

STERILIZATION PROCESS FROM THE PERSPECTIVE OF THE PROFESSIONALS OF THE MATERIAL AND STERILIZATION CENTER

Processo de esterilização sob a ótica dos profissionais do centro de material e esterilização

Procedimiento de esterilización bajo la óptica de los profesionales del centro de material y esterilización

Lívia Maria Correia de Morais^{1*}, Solange Queiroga Serrano², Alessandra Nogueira Santos³,
Jéssica Maricelly Deodato de Oliveira⁴, Jéssica Thamires da Silva Melo⁵

ABSTRACT: Objective: To analyze the work process of nursing professionals working in the material and sterilization center (MSC) on the sterilization of surgical material. **Method:** A descriptive study, anchored by qualitative approach and carried out with 11 nursing professionals from MSC, through a semi-structured interview. In order to evaluate the data, content analysis was chosen, with transversal thematic modality. **Results:** The interviews presented the description of the steps involved in the sterilization process, the relationship with patient safety, difficulties in the work process, and permanent health education as a possible mean of overcoming difficulties. **Conclusion:** Workers have incipient knowledge of the steps of the sterilization process with a direct influence on patient safety. Management actions and permanent education in health are necessary to guarantee the quality of work and to enable the reduction of failures in the work process. The daily difficulties encountered by MSC nursing staff were also related.

Keywords: Nosocomial infection. Sterilization. Patient safety. Professional practice. Continuing education.

RESUMO: Objetivo: Analisar o processo de trabalho dos profissionais de enfermagem atuantes no centro de material e esterilização (CME) acerca da esterilização de material cirúrgico. **Método:** Estudo descritivo, ancorado pela abordagem qualitativa e realizado com 11 profissionais de enfermagem do CME por meio de entrevista semiestruturada. Para avaliação dos dados, optou-se pela análise de conteúdo, modalidade temática transversal. **Resultados:** Os depoimentos apresentaram a descrição das etapas envolvidas no processo de esterilização, a relação com a segurança do paciente, as dificuldades no processo de trabalho e a educação permanente em saúde como meio possível de superar as dificuldades. **Conclusão:** Os trabalhadores têm conhecimento incipiente das etapas do processo de esterilização, com influência direta na segurança do paciente. Ações de gestão e de educação permanente em saúde são necessárias para garantir a qualidade do trabalho e possibilitar a redução de falhas nesse processo. Foram citadas, ainda, as dificuldades diárias encontradas pelo pessoal de enfermagem do CME.

Palavras-chave: Infecção hospitalar. Esterilização. Segurança do paciente. Prática profissional. Educação continuada.

RESUMEN: Objetivo: Analizar el proceso de trabajo de los profesionales de enfermería actuantes en el CME sobre la esterilización de material quirúrgico. **Método:** Estudio descriptivo, anclado por el abordaje cualitativo y realizado con 11 profesionales de enfermería del CME, por medio de entrevista semiestruturada. Para la evaluación de los datos, se optó por el análisis de contenido, modalidad temática transversal. **Resultados:** Los testimonios presentaron la descripción de las etapas involucradas en el proceso de esterilización, la relación con la seguridad del paciente, las dificultades en el proceso de trabajo y la educación permanente en salud como medio posible de superar las dificultades. **Conclusión:** Los trabajadores tienen conocimiento incipiente de las etapas del proceso de esterilización con influencia directa en la seguridad del paciente. Las acciones de gestión y de educación permanente en salud son necesarias para garantizar la calidad del mismo y possibilitar la reducción de fallas en el proceso de trabajo. Aún se relacionó las dificultades diarias encontradas por el personal de enfermería del CME.

Palabras clave: Infección hospitalaria. Esterilización. Seguridad del paciente. Práctica profesional. Educación continua.

¹Nurse, specialist in Surgical Nursing at the Academic Center of Vitória, Universidade Federal de Pernambuco – Recife (PE), Brazil.

