

Health technology for the quality of manual cleaning in the sterile processing department

Tecnologia em saúde para qualidade da limpeza manual no centro de material e esterilização

Tecnología en salud para la calidad de la limpieza manual en el centro de material y esterilización

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ABSTRACT: Objective: To report the development of a health technology in a sterile processing department (SPD). Method: This is a case report from nursing students based on their experience in a reference hospital in oncology, nephrology, transplants, and neurosurgery, using the Maguerez Arch methodology. Results: In the development of the health technology in the form of a chart (checklist of cleaning accessories), the students worked to solve a problem that was compromising the cleaning quality at the SPD. The developed technology was carefully considered to be easy to understand and intuitive, so that any professional could quickly understand its purpose. Conclusions: The technique applied to the manual cleaning of healthcare products allowed students to have a different perspective on the importance of nursing performance in the quality of this work, in addition to the relevance of health technologies in the management of nursing processes.

Keywords: Sterile processing department. Nursing. Patient safety. Health technology.

RESUMO: Objetivo: Relatar o desenvolvimento de uma tecnologia em saúde num centro de material e esterilização (CME). Método: Trata-se do relato de experiência de discentes de enfermagem com base na sua vivência num hospital de referência em oncologia, nefrologia, transplantes e neurocirurgia, utilizando-se a metodologia do Arco de Maguerez. Resultados: No desenvolvimento da tecnologia em saúde em forma de quadro (*checklist* de acessórios de limpeza), os discentes trabalharam para solucionar um problema que estava prejudicando a qualidade da limpeza no CME. A tecnologia elaborada teve um olhar minucioso para ser de fácil compreensão e intuitiva, de modo que qualquer profissional pudesse rapidamente entender seu propósito. Conclusão: A técnica aplicada na limpeza manual dos PPS possibilitou aos discentes um olhar diferenciado acerca da importância da atuação da enfermagem na qualidade desse trabalho, além da relevância das tecnologias em saúde no gerenciamento dos processos de enfermagem.

Palavras-chave: Centro de material e esterilização. Enfermagem. Segurança do paciente. Tecnologia em saúde.

RESUMEN: Objetivo: Reportar la experiencia del desarrollo de una tecnología para la salud en un Centro de Material y Esterilización (CME). Método: Se trata de un relato de experiencia, basado en la experiencia de estudiantes de enfermería en un hospital de referencia en oncología, nefrología, trasplantes y neurocirugía, utilizando la metodología del Arco de Maguerez. Resultados: En el desarrollo de la tecnología para la salud en forma de cuadro (lista de verificación de accesorios de limpieza), los estudiantes trabajaron para solucionar un problema que perjudicaba la calidad de la limpieza en el CME. La tecnología sanitaria elaborada tuvo un enfoque minucioso para que fuera fácil de entender e intuitiva, de modo que cualquier profesional pudiera comprender rápidamente su propósito. Conclusión: La práctica vivida en el hospital a partir de la realidad observada permitió a los estudiantes tomar una mirada diferente sobre la importancia de la actuación de la enfermería en la calidad de la limpieza manual de Productos para la Salud (PPS), además de la relevancia de las tecnologías sanitarias en la gestión de los procesos de enfermería.

Palabras clave: Centro de material y esterilización. Enfermería. Seguridad del paciente. Tecnología para la salud.

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INTRODUCTION

The sterile processing department (SPD) is an essential sector in healthcare services, responsible for ensuring safety and quality in the processing of healthcare products (HPs) used in the units¹.

The SPD adopts a directed flow and plays a fundamental role in preventing healthcare-associated infections (HAIs) through the appropriate processing of HPs used for patient health care¹.

The SPD can be classified into classes I and II. In Class I SPD, noncritical, semi-critical, and critical HPs with non-complex conformation, capable of processing, are processed, while in Class II SPD, noncritical, semi-critical, and critical HPs are processed, covering complex and noncomplex conformations, capable of processing².

For HPs to be made available for health care safely, it is necessary to submit them to several processing stages. Thus, the SPD is divided into four areas:

1. Reception and cleaning;
2. HPs preparation;
3. Sterilization or disinfection; and
4. Storage and distribution of HPs³.

The cleaning stage involves removing visible dirt that adheres to surfaces, fissures, perforations, joints, and lumens of hospital items. This procedure uses detergents and water in order to eliminate residues, as well as other fragments that may adhere to the items, in addition to reducing the presence of microorganisms³.

Cleaning is manual, involving rubbing, rinsing, and drying, and automated, using ultrasonic washers and thermodisinfectors. For the manual stage, brushes can be used for cleaning in general and instruments such as cannulas and stiff line cannulas, vats, basins, and rounded materials.

