MANAGEMENT OF THE SURGICAL BLOCK IN PANDEMIC TIMES: WHERE WE STARTED AND WHERE WE WANT TO BE

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Since the beginning of the pandemic, the Brazilian Health Regulatory Agency (*Agência Nacional de Vigilância Sanitária* – ANVISA) recommends that all health services develop and implement a contingency plan with strategies and policies needed to tackle the SARS-CoV-2 pandemic, including the management of human and material resources[1].

This plan should define several practical actions necessary to confront this crisis in the service, including: surveillance and data management of infected patients and professionals; elaboration and implementation of clinical protocols and workflows (screening of suspected and infected patients and professionals, work leave and return for professionals who have tested positive for COVID-19, among others); internal communication involving all professionals in the facility; training and dissemination of protocols, flows, and proper use of personal protective equipment; monitoring of professionals regarding adherence to the actions implemented; daily control of pandemic-related supplies; mechanisms that promote awareness among the entire health team about actions that must be taken to face this pandemic[1].

The service must periodically monitor the implementation and adherence to the actions of the contingency plan in order to make the adjustments and improvements necessary. Monitoring the plan also contributes to detecting improvement points, such as the reinforcement of instructions for a specific group of professionals from the hospital, the readjustment of flows, and emergency actions in case of shortage of human and material resources[1].

Groups of professionals who work in the surgical block are among the most affected by the COVID-19 pandemic in recent months, initially by the suspension of elective procedures and the prioritization of urgency and emergency surgeries[1]. Furthermore, in many hospitals, the surgical center became an intensive care unit ready to receive infected patients. Teams of nurses and doctors were assigned to the care to these patients, optimizing the allocation of resources and space[1]. If in conventional circumstances, managing the surgical block is a challenging mission, the situation becomes even complex when we rethink this scenario in times of greater uncertainties, changes, transitions, coupled with little time to assimilate, reorganize resources, and prepare the team for this new reality[2].

In the years we have worked as managers of the surgical block and participated in collaborative fronts to tackle the pandemic, we have understood that the situation requires leadership, quick thinking, prior knowledge, trust and ethics, visibility, communication and power of persuasion, flexibility, and resiliency. Many leaders are working remotely and supporting their families while dealing with issues of care and safety for the patient and the multidisciplinary team[3].

In addition to these factors, the scope of the current leadership role for the surgical block includes redesigning models of care and professional training in real-time, developing intensive training in intensive therapy nursing, completely transforming the surgical environment into intensive care beds and returning them afterward for the resumption of surgeries, going back to the usual planning models[3].

Some leadership behaviors have become essential in this crisis, such as:

- making quick and effective decisions, identifying the most important points to handle, and engaging the leaders;
- adapting with boldness, deciding what not to do, and adjusting to the new situation;
- reliably giving the shift report, unifying the team focus, and monitoring performance;
- becoming involved with the care of the team, motivating them, and clearly and fully communicating new goals and important information[3].

Currently, we are experiencing a gradual recovery of surgical volume, amid concerted efforts to protect patients and staff, as well as allay fears about virus exposure. Some recommendations are crucial to ensure that the risks do not supersede individual needs. Any reopening must be approved by competent municipal and state health authorities and the public health system (*Sistema Único de Saúde* – SUS), and local decisions of private health insurance providers (Agência Nacional de Saúde – ANS) and health facilities must be evaluated[1,4,5].

In parallel to the return of elective surgeries, on June 19, 2020, the Ministry of Health published the Directive no. 1,565 in the Brazilian Official Gazette, providing general guidelines for the prevention, control, and mitigation of transmission of the novel coronavirus. The guidelines are also aimed at promoting the physical and mental health of the population. The goal is to support local strategies for the safe return to activities and social life, respecting the specificities and characteristics of each sector or line of business. Local authorities and local health bodies will be responsible for deciding the reopening process after evaluating the epidemiological scenario and the response capacity of the health care system.

In the face of the pandemic, overt precautions have been implemented for the return of elective surgeries. These precautions are being continuously monitored and will continue to be for an indefinite period. They include: monitoring of accesses, social distancing in hospital environments, use of specific protective equipment, decontamination routines and protocols, specific approach in procedures with the generation of aerosols, optimization and decrease in the number of people circulating in the operating room, safe flows without contact with infected patients, in addition to environmental control with negative/neutral pressure and air exchange for surgeries performed in suspected or contaminated patients, and positive pressure in the operating room for elective surgeries in uncontaminated patients[1,4,5].

The current situation brought to light novel practices that should be considered the new normal for the hospital environment, especially in areas with extensive manipulation of airways and body fluids of patients. We must ensure that the health professionals who will provide this care have proper training on these precaution techniques. The use of new tools, such as telemedicine and meetings on online platforms, has become usual and necessary[6,7].

Leaders of the organization must maintain the critical infrastructure and, at the same time, provide support to team members and empathize with their needs. In the international year of nursing, it is up to us, professionals of this area, of this beautiful profession of almost 200 years, to be proud every day and honor the legacy left by Florence Nightingale, who represents strength, courage, and dedication, noble attitudes that make us unique in this mission of caring for others.

