

Difficulties and facilities perceived by nursing workers in relation to exposure to biological material

Dificuldades e facilidades percebidas por trabalhadores de enfermagem sobre a exposição a material biológico
Dificultades y facilidades percibidas por los trabajadores de enfermería en relación con la exposición a material biológico

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Abstract

Objective: To describe the difficulties and/or facilities perceived by nursing workers in situations involving exposure to biological material. **Methods:** This was a qualitative study carried out with eight female mid- and higher-level nursing workers who had been working for at least six months in the Medical and Surgical Clinics of a public general hospital. Data was collected through semi-structured interviews, carried out remotely (videoconferencing) and in person, between December 2021 and April 2022. The Content Analysis technique was used to analyze the data. **Results:** The difficulties were: high demand; non-adherence to Personal Protective Equipment; inadequate disposal of materials used by students; management of emotional issues; implementation of the protocol; lack of knowledge of the source patient; and non-recognition of exposure by the exposed worker. As for facilities, these were: aspects related to care (guidance, reception, service and agility); control of the situation; segregation of hospital waste; knowledge of the protocol and of the source patient. **Conclusion:** There is a need for interventions that seek to overcome the difficulties and strengthen the facilities found in this study to reduce/avoid the occurrence of possible exposures and promote the quality of the service provided.

Descriptors: Hospitals; Occupational Health Nursing; Occupational injuries.

What is already known on this?

Nursing workers are exposed to risks in the hospital environment, such as biological, physical, chemical, mechanical and psychosocial.

What this study adds?

The difficulties and facilities perceived by nursing workers in situations involving exposure to biological material have been described, and knowledge of these could help prevent accidents and possible health risks for these workers. In addition, this study could help to implement strategies to overcome the difficulties and strengthen the facilities identified, as well as sparking debate in academia and health services so that adequate working conditions are guaranteed for nursing workers.



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Resumo

Objetivo: Descrever as dificuldades e/ou facilidades percebidas por trabalhadores de enfermagem diante das situações de exposição a material biológico. **Métodos:** Estudo de abordagem qualitativa, realizado com oito trabalhadores de enfermagem de nível médio e superior, do sexo feminino, que estavam trabalhando com tempo mínimo de seis meses na Clínica Médica e Cirúrgica de um hospital geral público. Os dados foram coletados por meio de entrevistas semiestruturadas, realizadas remotamente (videoconferência) e/ou presencialmente, no período de dezembro de 2021 a abril 2022. Para análise dos dados, utilizou-se a técnica de Análise de Conteúdo. **Resultados:** As dificuldades foram: alta demanda; a não adesão aos Equipamentos de Proteção Individual; descarte inadequado dos materiais utilizados por alunos; manejo das questões emocionais; implementação do protocolo; desconhecimento do paciente-fonte; e não reconhecimento da exposição pela trabalhadora exposta. Já as facilidades foram: aspectos relacionados à assistência (direcionamento, acolhimento, atendimento e agilidade); controle da situação; segregação dos resíduos hospitalares; conhecimento do protocolo; e do paciente-fonte. **Conclusão:** Destaca-se a necessidade de intervenções que busquem vencer as dificuldades e fortalecer as facilidades encontradas neste estudo, a fim de diminuir/evitar a ocorrência de possíveis exposições e promover a qualidade do serviço prestado.

Descritores: Hospital; Enfermagem do Trabalho; Acidentes de Trabalho.

Resumen

Objetivo: Describir las dificultades y/o facilidades percibidas por trabajadores de enfermería en situaciones de exposición a material biológico. **Métodos:** Estudio cualitativo realizado con ocho trabajadoras de enfermería de nivel medio y superior que llevaban al menos seis meses trabajando en las Clínicas Médico-Quirúrgicas de un hospital general público. Los datos se recogieron mediante entrevistas semiestructuradas, realizadas a distancia (videoconferencia) y presencialmente, entre diciembre de 2021 y abril de 2022. Para el análisis de los datos, se utilizó la técnica de Análisis de Contenido. **Resultados:** Las dificultades fueron: alta demanda; no adherencia a los Equipos de Protección Individual; inadecuada eliminación de los materiales utilizados por los alumnos; manejo de aspectos emocionales; implementación del protocolo; desconocimiento del paciente fuente; y no reconocimiento de la exposición por parte del trabajador expuesto. Los factores facilitadores fueron: aspectos relacionados con la atención (orientación, acogida, servicio y agilidad); control de la situación; segregación de los residuos hospitalarios; conocimiento del protocolo y del paciente fuente. **Conclusión:** Hay necesidad de intervenciones que busquen superar las dificultades y fortalecer las facilidades encontradas en este estudio para reducir/evitar la ocurrencia de posibles exposiciones y promover la calidad del servicio prestado.

