

# OCCUPATIONAL RISKS AND HEALTH CARE WASTE IN THE SURGERY CENTER

*Riscos ocupacionais e os resíduos de serviços de saúde em centro cirúrgico*

*Riesgos ocupacionales y residuos de salud en un centro quirúrgico*

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**ABSTRACT: Objective:** To understand the relationship between occupational risks and health care waste (HCW), from the perspective of nursing professionals working in the surgery center (SC). **Method:** This is exploratory and descriptive field research with a qualitative approach. Data were collected through recorded interviews, with three open questions on the generation and management of waste and health risks to nursing professionals. The sample consisted of 11 technicians and two auxiliary nurses. Data were organized and analyzed according to the collective subject discourse (CSD) method. **Results:** The speeches revealed concern in adequately managing the generated waste, particularly biological and sharp ones. Professionals understand that failure to comply with safe management practices can lead to damage to their health, that of the patient, and that of other professionals. **Conclusion:** The results showed the exposure of nursing professionals to the waste generated in the SC, which reinforces the need for ongoing guidance practices and training for the appropriate management of these residues, in order to minimize risks of exposure for professionals, patients, and the environment. **Keywords:** Occupational health. Occupational risks. Medical waste. Surgicenters. Nursing.

**RESUMO: Objetivo:** Conhecer a relação dos riscos ocupacionais com os resíduos de serviços de saúde (RSS), na perspectiva de profissionais de enfermagem que atuam no centro cirúrgico (CC). **Método:** Trata-se de uma pesquisa de campo de caráter exploratório e descritivo e abordagem qualitativa. Os dados foram coletados por meio de entrevista gravada, com três questões abertas sobre a geração e o manejo de resíduos e riscos à saúde dos profissionais de enfermagem. A amostra foi composta de 11 técnicos e dois auxiliares de enfermagem. Os dados foram organizados e analisados segundo a proposta do método do discurso do sujeito coletivo (DSC). **Resultados:** Os discursos revelaram preocupação em realizar o manejo adequado dos resíduos gerados, com destaque para os biológicos e perfurocortantes. Os profissionais compreendem que o não cumprimento de práticas seguras de manejo pode expor prejuízos à própria saúde, à do paciente e à de outros profissionais. **Conclusão:** Os resultados evidenciaram exposição dos profissionais de enfermagem aos resíduos gerados no CC, o que reforça a necessidade de práticas contínuas de orientações e treinamentos para o manejo apropriado desses resíduos, com a finalidade de minimizar riscos de exposição dos profissionais, dos pacientes e do ambiente. **Palavras-chave:** Saúde do trabalhador. Riscos ocupacionais. Resíduos de serviços de saúde. Centros cirúrgicos. Enfermagem.

**RESUMEN: Objetivo:** Conocer la relación entre riesgos laborales y los residuos de los servicios de salud (RSS), desde la perspectiva de los profesionales de enfermería que trabajan en quirófano (CQ). **Método:** Esta es una investigación de campo exploratoria y descriptiva con un enfoque cualitativo. Los datos se recopilieron mediante entrevistas grabadas, con tres preguntas abiertas sobre la generación y gestión de residuos y riesgos para la salud de los profesionales de enfermería. La muestra consistió en 11 técnicos y dos auxiliares de enfermería. Los datos fueron organizados y analizados de acuerdo con el método del discurso del sujeto colectivo (DSC). **Resultados:** Los discursos revelaron una preocupación por llevar a cabo el manejo adecuado de los

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desechos generados, con énfasis en productos biológicos y objetos punzantes. Los profesionales entienden que el incumplimiento de las prácticas de gestión segura puede exponer el daño a su propia salud, la del paciente y la de otros profesionales. **Conclusión:** Los resultados evidenciaron la exposición de los profesionales de enfermería a los desechos generados en el CQ, lo que refuerza la necesidad de orientación continua y prácticas de capacitación para el manejo adecuado de estos desechos, a fin de minimizar los riesgos de exposición de profesionales, pacientes y medio ambiente

**Palabras clave:** Salud laboral. Riesgos laborales. Residuos sanitarios. Centros quirúrgicos. Enfermería.

## INTRODUCTION

Health care should be a safe act, with minimal incidence of adverse events. However, in daily work, there is excessive exposure to situations that offer risk to the health of the professional, especially those that occur in the surgery center (SC), a place where the worker is vulnerable to harmful events<sup>1</sup>.