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SURGICAL SAFETY CHECKLIST: ANALYSIS OF ITS ELABORATION AND IMPLEMENTATION IN TWO TERTIARY HOSPITALS

Protocolo de cirurgia segura: análise da produção e execução em dois hospitais terciários

Protocolo de cirugía segura: análisis de producción y ejecución en dos hospitales terciarios

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ABSTRACT: Objective: To analyze the process of elaboration and implementation of the surgical safety checklist in two tertiary hospitals in the city of Manaus. **Method:** This study was based on design thinking, focusing on the double diamond technique. It was conducted in two public hospitals in Manaus, from July 2018 to March 2019. The following stages were adopted for this research: investigation (observation and questionnaire) and intervention (synthesis, ideation, and delivery). **Results:** The first stage, consisting of 120 hours of observation, showed the non-fulfillment of the three phases of the process. After analyzing the answers to the 63 questionnaires, we confirmed the non-adherence to the checklist. Based on these findings, the synthesis phase focused on the use of the checklist; the ideation phase involved the proposal of solutions and the pilot testing; the delivery phase concluded the cycle by providing solutions to the hospitals. **Conclusion:** The analysis of the process of implementation of the checklist indicated non-compliance, suggesting risk to patient safety. After delivery and implementation, the tested solution may contribute to the effective execution of the checklist.

Keywords: Patient safety. Surgery department, hospital. Perioperative nursing.

RESUMO: Objetivo: Analisar o processo de produção e execução do protocolo de cirurgia segura em dois hospitais terciários do município de Manaus. **Método:** Pesquisa guiada pelo *design thinking*, com ênfase na técnica do duplo diamante, realizada em dois hospitais públicos no município de Manaus, de julho de 2018 a março de 2019. Foi feita nas etapas: investigativa (observação e questionário) e interventiva (síntese, ideação e entrega). **Resultados:** Na primeira etapa, com 120 horas de observação, constatou-se que as três fases do protocolo não foram cumpridas; analisando-se as repostas a 63 questionários, reforçou-se a não adesão ao *checklist*. Com base nesses achados, na etapa de síntese, elegeu-se como foco a aplicação do *checklist* do protocolo; na etapa de ideação, realizou-se a proposição de solução e a testagem-piloto; a etapa de entrega da solução aos hospitais encerrou o ciclo. **Conclusão:** A análise do processo de execução do protocolo indicou seu descumprimento, o que sugere o comprometimento da segurança do paciente. A solução testada poderá, após entrega e implementação, contribuir para a execução efetiva do protocolo.

Palavras-chave: Segurança do paciente. Centro cirúrgico hospitalar. Enfermagem perioperatória.

RESUMEN: Objetivo: Analizar el proceso de producción y ejecución del Protocolo de Cirugía Segura en dos hospitales terciarios de la ciudad de Manaus. **Método:** Investigación guiada por *Design Thinking,* con énfasis en la técnica *Double Diamond,* llevada a cabo en dos hospitales públicos de la ciudad de Manaus, desde julio de 2018 hasta marzo de 2019. Se realizó por etapas: de investigación (observación y cuestionario) e intervencionista (síntesis, ideación y entrega). **Resultados:** En la primera etapa, con 120 horas de observación, se encontró que las tres fases del protocolo no se cumplieron; En base a las respuestas a 63 cuestionarios, se reforzó la no adhesión a la lista de verificación. Con base en estos hallazgos, en la etapa de síntesis, la aplicación de la lista de verificación del protocolo fue elegida como el foco; en la etapa de ideación, se llevaron a cabo la propuesta de solución y la prueba piloto;

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La etapa de entrega de la solución a los hospitales finalizó el ciclo. **Conclusión:** El análisis del proceso de ejecución del protocolo indicó incumplimiento, lo que sugiere comprometer la seguridad del paciente. La solución probada puede, después de la entrega y la implementación, contribuir a la ejecución efectiva del protocolo.

Palabras clave: Seguridad del paciente. Servicio de cirugía en hospital. Enfermería perioperatoria.

INTRODUCTION

The concern with patient safety in health facilities has globally increased. Research in this area started in 1974 and reached a significant milestone in 1999, after the Institute of Medicine report, *To Err is Human*, published results of a study conducted in hospitals of the United States of America (USA). The findings revealed that approximately 100 thousand people died from adverse events, that is, damage caused during care and not associated with the patient's disease[1].

The international mobilization to promote patient safety reached Brazil in 2001 when the Sentinel Hospital Project was created to increase and systematize the surveillance of products used in health services, ensuring better safety and quality for patients and professionals[2]. In 2008, the Pan American Health Organization (PAHO) established the Brazilian Network for Nursing and Patient Safety (*Rede Brasileira de Enfermagem e Segurança do Paciente* – REBRAENSP) to disseminate the patient safety culture to health facilities, workers, and families of patients[3].

