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## Conhecimentos e condutas de biossegurança entre docentes de enfermagem

Knowledge and practices of biosafety among nursing professors

Conocimiento y conducta de bioseguridad entre los docentes de la facultad de enfermería

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### ABSTRACT

**Objectives:** To describe the knowledge of nursing teachers of a nursing course on Norm 32 and on post-exposure practices to biological materials and to identify the vaccination status of these teachers. **Method:** Quantitative descriptive cross-sectional study. Data was collected between September and October 2014, using a questionnaire and analyzed using the SPSS statistical software 21.0. The participants were 35 nursing teachers. **Results:** 71.4% were female; 100% claimed to have knowledge on biosecurity; 51.4% knew Norm 32; 71.4% were immunized for hepatitis B; 22.9% had accidents involving biological material; only 14.3% cited washing the injury with water and soap after the occurrence of an accident. **Conclusion:** It was evidenced that there is a weakness in the teachers' knowledge regarding biosafety actions.

**Descriptors:** Occupational health, Teachers, Nursing, Occupational hazards, Exposure to biological materials.

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## RESUMO

**Objetivos:** Descrever o conhecimento dos docentes enfermeiros de um curso de enfermagem sobre Norma Regulamentadora 32 e as condutas pós-exposição a materiais biológicos e identificar a situação vacinal destes docentes. **Método:** Estudo quantitativo descritivo de corte transversal. Os dados foram coletados, entre setembro e outubro de 2014, através de um questionário, e analisados através do Software estatístico SPSS 21.0. Participaram da pesquisa 35 docentes enfermeiros. **Resultados:** 71,4% eram do sexo feminino; 100% afirmou ter conhecimento sobre biossegurança; 51,4% conheciam a Norma Regulamentadora 32; 71,4% estavam imunizados para hepatite B; 22,9% sofreram acidente envolvendo material biológico; apenas 14,3% citaram a lavagem com água e sabão do ferimento após a ocorrência de acidente. **Conclusão:** Evidenciou-se que existe uma fragilidade no conhecimento dos docentes relativo às ações de biossegurança.

**Descritores:** Saúde do trabalhador, Docentes, Enfermagem, Riscos ocupacionais, Exposição a materiais biológicos.

## RESUMEN

**Objetivos:** Describir el conocimiento de los profesores de enfermería de un curso de enfermería en la Norma 32 y comportamientos posterior a la exposición a materiales biológicos y para identificar el estado de vacunación de estos maestros. **Método:** Estudio descriptivo transversal cuantitativo. Los datos fueron recogidos entre septiembre y octubre de 2014, mediante un cuestionario y analizados mediante el programa estadístico SPSS 21.0. Los participantes fueron 35 profesores de enfermería. **Resultados:** 71,4% eran mujeres; 100% afirmó tener conocimiento de la bioseguridad; 51,4% conocía la Norma 32; 71,4% fueron inmunizados contra la hepatitis B; 22,9% tenían accidentes con material biológico; sólo el 14,3% citó lavado con agua y jabón lesión ante la ocurrencia de un accidente. **Conclusión:** Se demostró que hay una debilidad en el conocimiento de los profesores en relación con las acciones de bioseguridad.

**Descriptor:** Salud ocupacional, Profesores, Enfermería, Riesgos laborales, Exposición a materiales biológicos.

## INTRODUCTION

The worker's health is a field of public health that comprises the interactions between the worker and the health/sickness process, therefore it has acts regulated by Health Law nº 8080/1990, defined as a set of activities aimed, through epidemiologic and sanitary vigilance acts, to the promotion and protection of workers' health, as well as it seeks their health recovery and rehab.<sup>1</sup> These acts were introduced due to the numerous risks resulting from working conditions.<sup>2,3</sup>

It is important to note that health workers, during their professional activities, are routinely exposed to multiple and varied risks related to chemical, physical, biological, psychosocial and ergonomic agents.<sup>4</sup> Among health workers, nursing professionals are the ones who face higher risks of exposure to biological material, depending on their professional routine, and the most worrying infections are those caused by the SIDA virus (HIV) and hepatitis B and C (HBV and HCV).<sup>2,4,5</sup>

