Revista de Epidemiologia e Controle de Infecção
ISSN: 2238-3360
reciunisc@hotmail.com
Universidade de Santa Cruz do Sul
Brasil

Siqueira de Oliveira, Marcelo; Cruz Soares, Amanda; Araújo Andrade,
Ítala Maria; Rogério Cameli, Helen Fernanda; Ponci Silva, Viviane Taís

Hepatitis B in the west brazilian Amazon: knowledge and biosafety measures among nursing professionals
Revista de Epidemiologia e Controle de Infecção, vol. 10, no. 2, 2020, -June, pp. 100-105
Universidade de Santa Cruz do Sul
Santa Cruz do Sul, Brasil

DOI: https://doi.org/10.17058/jeic.v10i2.13324

Available in: https://www.redalyc.org/articulo.oa?id=570468249002

Original Article

Hepatitis B in the western Brazilian Amazon: knowledge and biosafety measures among nursing professionals

Hepatite B na Amazônia ocidental brasileira: conhecimento e medidas de biossegurança entre profissionais de enfermagem

Hepatitis B en la Amazonía occidental brasileña: conocimiento y medidas de bioseguridad entre los profesionales de enfermería

Marcelo Siqueira de Oliveira[1] ORCID 0000-0001-8798-4759
Amanda Cruz Soares[1] ORCID 0000-0003-3715-7549
Ítala Maria Araújo Andrade[1] ORCID 0000-0001-5149-9348
Helen Fernanda Rogério Cameli[2] ORCID 0000-0002-1176-9582
Viviane Taís Ponci Silva[2] ORCID 0000-0002-4156-6620

[1]Federal University of Acre, Brazil.
[2]State Health Secretariat of Acre, Brazil.

Submitted:03/19/2019
Accepted:09/26/2018

Email: marcelo.oliveira@ufac.br
Address: Estrada do Canela Fina, Km 12, Cruzeiro do Sul – Acre.

ABSTRACT

Background and objectives: Biosafety is extremely important for nursing professionals, especially in areas presenting high endemic standard for diseases such as infection by hepatitis B virus. Thus, this study aimed to describe aspects related to biosecurity measures and infection by the hepatitis B virus among nursing professionals in the western Brazilian Amazon. **Methods:** This is a cross-sectional, descriptive study conducted with nursing professionals working in the obstetric center of a maternal and children's hospital. **Results:** A total of 30 professionals participated in the study, 33.3% nurses and 66.7% nursing technicians. The professionals were mostly female (70%) with an average age of 40.9 years old. For the entire sample, 86.7% of professionals had complete vaccination schedule against hepatitis B. Among nursing technicians, 15% of them reported not having received the anti-HBs. Regarding the use of personal protective equipment, 60% of the professionals reported sporadic use. No biosafety training was offered for 80% of the nurses and 60% of the nursing technicians. Concerning accidents, 70% of the nurses and 35% of the nursing technicians reported some type of exposure. Among nurses, 85.7% said they had not notified the event. Among accidents, 42.9% associated the event to an excessive workload. **Conclusion:** Nursing professionals recognize hepatitis B as a condition of high incidence in the Amazon region, which requires stricter biosafety measures due to the risks. However, despite the fact that most of the investigated groups have a complete vaccination schedule for the disease, there were reports of lack of training, sporadic use of personal protective equipment, limitations on immunization tests (anti-HBs) and underreporting of accidents with biological risk.

Descriptors: Hepatitis B. Biosafety. Nursing.

