DOI: 10.4025/cienccuidsaude.v12i2.19371

PREVALENCE AND CHARACTERISTICS OF ACCIDENTS WITH BIOLOGICAL MATERIALS INVOLVING PROFESSIONALS FROM THE PRE-HOSPITAL MOBILE ATTENDANCE SERVICE[1]

Adriana Cristina Oliveira*
Maria Henriqueta Rocha Siqueira Paiva**

ABSTRACT
The characteristics related to exposure to biological material in pre-hospital attendance remain little-explored. This study aimed to calculate the prevalence and characteristics of the accidents involving exposure to biological material among professionals of the Pre-Hospital Mobile Attendance Service in the Brazilian state of Minas Gerais. It is a cross-sectional, descriptive study, undertaken with professionals from the pre-hospital mobile attendance service of Minas Gerais. The data was collected between December 2011 and July 2012 through a structured questionnaire, was typed up and was analyzed with the statistical program SPSS version 18.0. Descriptive analysis and calculation of prevalence was undertaken. 487 professionals participated in the study; the prevalence of accidents by exposure to biological material was 17.0%, with 47.9% percutaneous; 39.7% via mucosa; and 12.4% in non-intact skin. Blood was the fluid present in most cases of exposure, followed by vomit and tracheal secretions, with the most-affected areas being the hands, arms and ocular mucosa, during undertaking of the blood glucose test, venipuncture, orotracheal intubation, hygienization of material and the immobilization of the patient. It is anticipated that knowledge of these characteristics relating to the occurrence of these accidents may support discussion among professionals and managers regarding strategies for their minimization.

Keywords: Emergency Medical Services. Exposure to Biological Agents. Work Accidents.

INTRODUCTION

The health work environment is considered unhealthy, as it groups people with infectious and contagious conditions and involves undertaking procedures which bring risks of accidents and the acquisition of illnesses for the workers, which may be greater or lesser depending on the sector in which they work and on the activities carried out [1-3].

Among the occupational risks, exposure to biological material (BM) stands out. This is caused by various pathogens which may be carried by the blood and organic fluids, those of the greatest epidemiological relevance being the Human Immunodeficiency Virus (HIV) and Hepatitis B (HBV) and C (HCV) [2-3].

The exposures considered as of risk to the health professional are those resulting from lesions caused by potentially contaminated cutting/perforating material, and contact of body fluids with mucosa or non-intact skin [3-4]. In spite of many professionals in the area under-rating accidents with biological material on intact skin, this may contain micro-lesions which can serve as gateways for infectious agents [3,5].

The workers in the surgical and emergency areas are described as professionals at high risk of exposure to biological material [2-4], as are those of the pre-hospital attendance (PhA), because of the intense contact with body fluids related to attending the victims of a variety of trauma, and because of the complexity of the activities undertaken [6-8].

Although some studies have analyzed the prevalence of occupational accidents involving exposure to biological material among the PhA workers [6-11], these events' characteristics are not yet well known, which constitutes an important knowledge gap, essential for the development of strategies which may minimize their occurrence.

In the light of the above, it is proposed to estimate the prevalence and the characteristics of the accidents, according to the means of

*Nurse. Postdoc by New York University, Estados Unidos. Associate Professor, Escola de Enfermagem da Universidade Federal de Minas Gerais. CNPq's Researcher. Leader of Studies and Researches Center in Infection Related to Health Care / CNPq. E-mail: adrianacoliveira@gmail.com
**Nurse, Sistema de Atendimento Móvel de Urgência, Prefeitura Municipal de Belo Horizonte. Doctorate, Escola de Enfermagem da Universidade Federal de Minas Gerais. Member of Studies and Researches Center in Infection Related to Health Care / CNPq. E-mail: mariahenriquetarsp@yahoo.com.br

exposure to biological material among professionals of the Pre-hospital Attendance of the state of Minas Gerais.

METHODOLOGY

This is a cross-sectional study with a descriptive character, undertaken with doctors, nurses, nursing technicians, nursing auxiliaries and drivers who worked in the mobile units of the Emergency Mobile Attendance Services and who had carried out direct/indirect attendance to users of this service for over one year, in the state of Minas Gerais.

