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Clinical laboratory follow-up of workers who suffered accidents with biological material in hospital institutions

Seguimento clínico laboratorial de trabalhadores que sofreram acidente com material biológico em instituições hospitalares

Seguimiento de laboratorio clínico de trabajadores que sufrieron accidentes con material biológico en instituciones hospitalarias

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Abstract: Objective: To analyze the clinical laboratory follow-up of workers who suffered accidents with biological material in hospitals (AWBM). **Method:** cross-sectional, quantitative study with analysis of medical records of 550 workers who suffered AWBM in the area of the 17th Regional Health of the State of Paraná, from October 2010 to December 2013. For the analysis of the association the ratio of prevalence was used (RP), and Wald's chi-square test to determine if there were differences between study variables and abandonment of clinical follow-up. **Results:** 51.5% of those affected did not give clinical follow-up to the care recommended by the Ministry of Health's AWBM protocol. There was greater abandonment of treatment when there was no patient. **Conclusions:** More than half of the injured people did not continue the clinical follow-up, highlighting the importance of strategies for worker health.

Descriptors: Occupational Risks; Occupational Health; Occupational Accidents Registry; Occupational Health Nursing

Resumo: Objetivo: analisar o seguimento clínico laboratorial de trabalhadores que sofreram acidente com material biológico em instituições hospitalares (ATMB). **Método:** estudo transversal, quantitativo, com análise de prontuários de 550 trabalhadores que sofreram ATMB na área da 17ª Regional de Saúde do Estado do Paraná, no período de outubro de 2010 a dezembro de 2013. Para a análise da associação foi utilizada a razão de prevalência (RP), e o teste de qui-quadrado de Wald para determinar se havia diferença entre as variáveis de estudo e o abandono do seguimento clínico. **Resultados:** dos acometidos, 51,5% não deram seguimento clínico ao atendimento

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preconizado pelo protocolo de ATMB do Ministério da Saúde. Verificou-se maior abandono no tratamento quando não havia paciente. **Conclusões:** mais da metade dos acidentados não deram continuidade ao seguimento clínico, evidenciando a importância de estratégias para a saúde do trabalhador.
Descritores: Riscos ocupacionais; Saúde do trabalhador; Notificação de acidentes de trabalho; Enfermagem do trabalho

Resumen: Objetivo: analizar el seguimiento en laboratorio clínico de trabajadores que sufrieron accidentes con material biológico en instituciones hospitalarias (ATMB). **Método:** estudio cuantitativo transversal con análisis de registros médicos de 550 trabajadores que sufrieron ATMB en el área de la 17ª Región de Salud del Estado de Paraná, desde octubre de 2010 hasta diciembre de 2013. Para el análisis de la asociación se utilizó la razón de prevalencia (PR) y la prueba de chi-cuadrado de Wald para determinar si hubo diferencias entre las variables del estudio y el abandono del seguimiento clínico. **Resultados:** el 51.5% de los afectados no dio seguimiento clínico a la atención recomendada por el protocolo ATMB del Ministerio de Salud. Hubo un mayor abandono del tratamiento cuando no hubo paciente. **Conclusiones:** más de la mitad de los lesionados no continuaron el seguimiento clínico, lo que destaca la importancia de las estrategias para la salud de los trabajadores.
Descripores: Riesgos Laborales; Salud Laboral; Notificación de Accidentes del Trabajo; Enfermería del Trabajo

Introduction

Accident at Work with Biological Material (AWBM) occurs when there is percutaneous contact with blood and/or direct contact with mucosa or unhealthy skin, with potentially infectious organic fluids (semen, vaginal discharge, CSF, synovial fluid, pleural fluid, peritoneal, pericardial and amniotic) and potentially non-infectious organic fluids (sweat, tears, feces, urine and saliva) unless contaminated with blood.[1]

Registration of the AWBM is required by Law No. 8.213/1991, by means of the Work Accident Report (WAR), and the notification form of the Notification Information System (NIS) must be completed for all workers, regardless of the existence of employment relationship.[2]

It is estimated that approximately 3 million percutaneous exposures occur annually among 35 million health professionals worldwide.[3] These professionals are exposed to more than 20 AWBM-related pathogens, including the human immunodeficiency virus (HIV), hepatitis B (HBV) and hepatitis C (HCV).[1]

The average risk of HIV transmission is around 0.3%, HCV ranges from 1 to 10%, and HBV from 6% to 30%, and may reach up to 62% when the source patient has the HIV virus antigen.