RESUMO

Justificativa e objetivos: A biossegurança é de extrema importância para os profissionais de enfermagem, principalmente em áreas de elevado padrão endêmico para agravos como a infecção por vírus da hepatite B. Nesse sentido, o estudo teve como objetivo descrever aspectos relacionados às medidas de biossegurança e à infecção por vírus da hepatite B entre profissionais de enfermagem na Amazônia ocidental brasileira. **Métodos:** Estudo transversal, descritivo, realizado com profissionais de enfermagem atuantes no centro obstétrico de um hospital materno infantil. **Resultados:** 30 profissionais participaram da pesquisa, sendo 33,3% enfermeiros e 66,7% técnicos de enfermagem. A maioria foi do sexo feminino (70%) com média de idade de 40,9 anos. Para toda a amostra, 86,7% dos profissionais declararam esquema vacinal completo contra a hepatite B. Entre os técnicos de enfermagem, 15% declararam não ter realizado o anti-HBs. Quanto ao uso de equipamentos de proteção individual, 60% dos profissionais declararam uso esporádico. Para 80% dos enfermeiros e 60% dos técnicos de enfermagem, não houve oferta de treinamento em biossegurança. Sobre acidentes, 70% dos enfermeiros e 35% dos técnicos de enfermagem declararam ter sofrido algum tipo de exposição. Entre os enfermeiros, 85,7% afirmaram não ter notificado o evento. Entre os que sofreram acidente, 42,9% o relacionaram à carga horária excessiva. **Conclusão:** Os profissionais de enfermagem reconhecem a hepatite B como uma condição de alta incidência na região amazônica, o que exige medidas mais rígidas de biossegurança devido aos riscos. No entanto, apesar dos grupos investigados, em sua maioria, declararem um esquema completo de vacinação para a doença, foi observado relatos de falta de treinamento, uso esporádico de equipamentos de proteção individual, limitações nos testes de imunização (anti-HBs) e subnotificação de acidentes com risco biológico.

Descritores: Hepatite B. Biossegurança. Enfermagem.

RESUMEN

Justificativa y objetivo: la bioseguridad es de extrema importancia para los profesionales de enfermería, principalmente em las áreas de padrón endémico elevado para agravios como la infección por virus de la hepatitis B (VHB). El estudio tuvo como objetivo describir aspectos relacionados a las medidas de bioseguridad y la infección por VHB entre los profesionales de enfermería actuantes en la Amazonía occidental brasileña. **Métodos:** estudio transversal, descriptivo, realizado con profesionales de enfermería actuantes en un hospital materno infantil. **Resultados:** el estudio incluyó a 30 profesionales, 33.3% enfermeras y 66.7% técnicos de enfermería. los profesionales eran mayoritariamente del sexo femenino, 70%, con media de edad de 40,9 años. 86,7% de los profesionales declararon esquema vacunal completo contra VHB. Entre los técnicos de enfermería 15% declararon no haber realizado el anti-HBs. En relación al uso de equipo de protección individual 60% de los profesionales declararon el uso esporádico. Para 80% de los enfermeros y 60% de los técnicos no fueron ofertados entrenamientos en bioseguridad. Sobre accidentes, 70% de los enfermeros y 35% de los técnicos de enfermería declararon haber sufrido algún tipo de exposición. Entre los enfermeros 85,7% afirmaron que no notificaron los casos. Entre los que sufrieron accidentes 42,9% relacionaron con a la carga horaria excesiva. **Conclusión:** los profesionales de enfermería reconocen la hepatitis b como una condición de alta incidencia en la región amazónica, que requiere medidas de bioseguridad más estrictas debido a los riesgos. Sin embargo, a pesar del hecho de que la mayoría de los grupos investigados declaran un calendario completo de vacunación para la enfermedad, hubo informes de falta de capacitación, uso esporádico de equipos de protección personal, limitaciones en las pruebas de inmunización (anti-HBs) y subregistro de accidentes con riesgo biológico.

Palabras clave: Hepatitis B. Contención de Riesgos Biológicos. Enfermería.

INTRODUCTION

Hepatitis B is a disease caused by a hepatotropic virus of the family *hepadnaviridae*, capable of infecting only human beings and which has tropism by liver cells[1,2].

Hepatitis B virus (HBV) infection has a worldwide distribution. Studies estimate that approximately two billion people are infected, with 240 to 400 million of them progressing with chronic liver disease[1,3,4].

As for the epidemiology of HBV infection, the prevalence is considered high when the rates are higher than 8%. Worldwide, the indicators vary from 0.1% to rates above 30%, as in some Asian countries[5]. In recent years, some regions of the globe have shown an intermediate pattern of prevalence, ranging from 1% to 8%, as in Eastern and Central Europe, the Middle East and the Indian subcontinent[6].

In Brazil, the disease is heterogeneously distributed across the country, with the North region being more endemic, with a prevalence of more than 8% (Amazon basin), with the remaining areas of the country (Northeast, Southeast, Central-West and South) are classified as regions of moderate endemicity[1,7,8].

However, medical records indicate that the prevalence of HBV infection has been reduced in countries that have adopted vaccination against the disease, although the indicators remain high in nations where vertical and horizontal transmission (home) has not been effectively controlled[1].