Descriptor: Hospitales; Enfermería del Trabajo; Accidentes de Trabajo.

INTRODUCTION

Nursing workers are part of a work process that consists of providing direct care to hospitalized people, and are susceptible to various types of exposure to risks, such as: biological, physical, chemical, mechanical and psychosocial.⁽¹⁾

In this context, nursing workers, because they carry out procedures that may involve the presence of biological materials, such as blood, fluids and other materials, are highly likely to be exposed to biological risk, which can result in harm to their health. Biological risk is understood as the probability of occupational exposure to biological agents⁽²⁾.

The types of exposure to biological material are divided into: percutaneous; mucous membranes; cutaneous; and human bites.⁽³⁾ A study⁽⁴⁾ shows that the majority of injuries among nursing workers occur mainly through percutaneous exposure, with blood as the main biological material involved, occurring more frequently among nursing technicians and assistants.

Another study⁽⁵⁾ showed that female nursing workers were the ones who reported the most exposures to biological material among the participating health professionals, accounting for 55.5% of notifications. Nursing technicians and assistants are more susceptible to injuries at work,⁽⁶⁾ which can be explained by the fact that they are the largest category in the hospital environment and have direct contact with patients.

The work process in nursing is characterized by technical and social division, with different workers: nurses; technicians; and nursing assistants.⁽⁷⁾ Thus, nurses are responsible for carrying out managerial and assistance activities related to more complex patient care, which require greater scientific knowledge and immediate decision-making, while technicians and nursing assistants are responsible for carrying out less complex activities/procedures, under the supervision/guidance of nurses.⁽⁷⁾

There are several factors that can contribute to the occurrence of accidents involving biological material in the nursing profession, such as long daily working hours, overconfidence on the part of more experienced professionals and failure to adhere to biosafety rules.⁽⁸⁾

It should be noted that accidents involving biological materials are worrying because of the possibility of transmitting infectious diseases, especially the Aids (HIV), hepatitis B and hepatitis C viruses.⁽⁹⁾

Therefore, this study could provide information on the difficulties and facilities perceived by nursing workers in situations involving exposure to biological material, and its knowledge could help prevent these injuries and possible health risks for these workers. In addition, this study could help implement strategies to overcome the difficulties and strengthen the facilities identified, as well as sparking debate in academia and health services, so that adequate working conditions are guaranteed for nursing professionals.

With this in mind, we set ourselves the guiding question for this study: What are the difficulties and/or facilities perceived by nursing workers when exposed to biological material?

In order to answer this question, we set ourselves the following objective: to describe the difficulties and/or facilities perceived by nursing workers when exposed to biological material.

METHODS

This is a field study with a qualitative approach, which aims to investigate the universe of meanings, motives, aspirations, beliefs, values and attitudes, which are phenomena that cannot be quantified.⁽¹⁰⁾

The setting for this study was the Medical and Surgical Clinics I and II of the Hospital Geral Clériston Andrade (HGCA), a public state institution located in the municipality of Feira de Santana, in the state of Bahia, field of practice/internship for undergraduate health students. The HGCA's Medical Clinic has approximately 39 beds, while the Surgical Clinic I has 44 beds and the Surgical Clinic II has 30 beds.

The HGCA's Medical Clinic and Surgical Clinics I and II were chosen because of the high rate of hospitalizations and procedures carried out in these sectors, as well as the number of nursing staff needed to run them.

The inclusion criteria for the participants were: to be a nursing worker, in the position of nursing technician (middle level) or nurse (higher level); who had been working in the service for at least six months, in order to answer the questions proposed in this study more accurately. Nursing workers who were on vacation during the period of data collection, or on leave or had a sick note, were excluded.