The following were used as selection criteria: municipalities with this mode of health assistance in place for over one year, and covering populations of over 100,000 inhabitants, according to Decree 2.048/2002 of the Ministry of Health for the functioning of Pre-hospital attendance [3]. 13 cities were selected, of which two refused to participate in the study and in two of which similar studies had already been carried out. Hence, the research was undertaken in 9 municipalities in the state of Minas Gerais.

A structured questionnaire was used which covered demographic and professionals issues (professional category, sex, age, length of service in the institution, unit in which placed, number of jobs worked (It is fairly common for Brazilian health care professionals to work more than one job, due to low salaries) and hours worked per week) and the occurrence of occupational accidents involving contact with BM classified as percutaneous, mucosal, and non-intact skin, in accordance with the Ministry of Health's "Manual of Recommendations for attendance and follow-up of occupational exposure to biological material: HIV and Hepatitis B and C" [12].

The characteristics analyzed according to classification of occupational accident included: number of accidents, the body fluid involved, the type of cutting/perforating material (when this was the case), the body region affected, and the activity being undertaken at the time of the accident.

After previous authorization from the coordination of the local PhA service in each municipality, direct contact was made with each professional so as to present the study's objectives, the importance of the results for deepening and the knowledge of this issue, and the possible repercussions for workers' health. During this same opportunity, after the acceptance to participate in the research, the terms of free and informed consent (TFIC) were signed by the participants.

Data collection was carried out between December 2011 and July 2012 and referred to occupational exposures which had occurred in the 12 month period preceding the data collection.

The collected data was inserted into an Excel spreadsheet and the descriptive and prevalence analyses were produced by the Statistical Package for Social Science (SPSS) program, version 18.0.

This project was based on Resolution 196/96 of the National Health Council, and was submitted along with the respective TFIC to the Research Ethics Committee of the Federal University of Minas Gerais. It was approved under Decision nº ETIC 503/2011.

RESULTS AND DISCUSSION

The multidisciplinary team which met the inclusion criteria totalled 545 professionals, a loss of 10.6% (58/545) being ascertained. The reasons for non-participation were essentially as follows: 31 professionals were on holiday; 15 were on sick leave and 12 did not attend work during the data collection period. As a result, the final population of participants in this study was made up of 487 respondents, of whom 25.5% were doctors, 12.3% nurses, 35.5% nursing technicians and 26.7% drivers.

A predominance of male professionals was ascertained (62.8%), of whom 58.1% were aged over 36 years old (22-60 years old), 50.9% had a length of service(e in the institution of less than 4 years and 10 months (1 – 8 years), 56.5% had a working week of less than 40 hours (12-48h), 50.5% were placed in advanced life support units and 67.3% were registered as working more than one job.

The global prevalence of workers in the Pre-hospital Attendance Service of Minas Gerais who had had accidents involving exposure to biological material, in this study, was 17.0% (83/487). Among the municipalities which took

part in this study, this result varied from 7.7% to 26.8%. Of the professionals who had had accidents, 67.5% (56/83) reported a single exposure to the biological material; 19.3% (16/83), reported two; and 13.2% (11/83), three, totalling 121 accidents involving body fluids in this period. Of these, 47.9% (58/121) had been percutaneous; 39.7% (48/121) through contact with mucosa; and 12.4% (15/121) via non-intact skin.

The occurrence of more than one accident involving exposure to body fluids, in this study, corroborates two other studies undertaken in other municipalities of Minas Gerais, in which the authors mention the occurrence of more than one accident in the period analyzed, although only percutaneous exposure was specified, other forms being termed "accidents involving contact with body fluids" [8,10]. In addition, research undertaken in the period 2002 – 2003 with 6,142 paramedics in the United States showed that on average 3.7 occupational accidents involving exposure to biological material were recorded per worker [11].

This same situation was recorded in a survey held in Serbia, whose objective was to assess occupational exposure to blood and other body fluids among 119 health professionals and 397 medical students in Serbia, in which 33.3% of the participants responded that they had not had such accidents, 10.3% reported the occurrence of one accident, and 56.4% more than one contact [13].

As the occupational risk after contact with biological material depends directly on the characteristics related to the type of accident, the greater the number of accidents of this nature, the greater the possibility of transmission of pathogens carried by the blood and other biological fluids [3].

The global prevalence of professionals in the state of Minas Gerais who had had accidents during PhA involving biological material was below that observed in studies carried out with PhA professionals in two other cities in the state of Minas Gerais [8,10], 19.8% to 20.6%, and among paramedics in the United States, 21.6% [11].