²Doctor nurse. Adjunct professor and coordinator of the disciplines of Surgical Nursing and Research Methodology of the Academic Center of Vitória, Universidade Federal de Pernambuco. Tutor of the Nursing Residency Program at the Getúlio Vargas Hospital, Universidade Federal de Pernambuco – Recife (PE), Brazil.

³Nurse at the Universidade de Pernambuco; specialist in Surgical Nursing at the Academic Center of Vitória of the Universidade Federal de Pernambuco – Recife (PE), Brazil.

⁴Nurse and specialist in Surgical Nursing at the Academic Center of Vitória of the Universidade Federal de Pernambuco – Recife (PE), Brazil.

⁵Nurse at the Universidade de Pernambuco; specialist in Orthopedics and Traumatology at the Academic Center of Vitória of the Universidade Federal de Pernambuco – Recife (PE), Brazil.

*Corresponding author: liecorreia@gmail.com

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INTRODUCTION

The material and sterilization center (MSC) is a technical support unit for the provision of appropriately processed health products (HPs) for the provision of health care to individuals. This process includes: cleaning, preparation, sterilization, storage, and distribution of materials to other hospital areas^{1,2}.

Direct patient care is related to indirect care provided by MSC professionals, who must provide support for care, since the efficiency of sterilization makes it possible to reduce exogenous infections and to improve the quality of care provided to the patient^{3,4}.

The understanding on the influence of cleaning, disinfection and sterilization procedures of materials in the prevention and control of hospital infections highlights the importance and the responsibility of the MSC in health institutions, as the existence of flaws in these processes determines the emergence of complications in patients⁵.

Historically, the activities developed in the MSC were carried out by people without specific qualification to exercise the complexities of the processing of health materials. The lack of training programs and ongoing updating for professionals, both for those who directly perform actions and those who use the sterilized materials, jeopardizes the security of health care due to the lack of knowledge of the processing steps⁴.

This reality can be modified by associating the qualification of the professionals to the development of their attributions with excellence⁶.

OBJECTIVE

To identify the perception of nursing professionals working in the MSC on the process of the sterilization of surgical material.

METHOD

The study was based on a qualitative, descriptive and exploratory approach that emphasizes the uniqueness and the significance understood by the nursing professionals regarding the work process in the MSC pertinent to the studied phenomenon⁷.

Therefore, the study was carried out at the MSC of a public hospital in Recife, Pernambuco, Brazil, which is a reference

in the fields of trauma-orthopedic surgeries and general surgeries, with nurses, technicians and nursing assistants working in this unit. The inclusion criterion was related to the exercise of the functions, for at least one year in the referred department. Professionals who were on health leave, maternity leave or vacation were not included.

The saturation criteria were obeyed, in which there were no new ideas in the testimonies, to totalize the sample of 11 individuals. The data were collected from October 2016 to February 2017 through a semi-structured interview in a reserved environment, to ensure the confidentiality of the information obtained.

An instrument was elaborated by the researchers consisting of sociodemographic information from the participants, such as: age, sex, working hours, length of service and schooling, to characterize the sample, as well as the following questions:

1. What do you understand by the process of sterilization of critical articles?
2. How do you relate material processing in the MSC to patient safety during your practice?
3. What difficulties do you encounter in your daily work?
4. Do you get any kind of training to do your job? How is this process done?

The interviews were recorded in a digital device and then transcribed in full and lasted, on average, 7 minutes. To ensure the anonymity of the subjects, they were identified by the letter I (interviewed), followed by the interview's ordinal number (1, 2, 3, etc.), and their functional category (N: nurse; NT: nursing technician; NA: nursing assistant).

The evaluation of the analytical material was carried out by content analysis with transversal thematic modality, which consists of pre-analysis, material exploration and treatment of results⁸. In the pre-analysis, the ordering of the initial ideas was organized according to the research objective and the literature⁸.

In the exploration of the material, the coding system was defined by the identification of the recording units or nuclei of the senses, and by the determination of the categories. Then, there was the treatment of the results, with inference and interpretation to condense and highlight the information collected, as well as to compare them with the pertinent literature⁸.