HBV transmission occurs through skin lesions and mucosa, sexual intercourse and percutaneous (parenteral) exposure. The main means of contamination, in addition to unprotected sexual intercourse, are centered on the blood transfusion and its derivatives outside the technical recommendation (without laboratory investigation for communicable diseases), on dental, surgical and hemodialysis procedures that disregard universal biosafety standards, in the use of injectable drugs, perinatal transmission and accidents with sharps in work spaces, which represent a continuous risk of exposure for health professionals[7,9].

The possibility of health professionals' contamination is related to the logistics and activities inherent to the profession. Thus, professionals work in environments of continuous care for human health and consequently they are exposed to the vulnerability of accidents and infections by biological agents, with emphasis on the hepatitis B virus (HBV)[7].

The risk of biological accidents is considered a threat to health professionals, especially nurses, as they are continuously exposed to contact with blood and other bodily fluids that can favor contamination. Nursing currently has the highest accident record rates[10].

Accidents with sharps among nursing professionals are mainly related to poor infrastructure, misuse or absence of personal protective equipment (PPE), inexperience or lack of skill and non-compliance with biosafety standards when carrying out work activities. The nursing team is the main risk group for accidents related to contamination by biological, physical and chemical agents, since they are in constant contact with the patients[11].

In the context of the western Brazilian Amazon and specifically considering the high epidemiological indicators of hepatitis B in the area, occupational accidents are an immediate risk factor for the increase in the incidence of infection, especially among nursing professionals. Thus, knowing the context, identifying the magnitude of the problem and implementing biosafety measures constitute an essential step to alleviate the problem, since hepatitis B is the disease with the highest risk of infection by accidents with biological material, with an incidence of transmission ranging from 6% to 30% among health workers, and depending on the conditions of the source of contamination, this percentage can reach up to 60%[12].

In addition, the lack of reliable epidemiological records on accidents at risk of biological contamination in Brazil not only hinders the implementation of preventive measures, but also prevents knowing the real magnitude of the problem[10].

Thus, it is necessary to obtain, through scientific study and also through epidemiological control mechanisms, a descriptive diagnosis of aspects related to the nursing team, in order to identify which nursing professionals are most vulnerable to the risks of occupational accidents (nursing assistants, nursing technicians and nurses), focusing on the HBV transmission chain, considering information on vaccination, immunization and the provision of information and conditions for preventive conduct. As a result, this study aimed to describe aspects related to biosafety measures and hepatitis B virus infection among nursing professionals in the western Brazilian Amazon.

METHODS

This is a cross-sectional, descriptive study carried out at the obstetric center of the Hospital da Mulher e da Criança do Juruá - Irmã Maria Inete Della Senta (HMCJ), in the city Cruzeiro do Sul, State of Acre, in the western Brazilian Amazon. The chosen center has services of epidemiological surveillance, immunization and distribution of immunobiological provided by the national strategy for combating and controlling viral hepatitis, being an obstetric reference for the entire Alto Rio Jurua area. This region is composed of five cities in the State of Acre (Cruzeiro do Sul, Mancio Lima, Rodrigues Alves, Porto Walter and Marechal Thaumaturgo) and one city in the State of Amazonas (Guajara).

The study was approved by the Research Ethics Committee of the Federal University of Acre, protocol 1638233 and CAEE 46821715 4 0000 5010.

The study population consisted of a total of 42 nursing professionals working at the service of the Obstetric Center of the HMCJ, from May 1 to June 30, 2017. The participants in the study were professionals who, according to their work scale were working in the assistance services of the HMCJ obstetric center, belonging to the categories of nursing technician and nurse and who free and informed accepted to participate in the study.

The variables analyzed in the study were divided into three groups of information: a) personal data - professional category (nursing technician and nurse), gender (male and female), age; b) specific knowledge - forms of transmission of hepatitis B, complete vaccination schedule against hepatitis B, doses taken of the hepatitis B vaccine, performance of anti-HBs serology; c) biosafety measures - frequency of PPE use, training/preventive guidance for accidents with sharps, procedure in case of accidents with sharp objects, record of accidents with sharps or biological material, accident and workload association, conduct after the accident.

For data collection, we used a structured questionnaire adapted from Pinheiro & Zeitoune, which assessed, in their study, the knowledge and biosafety measures used by the same population group in another region of Brazil[7]. The questionnaire was applied by the team of researchers on the site, considering the alternation of professionals due to the shift system.