In order to define the number of participants in this study, we followed the saturation criterion, which is when repetitions appear, identical answers during the speeches without the addition of new ideas on the subject under investigation,⁽¹¹⁾ "[...] that is, when the conceptions, explanations and meanings attributed by the subjects begin to have regularity of presentation" and are able to explain the phenomenon.⁽¹⁰⁾

In order to gain access to the participants and start collecting data, contact was made with the hospital's Research and Development Center (NUPED) to obtain a nominal list of the nursing staff working in the Medical and Surgical Clinics and their respective telephone/email contacts. Telephone calls or face-to-face contacts were made at random, informing the workers what the research was about and then identifying those who agreed to take part voluntarily.

After agreeing to take part in the research voluntarily, the participants – all female – signed the Informed Consent Form (ICF). Individual semi-structured interviews were carried out using a script containing sociodemographic information and the guiding question: What difficulties and facilities do you perceive when exposed to biological material?

According to the choice of some participants, six interviews were carried out in person, on a scheduled day and time or at an opportune moment according to their availability in a reserved place at the HGCA. Two interviews were conducted remotely via videoconference using Google Meet. The interviews were recorded using a portable recorder and lasted between two (2) and 12 minutes.

In the construction of the data analysis, the participants were named in the fragments of their speeches with the letter I, referring to the Interviewee initial, followed by the number indicating the order of each interview, as shown: I1; I2; I3; I4; I5; I6; I7; and I8.

The Content Analysis technique was used to analyze the data, following three stages⁽¹⁰⁾: pre-analysis, in which the organization of ideas and material was carried out by transcribing the interviews and a "floating" reading; exploration of the material, the moment of literal reproduction of the analysis, in which floating and exhaustive readings of the interviews were carried out in order to obtain greater contact with the content presented by them, making it possible to identify the nuclei of meaning of this study, being grouped in a summary table; and treatment of the results, where the categories worked on were defined, presented in the results, articulating the materials collected in the interviews with the theoretical references on the subject studied, and carrying out inference and interpretation, which consisted of dialog with the

propositions and presentation of relevant data (studies, theoretical concepts), generating an interpretative synthesis as a final result.

During the research, the ethical principles involving investigations with human beings were respected and data collection began after the research project was approved by the Research Ethics Committee (CEP) of the *Universidade Estadual de Feira de Santana* (UEFS), under opinion 4.943.632, dated August 31, 2021.

RESULTS

The eight participants in this study are female. Three have a technical certification and five have an undergraduate degree in nursing. Regarding their place of work, two worked in the Medical Clinic, three in the Surgical Clinic I and three in the Surgical Clinic II of the HGCA. The interviewees ranged in age from 22 to 43, of whom three were brown, four black and one white. With regard to marital status, four reported being single, three married and one did not respond. The participants had between 4 and 23 years of training and had been working in their current position for between nine months and three and a half years. With regard to postgraduate studies, one interviewee has a postgraduate degree in obstetrics, one in urgency and emergency, one in occupational nursing and ICU, and two are currently studying (one in emergency and the other did not say). Four interviewees have other employment relationships.

Two categories were constructed in an inductive way: "Exposure to biological material: factors that make it difficult for nursing workers to act" and "Facilitating aspects for the nursing team's actions in the face of exposure to biological material". The description of the key elements of these categories are shown in Chart 1.

Chart 1. Difficulties and facilities perceived by nursing workers in situations of exposure to biological material. Feira de Santana-BA, Brazil, 2022.

DIFICULTIES	<ul style="list-style-type: none"> - Non-recognition of exposure by the exposed worker; - Management of emotional issues; - Lack of knowledge of the source patient; - Non-adherence to the use of personal protective equipment (PPE) in the service; - Bureaucratic issues and protocols; - Difficulty in accessing the step-by-step instructions; - High demand; - Being a teaching hospital (inadequate disposal of materials used by students).
FACILITIES	<ul style="list-style-type: none"> - Knowledge of the source patient; - Control of the situation; - Knowledge of the protocol; - Aspects related to care (guidance, reception, service and agility); - Segregation of hospital waste.

Source: Prepared by the authors (2022).

Exposure to biological material: factors that make it difficult for nursing workers to act

Faced with exposure to biological material, nursing workers may encounter difficulties before the event, during the necessary procedures and after the event, or even during treatment and follow-up.