It is noteworthy that nursing professionals represent a significant number of SC workers and are exposed to various strain situations. We emphasize that risk factors present in this type of environment can cause damage to the quality of production and care provided in different circumstances, directly compromising the health of workers. These risk factors are a consequence of exposure to and handling of physical, chemical, biological, ergonomic, and psychosocial agents, causing occupational accidents<sup>2-5</sup>.

In view of this reality, we underline the risks related to exposure to health care waste (HCW), continuously generated in the SC, resulting from different types of procedures performed during the care practice.

According to the Collegiate Board Resolution (*Resolução da Diretoria Colegiada – RDC*) no. 222/2018 of the Brazilian Health Regulatory Agency (*Agência Nacional de Vigilância Sanitária – ANVISA*), HCW generators encompass all services related to human and animal health care, whether in-home care or in analytical laboratories for health products, mortuaries, funeral homes, mobile clinics, among other similar services<sup>6</sup>.

According to RDC no. 222/2018, HCW is classified into the following groups:

- Group A: biological waste, which includes infectious agents in its composition;
- Group B: chemical waste, such as medicines and sanitizers;
- Group C: radioactive waste, represented by products that may contain more radionuclides than the established by the National Nuclear Energy Commission;
- Group D: general waste, which does not present any of the characteristics of the other groups;
- Group E: sharps waste, such as blades, needles, among others<sup>6</sup>.

We highlight that SC generates all types of waste.

Among the professionals, those who comprise the nursing team are in daily contact with the waste when performing procedures in their practice, which exposes them to risks related to such materials<sup>7</sup>. The nursing team has a greater number of workers and is responsible for directing the flow of waste<sup>8</sup>.

HCW management is a set of management procedures duly planned and implemented based on scientific, technical, normative, and legal aspects. Its purpose is to reduce the generation of waste and adequately handle their final disposal, aiming at safety and the health of professionals, patients, and the environment<sup>6</sup>.

The number of studies investigating the problems involving HCW among SC nursing professionals is still small, and this type of research should be explored to strengthen the practice of managing the waste generated, minimizing the exposure of professionals, patients, and environments to it.

## OBJECTIVE

To understand the relationship between occupational risks and HCW from the perspective of nursing professionals working in the SC.

## METHOD

This is exploratory and descriptive field research with a qualitative approach conducted in the SC of a hospital in the inland of São Paulo in June 2016.

The 32 nursing professionals (nurses, technicians, and auxiliary nurses) working in the selected SC were invited to participate in the study. The study was carried out at a reserved time and place, as previously agreed with the sector coordination, without interfering in the work routine.

The inclusion criteria were working in SC for more than 12 months, agreeing to participate in the study,

and being in the unit during the data collection period. The exclusion criteria were being on vacation, a day off, or out of the work unit for some reason during the data collection period.

Among the 32 professionals, 19 did not meet the inclusion criteria, resulting in a total of 13 participants – 11 technicians and two auxiliary nurses.

For the data collection, an instrument with three open questions was elaborated, according to the collective subject discourse (CSD) method<sup>9</sup>:

1. In the activities performed in the SC, different types of non-invasive and invasive procedures that generate waste are performed. Tell me about this waste;
2. In your daily work in the SC, you perform non-invasive and invasive procedures that generate waste, which requires proper management (handling) so as not to cause damage to your health, that of the patient, and that of the environment. Tell me how you manage (handle) this waste;
3. In the SC environment, the procedures performed generate waste that may pose risks to your health. Could you talk about these risks?