The project was approved by the Research Ethics Committee of the Hospital Otávio de Freitas, under Certificate of Presentation

for Ethical Appreciation (CAEE) no. 58035316.0.0000.5200. All participants signed the informed consent.

RESULTS

Of the 11 participants, ten are female. They were: two nurses, seven technicians and two nursing assistants, with average age of 50 years, mean time of service in the department equal to nine years and average of 22.6 years of professional training. Their workday is a 12-hour shift per 60 hours off, and only one of the interviewees was a 6-hour daytime worker. The two upper-level participants have an industry-specific postgraduate degree.

Of the total, four had another employment relationship. No possible losses were identified in their work process, because they did not mention any complaints of problems related to the double journey, such as fatigue or delays, among others.

The codification of the testimonies resulted in the emergence of four categories, which will be described next.

Knowledge of the professionals on health product processing

The professionals' knowledge on the procedures performed for HPs sterilization was described succinctly, being restricted to the process of cleaning and preparation of the material:

We take the material, put it in the enzyme solution; we wait until we can take the material off of it; we put it under the tap, brush the material, remove the dirt and take it to the preparation room. Place it in the drying machine (I10, NT).

The material goes through the washing cycle, then goes to the dryer, then to the sorting table, and from there it goes to be packed (I8, NT).

It is washed, then goes on the table, then the drying process, then to be packed (I6, NA).

As for the cleaning step, only one of the participants mentioned the time of immersion of the products in solutions, but in a dubious and incorrect way:

Washing is performed with suitable solutions. In this step, the staff prepares and immerses the materials.

It then has to stay submerged for a while. I do not remember very well if it's 10 or 15 minutes (I5, NA).

Careful investigation of the cleaning process is one of the critical points for a product to be reused. Regarding the preparation of the materials, most of the testimonies described the process, although none mentioned its inspection:

In the sorting table, the product is placed in the dryer. It is separated by the type of piece, and then it goes to packing table (I4, NT).

It goes through the dryer, and when the material arrives on the table, it is already good and dry. So, we just have to sort them, and put them in boxes (I7, NT).

Importance of material processing in patient safety

The activities developed in the MSC show strong interference in the final product during care activities. The unanimity in the answers showed the relevance of the processing being performed correctly, to avoid possible complications, as shown in the following section:

If we have a flaw in one of these processes, we are putting the patient at risk for contamination and infection (I11, N).

You have to deliver the material completely sterile so as not to harm the patient's health. And it has to be free of any infection (I2, NT).

To avoid infection. Because the material needs to be sterilized, as it will be in direct contact with the patient (I3, NT).

One of the participants emphasized the importance of evaluating the effectiveness of the sterilization process through indicators:

For patient safety, depending on the material, it has to have a tape, a chemical indicator that goes inside the material indicating every process that it

goes through in sterilization. Failure in this indicator means that the material is not well sterilized. So, the goal is to give better surgery conditions to the patient, thus avoiding infection, whatever it is (I6, NA).

Difficulties encountered in the work process in the material and sterilization center

The interviewees exposed the difficulties encountered in the work routine, pointing out the lack of fundamental materials and personal protective equipment (PPE) as the aspects responsible for the department's poor functioning:

There are days when there is no surgical grade; there are days when there are no bands, of various sizes, that's when I see the need for materials [to be restocked] (I8, NT).

With regard to the quantity of material, we would need to have more instruments to replace them from time to time (I11, N).

The lack of material is due to this being a public hospital, which is in crisis and depends on public tenders. So, that is a problem (I1, N).

The difficulty is [the lack of] protective material for us, for example. In my case, there is a lack of glasses, a visor, you see? A lack of appropriate gloves to handle the hot material (I6, NA).

The stuff [material] that is lacking here is gloves; gloves are the main thing (I10, NT).

On the other hand, there was a perceived resistance from the professionals regarding the use of the PPEs, as emphasized in one of the interviews about daily work difficulties:

It is the protection of the employee and the use of PPE. They have a lot of resistance in using it (I1, N).