The lack of acknowledgement of the exposure by the workers was identified by interviewee I3 as a difficulty when faced with exposure to biological material:

For example, we use a sterile blade. And then, let's say an employee has an injury there, sometimes because they think [...] they automatically need to come into contact with a patient [...], they ignore it. Oh, it wasn't on the patient [...]. Sometimes the difficulty is this barrier of the employee himself knowing that he needs to be there, that he needs to go through the whole [...] flow of the unit that has to be followed. So sometimes I see a bit of resistance from the employee's own perception regarding the exposure of the material (I3).

Interviewee I2 highlights the emotional aspect as a difficulty to overcome when exposed to biological material:

[...] it's to calm down that professional, because each one acts in a different way, right? [...] you try to calm them down, [...] there have been technicians who have cried, right. There

are some who say they're going to leave, right, so it depends, right, each professional acts in a different way [...] (I2).

Interviewees I6 and I8 mentioned the lack of knowledge of the source patient as a difficulty when exposed to biological material, as described below:

So sometimes we can't identify which patient it was, right? [...] there's no way you can identify them so you can make the discoveries (I6).

The difficulty is when you don't know the source, I have a box of sharps, [...] Then I get contaminated, for example blood, I don't know where that blood comes from, it could be from an HIV-positive person, we don't know, so it's an unknown source [...] (I8).

Another aspect mentioned refers to non-adherence to the use of PPE:

It's our protective material and it's generally not used [...], sometimes it's not adopted, because the anxiety, the speed, of doing the procedure, you end up not thinking about it [...] (I4).

Despite the fact that the hospital has a care flowchart to be implemented in the event of an injury involving exposure to biological material, interviewee I1 reports that these are often not followed and, along with bureaucratic issues, are difficulties listed in the event of exposure to biological material.

[...] the difficulties are the bureaucratic issues [...] and the difficulty is also the issue of following the pre-established protocols within the institutions, one of the biggest difficulties is following the protocols [...] (I1).

Interviewee I4's comments show that the difficulty in accessing the necessary services and the high demand for work can be a barrier to implementing the procedures in the protocols for exposure to biological material.

It makes it difficult for me to have access, in terms of step-by-step, for example: there are institutions that won't be open to me if I come into contact with the biological risk of a patient who [...] has a certain pathology. So, depending on the sector we're looking for, it's not open on weekends [...]. The difficulty can be the number of staff members and the volume of patients for the team as well (I4).

Interviewee I4 adds that a limiting aspect is the fact that the institution is a teaching hospital, with students who can contribute to exposure to biological material due to the lack of good biosafety practices, such as the correct disposal of materials.

This is a teaching hospital, so we always have to be signaling, there are procedures where staff leave material exposed, so they don't throw it away in the area that has to be thrown away [...] (I4).

Facilitating aspects for the nursing team's actions in the face of exposure to biological material

Considering the complexity of exposure to biological material, the knowledge of the source patient is also mentioned by the interviewees as a facilitating aspect in this situation, according to the following statements:

[...] so if we know that, kinda directly, who is the patient, they come, notify us, ask the patient for permission to take the tests. [...] (I6).

[...] It's because when I know the source, it's easy [...]. I know I've been contaminated there, I've been exposed to his material, so I go, then the laboratory collects the material from the source, collects my material. Then we use the cocktail, medications and prophylaxis. Sometimes we get contaminated and it's easy to get treatment (I8).

Another ease encountered when exposed to biological material, highlighted by interviewee I1, was controlling the situation, for example. putting into practice what the protocols state. In addition to the correct execution of the protocol, interviewee I5 emphasized the need for training/educational activities that can facilitate/collaborate so that professionals can be informed about the content of each protocol, which can be an ease when faced with situations of exposure to biological materials.

It's easy for us to take control of the situation, right, to go after... and make the protocols come into play, right, because if you cower, shrink back, nothing happens (I1).

Information, right, actually, it's... protocol, we know it and we have training here, at least (I5).

In this context, guidance, reception, service and agility were described by interviewees I2, I3, I6 and I7 as facilitating aspects in the face of exposure to biological material:

[...] the easiest part is the guidance, so referral [...] (I2).

Oh, I thought it was [...] the fact that we know about the reception, right? It's easy for you to be attended to right here [...] (I3).

