms, as also other authors observed[15]. Work accident reports provide information necessary to ground strategic preventive and health promotion actions, therefore, when reports are not duly filled, the information conveyed does not accurately depict accidents and thus impairs the reach and effectiveness of occupational health surveillance actions[16].

Percutaneous exposure was the most common, mostly resulting from needle pricks. According to estimates, 15,000 cases of infection with the hepatitis C virus and 500 with HIV occur globally every year for this reason; the cases of infection with the hepatitis B virus following percutaneous exposure are considerable higher, up to 70,000[17]. The fact that most accident victims dropped out from treatment is a cause of much concern and demands judicious actions to minimize this situation. Furthermore, by dropping out workers might be unwittingly relinquishing social security and labor rights to which they are entitled provided a causal link between work and disease is demonstrated.

Hepatitis B vaccination, a universal precaution measure, is recommended to all healthcare workers. RS 32 ensures free vaccination to all workers in this occupational group. The rate of vaccination was high in the analyzed sample, thus disagreeing from findings in other studies[13,15]. Promoting the use of PPE in clinical practice allows reducing exposure to blood and other body fluids, and thus it prevents occupational hazards and ensures productivity. Wearing PPE such as latex gloves, scrub hats and masks, i.e. basic accessories indispensable for workers' protection, has paramount importance. Implementing a continuous policy to raise the staff's awareness of the benefits of adhering to PPE is similarly relevant[18,19].

In 2018, the Brazilian Ministry of Health established a new protocol for the care of health workers exposed to potentially infected biological materials. The Clinical Protocol and Therapeutic Guidelines for Post-Exposure Prophylaxis against Risk of Infection with HIV, Sexually Transmitted Infections and Viral Hepatitis brings updates for antiretroviral prophylaxis regimens aiming at providing integral care to workers at high risk. Taking antiretroviral medication after a work accident is not mandatory, and the risk of HIV infection must be judiciously weighted as a function of the nature of the accident and the toxicity of medications[20]. About 62.7% of the analyzed sample were not indicated chemoprophylaxis, which finding agrees with those in a study performed with 454 nursing professionals at a university hospital in Sao Paulo, Brazil, in which only 37% of the participants were indicated antiretroviral therapy[21].

The present study has some limitations, among which possible underreporting of sharps injuries, which hinders the attempts at estimating the actual magnitude of this type of work accidents. Indeed, the number of reports issued at Health Basic Units was extremely low, while this type of facilities accounts for most healthcare provided in Canoas.

Table 4. Tests results relative to healthcare workers who suffered sharps injuries in Canoas, Rio Grande do Sul, Brazil, in 2017 (n=121).

Variables	n (n=121)	%
Results of victims' tests		
All negative	64	52.9
Anti-HIV, HBsAg, anti-HCV (negative), anti-HBs (positive)	46	38.0
Not performed	3	2.5
Inconclusive	2	1.7
HBsAg positive	1	0.8
Unknown	5	4.1
Results of patients' serological tests		
HIV positive	15	12.4
HCV positive	7	5.8
HBsAg positive	1	0.8
HBsAg and anti-HBs positive	1	0.8
All negative	77	63.7
Not performed	6	5.0
All inconclusive	1	0.8
Unknown	13	10.7

HIV: human immunodeficiency virus; HBsAg: hepatitis B surface antigen; HCV: hepatitis C virus.

Table 5. Measures taken and case progression relative to healthcare workers who suffered sharps injuries in Canoas, Rio Grande do Sul, Brazil, in 2017 (n=121).

Variables	n (n=121)	%
Measures at the time of the accident		
AZT + 3TC + indinavir	15	12.4
Unknown	2	1.6
Other ART regimen	26	21.5
Refused indicated chemoprophylaxis	2	1.7
Without indication for chemoprophylaxis	76	62.8
Case progression		
Dropout	46	38.0
Negative testing source-patient discharged	40	33.1
Discharge without seroconversion	16	13.2
Unknown	19	15.7

AZT: zidovudine; 3TC: lamivudine; ART: antiretroviral therapy.