Whereas the biological risk is imminent among health professionals, it should be stressed the importance of

discussing the various risks involving this occupational exposure as etiological agents can determine serious diseases that not always have visible results in short term.<sup>6</sup>

For that matter, the Ministry of Labor and Employment (MTE) created in 2005 the Norm 32 (NR32), directed at those engaged in activities of health promotion and assistance in general, in order to determine the implementation of security protection measures for these professionals.<sup>7</sup> This is the only Norm that defines the importance of actions to be taken to prevent risks of work accidents among health professionals.<sup>8,9</sup>

Another important aspect for the prevention and protection of workers is immunization, as it is a further measure of protection from the vaccine-preventable diseases, such as hepatitis B.<sup>10</sup> Moreover, because of the high risk of HIV, hepatitis B and C serum conservation, the Ministry of Health (MS) published a technical guide to inform the health worker on proper practices facing an eventual accident involving biological equipment.<sup>11</sup>

The nursing professional, in terms of primary care practice and especially in hospitals, is one of the professional groups most exposed to biological risk, due to the straight contact with patients during assistance and also because of the types of procedures and the frequency they are performed, highlighting the imminent and/or constant contact with blood and corporal fluids.<sup>12,13</sup> Therefore, it follows that the nursing professors are also exposed to biological risks during supervisory practices and internships at the University, once they develop the same activities inherent in the profession.

Nursing is a profession that requires scientific expertise to perform assistance effectively and safely, therefore the in-depth knowledge of biosafety standards is essential. Thus, this study aims to discuss the knowledge that nursing professors have about biosafety. The research is justified by the shortage in studies about nursing professors regarding the knowledge of this population on this issue, as well as the possibility of exposure to biological risk in the exercise of their assistance and/or supervision activities that could lead to an accident.

This study is relevant because of the importance of the subject and the possibility to provide new knowledge and information to current professors and, consequently, to the students, future health professionals, approaching closely safety and health at work.

Facing this issue, the following objectives were established: to describe the knowledge of nursing professors of a nursing course on RN 32 and on biological material post-exposure practices, and to identify the immunization status for hepatitis B and diphtheria and tetanus (Td) of these professors.

## METHODS

Cross-section descriptive quantitative research, developed in Jequié, Bahia, at the State University of Southwest Bahia (UESB) between the months of September and October 2014.

The participants were nurse professors of the UESB undergraduate nursing program. The population consisted of 41 professors. It was used as inclusion criteria: to be a nurse professors and active during the survey period; and as exclusion criteria: professors who are not nurses, professors who were on leave to attend post-graduate courses, professors on leave for sickness, maternity or award, and professors in functional rehabilitation. After selection made by established criteria, the sample included 35 professors.

For data collection, the researchers prepared a questionnaire as a guiding instrument, which is divided into 5 blocks (sociodemographic information; occupational characteristics; occupational accidents; biosecurity, general health conditions) from which it was evaluated issues related to: sociodemographic information, accidents with biological material, biosecurity, knowledge of the RN 32 and vaccination.

Before applying the questionnaire to the participants, it was validated through a pilot study with 20 post-graduate students of the Master in Nursing and Health of UESB. Upon suggestions, the necessary corrections were made.

Data was tabulated by Epidata 3.1 software, using double typing to evaluate the quality of data. Subsequently, the databases were compared and the existence of typos was verified, followed by corrections with the help of the questionnaires. Considering the tabulated data and the checked data bank, the analysis was performed using the statistical software *Statistical Package for Social Sciences - SPSS*, version 21.0.

The study followed, according to Resolution 466/2012 of the National Health Council,<sup>14</sup> the ethical and legal standards for research involving human subjects, it was approved by the Research Ethics Committee of UESB (CEP/UESB) under the number of 242.588 and CAAE: 04830812.7.0000.0055. Before data collection, the participants were informed about the objectives of the research and signed the Free and Informed Consent Term (TCLE).