The highest percentage of professionals who had had accidents in this study involved percutaneous contact with body fluids. This result corroborates the results ascertained among PhA workers who had accidents involving biological material in other municipalities in the state of Minas Gerais, in which the proportion varied between 42.2% [10] and 45.9% [8] in Brazilian studies undertaken in municipalities in Minas Gerais and São Paulo [8-10]; although it is higher than that found in a study undertaken with PhA professionals in the city of Campinas, in the state of São Paulo, in which the proportion of these events was 17.1% [9].

Here, one should emphasize that the majority of attendances are made by professionals who work in Basic Life Support Units (USB); with trauma victims, with potential risk of bleeding, contact with blood is frequent; during assistance with birth, contact with amniotic fluid is frequent; and in cases of people suddenly falling ill or suffering from poisoning, vomiting is common.

Among American paramedics, the proportion of occupational accidents with biological material involving body fluid contact was similar; 30% involved non-intact skin, 30% intact skin, 20% percutaneously, and 20% via contact with mucosa. The authors called attention to the fact that sometimes it is necessary to attend more than one person per call-out and that one may have an accident involving biological material from more than one individual [11].

It should be noted that exposure to biological material can increase during a PhA, not only due to the characteristics of the service user and the assistance provided, but also due to the complex situations inherent to care provision, such as: the setting of the accident, the difficulty of accessing the victim, the stress resulting from the rapid attendance, necessary to maintain the victim alive, facing the local traffic until arriving at a health center which will give continuity to the care, and maintenance of the person's hemodynamic stabilization [9]. The constant presence of these fluids during the health attendance given under these conditions can increase the possibility of the worker's being exposed [7].

Table 1 contains the characteristics reported by the pre-hospital attendance professionals of the state of Minas Gerais who have been victims of occupational accidents involving percutaneous contact with biological material.

Table 1: Characteristics of occupational accidents reported by pre-hospital attendance professionals of Minas Gerais involving percutaneous contact with biological material.

Characteristic	Percutaneously 58(%)
Number of accidents	
One	46 (80.0)
Two	09 (15.6)
Three	03 (4.4)
Body fluid involved	
Blood	58 (100)
Type of cutting/perforating material	
Hollow needles	41 (70.7)
Intravenous catheters	07 (12.0)
Lancets	05 (8.6)
Suture needles	03 (5.1)
Glass	02 (3.6)
Body region affected	
Fingers	37 (64.0)
Hands	15 (25.8)
Arms	03 (5.1)
Legs	01 (1.7)
Thighs	01 (1.7)
Buttocks	01 (1.7)
Activity being undertaken at time of accident	
Blood glucose test	24 (41.3)
Venipuncture	11 (18.9)
Packaging up of waste	07 (12.1)
Discarding of surgical material	06 (10.6)
Re-sheathing of needle	04 (6.9)
Intra-muscular medication	02 (3.4)
Hygienization of the material used	02 (3.4)
Suturing	01 (1.7)
Hygienization of the ambulance	01 (1.7)

Table 2 describes the results relating to the characteristics of the accidents involving contact of biological materials with the mucosa and non-intact skin.

Of the biological materials with which contact may be made during occupational exposure, blood contains the highest concentration of the hepatitis B and C and HIV viruses, and is considered the most important vehicle of transmission in health institutions [3]. Following exposure to biological material, the risk of transmission of pathogens carried by organic fluids is variable, depending on the type of accident, its seriousness, the presence or not of associated wounds, the volume of blood involved, the clinical conditions of the source-patient and the health professional's acceptance to undergo post-exposure prophylaxis when indicated [3].

Accidents involving perforations are considered serious, assessable, and for which it is possible to carry out serological monitoring and which indicate chemoprophylaxis. [3]. In one study undertaken in Canada assessing percutaneous exposures involving health professionals, the results evidenced that the accidents mainly affected nurses (62.1%) and laboratory assistants (9.9%), 51.3% through handling of hollow needles, 46.6% during the undertaking of surgical procedures, and 53.4% through the inadequate disposal of cutting/perforating material after use [14].

Table 2: Characteristics of the occupational accidents reported by the pre-hospital service professionals of Minas Gerais, involving the contact of biological material with mucosa and non-intact skin.