Yes, we have a sector, I think it's called CIAD [possibly the interviewee was referring to the Internal Accident Prevention Commission], where we look for information [...] (I6).

[...] No, it's super-fast here [...]. And I'm happy about that. The fact that here, even if we get really sick, let's say we've eaten something, then we have a stomach ache, something, we tell the nurse and she sends us to the emergency room (I7).

Another facilitating aspect addressed by interviewee I4 is the segregation of healthcare waste, described as an action that can prevent exposure to biological material.

[...] here the waste is separated from the biological material so that it can be put away separately [...] (I4).

DISCUSSION

Workers' perception that exposure is not recognized as an accident may be a barrier that prevents them from seeking appropriate care. However, it's worth pointing out that post-exposure procedures are carried out when the worker has direct contact with the patient's biological material without adequate protection (PPE) or when exposure occurs with materials contaminated with biological substances, such as the sharps used.

Each nursing professional has their own way of understanding the accident. Human beings, within society, have an action and reaction to the way they understand something or a situation, which can be changed from the moment they interact, for example. when an accident occurs, the professional can change the way they look at the problem, through re-signification. However, educational actions need to be carried out for this process to take place, so that injuries can be prevented.⁽¹²⁾

When an injury with biological material occurs, workers experience various feelings depending on their experience and worldview, such as fear, worry and anguish, which can cause stress and consequently affect their quality of life. They occur mainly due to the risk of contamination by the HIV, HBV and HCV viruses.⁽¹³⁾

Given that these experiences cause individual feelings and meanings, in the face of exposure it is important to intensify educational and reflective actions that address the relevance and necessity of adopting safe measures and the use of PPE when providing care, as well as offering psychological support to these professionals, in order to guarantee them the necessary support.

One aspect mentioned by the interviewees was the identification of the source patient, highlighting its non-occurrence as a complicating aspect and its identification as a facilitating aspect when exposed to biological material.

When identifying the source patient, rapid tests should be carried out in order to find out their serological status for HIV and hepatitis B and C, if available in the unit. In addition, HBsAg, Anti-HBc IgM,

Anti-HCV and Anti-HIV serological tests should be collected. In cases where it is not possible to identify the source patient, the situation is assessed on an individual basis, taking into account the type of material involved, the severity and location of the exposure.⁽³⁾

In the event of exposure to biological material, a specific flow of procedures is adopted in cases of accidents with exposure to pre-existing biological material, in order to minimize the risks. This is of the utmost importance if therapeutic procedures (prophylaxis) are to be established.⁽¹⁴⁾ In this way, knowing the source patient and carrying out tests to identify possible transmissible diseases can help in the treatment of the exposed worker, as well as helping to improve their clinical condition until they are discharged from clinical-laboratory follow-up.⁽¹⁵⁾

We emphasize that identifying the source patient is essential for establishing the conduct to be followed by the exposed worker, such as carrying out serological tests, as mentioned by the interviewees. However, it should be highlighted that serological tests must also be carried out on the exposed worker because, regardless of whether the source patient is identified or not, the injury must be thoroughly investigated. In addition, depending on the situation in which the worker was exposed, prophylaxis treatments for HIV and viral hepatitis B established by the Ministry of Health can be requested as prevention, as a facility for implementing treatment.

It is noteworthy that non-adherence to the use of PPE is discussed in a study⁽¹⁶⁾ as one of the most common reasons/causes of injuries and as the main way of preventing possible exposure to biological materials. Healthcare workers are more vulnerable to injuries with biological materials due to emotional stress, long working hours, overload and having more than one job, which can affect adherence to standard precautionary measures.⁽¹⁷⁾

Actions related to segregation, which is one of the stages corresponding to the management of healthcare waste, can help to avoid situations of exposure to biological material. According to RDC No. 222 of 2018,⁽¹⁸⁾ segregation is the separation of waste according to the classification of the groups established by the resolution at the time and place where it was generated, according to its physical, chemical, biological attributes, its physical state and the risks involved.