## RESULTS AND DISCUSSION

Considering the data collected by questionnaires, the sociodemographic characteristics of the participants are described in the following table (Table 1).

**Table 01** - Sociodemographic variables distribution of UESB nursing course nurse professors, Jequié, 2014

Variables	Nº	%
<b>Gender</b>	Male	04 11,4
	Female	25 71,4
	No answer	06 17,1
<b>Age</b>	25 to 35 years-old	08 22,9
	36 to 46 years-old	1 31,4
	47 to 57 years-old	12 34,3
	58 to 68 years-old	04 11,4
<b>Education</b>	Specialization	07 20,0
	Master's/Doctorate	25 71,4
	Post-Doctorate	03 8,6

100% of the population reported to know about the meaning of biosecurity and at least 77.1% have participated in a course/lecture addressing the issue. Most professionals (97.1%) knew the meaning of personal protective equipment (PPE) and only one professor did not know the meaning. A percentage of 85.7% reported using PPE when performing activities related to the nursing profession.

Regarding the nurse professors' knowledge about the existence of any standard of biosecurity related to health professionals, 60% replied to know, 20% said they did not know and the other 20% did not answer the question. The main descriptions given by them are in Table 2.

**Table 02** - Professors' knowledge on biosafety norms aimed at health professionals, Jequié, 2014

Variables	%
RN 32	22,9
Correct disposal	12,9
PPE	17,1
Others: RN- 5, 6, 7, 9 and 17	77,1
Environmental control	2,9
CCIH determined norms	2,9
EPC	2,9
NBR 91	2,9
Glove use for contact with corporeal fluids	2,9
Glove use to venous puncture	2,9
Vaccine	2,9

The professors were also asked about their knowledge on the RN 32, and the majority (51.4%) mentioned knowing it, while 42.9% did not know of this standard and 5.7% of professors did not respond. The professors mentioned the following concepts regarding RN 32: standards for protection, prevention and safety to be followed by the health institution and the professional; biosecurity standards in the workplace and to professional guidelines and recommendations for professionals' protection and risk prevention and occupational diseases in the workplace.

Regarding the occurrence of occupational accidents involving biological materials, it was found that 22.9% of professors had suffered an accident, while 71.4% had not suffered such exposure and 5.7% did not answer. Among accident victims, all said that the event occurred in another type of employment. At the time of the occurrence, only 62.5% were vaccinated for hepatitis B, 25% were unvaccinated and 12.5% were not able to answer.

In terms of surveyed population knowledge on what should be done after the occurrence of an accident with biological materials, 88.6% reported to know what should be done after exposure, 5.7% said they did not know and 5.7% did not answer. The main practices reported by professors are described in Table 3.

**Table 03** - Post-biological material accident practices mentioned by nurse professors. Jequié, 2014

Variable	%
Communicate CCIH	37,1
Wash the site with water and soap	14,3
Wash the site with water	2,9
Take quick tests for HIV and hepatitis	5,7
Talk to the patient to take exams	5,7
Take medications	14,3
Take exams of the patient	14,3
Take exams of the accident victim	11,4
Take vaccines	12,9

Regarding the vaccination status data, it was found that 92.4% had been vaccinated against hepatitis B, 2.9% had not received the vaccine and 5.7% did not answer. As for the vaccination schedule for hepatitis B, most (80%) reported taking the full treatment, 5.7% had had only 2 doses, 5.7% did not know or did not remember and 8.6% did not answer.

As for the anti-HbS examination, it was found that there is still a percentage of 14.3% of professors who did not undergo the test to ratify immunization against hepatitis B; while 77.1% were examined and 8.6% did not answer. Concerning the acquisition of immunity to hepatitis B, 71.4% said they were immunized for the disease, 8.6% were not immunized and 20% did not respond to the question. It is worth noting that 14.3% needed to take booster vaccine for hepatitis B.