Characteristic	Contact with mucosa 48(%)	Contact with non-intact skin 15(%)
Number of accidents		
One	34 (71.4)	10 (63.6)
Two	10 (20.0)	05 (36.4)
Three	04 (8.6)	-
Body fluid involved		
Blood	36 (75.0)	15 (100)
Tracheal secretions	06 (12.5)	-
Vomit	04 (8.3)	-
Amniotic fluid	02 (4.2)	-
Body region affected		
Eyes	43 (89.5)	-
Hands	-	10 (66.6)
Fingers	-	03 (20.0)
Arms	-	02 (13.4)
Nose	05 (10.5)	-
Activity being undertaken at time of accident		
Orotracheal intubation	11 (22.5)	(13.3)
Breaking of medical gloves during the attendance	-	(13.3)
Hygienization of the material	10 (20.9)	(20.0)
Immobilization of the victim	07 (15.4)	(53.4)
Hygienization of the ambulance	05 (10.4)	-
Aspiration of tracheal secretion	05 (9.9)	-
Containment of hemorrhage	04 (8.3)	-
Assistance with birth	02 (4.2)	-
Pleural drainage	02 (4.2)	-
Applying dressing	02 (4.2)	-

In the present study, the fingers, hands and arms were the areas most affected by biological material. These findings corroborate those found among health professionals who undertake aeromedical transport in Canada [15], different from what was observed among police officers, fire fighters and paramedics in the United States, who reported, in 29% of cases, the back and the neck as the most-affected areas [16].

Although this was not the object of this study, the use of medical gloves and an institutional uniform with long sleeves in all health care situations is a fundamental pre-requisite for the professional's protection, above all for the areas which in general are more affected during the accident. Although this was not evaluated, it was observed that the institutional uniform adopted by all the services analyzed allowed the partial removal of the sleeves, leaving the arms unprotected, which is not considered appropriate to the safety of the worker.

In relation to the main care activities related to accidents involving percutaneous exposure to BM (blood glucose test), exposure of the mucosa (orotracheal intubation) and non-intact skin (immobilization of the patient), other studies with PhA professionals analyzing this type of information were not found. Only two studies were found which analyzed the contribution of undertaking blood glucose testing as an activity related to the occurrence of accidents of this nature. The first analyzed 143 notifications from health professionals, in the Municipality of Maringá in the state of Paraná, in which

undertaking this activity was cited as the cause of 12.6% of the accidents [17]. In the second, done with 155 workers from public health centers in a municipality in São Paulo, this was emphasized by 15.1% of the workers who reported the occurrence of occupational accidents involving exposure to BM [18].

Although this study did not analyze the use of, and quality of, personal protective equipment (PPE), the finding in relation to the accidents involving the ocular and nasal mucosa allows one to infer the non-use or inadequate use of safety glasses and face masks by these professionals, as during the undertaking of the most-reported activity the worker's face is very close to the person being assisted, which can increase the risk of contact with biological material. Attention was also called by the fact that a proportion of the professionals reported that the contact with the BM occurred because the PPE used – in this case, the medical gloves, presented damage to their structure during the attendance undertaken.

The non-use or inadequate use of PPE during health attendance, ignorance of the recommendations for protective equipment in accordance with the activity to be carried out, and professionals' resistance to assimilating new conducts, training and routines have been stressed as causes of occupational accidents involving exposure to biological material involving the mucosa and non-intact skin [19].

FINAL CONSIDERATIONS

The global prevalence of work accidents involving BM among PhA professionals was similar to that observed in other studies undertaken in the state of Minas Gerais and also among American paramedics, although it was low in comparison with other municipalities in Brazil.

The analysis of this study's results evidenced that blood is the body fluid involved in the majority of occupational accidents, and that among these, the majority of the accidents reported by the professionals involved percutaneous lesions caused by cutting/perforating material contact of biological material, followed by, mucosa and non-intact skin.

The handling of hollow needles which are dirty with blood predominated in cases of percutaneous exposure, with the fingers being the region affected most by these devices, during the undertaking of blood glucose testing and venipuncture.

In relation to contact of BM with mucosa, the eyes were the most-affected areas during hygienization of the material used during PhA and the undertaking of orotracheal intubation.

In relation to accidents involving non-intact skin, the hands were the most-affected body region, with the most-reported care activities being the immobilization of the victim and the hygienization of the material used during the PhA.