The automated method, by incorporating ultrasonic and thermodisinfection technology, provides more effective cleaning, eliminating microscopic dirt and ensuring thermal disinfection. This approach combines technological precision with efficiency, guaranteeing the removal of tiny impurities while ensuring a comprehensive thermal disinfection process³.

Performing manual cleaning in the SPD faces several challenges arising from the complexity and sensitivity of the HPs, highlighting the difficulty of accessing difficult-to-reach areas, such as complex joints and narrow lumens, which makes it

essential to guarantee the contact with cleaning agents to all components of the HPs⁴.

Knowing the specificities of each input is paramount for the cleaning process, which is a fundamental step to reduce the microbial load and remove dirt before the disinfection or sterilization steps. The correct cleaning of HPs guarantees the safe use of these materials by patients and professionals, resulting in the provision of an excellent service⁴.

OBJECTIVES

To report the development of a health technology in a sterile processing department (SPD).

METHOD

This is a descriptive research of the case report type, using the Charles Maguerez Arch Problematization Methodology (Figure 1)⁵, employing the following stages:

1. Observation of reality;
2. Survey of key points;
3. Theorization;
4. Solution hypotheses; and
5. Application to reality⁶.

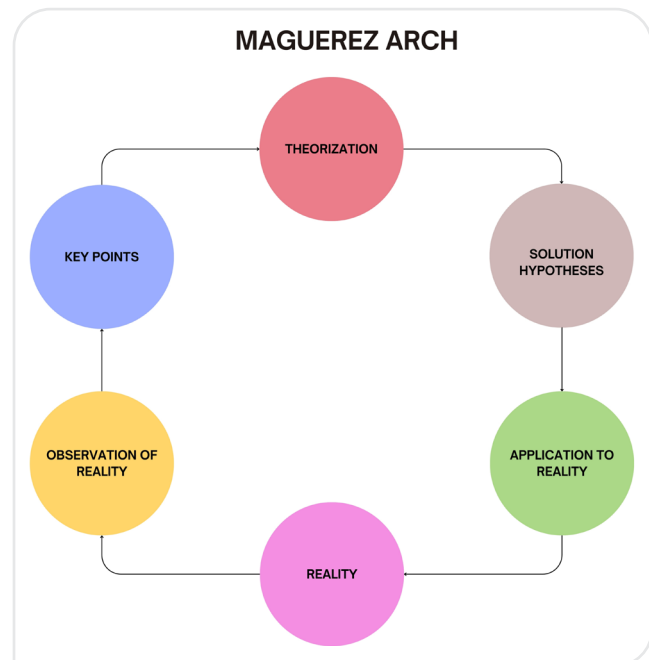


Figure 1. Stages of the Charles Maguerez Arch Problematization Methodology⁵.

The study took place in a reference hospital for oncology, nephrology, transplants, and neurosurgery in the city of Belém (state of Pará, Brazil), which serves users from different municipalities in the state and even from adjacent states.

The hospital, affiliated with the Brazilian Unified Health System (SUS), has 230 beds: 116 surgical, 77 clinical, 8 oncological urgency and emergency, and 29 in the adult Intensive Care Unit (ICU) to serve their reference specialties.

The case report was evidenced by three students in the fifth semester of the Nursing course at the Universidade do Estado do Pará (UEPA). The study was carried out during the internship of the Nursing in Surgical Center and SPD curricular component, in December 2022, which lasted three days and had as its main focus the Class II SPD area.

In the first stage of observation of reality, it was noted that the HPs were received based on protocols and their cleaning was done only manually, as the aforementioned SPD did not have automated equipment. A thermodisinfector is installed in the sector; however, according to information, it has never been used. Nowadays, it is not working.

After observing the reality, the students were able to identify two key points, which correspond to the second stage of the problematization: the lack of knowledge and control of the nursing team regarding manual cleaning accessories of HPs and the importance of the role played by nurses in the supervision of the SPD.

For the third stage (theorization), the students used the Virtual Health Library (VHL) for research, using the keywords “sterile processing department” and “manual cleaning.” In addition, they consulted the Resolution of the Collegiate Board (RDC) No. 15, of March 15, 2012, and the Guidelines on Practices in Perioperative Nursing and Processing of Healthcare Products of the *Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização* (Brazilian Association of Nurses of the Surgical Center, Anesthetic Recovery and Sterile Processing Department – SOBECC) to deepen the knowledge on the subject in question^{2,7}.