After data collection, the data were tabulated in Microsoft Excel Office 2016, Windows version. For statistical analysis and presentation of results, the GraphPad Prism, online version, was used. For qualitative variables, data were described through the distribution of absolute and relative frequencies. Fisher's exact test was used to analyze the distribution of categorical variables. Throughout the statistical analysis, a 95% confidence interval with a significance level of 0.05 was adopted.

RESULTS

Of the 42 nursing professionals working at the HMCJ obstetric center, 30 accepted to participate in the study, 33.3% of them were nurses and 66.7% nursing technicians. Regarding age, the study showed an average of 40.9 years old for the entire sample. When comparing the groups, it was found that the average age among nurses was 35.6 years old, while for nursing technicians the average was 43.4 years old. Regarding the gender of the professionals, most of them were women, representing 70% of the total sample.

As for the distribution by professional category among the professionals interviewed, it was evident that most of them were nursing technicians (66.7%).

When asked about their knowledge of the forms of hepatitis B transmission, 100% of respondents reported knowing them. The research also investigated the professionals' knowledge about the vaccination schedule against Hepatitis B. The results showed that 100% of nurses said they knew the current vaccination schedule against hepatitis B, compared to 75% of nursing technicians (p=0.140).

Regarding the hepatitis B vaccine, 86.7% of the professionals reported that they had a current vaccination schedule and 13.3% did not know how to respond it. When investigating the number of doses taken, it was observed that 16.7% of professionals took a booster dose and 20% of them repeated the entire schedule.

The study also investigated, according to table 1, the performance of the anti-HBS serological test as a strategy to confirm the immune condition.

Table 1. Performance of anti-HBS serology by category of nursing professionals working at the obstetric center of the Hospital da Mulher e da Criança do Jurua, Cruzeiro do Sul, 2017.

	Nurse		Nursing Technician		
	n	%	n	%	#*P*
Yes	10	33.3	17	56.7	
No	0	0	3	10	0.532
Total	10	33.3	20	66.7	

Fischer's exact test

For the variable performance of anti-HBS serology, 100% of nurses reported having undergone the test, compared to 85% of nursing technicians (p=0.532).

Another aspect observed in the study, according to table 2, was the frequency of use of PPE.

Table 2. Frequency of use of PPEs by category of nursing professionals working at the obstetric center of the Hospital da Mulher e da Criança do Jurua, Cruzeiro do Sul, 2017.

	Nurse		Nursing Technician		
	n	%	n	%	#*p*
Always	4	13.3	8	26.7	
Sometimes	6	20	12	40	0.5320
Never	0	0	0	0	
Total	10	33.3	20	66.7	

As for the use of PPE, for the entire sample, 40% of professionals reported frequent use, while 60% answered that they used sporadically. The results showed the same distribution within each professional group.

The training offer involving the topic of biosafety was also observed in the study. When asked if they received any type of preventive training for accidents with sharps, 80% of nurses and 60% of nursing technicians reported not having received any type of training or guidance (p=0.419).

Nursing professionals were also asked, according to table 3, about how to proceed in the event of a biological accident.

Table 3. Knowledge on how to proceed in the event of a biological accident by category of nursing professionals working at the obstetric center of the Hospital da Mulher e da Criança do Jurua, Cruzeiro do Sul, 2017.

	Nurse		Nursing Technician		
	n	%	n	%	*#P*
Yes	8	26.7	16	53.3	
No	2	6.7	4	13.3	1.000
Total	10	33.3	20	66.6	

Fischer's exact test

For the entire sample, 80% of professionals reported having sufficient knowledge to proceed in the event of a biological accident.

When asked about the occurrence of an occupational accident, 70% of nurses and 35% of nursing technicians reported some type of exposure. Most professionals who suffered accidents, 42.9% for both groups, associated the fact with the exhaustive workload. Among nurses, there was only one notification (14.3%), while among nursing technicians 71.4% said they had reported occupational accidents. For the entire sample, among those who had some type of accident, only 42.9% of the professionals reported to have received medical assistance.

DISCUSSION

The results showed a sample of nursing professionals composed of young adults, most of them were female and members of the category of nursing technicians. Such information converges to that evidenced in another study carried out in the Northeast region, in which the average age group was 43.5 years old, with a greater proportion of female professionals of

72.2% and most of them (86.1%) were member of the nursing technicians (and assistants) category[13].