Then, we analyzed data corresponding only to 2017. As for its strengths, the present study calls the attention of managers and competent authorities to an alarming situation requiring preventive and educational measures, particularly targeting younger healthcare workers, as well as greater attention to the follow-up and clinical progression of reported cases.

CONCLUSION

Occupational exposure to biological materials still poses a challenge to institutions and workers. Standard precautions are some of the measures designed to reduce occupational exposure, including care in the handling and proper disposal of sharps and not recapping needles. Professionals also need to revise habits long consolidated in clinical practice, including training in proper use of PPE. In turn, human resources departments should invest more judiciously in educational actions focusing on biosafety standards, as well as in adequate supervision of the follow-up of accident victims. Accidents do not only cause harm to the physical and mental health of workers — and raise concerns about their own health and possible transmission of infections to family members — but also interfere with the organization of the work process. Therefore, improvements are needed in the procedures for reporting accidents and in the adherence of victims to treatment, thus increasing their commitment to and responsibility for their own safety at work.

The particular vulnerability of healthcare workers — resulting from exposure to emotional tension, work overload, long working hours, low salary and having more than one job, among other insalubrious factors — impairs their adherence to universal safety precautions. Establishing regulations and legislation without the due evaluation of the care provided to workers does not suffice to change attitudes and behaviors. Greater investment is needed in the education of this category of workers during their early training and as continuing education, to incentivize a reflections on the multiple facets of their work environment and promote individual and collective skills to neutralize hazards inherent to the various fields of activity. In addition, institutions should implement occupational safety and health management systems to contribute to the identification and analysis of workplace hazards to avoid or reduce the occurrence of work accidents and manage them adequately when they occur by providing sound grounds to decision making on control and prevention measures and raising awareness on safe practices among workers.

REFERENCES

1. Santos Junior EP, Batista RRAM, Almeida ATF, Abreu RAA. Acidente de trabalho com material perfurocortante envolvendo profissionais e estudantes da área da saúde em hospital de referência. Rev Bras Med Trab. 2015;13(2):69-75.
2. Nogueira AS, Carvalho BKG, Medeiros AR, Carneiro SER, Souza GCA. Prevalência e notificação de acidentes de trabalho com exposição a material biológico na odontologia. Rev Ciênc Plural. 2016;2(1):102-19.
3. Brasil. Ministério da Saúde. Lei nº 8.213, de 24 de julho de 1991. Dispõe sobre os Planos de Benefícios da Previdência Social e dá outras providências. Brasília: Ministério da Saúde; 1991.
4. Brasil. Ministério da Saúde. Portaria de consolidação nº 5, de 28 de setembro de 2017. Consolidação das normas sobre as ações e os serviços de saúde do Sistema Único de Saúde. Brasília: Ministério da Saúde; 2017.
5. Nowak NL, Campos GA, Borba EO, Ulbricht L, Neves EB. Fatores de risco para acidentes com materiais perfurocortantes. O Mundo da Saúde. 2013;37(4):419-26.
6. Brasil. Ministério do Trabalho e Emprego. Portaria nº 485, de 11 de novembro de 2005. Aprova a norma regulamentadora no 32 (Segurança e saúde no trabalho em estabelecimentos de saúde). Diário Oficial da República Federativa do Brasil. 2005.
7. Brasil. Regulamento Técnico para o Gerenciamento de Resíduos de Serviços. Resolução RDC nº 306, de 7 de dezembro de 2004. Diário Oficial da República Federativa do Brasil. 2004.
8. Brasil. Ministério do Trabalho. Portaria nº 939, de 18 de novembro de 2008: dispõe sobre substituição de materiais perfurocortantes por outros com dispositivo de segurança [Internet]. Brasília: Ministério do Trabalho; 2008 [cited Mar. 7, 2011]. Available at http://www.mte.gov.br/legislacao/portarias/2008/p_20081118_939.pdf
9. Brasil. Ministério da Saúde. Portaria nº 104, de 25 de janeiro de 2011. Define as terminologias adotadas em legislação Nacional, conforme o disposto no Regulamento Sanitário Internacional 2005 (RSI 2005), a relação de doenças, agravos e eventos em saúde pública de notificação compulsória em todo o território nacional e estabelece fluxo, critérios, responsabilidades e atribuições aos profissionais e serviços de saúde. Diário Oficial da União. 2011.
10. Miranda FMD, Cruz EDA, Félix JCV, Kalinke LP, Mantovani MF, Sarquis LMM. Profile of Brazilian workers victims of occupational accidents with biological fluids. Rev Bras Enferm. 2017;70(5):1061-8. https://doi.org/10.1590/0034-7167-2016-0482