Another factor that interferes with the quality of sterilization services is the insufficient number of existing workers, as well as the great number of nursing professionals

with physical or psychological problems, which, according to the interviews, is frequent and inadequate for the department's demands:

Deficit of personnel, we actually need a larger staff so that we can improve the quality of service (I11, N).

We don't have enough people, it's too much work for too little staff; there is a shortage in workforce (I2, NT).

Most of the time, the MSC has a bad reputation, because it is the department where the older people, sick people, and those deemed useless go to work at (I3, NT).

When you have a health problem, their [managers'] view is that this is your place, but it is not, because we know that we do a lot here, and it depends a lot on physical strength, we deal with a lot of heavy things (I1, N).

Permanent education of professionals as a strategy for service improvement

In the praxis of the MSC professionals, the lack of training is a limitation in overcoming daily difficulties:

They told me to train with my colleagues on the job. Those who have more time started teaching me, that's how I learned (N8, NT).

So, as there is a lot of very specific things, it is a very vast area, I feel this difficulty, because I had to learn on the job. Every day you learn something different, and I think I need to go through a recycling process with the professionals (N3, NT).

According to the narratives, when permanent education courses were offered, associated with extra remuneration, employees felt stimulated to participate, and considered it as a positive aspect of the institution:

The goal of the hospital is to train the professional as a whole, even considering positions and careers,

which has an increase in productivity over every eight hours of the semester course that we take. So, it's a way to encourage employees to seek qualification (N3, NT).

Also, productivity is a thing. Without this productivity, we do so much when we take the course, if we don't take it, it will be worse. So, you have to seek it (N2, NT).

Likewise, despite the importance of the nurse as a manager of these activities, only one of the respondents highlighted the role of the nurse as an educator:

The nurse who teaches us does it through the information that we have in literature, in those books that show the images and names of the instruments (N9, NT).

DISCUSSION

The MSC is the department responsible for concentrating the HPs, sterilized or not, preserving them and keeping them in good condition. For the proper development of its operating dynamics and the effective processing of the material, it is ideal that it is submitted to the following steps, sequentially: reception, cleaning/disinfection, preparation, sterilization, storage and distribution¹.

Research conducted in a public hospital in Porto Alegre, Rio Grande do Sul, Brazil, with nursing professionals working in the MSC showed that most professionals describe the process of cleaning and preparation of the materials in a concise way, which can be justified by doing isolated practical activities, without theoretical articulation, making the employees mere executors of tasks, mechanized^{3,9}.

The greater the difficulty in the cleaning step, the greater the difficulty in sterilization, considering that cleaning is the central to the processing of the items. Therefore, when it is not possible to guarantee safety during preparation, sterilization of the material should not be carried out. Doubts, lack of knowledge, and inadequate washing techniques can lead to failures in the reprocessing of instruments³.

Upon receipt of the material, it should be thoroughly submerged in a solution containing enzymatic detergent at warm temperature for at least 3 minutes or as directed

by the manufacturer^{3,10}. Despite the importance of immersion time, only one participant mentioned this aspect, but in a dubious and incomplete way. This fact could be related to the non-use of protocols in the service, in the training of the team and/or in the supervision of the nurse during the procedures.

There was a significant difference between the participant's statement about the exposure to detergent and what is recommended by the standards, which may imply inefficient processing in terms of wasted time and the probable wear of the item, having a direct effect on the efficiency of the process¹¹.

After the washing, the materials are completely dried, manually or through an automated process, using a soft and light-colored material that does not release fibers, to facilitate the identification of possible dirt, or by means of a compressed air jet on materials with lumens, recesses, valves, among others¹¹. Most of the interviewees reported the drying stage without concern for the inspection.

Careful investigation of cleaning is one of the critical points for a product to be reused, as residues can prevent the contact of the sterilizing agent and cause adverse immunological events to patients. In addition, articles that are not intact or functional should be replaced to avoid harm to the patient, lengthen of the surgery's duration, or dissatisfaction of the user team¹¹.