In addition, we reinforce the need for protocols, as discussed earlier in this study. It should be noted that, although the existence of a protocol is clear in the unit surveyed, there are difficulties in terms of follow-up and the bureaucratic issues that need to be dealt with at the time of exposure. However, even though there is evidence in the literature about the high risk of contamination and the development of serious illnesses after exposure to biological materials, and even though the appropriate procedures to be followed after exposure have been publicized, many workers do not follow them.⁽¹⁹⁾ Some professionals have little experience and are unaware of the risks of injuries.⁽¹⁴⁾

It should be noted that protocols are important tools to be followed, as they can provide the necessary information on the conduct that should be taken at the time of exposure. However, when the protocols are not made available, or their content is not known by the worker, it can be difficult to implement the necessary procedures and conduct. This is why we stress the need for protocols to be set up in health units and for health training/education to be carried out so that all health professionals are aware of their content.

Controlling and directing the situation can make it easier to implement the actions contained in the protocols. However, another point that deserves attention is the feeling that “nothing is happening” when the situation is not dealt with, which makes us reflect on the need to organize and qualify workers so that care and reception within health services occurs in an effective and systematic way in the event of exposure to biological material.

In this way, a service that does not provide structured care and follow-up in the event of exposure to biological material can generate discomfort and dissatisfaction. In addition, a lack of support from leaders can make it difficult to provide care to professionals in this situation.⁽²⁰⁾ We emphasize that effective, problem-solving care can help facilitate the occurrence of the necessary procedures to be implemented for adequate care in the event of exposure to biological material.

We would point out that the high workload in the service can make it difficult to implement care-related procedures, but it is worth noting that exposure to biological material is an emergency situation in which the professional must immediately seek out and have available the necessary service to provide care in accordance with the recommendations of the Ministry of Health.

It is worth noting that the study⁽²¹⁾ which aimed to verify the knowledge of and adherence to standard precautions (practice of not recapping needles, actions to be taken in the event of injuries,

prevention of infections) by oral health teams in the public network of a municipality in the state of São Paulo, Brazil, found that 86.6% of the participants in the survey did not know the maximum time limit for starting chemoprophylaxis after exposure to HIV. Knowledge of these deadlines is of the utmost importance and reinforces the need for agility in the conduct/procedures required by workers after exposure to biological material. For this reason, we stress that the high demands on the service should not be a factor that delays the assistance they need in these situations.

Although the statement refers to the lack of adherence to safe measures for disposing of sharps or other materials used by university students, it should be noted that the hospital itself provides training for all students, which is a mandatory prerequisite for them to carry out practical activities and internships at the hospital. These trainings are usually carried out by the HGCA's Health Services Waste Management Program and, in conjunction with the Hospital Infection Control Commission, discuss biosafety measures, such as the correct disposal of the supplies used, including sharps, during specific techniques, according to their physical, chemical and biological characteristics.

In view of this, we cannot say that the existence of university students contributes to the occurrence of exposure to biological material, since, in addition to students, there are several health professionals who work in the clinics surveyed and who may also not adhere to preventive and biosafety practices in the institution.

University hospitals perform "many invasive procedures and require qualified nursing staff" and "actions that include adequate planning of in-service education and efforts to minimize the influence of possible distortions of learning in practice".⁽²²⁾

Although good biosafety practices need to be part of the routine in health services during the care provided by nursing workers, there is a clear need for health education in order to prevent injuries and promote knowledge among workers and students, with a view to quality and safety in the services offered.

The limitations of this study include the fact that the reality of a specific hospital was analyzed, as well as the fact that this is a qualitative investigation, which makes it impossible to generalize the facts investigated. In addition, as two interviews were conducted remotely, we consider this a limiting aspect, which may have made it impossible to perceive the emotional and psychological aspects of the participants. However, we would like to point out that the results we have found could help stimulate the development of other studies, actions and reflections that could contribute to the prevention of exposure to biological material and the way nursing workers deal with injuries.

CONCLUSION

Based on the difficulties listed, there is a need to establish and follow protocols in an effective and resolute manner in order to avoid possible conflicts, unpleasant feelings and, above all, illnesses for these nursing workers, as well as to help them make appropriate decisions in situations involving exposure to biological material.

The procedures related to the conducts contained in the protocol were identified as difficulties by some participants, while others highlighted these conducts as facilitating aspects, pointing out that quality care and reception can provide confidence and a degree of comfort for those who have been exposed to biological material.

Other facilities identified (aspects related to care – guidance, reception, service and agility – control of the situation, segregation of hospital waste, knowledge of the protocol and the source patient) highlight aspects that can help ensure that the necessary and appropriate procedures/conduct in the event of exposure to biological material are carried out, in order to guarantee safer working conditions.