As for the analysis of the knowledge of the forms of transmission, the interviewees were confident that they knew the mechanisms. Hepatitis B, because it is an endemic disease in Brazil, is an aggravation of control of epidemiological surveillance services, which has a protocol with therapeutic guidelines and practices aimed at guiding the actions of health professionals[1,7,9].

When analyzing the responses regarding the hepatitis B vaccination schedule, it was observed that 100% of nurses declared to know the schedule, a statement that converges to the training and responsibility of this professional in the obstetric center. This data interacts with other findings, in which, when analyzing the execution of the vaccination schedule of nursing professionals, 67% to 70.5% of nurses had it up to date, compared to 48.4% of nursing technicians[13,14].

Although the recommended schedule for hepatitis B usually consists of 3 doses of the vaccine, the study also showed that some professionals took extra doses, while others repeated the entire schedule[15]. Health authorities in Brazil recommend that health workers should undergo Anti-HBS serology after 30 days of complete vaccination schedule, in order to verify seroconversion and level of protection: "Complete vaccination, in addition to serological evidence from health professionals, is an essential assessment in the prevention of occupational transmission of hepatitis B"[16].

The importance of specific protection dialogues with a study finding, since it was observed that less than half of the professionals in both categories had a frequent use of PPEs. This data converges in the affirmative of 52.5% of the interviewed professionals, who reported having already suffered some type of occupational accident. These values are higher than the 47.9% observed among professionals of the same category in the Northeast region and 46.6% among the participants in a study on biological accidents with sharps in the Central-West[13,17]. Failure to use PPEs and the lack of standard precautions inherent in health work spaces are aspects reported in the scientific literature as a direct risk factor for health professionals, especially in an area with a high incidence of hepatitis B[7,18].

Another important data concerns the volume of notifications, mainly in the category of nurses, as only one declared to have formally reported the accident. Studies show records of notification rates of up to 75% for the same category, in which the authors suggest, according to their scientific bases, that work accidents affect almost half of nursing professionals, with two thirds of these accidents not being notified or investigated[13,19].

One of the alternatives to strengthen knowledge about biosafety measures and HBV infection lies in continuing education and professional updating. However, most respondents reported not having received any training or guidance on the topic. Studies have shown that training and permanent qualification are very important for the maintenance of occupational health for health professionals[17,20].

Biosafety is an extremely important issue for health professionals, especially the nursing team, mainly when working in areas of high endemic standard for infections such as that caused by HBV.

The results of this study show an initial view on the topic in the research space, from the perspective of the opinion of nursing professionals on the association between hepatitis B and biosafety measures.

Nursing professionals recognize hepatitis B as a condition of high incidence in the Amazon region, which requires stricter biosafety measures due to the risks. However, despite the fact that most of the investigated groups declare a complete vaccination schedule for the disease, reports of lack of training, sporadic use of personal protective equipment, limitations on immunization tests (anti-HBs) and underreporting accidents with biological risk were observed.

However, as it is a research focused on professional opinion and generating hypotheses, the study has limitations regarding the confirmation of the participants' immunological condition. Thus, there is a need for further investigations, especially considering serological testing for hepatitis B, as well as other infectious and contagious conditions.

REFERENCES

1. Silva AL da, Vitorino RR, Esperidião-Antonio V, *et al*. Hepatites virais: B, C e D: atualização. Rev Bras Clin Med. São Paulo, 2012;10(3):206-18.

2. Terrault NA, Bzowej NH, Chang K-M,et al. AASLD guidelines for treatment of chronic hepatitis B: Hepatology, Month 2015. Hepatology 2016;63(1):261–83. http://doi.org/10.1002/hep.28156

3. Lok ASF, McMahon BJ. Chronic hepatitis B. Hepatology. 2007;45(2):507–39. http://doi.org/10.1002/hep.21513

4. McMahon BJ. The natural history of chronic hepatitis B virus infection. Hepatology 2009;49(S5):S45–55. http://doi.org/10.1002/hep.22898

5. Ferreira CT, Silveira TR. Hepatites virais: aspectos da epidemiologia e da prevenção. Rev Bras Epidemiol 2004;7(4):473–87. http://doi.org/10.1590/S1415-790X2004000400010

6. Tegan FM, Araújo ESA. Epidemiologia da Hepatite B e D e seu Impacto no Sistema de Saúde. Braz J Infect Dis 2006;10(1):6–10.