Regarding the vaccination status for tetanus and diphtheria (Td), 82.9% of the professors said they had received three or more doses of the vaccine and 11.4% did not answer. As for the time of receipt of the last dose of Td, 62.9% reported having taken it less than 10 years ago, 17.1% more than 10 years ago and 8.6% did not answer.

By analyzing the socio-demographic data, it was found a female predominance. It is noticed that both in assistance as in teaching, the women's role in society is reflected, since, in both areas, these activities are considered as "feminine"<sup>15,16</sup>

According to the information collected involving the knowledge of biosafety, it was observed in the results an

absolute quantitative of 100% professors in sample claiming to have knowledge on the subject. In addition, 87.5% reported the use of PPE when performing procedures. Therefore, it reinforces the need for health professionals to be aware of the rules governing biosafety and follow them in the daily activities.<sup>16</sup>

Nurses should rely on scientific knowledge by adopting simple biosecurity measures such as hand washing and the use of PPE, which are essential for the practices, as these measures eliminate most of the microorganisms that cause infections, protecting the professional against the various risks inherent in the occupational environment.<sup>3</sup> Moreover, it is noteworthy that handwashing and use of PPE guarantee not only the safety of the professional as well as of the patient, who is in a risky environment.

Health workers now have greater access to the knowledge of their rights related to occupational health and safety by RN 32, since this legislation gathered in a single standard the specific recommendations for this group.<sup>2</sup> According to the percentage of professors (51.4%) who said they knew the RN 32, it is clear that most of them are aware of both the existence of this standard as its guidelines for the protection and prevention of workers in the health services.

However, despite claiming to have knowledge on the RN 32, the teachers did not mention fundamental definitions of this standard, namely: the obligation of the employer to provide PPE free of charge, and its mandatory use by the employee; proper management for the treatment of biowaste, as well as training of workers in the management of these; use of sharp objects with safety devices; prior and ongoing training of workers; health professional responsibility to properly dispose sharp objects, as well as not recapping needles or disconnect them manually; immunization of workers as a preventive measure, among other rules.<sup>7</sup>

Regarding the knowledge of some biosafety standard for health professionals, 60% of the professors answered in relation to both the existence of regulatory standards and the practice of correct conduct involving, in a way, the recommendations that are inserted in RN 32 and described in Table 02.

Nursing has been flagged as the professional category most affected by accidents involving biological material. This happens because of the number of nurses in health institutions, in straight contact with patient assistance as well as the frequency and type of procedures performed by these professionals, that make them susceptible to occupational accidents.<sup>21</sup>

Although only 08 teachers (22.9%) have suffered accidents involving biological material in another employment bond, it still can be noted the occurrence of this sort of incident in nursing. Moreover, it is noteworthy that 25% of professors were not vaccinated for hepatitis B at the time of the injury, which made them vulnerable to possible contamination by this etiological agent.

The protocol created by MH recommends that after the occurrence of an accident involving biological materials, a

careful assessment and monitoring of the type of accident should be carried out, checking and recording the exposure characteristics, the body region affected by organic material, since the contamination risk grades are different to each disease, and consequently the post-accident practices are also distinct.<sup>6,11</sup> It was found that 88.6% said they know what to do after the accident involving biological material, bringing as answers the data in Table 3.

Thus, it was found that 14.3% of nursing professors cited as post-exposure conduct washing the affected site with soap and water; 14.3% take exams of the patient; 11.4% take exams of the accident victim; 12.9% take vaccines; and 5.7% take quick tests for HIV and hepatitis. According to the Ministry of Health, the initial post-accident conduct is to wash the area affected with soap and water in case of percutaneous or dermal exposure and washing with water or saline solution in case of exposure of mucosa.<sup>11,21,22</sup> It means only a few professors would know how to act correctly in relation to the accident.