In the fourth stage, there were discussions between the students and a professor, which culminated in the elaboration of solution hypotheses (Chart 1).

In the stage of application to reality (fifth stage of the methodology), the students could only put into practice the first solution hypothesis, which concerns the development of the health technology. It was carried out in the form of a chart to assist the team responsible for reception and cleaning at the SPD.

The chart was created using the Microsoft Word platform, incorporating illustrations of the HPs regularly used in the hospital’s SPD. This strategy, as well as the choice of colors and font, was adopted with the aim of ensuring the creation of a visually attractive, functional resource that complies with the guidelines established by the healthcare institution.

Therefore, after discussions about the approach and ideal format of the tool, the chart was created with the title “Checklist of cleaning accessories,” which contains the five main HPs used in the SPD in question. The challenges overcome at this stage involved the selection and simplification of language, as well as the incorporation of colors and captions to make the team’s completion more efficient and accurate.

RESULTS

Taking into account the solution hypotheses, a health technology was developed with the aim of optimizing the quality control of the accessories used to manually clean the HPs. In addition, it was recommended for the nurse in the sector to train the technical nursing team working in the SPD as for the importance and care in cleaning the products, as well as the accessories used.

Initially, we observed that cleaning in the studied sector was done manually by nursing technicians due to the lack of automated equipment in operation. The HPs were immersed in an enzymatic detergent solution, rubbed using brushes and sponges and, subsequently, rinsed and dried.

We also observed that the unit’s water pressure jet was damaged and there was no informative material available in

Chart 1. Fourth stage: Charles Maguerez Arch Problematization Methodology.

1st solution hypothesis	To develop a healthcare technology that optimizes the quality control of accessories used for manual cleaning of HPs.
2nd solution hypothesis	To propose to the nurse in the sector to train the technical nursing team working at the SPD regarding the importance and care of cleaning materials as well as the accessories used for this purpose.

HPs: healthcare products; SPD: sterile processing department.

the environment on the validity and conditions of use of the cleaning accessories.

The students then proposed a health technology in the checklist model divided into columns, each containing the image of the material used, the description, and the factors that indicate its condition, in addition to a caption containing the meaning of the symbols and colors present in the chart (Figure 2). The chart, measuring 60 x 40 cm, was designed aiming at the practicality and simplicity of its periodically completion, only requiring a brush and removable paint.

The columns have process indicators in the following order: opening date, expiration date, condition of the brush bristles (with the “rigid” and “soft” options), space to mark whether the material has been changed, containing the options “yes” and “no,” and the informative caption at the bottom of the chart.

The colors green and red were used to respectively indicate the status of the material (“adequate” or “inadequate”) for use according to each option marked in the checklist, in

addition to the indicator “condition of the brush bristles” being described in purple to indicate that it must be filled in daily.






DISCUSSION

With the health technology in the form of a checklist chart, the students aimed to solve a problem that was harming the quality of cleaning at the SPD. The instrument should be easy to understand and intuitive, so that any professional could quickly understand its purpose.

Health technologies encompass materials, equipment, procedures, organizational, educational, information and support systems, as well as care programs and protocols. They play an essential role in providing health care to the population, being able to assist nurses and staff in their daily practice⁸.

The nurse is the professional in charge of managing the SPD and the operation of all steps of HPs processing. Among their several responsibilities, product management

Checklist of cleaning accessories

 Brush for cleaning in general	Opening date / /	Expiration date / /	Brush bristles condition <input type="checkbox"/> RIGID <input type="checkbox"/> SOFT	Change after 15 days <input type="checkbox"/> YES <input type="checkbox"/> NO
 Brush for cleaning instruments	Opening date / /	Expiration date / /	Brush bristles condition <input type="checkbox"/> RIGID <input type="checkbox"/> SOFT	Change after 15 days <input type="checkbox"/> YES <input type="checkbox"/> NO
 Brush for cleaning cannulas	Opening date / /	Expiration date / /	Brush bristles condition <input type="checkbox"/> RIGID <input type="checkbox"/> SOFT	Change after 15 days <input type="checkbox"/> YES <input type="checkbox"/> NO
 Brush for cleaning stiff line cannulas	Opening date / /	Expiration date / /	Brush bristles condition <input type="checkbox"/> RIGID <input type="checkbox"/> SOFT	Change after 15 days <input type="checkbox"/> YES <input type="checkbox"/> NO
 Brush for cleaning vats, basins, and rounded materials	Opening date / /	Expiration date / /	Brush bristles condition <input type="checkbox"/> RIGID <input type="checkbox"/> SOFT	Change after 15 days <input type="checkbox"/> YES <input type="checkbox"/> NO

Caption
 Needs to be changed Adequate for use

*The opening and expiration dates of the product must be filled in on the same day, every 15 days.
 *If the bristles condition is not adequate before 15 days, they must be changed.
 *The fields in the penultimate column (purple) must be filled in daily.