Hepatitis B (HbsAg) positive and no prophylactic measures are taken after the accident. It is estimated that each year AWBM results in 15,000 HCV infections, 70,000 hepatitis B virus (HBV) infections, and 500 HIV infections.[3-4]

There are several ways to prevent these biological hazards, such as the use of personal protective equipment and pre-exposure prophylaxis for hepatitis B by vaccine and/or immunoglobulin, but there are no vaccines for hepatitis C. If a biological material accident occurs, there is also the use of post-exposure prophylaxis (PEP) to prevent HIV contamination that reduces seroconversion by up to 81.0% .[5]

After exposure arising from an AWBM, practitioners should seek specialist care to detect their serological status, risk of infection and receive prophylactic treatment, when indicated, according to the type of exposure.[6]

However, many professionals do not recognize their vulnerability to infection and occupational risks from an ATMB.[4] This type of accident has several consequences for workers, such as: worry, sleep loss, anxiety, fear, emotional uncontrollability, guilt, problems in the workplace, relationship with family and discomfort due to chemoprophylaxis.[7] Therefore, studies have identified that many injured professionals do not complete clinical follow-up or do not perform any prophylactic measures after occupational exposure.[4, 8-9] It is emphasized that inappropriate and/or incomplete use antiretroviral regimen is directly related to the risk of prophylaxis failure.[10]

In an integrative review conducted on AWBM in health professionals, which gathered 20 scientific articles, showed that in most studies, sharps accidents were the most common type of accident and that most professionals report they initiated the proposed prophylactic or curative treatment, but many do not follow up until the end and abandoned the treatment. In addition, this review concluded that AWBMs occur in significant quantities and negatively impact workers' health, giving priority to education and awareness of health professionals regarding

accident prevention and adherence to standardized behaviors after exposure and full treatment when indicated.[11]

Given the complications arising from the AWBM and the importance of proper follow-up after exposure to reduce the risk of disease transmissibility, this study aimed to analyze the clinical laboratory follow-up of workers who suffered accidents with biological material in hospital institutions.

Method

It is a cross-sectional study of quantitative approach. We analyzed medical records of 550 workers who suffered AWBM in 21 municipalities that make up the 17th Regional Health of the State of Paraná, from October 2010 to December 2013, in a public state hospital that is a reference for these occurrences in this region.

Information was also collected from electronic medical records of the Inter-municipal Consortium Ambulatory where workers with potential risk of contamination were referred by the hospital for follow-up until the case was concluded. In addition, in the case of medical records that presented incomplete data, information was sought in the notification forms of the Notification Disease Information System (NDIS) stored in the Worker Care Center of the 17th Health Regional of Paraná.

All workers who suffered AWBM during the established period and who were referred to the referral service where the medical records were taken were included. Exclusion criteria were medical records of health students, since the follow-up of these cases was not in the outpatient clinic where data related to treatment follow-up were collected.

Data were collected between December 2013 and June 2014. The variables of interest of the study were: age, gender, educational level, professional category, mechanisms involved in the

accident (needle perforation, cut, blood over mucosa, presented intact skin or injured skin), act and material of the accident and adherence to clinical follow-up.

Adherence to clinical follow-up was considered to be the attendance of the professional who had exposure to biological material to all appointments at the referral outpatient clinic until discharge, according to the protocol established by the Ministry of Health.[12]

Abandonment of clinical follow-up was considered as interruption or non-attendance to outpatient visits.

The collected data were organized in spreadsheets and statistically analyzed using the Statistical Package for Social Sciences (SPSS), version 20.0. Descriptive statistics were performed to characterize the participants regarding the selected variables. For the association analysis, the prevalence ratio (RP) was used. Wald's chi-square test, with a significance level of 5%, was performed to determine if there was a difference between the study variables and the abandonment of clinical follow-up.

The study was approved by the Research Ethics Committee of the State University of Londrina (UEL), CAAE No. 19885813.1.0000.5231, respecting the rules for the use of data in medical records, according to Resolution National Health Council No. 466/12.

Results

On the 550 affected, 51.5% did not have clinical follow-up to the care recommended by the Ministry of Health's AWBM protocol.[10]

There was no association between sociodemographic and occupational variables and abandonment of clinical follow-up. However, it was found that male workers had a higher proportion of abandonment of clinical follow-up (53.4%) when compared to females (51.0%). Regarding education, the highest proportion of dropouts occurred in workers who worked in jobs that required only technical/auxiliary education (51.9%). The age group with the highest

dropout rate was over 30 years-old (50.5%), with a median of 34 years-old. Most accidents occurred among nursing professionals (73.9%); however workers from other professional areas had a higher percentage of abandonment (56.7%) (Table 1).

Table 1 - Association between sociodemographic and occupational variables of workers affected by accidents with biological material and the abandonment of clinical follow-up. Londrina, PR, Brazil, 2010 – 2013.