The individual data collection took place after the approval by the Research Ethics Committee, following the recommendations of Resolution no. 466/2012<sup>10</sup>, under opinion 1,447,657 and the Certificate of Presentation for Ethical Consideration (*Certificado de Apresentação para Apreciação Ética – CAAE*) no. 53337316.0.0000.5383. After the participants signed the Informed Consent Form, the information was collected in the morning, afternoon, and evening shifts and recorded on a voice recorder, with an average duration of three minutes and ten seconds for each interview.

For the data analysis, we used the CSD method, with the interviews recorded and transcribed manually. Next, we extracted the key expressions, which represent the principal passages or segments found in the full transcripts of the responses received in the main content, and selected the central ideas, with subsequent construction of the discourses<sup>9</sup>.

## RESULTS

In view of the results obtained in the interviews, the three guiding questions produced six CSDs, presented below.

### CSD 1: Waste generated and exposure of health professionals to occupational risks

Nursing professionals pointed out the different types of waste generated in SC and the concern with risk exposure situations.

*Sharp objects, other types [...], the remains of small amputations, skins [...], anatomopathological materials, chemical products, medicines, disposable products [...], also [...] needles [...], Abocath® [...], central lines that the doctor place [...] which sometimes create a risk [...] for the employee [...], doctors, not being well handled [...], in the rush, they leave it exposed [...]. All procedures generate a lot of waste [...]. In a femoral fracture repair, [...] many surgical sponges are used to stop the bleeding and [...] are thrown into the hamper [...]. They are always very dirty [...], leave a lot of filth in the room, and have a lot of residues [...]. Also, a lot of thread is used, as in cardiac surgery [...], which requires opening many boxes [...], clamps [...] and several different materials [...], glove, gauze [...], drapes, needle, syringe, drain [...]. We have the general waste [...], which are paper towels that we use during the hand washing procedure [...]. The waste that is sterile, because here we use sterile disposable drapes, gowns [...]. So, that generates waste [...]. There is solid waste, which includes sharp objects [...], contaminated ones [...], common [...], glass ampoules [...], various types of waste [...]. Everything with blood on it, contact with patient [...], secretion [...], blades.*

### CSD 2: Exposure of health professionals to occupational accidents with sharps waste

The study participants revealed that, in daily work, among the waste generated, sharps waste can lead to occupational risks, compromising their health.

*What we handle most here are sharp objects [...], syringes [...], needles [...], glass ampoules [...]. We usually ask the scrub nurse or intern to remove them from the table, but they do not always comply. When accidents happen [...], someone can get punctured, I have already gotten punctured myself [...] for not throwing the waste in the right place, not [...] organizing the table [...]. We must*

*be very careful not to leave the Descarpack® (waste disposal container) too full because we could get hurt [...], hurt the colleague who takes it [...]. The sharps waste [...] must be disposed of in the Descarpack® [...], the contaminated waste, [...] thrown into the white trash [...], the [...] common [...], into the black trash.*

### **CSD 3: Nursing professionals' care when handling the waste generated**

Another concern of the participants identified in the responses was the need for safe handling of the different types of materials in order to minimize risk exposure.

*When we handle [...], we try to take possible precautions [...]. It's a bit difficult because the SC is a sector that [...] doesn't stop [...]. So, we don't always see a sharp object on the table, and that's why we end up getting punctured [...], getting hurt [...]. We try to preserve our health and that of the patient, not to touch these garbage when the patient is in the room, try to send the patient to the recovery room before removing all these materials [...], paying more attention on the table when removing the waste [...], looking at everything again, checking if everything has been put in the box to go down to central. [...] When we handle this kind of waste, we pay a lot of attention, always using gloves. Depending on the waste and the quantity, I usually wear two gloves, so I don't have the problem of getting my hand dirty if one gets punctured [...]. Handling requires disposal in the correct place, [...] but when it's on the operating table, I always pick it up with clamps. We always remove the scalpel with a needle holder, so there is no risk of it jumping and hurting someone or ourselves [...], avoiding accidents [...]. I never use my hand to pick it up, because even if you puncture your finger wearing a glove [...] your finger will be there. Just using a glove doesn't protect you from anything basically [...], because we use many drapes. We must be extra careful [...], we must use procedure [...] gloves [...]. When using a needle syringe, you can't recap, you must discard the entire syringe [...], always wearing gloves and, depending on the case, a mask too, to avoid splashes [...] on you.*