It is noteworthy that the laboratory tests after the accident should occur in all cases for the proposition of right conduct regarding the chemoprophylactic therapy, which should begin immediately (within the first 2 to 72 hours), considering that this action reduces around 80% of the risk of HIV contamination. In addition, vaccination and monitoring by an enabled medical professional from the institution should occur immediately.<sup>22</sup>

Among the various protective actions for workers' health, vaccination can be mentioned as a practical and effective preventive measure for some diseases. Since health workers are exposed in the workplace to various microorganisms, it is necessary for them to be vaccinated against those pathogens for which there are available vaccines.<sup>5,12,17,18</sup> Most nursing professors surveyed in this study (80%) reported complete vaccination for hepatitis B, as mentioned in other studies.<sup>5,12,17</sup>

Analysis of the data in relation to anti-HBs exams by professors found that 77.1% have done it, and 71.4% said they were immunized for hepatitis B. These data differs from a study, in which 86.4 % of nurses did not perform the anti-HBs serologic testing due to factors such as ignorance of its importance and lack of time.<sup>19</sup> Therefore, it is worth noting that once the full vaccination is done, it is necessary to evaluate the seroconversion, since immunization is not always effective.<sup>5</sup>

As for the professors who did not perform the test (14.3%) and those who did not receive the vaccine against hepatitis B (2.9%), it is assumed that if they have negative results and have contact with the pathogen in the occupational environment, they could contract hepatitis B.<sup>19</sup>

By analyzing the vaccination for dT of the professors it was found that the majority (82.9%) had completed the vaccination schedule, and 62.9% reported having taken the last dose of vaccine in the past 10 years. These data demonstrate that professors know and seek to follow what is recommended by the MWE and MH, since these bodies

essentially recommend vaccination for hepatitis B and dT for all health workers, in order to prevent these diseases.<sup>17</sup>

Despite this recommendation, it is evident that studies are still incipient in investigating vaccination for dT among professors and nursing professionals. A greater appreciation for hepatitis B is observed, and this can be related to an increased risk of being contaminated by this disease.

Moreover, with regard to tetanus, it was noticed a declining trend in the number of cases in Brazil, but there is still a frequency of it in all age groups, and the highest number of cases are among people who are 25 to 54 years-old followed by individuals of 55-64 years-old or over.<sup>20</sup> Facing the significant decrease in mortality compared to tetanus, it appears that the concerns of health professionals regarding this disease have decreased, which makes them feel confident and invulnerable.

It should also be emphasized the importance of these professors with incomplete immunization (17.1%) to update their immunization status for dT since the contamination of tetanus becomes imminent as it exceeds the maximum period of 10 years for taking the reinforcement dose.

## CONCLUSION

Based on the data identified in the survey, this study allowed us to assess the level of knowledge of nursing professors on issues involving biosafety.

Considering that the use of PPE minimizes biological risks and the occurrence of occupational accidents during nursing assistance, it is essential that nurses professors reinforce this security measure both in conduct during the monitoring practices and internships, as well as in the classroom. Thus, they become references for the future nurses they guide in graduation and contribute to changing the setting of occupational accidents with biological material among workers in the health field.

Another important fact revealed in the study is that about half of the teachers did not know the RN 32. It is essential to update the professionals on this issue, in order to disseminate this information to the nursing students, since this standard supports all health workers by ensuring important preventive measures such as free vaccination, the use of equipment for protection, among others.

As for post-exposure to biological material practices, it appears that the teachers have a general knowledge of it. Still, it is necessary to deepen on the subject, since the more information they acquire, the abler they will be to drive efficiently a situation involving exposure to biological materials involving either themselves or their students.

Finally, it is expected that the study will contribute to the awareness of nursing professors on the risks involving workers' health and the importance of preventing them. Though there was an increase of studies on occupational accidents with biological material among professionals in

the health field, there are few publications involving their knowledge about biosafety and workers' health.

Thus, this research aims to contribute to the reflection of the professional regarding occupational risks and enhancement of their safety during working exercise, serving as a reference for future bibliographic queries.

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