11. Paz AA, Santos C, Lautert L. Fatores associados aos acidentes de trabalho em instituição hospitalar. Enferm Foco. 2014;5(1/2):25-8. https://doi.org/10.21675/2357-707X.2014.v5.n1/2.600
12. Lima GMN, Kawanami GH, Romeiro FG. Perfil das exposições ocupacionais a material biológico entre profissionais de saúde do Hospital de Base de Bauru: medidas preventivas e pós-exposição. Rev Bras Med Trab. 2017;15(3):194-9. https://doi.org/10.5327/Z1679443520170001
13. Barbosa ASAA, Diogo GA, Salotti SRA, Silva SMUR. Subnotificação de acidente ocupacional com materiais biológicos entre profissionais de Enfermagem em um hospital público. Rev Bras Med Trab. 2017;15(1):12-7. https://doi.org/10.5327/Z1679443520177034
14. Vieira M, Padilha MI, Pinheiro RDC. Análise dos acidentes com material biológico em trabalhadores da saúde. Rev Latino-Am Enferm. 2011;19(2):1-8.
15. Julio RS, Filardi MBS, Marziale MHP. Acidentes de trabalho com material biológico ocorridos em municípios de Minas Gerais. Rev Bras Enferm. 2014;67(1):119-26. http://dx.doi.org/10.5935/0034-7167.20140016
16. Marque SLC. Proposta de ficha de notificação de acidentes de trabalho para a Fundação Oswaldo Cruz [graduate essay]. Rio de Janeiro: Fundação Oswaldo Cruz; 2011.
17. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de DST, Aids e Hepatites Virais. Manual A B C D E das Hepatites Virais para Cirurgiões Dentistas. Brasília: Ministério da Saúde; 2010.
18. Giancotti GM, Haeffner R, Solheid NLS, Miranda FMD, Sarquis LMM. Caracterização das vítimas e dos acidentes de trabalho com material biológico atendidas em um hospital público do Paraná, 2012. Epidemiol Serv Saúde. 2014;23(2):337-46. http://dx.doi.org/10.5123/S1679-49742014000200015
19. Brasil. Ministério da Saúde. Portaria nº 485, de 11 de novembro de 2005 Aprova a Norma Regulamentadora nº 32. Segurança e Saúde no Trabalho em Estabelecimentos de Saúde. Brasília: Ministério da Saúde; 2005.
20. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Protocolo Clínico e Diretrizes Terapêuticas para Profilaxia Pós-Exposição (PEP) de Risco à Infecção pelo HIV, IST e Hepatites Virais. Brasília: Ministério da Saúde; 2018.
21. Pimenta FR, Ferreira MD, Gir E, Hayashida M, Canini SRMS. Atendimento e seguimento clínico especializado de profissionais de enfermagem acidentados com material biológico. Rev Esc Enferm USP. 2013;47(1):198-204. http://dx.doi.org/10.1590/S0080-62342013000100025

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