### **CSD 4: Occupational risks related to waste disposal**

The participants were concerned about the need to be careful at the time of waste disposal and warned about this, as they understand this practice involves risks.

*"Sometimes" the resident or intern says they've already removed the sharp object. But then we'll check [and] they didn't. [...] When it comes to taking out the waste, even [...] the recyclable, because sometimes someone can throw something into the recyclable [...], this ends up putting us at risk [...]. You look at the ground, pay attention... because there are people who drop things on the floor [...]. When you find it, you need to get it, of course, but first, you put on the glove, you have to be careful, and pick it up the right way so as not to take risks, and discard it in the proper place [...]. There's the secretion aspirator. Sometimes, in surgery, the doctor starts aspirating [...] for us to discard later, the urine drainage bag [...], the Portovac® drain [...] in the toilet, which should be discarded in the slop hopper, [...] taking great care [...], wearing gloves and, usually depending on the content, such as a scalpel blade, using a Kelly forceps [...], we discard [...] in the Descarpack® [...], then we put the recyclables in the proper transparent bag, the contaminated [...] in the white bag, the clothes in the blue bag. [...] We must follow the procedure here at the hospital, we have to separate the recyclable waste, that is, packaging and everything else that we put in the transparent bag.*

### **CSD 5: Insecurity of nursing professionals related to the lack of information about the patient**

The professionals mentioned the lack of information about the clinical conditions of the patient treated in the SC, reinforcing the need to use personal protective equipment.

*Always wearing gloves, mask, gown, because we don't know what the patient's disease is. Sometimes the patient arrives in the emergency room and goes straight up [...], we don't know what diseases this patient has. Here, it's like an entrance door, as if it were an emergency room [...]. We know there are biological risks.*

*Most of the time, when the patient has tuberculosis, we don't know, we don't wear a mask, because we don't have this protocol for all patients [...]. When you know, the patient has already been diagnosed, has moved past here, is already in the room [...], but most of the time, you deal with the patient without knowing what they have [...]. We can get contaminated with secretions that are left behind sometimes, that can splash in our eyes, infecting us [...]. So, you protect yourself, wearing gloves, a mask [...]. And even when you use the proper PPE, [...] you are still at risk of contracting something from the patient without knowing.*

## CSD 6: Risks related to the waste generated

The professionals pointed out the need to maintain adequate waste handling practices during care activities.

*As I said, we try not to put ourselves at risk [...], nor the patient [...], nor anyone in the room [...]. We're at risk all the time [...]. The concern here in the working environment and that the [Hospital Infection Control Committee] HICC always reinforces is that we always wear glasses, mask, because of this risk of contamination [...], of getting some residue in the eye, [...] or secretion [...]. Now we have these procedures with devices, which are more practical, we collect the needle, but sometimes we can forget, does this represent a risk? Yes! But now, the risk of puncture is much lower [...]. It's also safer for us regarding accidents [...]. Before, when they couldn't be recapped, punctures would happen [...]. Also, when the garbage is not disposed of in the right place [...], or collected at the right times, of course it accumulates, and it can create risks [...], for example, if it has a sharp object, [...] you can puncture yourself. And I believe there would be more risk with sharp objects than the rest. If you wear the PPE, there is no danger of blood spattering or anything like that [...]. Risks [...] of everything, disease, [...], especially hepatitis [...]. Sometimes, a surgical procedure is a contaminated surgery [...], these *Pseudomonas* [...] are the ones that represent the most risk for us [...], they are strong types of bacteria present in hospitals, hepatitis C, [human immunodeficiency virus] HIV, everything, syphilis as well [...]. Biological risks from solid waste [...], needles, suture threads, which can*