A descriptive multi-case study conducted in four hospitals in Salvador, Bahia, Brazil, observed that employees did not systematically carry out the necessary visual inspection or the integrity and functionality tests to prevent risks related to cleaning failures and possible changes in the characteristics of products submitted to multiple reprocessing cycles¹². This fact resembled the findings of this series, in which only two professionals pointed out the inspection of materials as a primordial step in the quality of the cleaning performed.

Most of the subjects mentioned sterilization succinctly, citing it as part of the process. In contrast, only three interviewees discussed their types and their specificities, such as hydrogen peroxide plasma gas and saturated steam under pressure.

Some interviewees showed little knowledge about the stages of material processing, despite having nine years of experience, on average. This point can be considered as an alert for strategies to transform realities, such as the development of educational actions and the encouragement of participation in events and discussions, among others, aimed at improving the knowledge of these professionals.

Qualitative research with MSC professionals demonstrated that the participants did not know how to describe the stage nor to inform the types of sterilization. It was clarified that, in addition to knowing each step of the processing, it is essential to know the whole process, to guarantee the absence of contamination of the hospital materials and consequent complications to the patient³.

Storage is the final part of the process, in which sterilized products must be stored in a clean and dry place, protected from direct sunlight, and subjected to minimal manipulation, ensuring their physical integrity and avoiding contamination^{3,11}. In this sense, one of the participants attributed importance to the control of the material in that place.

MSC plays an important role in the prevention and control of infections. Therefore, it needs to function with adequacy, efficacy, and safety in the work process, in order to provide the necessary quality of the sterilized articles, contributing to patient care and with the surgical team³.

The activities developed in the MSC show strong interference in the final product during the assistance. Any failure in reprocessing implies a possible compromise of the sterility of the products and allows an increase in the risk of infections in all the procedures that are performed in patients, such as surgeries, dressings, and venous punctures¹³. The unanimity in the answers showed the importance of the processing being done correctly to avoid possible complications.

In a study conducted in Teresina, Piauí, Brazil, it was observed that the nursing team valued their work in the MSC and attributed it to indirect patient care, stressing the need to follow technological advances and the improvement of these activities so that patient safety was maintained¹⁴. One of the participants emphasized the importance of evaluating the effectiveness of the sterilization process through indicators.

The practice of sterilization should be based on pre-established criteria, anchored by relevant scientific references and standards, ensuring that reprocessed products do not cause infection³. In this sense, the professionals working in the MSC must have an active responsibility in the prevention and control of hospital infections, adopt measures with the purpose of causing microbial death and guaranteeing the safety of the processing¹¹.

During the research, the interviewees exposed the difficulties encountered in their work routine, pointing out the lack of fundamental materials to the department as the cause for its malfunction.

The management of materials is a segment in which the quantity of inputs is planned, executed and controlled through effective and economic strategies. However, it has been a concern in health institutions, especially in the public sector, due to tight budgets, which require more control of consumption and expenditure so that staff and patients are not deprived of the necessary materials, and there is no interference with the quality of processing¹⁵.

One study sought to assess occupational hazards in the MSC environment and demonstrated that most professionals stated that PPEs should be used and cared for to avoid basic accidents¹⁶. In this series, similar concern was found, even though the lack of such equipment in the department was highlighted due to the importance that the professionals attribute to them in the prevention of work accidents, constituting a positive factor of this research.

During the development of their work activities, workers must be aware of the occupational hazards to which they are exposed. The most common is the biological risk, since employees continually are exposed to blood and other body fluids upon receiving the contaminated product. In order to protect the employee from the risks likely to threaten their safety and health, it is recommended and mandatory to use PPE, which are all personal devices used by the individual in the exercise of their function¹⁷.

PPE, such as a cap, goggles, mask, thick rubber gloves, waterproof apron and closed and rubberized shoes, are work tools designed to protect the health of workers and reduce the risks to which they are exposed. Therefore, companies are responsible for the correct delivery, testing and training regarding its use, as well as for listening to suggestions and criticisms¹⁷. On the other hand, some resistance was noticed from the professionals regarding the use of PPEs.