There is a need to address and discuss the issue through interprofessional training/health education, as well as focusing on existing protocols, to disseminate relevant information and conducts which are appropriate and necessary, also seeking to collaborate in the adherence to good practices in relation to the safe handling and disposal of sharps and the importance of using PPE, in order to contribute to the quality of working conditions for nursing workers.

Finally, there is a need for interventions to overcome the difficulties and strengthen the facilities found in this study, in order to reduce/avoid the occurrence of possible exposures and promote the quality of the service provided.

CONTRIBUTIONS

Contributed to the conception or design of the study/research: Bispo GC, Araujo MO. Contributed to data collection: Bispo GC. Contributed to the analysis and/or interpretation of data: Bispo GC, Araujo MO. Contributed to article writing or critical review: Bispo GC, Araujo MO, Portela PP, Oliveira SS, Santana TS. Final approval of the version to be published: Bispo GC, Araujo MO, Portela PP, Oliveira SS, Santana TS.

REFERENCES

1. Rodrigues PP, Alencar RM. Risk of accidents with biological material in nursing professionals in the hospital environment: integrated review. *Rev. Nova Esperança*. [Internet]. 2019;17(2):64-72. DOI: <https://doi.org/10.17695/revnevol17n2p64-72>
2. Ministério da Economia (BR). Secretaria de trabalho. NR 32-Segurança e saúde no trabalho em serviços de saúde. Portaria MTb n.º 485, de 11 de novembro de 2005 alt. Portaria SEPRT n.º 915, de 30 de julho de 2019 [Internet]. Available from: <https://www.gov.br/trabalho/pt-br/inspecao/seguranca-e-saude-no-trabalho/normas-regulamentadoras/nr-32.pdf/view>
3. Ministério da Saúde (BR). Departamento de Vigilância, Prevenção e Controle das Infecções Sexualmente Transmissíveis, do HIV/Aids e das Hepatites Virais. Protocolo Clínico e Diretrizes Terapêuticas para Profilaxia Pós-exposição (PEP) de Risco a Infecção pelo HIV, IST e Hepatites virais. Brasília: Ministério da Saúde; 2021.
4. Silva RA, Silva BR, Bragança C, Cruz AU, Silva JBS, Paula CR, Pelazza BB, Mendonça GS. Work accident with biological material in nursing. *Braz. J. Hea. Rev.* [Internet]. 2020;3(4):7780-96. DOI: <https://doi.org/10.34119/bjhrv3n4-047>
5. Sardeiro TL, Souza CL, Salgado TA, Galdino Júnior H, Neves ZCP, Tipple AFV. Work accidents with biological material: factors associated with abandoning clinical and laboratory follow-up. *Rev. Esc. Enferm. USP*. [Internet]. 2019;53:e03516. DOI: <https://doi.org/10.1590/S1980-220X2018029703516>
6. Pereira MS, Rocha FC, Dias JLC, de Andrade Neto GR, Piris Álvaro P, Andrade DLB. Work accidents with exposure to biological materials between workers in the north of Minas Gerais. *Rev. Pesqui. (Univ. Fed. Estado Rio J., Online)* [Internet]. 2021;13:1122-8. DOI: <https://doi.org/10.9789/2175-5361.rpcfo.v13.9017>
7. Leal JAL, Melo CMM. The nurses' work process in different countries: an integrative review. *Rev. bras. enferm.* [Internet]. 2018;71(2):441-52. DOI: <http://dx.doi.org/10.1590/0034-7167-2016-0468>
8. Assis DC, Resende DV, Araújo GFS. Acidentes de trabalho com material biológico entre trabalhadores de enfermagem de um hospital universitário. *RSD* [Internet]. 2022;11(8):e8611830524. DOI: <https://doi.org/10.33448/rsd-v11i8.30524>
9. Aragão JÁ, Fontes LM, Aragão ICSA, Aragão FMSA, Reis FP. Occupational exposure to biological fluids in accidents with profiling on the hospital nursing team. *Enferm. foco (Brasília)*. [Internet]. 2019;10(1):58-64. Available from: <http://revista.cofen.gov.br/index.php/enfermagem/article/view/1341/496>
10. Minayo MCS, Deslandes SF, Gomes R. Pesquisa social: teoria, método e criatividade. 28. ed. Petrópolis: Vozes; 2009.
11. Fontanella BJB, Ricas J, Turato ER. Saturation sampling in qualitative health research: theoretical contributions. *Cad. Saúde Pública (Online)*. [Internet]. 2008;24(1):17-27. DOI: <https://doi.org/10.1590/S0102-311X2008000100003>
12. Rosa LS, Valadares GV, Silva IR. Meanings attributed to causes of accident with perforocortants: perception of nursing professionals. *REME rev. min. enferm.* [Internet]. 2018;22:e-1146. DOI: <https://doi.org/10.5935/1415-2762.20180077>