*puncture us [...], cut or contaminate us [...], and other types of accident. As we discard urine [...], putting the drapes inside the hamper, secretion can escape, this is a very high risk [...]. There are several risks because of the fluids [...], all of them [...], one must be very careful [...]. You may be contaminating yourself, except for the recyclables, if they are not dirty, or you would be contaminated [...] if you were not protected, the inhalants, depending on what you are touching [...]. For the patients, the risks generated, I suppose, a badly discarded needle. Regarding [...] aerosols, [...] these airborne diseases [...], the chemical can fall on the skin and cause an allergy [...]. We must separate the garbage correctly because a glove we put on the bag that should be disposable can contaminate everything. So, when it goes to the people downstairs [...], they see a glove or gauze inside the recyclable material, they have to put everything in the contaminated material [...], increasing the cost [...] for the proper final disposal.*

## DISCUSSION

In this study, the nursing professionals' concern with the exposure to the waste generated in the SC was evidenced in the speeches, as well as the attention to meet the norms implemented by the institution to avoid exposure to occupational risks.

The study of perceiving the risks inherent to the waste generated in health care facilities is relevant to the elaboration and implementation of actions that minimize the damage to workers, the community, and the environment<sup>11</sup>.

Another situation identified in the participants' speech was related to the continuous generation of waste, since this unit treats patients in urgent and emergency situations, and this waste is generated at different moments of the care practice and procedures performed by the multidisciplinary team.

The participants also mentioned that, among the variety of waste generated, there are also anesthetic gases, as well as the possibility of exposure to radiation; risk situations that can interfere with the worker's professional performance and quality of life.

According to data from a study conducted in a public university hospital, the exposure of nursing workers to occupational accidents may occur in daily activities as a result of their workload. This exposure is associated with chemical,



physical, psychic, and mechanical factors, especially biological ones, which can also lead to occupational diseases<sup>12</sup>.

Still on the potential of occupational exposure of nursing professionals working in the SC to the different types of waste generated during care practices, the participants stated that the risk increases in situations without the adequate management of these materials.

Among the waste generated, sharp objects stood out, since the nursing team handles them constantly, and they can offer risks to the worker's health, causing concern in this professional category.

The inadequate management of waste generated in health facilities, particularly in some sectors, such as blood banks, operating rooms, and laboratories, represents risks for people and the environment due to its characteristics, as it may contain infectious, radioactive, and sharp agents among others<sup>13</sup>.

Another study carried out in Family Health Units in the city of São Carlos, inland of São Paulo, points out that exposure to potentially contaminated materials, including sharp ones, is frequent in the activities of the nursing professional, a fact related to the excessive manipulation of this type of material in daily work<sup>14</sup>.

Thus, as described in Regulatory Standard (*Norma Regulamentadora* – NR) 32/2005, which determines standards for the safety and health of workers in health care facilities regarding exposure to sharp materials, an action plan aimed at minimizing this type of contact must be implemented and supervised<sup>15</sup>.

Also, data from a study carried out in a university hospital in João Pessoa, Paraíba, with the purpose of identifying the main types of accidents that affect nursing professionals, revealed a prevalence of exposure to sharp materials, followed by contact with patient secretions, assault, among others. These situations interfere with the professionals' health quality and, in some cases, result in leaves of absence<sup>16</sup>.

A study conducted in a public hospital in the inland of Ceará identified that, with respect to the waste generated, the handling stages, consisting of separation, packaging, and identification of sharp objects, were properly followed. The authors declared that the professionals involved showed caution regarding occupational exposure to this type of waste<sup>17</sup>.

The discourse of the participants in this research revealed their attention to the careful handling of waste, which is present in the practice at different stages, from generation to disposal in an appropriate container, as a way of protecting their health in care situations.