Authors have hypothesized that more senior workers, with more experience, could feel safer and end up neglecting certain precautions, relying too heavily on their skills, thus occasionally causing accidents¹⁸. The study population had, on average, 22.6 years of professional experience, which can be an alert to the other services.

In a survey carried out in six hospitals in Londrina, Paraná, Brazil, on the use of PPE in MSCs, negative feelings regarding their use were identified, such as discomfort, difficulty in use, heat, among others, but the professionals revealed that they used the equipment because it was a requirement from the institution. However, if they could choose, they would not use them¹⁷. These opinions converge with the workers' statements regarding adherence to PPE.

Another factor that interferes with the quality of sterilization services is the number of existing workers, which is often insufficient for the industry's demand. It may be due to the failure in sizing the nursing staff, thus affecting the operational functioning of their daily practice^{1,19}.

Often, the MSC becomes a space forgotten by managers, considering that nursing professionals with physical or psychological problems, those with advanced ages, readapted, in pre-retirement or due to inadequacy in relationships in different areas of care are referred to this department and, therefore, deemed unable to carry out direct care activities¹⁹.

Designating professionals with health or relationship problems, and/or knowledge gaps, for a sector of such high technical complexity as the MSC is a mistake, as workers need to have a satisfactory profile and theoretical and practical training to ensure the quality of services and care provided in health facilities¹.

The nurse responsible for the MSC must establish allies with continuing education services and develop coping strategies before a shortage of human resources, such as managing the activities to be developed, anticipating and organizing the priorities without jeopardizing the processing's safety or quality¹⁹.

The need for actions in education and health regarding the procedures performed in the processing of products was evidenced, since the professionals affirmed that the lack of training is a limiting factor in overcoming daily difficulties.

Taking into account it is a department with diverse peculiarities to keep the team in sync, the development of continuous worker training and improvement programs for permanent education could be useful for preventing these situations²⁰. In view of these aspects, linking theory to practice will provide employees with better assimilation and critical thinking about the need for and importance of meticulous care with the materials⁹.

People, when motivated, carry out their work in a balanced and productive way⁹. According to the narratives, when there were permanent education courses associated with extra remuneration, workers felt encouraged to participate, and this aspect of the institution was considered positive.

In a study carried out in São Paulo, São Paulo, Brazil, most of the nurses gathered their employees to guide them, usually when new equipment was acquired by the institution⁹, which converged with the findings in the respondents' statements when explaining the routine with the arrival of a new chemical or machine. Despite the importance of the

nurse as manager of these activities, only one of the respondents highlighted the role of this professional as an educator.

Thus, it is important to consider that, in order for nurses to achieve their professional recognition, they must transform their workspace into a pleasant environment in which all the staff can feel welcomed, with their aim focused on the value of care and humanization, besides being based on scientific research and effective actions regarding permanent education in health³.

FINAL CONSIDERATIONS

The MSC is a sector of vital importance in the prevention and control of infections related to health care when functioning in compatibility with its guidelines, so that all steps are carried out effectively and safely, as its service influences the quality of the indirect care provided to the patient.

Thus, it is necessary to implement health education programs that cover all professionals in the area, so that changes in the work method can be sought through awareness-raising, involvement, sharing, and application of scientific knowledge in daily practices.

Regarding the sterilization process of the surgical material, it was noticed that some professionals showed little knowledge of the steps involved in reprocessing. It was noticed that doubts and insecurities arise during practice, as well as lack of necessary materials, among other difficulties, which seriously compromises the effectiveness of sterilization.

Professionals who carry out their activities in the MSC must be able to follow the technological development that perfects the service. Therefore, the participation of nurses in the professional qualification of the material sterilization process and in the identification of the needs of its staff is fundamental to guarantee the efficiency of the processes and to contribute to the prevention of infections. Thus, the identification of the difficulties proposes the mobilization of subjects to implement changes in their work process, in order to overcome such frailties, as well as the need to carry out future researches that complement the data obtained here.

During the study, there were some limitations, such as data collection during employee working hours. This may have partially compromised the participants' statements, as the MSC is an environment of constant activity, and the professionals may have answered some questions briefly to resume their activities quickly.

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