7. Pinheiro J, Zeitoune RCG. Hepatite B: conhecimento e medidas de biossegurança e a saúde do trabalhador de enfermagem. Esc Anna Nery 2008;12(2):258–64. http://doi.org/10.1590/S1414-81452008000200009 http://doi.org/10.1590/S1414-81452008000200009

8. Tauil MC, Amorim TR, Pereira GFM, *et al*. Hepatitis B mortality in Brazil, 2000-2009. Cad Saúde Pública 2012;28(3):472–8. http://doi.org/10.1590/S0102-311X2012000300007

9. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de DST, Aids e Hepatites Virais. Protocolo Clínico e Diretrizes Terapêuticas para Hepatite B e Coinfecções. Brasília: Ministério da Saúde; 2017. 120 p.

10. Loureiro LA, Gomes AC, Malaguti SE, *et al*. Adesão de profissionais de enfermagem ao seguimento clínico após exposição ocupacional com material biológico. Rev Eletrônica Enferm [Internet] 2009 [citado 5 de janeiro de 2018];11(2):303-8. Disponível em: https://www.revistas.ufg.br/fen/article/view/46973. http://doi.org/10.5216/ree.v11.46973

11. Carvalho MEC, Santana MM F, Martins FS. Atuação de auxiliares e técnicos de enfermagem no manejo de perfurocortantes: um estudo necessário. Rev Lat Am Enfermagem 2009; 17(3): 321-27. http://doi.org/10.1590/S0104-11692009000300007

12. Scheidt KLS, Rosa LRS, Lima EFA. As ações de biossegurança implementadas pelas comissões de controle de infecções hospitalares. Rev. enfermagem UERJ 2006; 14(3):372-377.

13. Araújo TME, Costa, Silva N. Acidentes perfurocortantes e medidas preventivas para hepatite B adotadas por profissionais de Enfermagem nos serviços de urgência e emergência de Teresina, Piauí. Rev Bras Saúde Ocupacional 2014;39(130):175–83. http://doi.org/10.1590/0303-7657000079413

14. Silva FJCP, Santos PSF, Reis FP, *et al*. Estado vacinal e conhecimento dos profissionais de saúde sobre hepatite B em um hospital público do nordeste brasileiro. Rev Bras Saúde Ocupacional 2011;36(124):258–64. http://doi.org/10.1590/S0303-76572011000200009

15. Moraes JC, Luna EJA, Grimaldi RA. Imunogenicidade da vacina brasileira contra hepatite B em adultos. Rev Saúde Pública 2014;44(2):353–9. https://doi.org/10.1590/S0034-89102010000200017

16. Souza F O, Freitas P SP, Araújo TM, *et al*. Vacinação contra hepatite B e Anti-HBS entre trabalhadores da saúde. Cad Saúde Coletiva 2015;23(2):172–9. http://doi.org/10.1590/1414-462X201500020030

17. Carvalho DC, Rocha JC, Gimenes MCA, *et al*. Trabalho de incidentes com material biológico na equipe de enfermagem de um hospital do Centro-Oeste do Brasil. Esc. Anna Nery. 2018 ; 22(1): e20170140.

18. Kay A, Silva EM, Pedreira H, *et al*. HBV/HDV co-infection in the Western Brazilian Amazonia: an intriguing mutation among HDV genotype 3 carriers. J Viral Hepat. 2014;21(12):921-4. http://doi.org/10.1111/jvh.12267

19. Gessner R, Larocca LM, Chaves MMN, *et al*. As notificações de acidentes de trabalho com material biológico em um hospital de ensino de Curitiba/PR. Saúde Em Debate 2013;37(99):619–27. http://doi.org/10.1590/S0103-11042013000400009

20. Sousa ÁFL, Queiroz AAFLN, Oliveira LB, *et al*. Representações sociais da Enfermagem sobre biossegurança: saúde ocupacional e o cuidar prevencionista. Rev Bras Enferm.2016;69(5):864–71. http://doi.org/10.1590/0034-7167-2015-0114

Authors' contribution:

All authors actively participated in the design of the research project, analysis and interpretation of the data, article writing and final approval of the version to be published, being responsible for all aspects of the study.