This study's findings allow one to evaluate the need for further studies aiming to identify how these workers carry out their activities, the factors which may influence safe practices, the use of PPE and the knowledge of when it is indicated, and whether topics relating to worker's health are addressed in continuing education programs, thus permitting a forum for discussion.

In spite of this, it is hoped that knowledge on the prevalence and characteristics of accidents involving exposure to biological material may provide support for reflection on the part of workers, such that they may develop strategies for minimizing their occurrence, as well as strengthening discussion between managers and professionals on the importance of training and use of PPE which is appropriate to undertaking PhA activities, as well as cutting/perforating materials with safety devices, as recommended in NR 32, the Brazilian regulation ensuring workers' rights to health and safety at work.

PREVALÊNCIA E CARACTERÍSTICAS DOS ACIDENTES COM MATERIAL BIOLÓGICO ENVOLVENDO PROFISSIONAIS DO ATENDIMENTO PRÉ-HOSPITALAR MÓVEL

RESUMO

As características relacionadas à exposição a material biológico no atendimento pré-hospitalar ainda são pouco exploradas. Objetivou-se com este artigo avaliar a prevalência e as características dos acidentes por exposição a material biológico em profissionais do Atendimento Pré-hospitalar no estado de Minas Gerais. Trata-se de um

estudo de delineamento transversal descritivo. Os dados foram coletados entre dezembro de 2011 e julho de 2012, por meio de questionário estruturado, digitados e analisados pelo programa estatístico SPSS, versão 18.0, a partir de análise descritiva e cálculo de prevalência. Participaram do estudo 487 profissionais. A prevalência de acidentes por exposição a material biológico foi de 17,0%, sendo 47,9% percutâneo, 39,7% mucosas e 12,4% em pele não íntegra. O sangue foi o fluído presente na maioria das exposições, seguido de vômito e de secreção traqueal. As mãos, os braços e a mucosa ocular foram as áreas mais atingidas quando da realização de glicemia capilar, de punção venosa, de intubação orotraqueal, de higienização do material e de imobilização do paciente. Espera-se que o conhecimento das características relativas à ocorrência desses acidentes subsidie discussões entre profissionais e gestores sobre estratégias, para minimizá-los.

Palavras-chave: Serviços médicos de emergência. Exposição a agentes biológicos. Acidentes de trabalho.

PREVALENCIA Y CARACTERÍSTICAS DE LOS ACCIDENTES CON MATERIAL BIOLÓGICO INVOLUCRANDO A PROFESIONALES DE LA ATENCIÓN PRE-HOSPITALARIA MÓVIL

RESUMEN

Las características relacionadas a la exposición a material biológico en la atención pre-hospitalaria aun son muy poco exploradas. El objetivo de este artículo fue evaluar la prevalencia y las características de los accidentes por exposición a material biológico en profesionales de la Atención Pre-hospitalaria en el estado de Minas Gerais. Se trata de un estudio de delineamiento transversal descriptivo. Los datos fueron recolectados entre diciembre de 2011 y julio de 2012, por medio de cuestionario estructurado; digitados y analizados por el programa estadístico SPSS, versión 18.0, a partir del análisis descriptivo y cálculo de prevalencia. Participaron del estudio 487 profesionales. La prevalencia de accidentes por exposición a material biológico fue de 17,0%, siendo 47,9% percutáneos, 39,7% mucosas y 12,4% en piel no íntegra. La sangre fue el fluido presente en la mayoría de las exposiciones, seguido de vómito y de secreción traqueal. Las manos, los brazos y la mucosa ocular fueron las áreas más afectadas en los casos de realización de glucemia capilar, de punción venosa, de intubación orotraqueal, de higienización del material y de inmovilización del paciente. Se espera que el conocimiento de las características relativas a la ocurrencia de esos accidentes auxilie discusiones entre profesionales y gestores sobre estrategias para minimizarlos.

Palabras clave: Servicios médicos de urgencia. Exposición a agentes biológicos. Accidentes de trabajo..

REFERENCES

1. Spagnuolo RS, Baldo RCS, Guerrini IA. Análise epidemiológica dos acidentes com material biológico registrados no Centro de Referência em Saúde do Trabalhador - Londrina-PR. Rev bras epidemiol. 2008; 11(2):315-23.

2. Silva AID, Machado JMH, Santos EGOB, Marziale MHP. Acidentes com material biológico relacionados ao trabalho: análise de uma abordagem institucional. Rev bras saúde ocup. 2011; 36(124):265-73.