Socio-demographic and occupational data	Abandonment of clinical follow-up		RP	(IC 95%)	p-value
	Yes Frequency (%)	No Frequency (%)			
Sex					
Female	228(51,0)	219(49,0)	1	-	0,662
Male	55(53,4)	48 (46,6)	1,02	(0,92-1,11)	
Required education for the job					
Technician/Auxiliary	216(51,9)	200(48,1)	1	-	0,644
High education	66(46,6)	67(50,4)	1,02	(0,92-1,12)	
Age					
Up to 30 years-old	108(50,5)	106(49,5)	1	-	0,712
31 and older	175(52,1)	161(47,9)	1,01	(0.93-1,10)	
Professional Area					
Others	80(56,7)	61(43,3)	1,07	(0,97-1,18)	0,146
Nursing	203(49,6)	206(50,4)	1	-	

Source: Records of workers who have suffered AWBM.

The prevalence of abandonment of clinical follow-up was lower and statistically significant in the set of other municipalities, compared to the municipality where the referral center was located (PR=0.85 / CI=95%: 0.78-0.93). There was also greater abandonment in clinical follow-up when there was no identification of the source patient, compared to those visits in which the source was known (PR=1.20/95% CI = 1.08-1.34).

Table 2 - Association between data from accidents with biological material and abandonment of clinical follow-up. Londrina, PR, Brazil, 2010 – 2013.

Accident data	Abandomment of clinical follow-up		RP	(IC 95%)	p value
	Yes Frequency(%)	No Frequency(%)			
Exposure					
Percutaneous / Skin	243(50,5)	238(49,5)	1	-	0,247
Mucosa	40(58,0%)	29(42,0)	1,07	(0,95-1,22)	
Organic material					
Blood	233(50,4)	229(49,6)	1	-	0,649
Other body fluids	29(53,7)	25(46,3)	1,03	(0,87-1,19)	
Circumstance of the accident					
Medicine adm.	60(48,4)	54(51,6)	1	-	0,477
Drill Manipulation	187(52,1)	172(47,9)	1,03(0,93-1,14)		
Aggressor agent					
Needle	215(50,7)	209(49,3)	1	-	0,520
Others	68(54,0)	58(46,0)	1,03	(0,93-1,14)	
Known Source					
Yes	220(48,2)	236(51,8)	1	-	<0,001
No	63(67,0)	31(33,0%)	1,20	(1,08-1,34)	
City of the accident					
Londrina	208(56,7)	159(43,3)	1	-	<0,001
Others	75(41,0)	108(59,0)	0,85	(0,78-0,93)	

Source: Records of workers who have suffered AWBM.

Regarding the analysis of clinical follow-up, it was found that most workers abandoned clinical follow-up after the first outpatient visit, and lower prevalence of abandonment when antiretroviral use was required (RP= 0.83 / 95) % = 0.75-0.92) (Table 3).

Table 3 - Association between outpatient follow-up data on accidents with biological material and abandonment of clinical follow-up. Londrina, PR, Brazil, 2010 – 2013.

Clinical treatment data	Abandonment of clinical follow-up		RP	(IC 95%)	p value
	Yes Frequency (%)	No Frequency (%)			
Outpatient Consultations					
One consultation	89(53,0)	79(47,0)	-		0,069
Two or more	71(43,0)	94(57,0)	0,90	(0,81-1,0)	
Use of antiretroviral					
Yes	37(34,3)	71(65,7)	-		0,001
No	230(52,0)	212(48,0)	0,83	(0,75-0,92)	

Source: Records of workers who have suffered AWBM.

Discussion

The results of this study showed that more than half of professionals injured with biological material left the clinical follow-up.

The involvement of 550 workers over a three-year period is alarming, indicating the need for managers to develop and implement institutional accident prevention practices, constantly assessing the risks to which their employees are exposed, investing in minimizing them and promoting constant educational actions in health.[9]

Regarding the sociodemographic factors of workers who suffered AWBM, it was observed that there was a predominance of females, young adults (30-39 years-old) and workers of the nursing staff. The greater involvement of AWBM in women is consistent with that found in other studies that found that women predominate among health professionals, especially in the nursing area.[13-15] However, males showed a higher percentage of abandonment of clinical follow-up and this can be justified by sociocultural barriers that are related to men as being strong, virile and invulnerable, as well as the cultural issues of masculinity patterns that repress health needs and care.[16]

These data demonstrate the need for recurrent training and training related to prevention of AWBM and also the importance of continuity of monitoring and risks of abandonment of treatment for workers' health, being the manager's role, the coordination of a team that develops its activities, respecting the profession's ethical and technical precepts, working daily to minimize risk and harm.[13-14]