Figure 2. Health technology developed for use in the sterile processing department.

is highlighted due to the increasing advancement of health technologies⁹.

In this context, improving the skills necessary to effectively manage the SPD requires an experienced and technically competent nurse, preferably a specialist in the area. This involves the assessment of process, structure and outcome indicators, service quality indicators as well as managerial, assistance and educational tasks⁹.

The SPD is a fundamental sector in the hospital context, responsible for cleaning, preparing, disinfecting or sterilizing, storing and distributing HPs that can be processed, consumed in the surgical center and other units, thus requiring qualified professionals¹⁰.

The processes developed at the SPD are complex, which is why the relevance of their validation stands out, as it prevents contamination and HAIs and controls quality. Therefore, nursing professionals must comply with regulations and receive periodic training on manual cleaning by means of friction with brushes¹¹.

Accessories for manual cleaning can be disposable or reusable, of different sizes and shapes, must not be abrasive or sharp, which could damage the surface of the product and the interior of the lumens; however, they must be inspected and replaced as soon as they lose the characteristics necessary for the purging action, in addition to being clean and dry after each use to avoid microbial proliferation^{7,12}.

The manual cleaning method is hampered by the lack of uniformity in technical execution by different professionals, low productivity, and high occupational, chemical and biological risks, when standard precautions are not properly observed. These variables can reduce processing effectiveness and make validation difficult⁷.

Nonetheless, it is still considered the most suitable method for cleaning sensitive or complex items that do not bear automated methods. HPs intended for automated cleaning must be subjected to manual cleaning first, considering that it can eliminate 99% of the microbial load¹².

Professionals who work in cleaning do not perform routine and repetitive activities only; it is clear that there is a gap in the importance of the work process in this unit, with greater emphasis on the cleaning stage in the dirty area of the SPD, called purging. However, it should be noted that the nursing team acquires significant skills and knowledge in care functions through the competence developed in the sector¹⁰.

The resolution of the Federal Council of Nursing (COFEN) No. 424/2012 regulates the role of nurses in the SPD, with management being the main activity carried out by these professionals¹. It is the nurse's duty to have technical-scientific

knowledge of its operation and mainly to coordinate, guide, supervise, and support the improvement of nursing professionals, fulfilling their functions ethically and in accordance with the guiding principles of the profession¹¹.

For this to be feasible, as recommended, adequate instruments and working conditions are necessary, such as appropriate physical structure, fair remuneration, quality equipment and materials, protocols and standards, balanced sizing, and effective communication capacity¹³.

The nurses' competence in carrying out their activities guarantees the effectiveness of the SPD processes, in addition to helping to prevent infections. However, the importance of its work to the nursing team must be continually discussed and presented to other units of the institution so that it can receive due recognition¹³.

The development of this study gave students the opportunity to contribute to the area of nursing focused on improving the quality of manual cleaning in the SPD of an important hospital. As limitations of the study we highlight the limited time of practice in the unit and the restrictions on access to the SPD controlled environment, which prevented more detailed observations, as well as the application of the second solution hypothesis.

CONCLUSION

The implementation of the health technology tool in the SPD cleaning sector will be able to benefit the hospital team responsible for this function, as well as to strengthen the safety and efficiency of the institution as a whole, becoming essential to ensure the highest level of care in an extremely relevant hospital environment.

The technique applied to the manual cleaning of HPs allowed students to have a different perspective on the importance of nursing performance in the quality of this work, in addition to the relevance of health technologies in the management of nursing processes.

Thus, it favored the creation of an enabling experience for future work as professionals attentive to the nuances of the necessary care process with HPs and its use in an appropriate, efficient, and safe manner.

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None.

CONFLICT OF INTERESTS

The authors declare no conflicts of interest.

AUTHORS' CONTRIBUTIONS

RJSN: Project administration, Formal analysis, Conceptualization, Data curation, Methodology, Writing

– review & editing, Supervision. MNGB: Project administration, Formal analysis, Conceptualization, Data curation, Methodology. TMNP: Project administration, Formal analysis, Conceptualization, Data curation, Methodology. JFSJ: Investigation, Resources, Writing – original draft, Writing – review & editing, Validation. MESG: Research, Writing – original draft, Writing – review & editing. CMSS: Research, Writing – original draft, Writing – review & editing.

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