3. CDC. Centers for disease control and prevention. Updated U. S. Public Health Service Guidelines for the Management of Occupational Exposures to HIV and Recommendations for Postexposure Prophylaxis. MMWR Morb Mortal Wkly Rep. 2005; 54:1-17.

4. Oliveira AC, Diaz MEP, Toledo AD. Acidentes de trabalho com materiais perfurocortantes entre a equipe multiprofissional de uma unidade de emergência. Cienc cuid Saude. 2010; 9(2):341-9.

5. Toledo AD, Oliveira AC. Situação vacinal e sorológica para hepatite B entre trabalhadores de uma unidade de emergência. Rev Enferm UERJ. 2008; 16(1):95-100.

6. Oliveira AC, Paiva MHRS. Análise dos acidentes ocupacionais com material biológico entre profissionais em serviços de atendimento pré-hospitalar. Rev. Latino-Am. Enfermagem. 2013; 21(1): 309-15.

7. Vegian CFL, Monteiro MI. Living and working conditions of the professionals of the a Mobile Emergency Service. Rev. Latino-Am. Enfermagem. 2011; 19(4): 1018-24.

8. Oliveira AC, Lopes ACS, Paiva MHRS. Acidentes ocupacionais por exposição a material biológico entre a equipe multiprofissional do atendimento pré-hospitalar. Rev Esc Enferm USP. 2009; 43(3):677-83.

9. Soerensen AA, Moriya TM, Hayashida M, Robazzi MLCC. Acidentes com material biológico em profissionais do Atendimento Pré-hospitalar Móvel. Rev Enferm UERJ. 2009; 17(2):234-9.

10. Paiva MHRS, Oliveira AC. Fatores determinantes e condutas pós-acidente com material biológico entre profissionais do atendimento pré-hospitalar. Rev bras enferm. 2011; 64(2):268-73.

11. Leiss JK, Ratcliffe JM, Lyden JT, Sousa S, Orelien JG, Boal WL, et al. Blood Exposure Among Paramedics: Incidence Rates From the National Study to Prevent Blood Exposure in Paramedics. Ann Epidemiol. 2006; 16(9):720-5.

12. Ministério da Saúde (BR). Programa Nacional DST/Aids. Secretaria de Vigilância em Saúde. Programa Nacional para a Prevenção e o Controle das Hepatites Virais. Departamento de Vigilância Epidemiológica Secretaria de Vigilância em Saúde. Recomendações para atendimento e acompanhamento de exposição ocupacional a material biológico: HIV e Hepatite B e C. Brasília (DF); 2004c.

13. Denić LM, Oštri I, Pavlović A, Oštrić DK. Knowledge and occupational exposure to blood and body fluids among health care workers and medical students. Acta Chir Iugosl. 2011; 59(1): 71-5.

14. Alamgir H, Cvitkovich Y, Astrakianakis G, Yu S, Yassi A. Needlestick and other potential blood and body fluid exposures among health care workers in British Columbia, Canada. Am J Infect Control. 2008; 36(1):12-21.

15. Sibley AK, Tallon JM, Day AL, Ackroyd-Stolarz S. Occupational Injuries and Stressors Among Canadian Air Medical Health Care Professionals in Rotor-wing Programs. Air Med J. 2005; 24(6):252-7.

16. Reichard AA, Jackson LL. Occupational Injuries Among Emergency Responders. Am J Ind Med. 2010; 53(1):1-11.

17 Amadei JL, Ivatiuk C. Vigilância de HIV em acidentes perfurocortantes com trabalhadores da saúde. Rev bras promoç saúde. 2010; 23(4): 325-34.

18. Vieira M, Padilha MI, Pinheiro RDC. Análise dos acidentes com material biológico em trabalhadores da saúde. Rev. Latino-Am. Enfermagem. 2011; 19(2): 332-9.

19. Silva JA, Paula VS, Almeida AJ, Villar LM. Investigation of biological accidents among health care workers. Esc Anna Nery Rev Enferm. 2009; 13(3):508-16.

Corresponding author: Maria Henriqueta Rocha Siqueira Paiva. Avenida Professor Alfredo Balena, 190 Sala 200 Bairro Santa Efigênia. Escola de Enfermagem da UFMG. CEP: 30130-100. Belo Horizonte, Minas Gerais.

Submitted: 05/12/2012
Accepted: 24/07/2013