Nursing technician/auxiliary workers were the most affected by accidents with biological material, as found in other studies that present the nursing technician/auxiliary category as the largest health category to have direct contact with the nursing staff. However, the nursing staff showed a lower dropout rate (49.6%) than other health care professionals (56.7%), which can be attributed to the higher number of nursing professionals. approach the possible outcomes of the ATMB for their health and be better prepared for such a situation in their course.[7]

On the other hand, it was observed that nursing technicians had a higher percentage of abandonment when compared to nurses, possibly attributed to undergraduate courses to prepare their students to deal with this work accident. A study that evaluated the factors that interfere with AWBM care identified the scientific and technical knowledge of health professionals as a facilitator for the success of post-exposure care.[19]

With regard to age, professionals over 31 years-old had a higher percentage of abandonment of clinical follow-up and it is inferred that professionals older and longer in the profession may have had more than one work accident and with that disbelieve the treatment. It is emphasized that more experienced professionals may be more resistant to changes in their behavior.[4]

Regarding the circumstances of the accident, the municipality where the study was conducted showed a significant association with the greater abandonment of clinical follow-up, and 94.5% of workers suffered percutaneous accidents, which are considered serious biological

exposures. It is inferred that professionals from other locations showed greater commitment and concern with the accident, continuing the clinical follow-up.

It is noteworthy that accidents occurring in neighboring municipalities may have a higher rate of underreporting, as these professionals have less accessibility to the 17th Regional referral hospital and the Outpatient Clinic, in addition to the delay resulting from the distance traveled to start the service, which often , exceeds the recommended two hours to start chemoprophylaxis.

The protocol of the Ministry of Health guarantees AWBM care in any emergency room, [13] however, not all health facilities have trained doctors and materials, such as chemoprophylaxis drugs, requiring the referral of injured workers.

Most AWBM resulted from the handling of sharps, especially with needles. In this category, procedures involving venous/arterial puncture, disposal, recapping and box manipulation with sharps were considered. These findings are similar to results from a study in which it was found that most accidents occurred due to needle contact during or after use or when attempting to recap these materials.[20]

In addition, in the present study it was found that abandonment of follow-up was associated with the use of chemoprophylaxis. According to the Ministry of Health, approximately one third of professionals discontinue treatment due to adverse effects of antiretroviral chemoprophylaxis.[10]

It is noteworthy that HIV chemoprophylaxis, when indicated, has a time-dependence relationship, and its greatest benefit when started within two hours after the accident.[12] Although gastrointestinal effects, headache and fatigue are discrete; as well as laboratory alterations, it is observed that the greater the interference of anti-retrovirals in daily activities and the more cumbersome adverse effects, the greater the risk of non-adherence to prophylaxis.[10] A study has shown the importance of zidovudine chemoprophylaxis (AZT), which

can reduce the risk of seroconversion by up to 81% after occupational exposure to biological material.[13]

Regarding the risk of exposure of injured workers to seroconversion, a study conducted in the United States from 1981 to 2010 showed that 57 North American workers suffered seroconversion after an occupational accident with exposure to potentially contaminated biological material.[21]

Although Brazilian public health policies invest in the theme through Occupational Health Reference Centers - CEREST, the establishment of compulsory notification by NIS after AWBM injuries and the implementation of protocols such as NR-32, which encourage precautionary measures. With the objective of protecting health professionals against possible occupational contamination, there is no precise data on the number of occurrences of seroconversion to HIV, Hepatitis B and C among Brazilian health professionals.[22]

For data collection, some limitations were found, the main one being the lack of detailed information in the medical records that allowed identifying the characterization of the AWBM, as well as some information indicating the reasons for discontinuation of trea tment. These limitations show how much care for workers who suffer an A WBM does not yet meet labor law, especially in medium and small municipalities.

Final Thoughts

The high rate of non-adherence to clinical follow-up, especially in health professionals who had chemoprophylaxis indication is of concern, considering that the use of anti-retrovirals could significantly reduce the seroconversion of infections resulting from occupational contamination.

These findings reaffirm the need for greater attention to the clinical follow-up of health professionals after exposure to AWBM. Thus, it is suggested the implementation of measures that facilitate access to follow-up of cases in the place of origin of the worker.

It is noteworthy that to ensure adherence to treatment, health institutions must be able to receive the affected professional effectively, solving their doubts about the side effects of chemoprophylaxis, serological tests that should be performed and frequency of outpatient returns. All these strategies must be linked in order to accompany the worker throughout the clinical follow-up, giving him the necessary support.

It is suggested the development of other research on this subject that may offer an overview of how the AWBM has been happening, the occurrence of treatment abandonment and how the follow-up of these professionals is. It is believed that, based on future studies, it will be possible to build increasingly solid measures to reduce accidents and improve workers' quality of life.

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