A study carried out at the Universidade Federal de Minas Gerais with undergraduate students from the Department of Biological and Health Sciences, aiming at identifying the knowledge of these students about the management of waste from biological and sharp groups, showed that their partial knowledge about the adequate disposal of sharp objects is concerning, as the research participants represent a group responsible for occupational exposure<sup>11</sup>.

With respect to the completion of the management stages, the participants' discourse demonstrated their concern about their safety, as they are aware of being exposed to different types of risks, including those related to the waste generated. They are also aware that the management stages must be safely followed to preserve their health, as well as that of the patient and other professionals who work in the SC. It is noteworthy that the management stages are included in the managing of this waste<sup>6</sup>.

Another study, performed in a blood bank in Paraná, with the purpose of understanding the management of the HCW generated in the institution, evidenced the need for a different look at the handling stages, as well as for the strengthening of the practice of continuing in-service education due to risks to public health and the environment<sup>18</sup>.

Concerning the practice, this study revealed another concern related to the compliance with the proper disposal of waste because when this stage is not correctly followed, and the general waste is discarded as contaminated, the cost for the adequate final disposal increases.

Thus, we can affirm that, when separation is not done properly, the other management stages are compromised, and waste disposal without prior treatment or in an inappropriate place creates a risk of exposure for the patient, the professional, and the environment<sup>17,19,20</sup>.

However, the nursing professional is not the only one responsible for the generation of waste when assisting the patient; professionals from other health areas also produce it. Nevertheless, the responsibility for handling and packaging this waste is delegated to the nursing team, as they are in charge of the continuity of care during the patient's treatment and recovery process.

Considering the nursing professionals' practice of handling the waste generated, we can state that they are the starting point in the management of HCW, since separation, the initial handling stage, is mostly performed by them<sup>7</sup>.

Therefore, the nursing professional needs to know the stages of waste management, as described in RDC no. 222/2018<sup>6</sup>, to minimize the chance of occupational exposure.

Another topic addressed in the present study was the issue of insecurity identified in the participants' speech in relation to the patient treated. According to their statements, professionals stay alert in the surgical block, as a patient can be admitted to this environment at any time, either in urgent or emergency situations, at different levels of complexity regarding their health status. This fact, as claimed by professionals in the area, does not leave enough time for communication prior to the period preceding the interventions in the SC, which makes this situation prone to exposure to risks.

In view of this situation, the professionals mentioned that, for their safety, they put into practice preventive actions, such as the proper use of PPE, as a means to minimize exposure to this type of adverse occurrence, as well as receive continuous attention and care from the HICC.

The waste produced in the SC results from actions performed during anesthesia and surgical procedures. Examples are disposable gowns, surgical drapes, sponges, gauze, wrapping of the materials used, among others<sup>21</sup>.

Thus, the performance of procedures in a mechanical, accelerated, or distracted manner can lead the professional not to consider their safety and health in the work environment. In the SC, the need to carry out care actions intensely predisposes professionals to exposure to waste<sup>22</sup>.

## FINAL CONSIDERATIONS

The results of this research revealed that nursing professionals consider that different types of waste are generated in the SC and that, when identified and handled improperly, these materials can cause damage to their health, as well as that of other professionals and patients.

The management of the waste generated in the daily work of these professionals is constant. They understand that the handling, separation, and packaging stages are fundamental to ensure the integrity of the health of workers and patients, with a clear concern about handling the waste properly.

The speeches of the participants highlighted that they feel more exposed to biological and sharps waste during the performance of their work activities and recognize that these exposures can impact their health, causing losses.

Another fact pointed out by the participants was the lack of attention from other professionals that make up the health team working at the SC regarding the inappropriate disposal of waste. This situation, consequently, generates insecurity and concern.

Therefore, we recommend that these professionals receive periodic guidance and training in the proper management of HCW, minimizing risks of exposure to the waste generated and damage to their health, as well as that of the patient, other professionals, and the environment.

The fact that we did not include other professional categories that are part of the SC team due to the reduced time for research can be considered a limitation of the study.

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