13. Fernandes AT, Nery AA, Matos Filho AS, Morais RLGL, Oliveira JS, Oliveira YNS. Feelings experienced by health workers in occurrence of acidentes with biological material. *Rev. Paul. Enferm.* (Online). [Internet]. 2018;29(1-2-3):56-67. Available from: <https://repen.com.br/revista/wp-content/uploads/2018/11/Sentimentos-vivenciados-por-trabalhadores-de-sa%C3%BAde-na-ocorr%C3%Aancia-de-acidentes-com-material-biol%C3%B3gico.pdf>
14. Correia LS, Jesus ECO, Heliodoro EA, Gomes NP, Coutinho MO, Silvestre EC, Neves LB, Jesus BS. Acidentes com exposição a material biológico em hospital de campanha durante pandemia de Covid-19: relato de experiência. In: Klauss, J, organizador. *Os profissionais de saúde durante a pandemia de covid-19 - volume 2: atitudes e barreiras*. Editora Científica Digital; 2023. p. 10-19. DOI: <https://10.37885/230212009>
15. Forekevicz G, Rossa R, Schwab A, Birolim MM. Accidents with biological material: An analysis with Nursing professionals. *Rev. enferm. UFSM*. [Internet]. 2021;11(e60):1-17. DOI: <https://doi.org/10.5902/2179769263570>
16. Benathar GS, Benathar IKA. The role of the nurse in reducing biological risks in the nursing work environment. *Rebena - Revista Brasileira de Ensino e Aprendizagem*. [Internet]. 2022;3:37-45. Available from: <https://rebena.emnuvens.com.br/revista/article/view/26>
17. Soares RZ, Schoen AS, Benelli KRG, Araújo MS, Neves M. Analysis of reported work accidents involving healthcare workers and exposure to biological materials. *Rev. bras. med. trab.* [Internet]. 2019;17(2):201-8. DOI: <https://doi.org/10.5327/Z1679443520190341>
18. Ministério da Saúde (BR). Agência Nacional de Vigilância Sanitária. Resolução - RDC nº 222, de 28 de Março de 2018, Regulamenta as Boas Práticas de Gerenciamento dos Resíduos de Serviços de Saúde e dá outras providências. *Diário Oficial da União*: seção 1, 61. ed, p.76; 2018.
19. Carvalho TS, Luz AR. Biological accidents with health care workers in Brazil: a literature review. *Arq. Méd. Hosp. Fac. Ciênc. Méd. St. Casa São Paulo* (Online). [Internet]. 2018;63(1):31-6. DOI: <https://doi.org/10.26432/1809-3019.2018.63.1.31>
20. Ribeiro LCM, Souza AC, Tipple AFV, Melo DS, Veronez MKA, Munari DB. Intervening factors in attention flow of professionals injured by biological material. *Rev. Esc. Enferm. USP*. [Internet]. 2014;48(03):507-13. DOI: <https://doi.org/10.1590/S0080-623420140000300017>
21. Martins RJ, Belila NM, Araújo TB, Garbin CAS, Garbin AJÍ. Perception of the standard precautions, practice of re-capping of needles and practices when facing an accident involving biological material of dental health teams at dental public service. *Cienc Trab.* [Internet]. 2018;20(62):70-7. DOI: <http://dx.doi.org/10.4067/S0718-24492018000200070>
22. Vieira KMR, Vieira FU, Bittencourt ZZLC. Occupational accidents with biological material in a school hospital. *Rev. bras. enferm.* [Internet]. 2019;72(3):737-43. DOI: <https://doi.org/10.1590/0034-7167-2018-0630>

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