The World Health Organization (WHO), with the aid of collaborators from several countries, developed a surgical safety checklist (SSC) for the perioperative period, guided by three principles: simplicity, broad applicability, and the possibility of impact measurement. Thus, it allows the teams to follow critical safety steps efficiently and minimize the most common avoidable risks endangering the lives and well-being of patients[3,4].

In 2009, the Ministry of Health, together with PAHO, published guidelines in Portuguese to implement measures for the patient safety project Safe Surgery Saves Lives. In a study carried out in 2009 and 2010, complications decreased by 36% and mortality by 47% in surgical patients after the establishment of safe surgery[4]. Patient safety is part of a care axis committed to providing a service free of harm and accidental injuries during the delivery of health care[4].

The SSC created by the WHO has been implemented in Brazilian hospitals to ensure the safety of surgical patients[4,5]. It is considered a tool that helps foster teamwork among those involved in the anesthesia-surgical procedure, promoting patient safety, in addition to favoring the training of professionals and a better understanding of the actions necessary for strengthening patient safety processes, that is, perceived risk as an effective way of establishing a practical change in preventive measures[5,6].

The nurse who works in a surgical context can identify problems and encourage the development of devices and technological solutions[7]. Possible errors, difficulties, and weaknesses that can jeopardize the safety of surgical patients must be solved with the proper and full use of instruments that provide strategies for safe and quality care[7].

Based on the exposed, we formulated the research question: how can the SSC implementation process be developed in two large general hospitals in the city of Manaus?

OBJECTIVE

To analyze the process of elaboration and implementation of the SSC in two hospitals in Manaus.

METHOD

This is a methodological study[8] based on the stages of design thinking, focused on the double diamond technique[9,10]. In the health field, the design thinking method has been successfully used and has contributed to solving problems in several areas, such as the humanization of services, attention to patient needs, and improvement to perioperative flow[10].

A model proposed for implementing design thinking is the double diamond technique, created by the British Design Council in 2004[11]. The development of the double diamond technique requires the completion of four stages: discovery (research), which seeks to understand the problem to be solved; definition (synthesis), which identifies the area of focus; development (ideation), which elaborates and tests potential

solutions to the problem; implementation (delivery), which provides solutions that work best[10,11].

Thus, this research has adapted the double diamond technique, carrying out the following stages: investigation (discovery – observation and administration of questionnaires), which took place between July and September 2018; intervention (synthesis, ideation with pilot testing, and delivery), between October 2018 and March 2019. Both stages were completed in two surgical centers of two large public hospitals in Manaus, Amazonas, Brazil; one of them is a state hospital, reference in orthopedic surgeries (Hospital A), and the other is a federal university hospital (Hospital B).

A total of 63 professionals participated in the study (14 nurses, 15 surgeons, 13 anesthesiologists, 14 nursing technicians, and 7 surgical technologists). The sample was defined by convenience. The inclusion criteria were: working in one of the two surgical centers and having at least one year of experience in surgical activities.

Data collection was based on non-participant observation (shadowing), supported by the SSC, and an adapted questionnaire[11]. The observation in the two hospitals was performed by the first researcher, after the surgical team agreed and consented to participate, and occurred concomitantly in both facilities (Hospital A in the morning and Hospital B in the afternoon). During the intervals between observations (the end of one surgery and the start of the next), the researcher talked with the professionals about the goals of the study and provided the questionnaire to be filled, which aimed at verifying the knowledge, benefits, difficulties, and suggestions mentioned by the professionals for the implementations of the SSC. The completion of the questionnaire by the surgical team took place at the premises of the surgical center, at times previously scheduled with the participants according to their availability, with subsequent return to the researcher.

Data were analyzed through quantitative descriptive statistics, based on mean and percentage. We performed the distribution of absolute (n) and relative (%) frequencies of the data listed (attributes or nominal data) and the descriptive statistics of quantitative data (specific magnitudes or variables). Data were organized in Microsoft® Excel 2013 and assessed in the Statistical Package for the Social Sciences (SPSS), version 21.

The study complied with ethical aspects at all stages, in agreement with Resolution no. 466/2012 of the National Health Council. The Research Ethics Committee of Universidade Federal do Amazonas (REC/UFAM) approved this project under the Certificate of Presentation for Ethical Consideration (*Certificado de Apresentação para Apreciação Ética* – CAAE) no. 92500817.9.0000.5020. This article is part of the Master's thesis entitled *Programa de cirurgia segura: proposta para consolidar a implementação em dois hospitais públicos terciários em Manaus* (Safe surgery checklist: proposal to consolidate its implementation in two tertiary public hospitals in Manaus).

RESULTS

The investigation stage involved 120 hours of observation, 60 in each hospital, in their respective surgical blocks (SB). The mean number of surgeries observed daily in both hospitals was 20, totaling 200 surgical procedures followed in 10 days in each hospital. These observations focused mainly on the beginning and the end of surgeries.

Regarding the moment before induction of anesthesia (sign in), the surgical site was not marked in 197 procedures (98.5%) in both hospitals, as recommended by the SSC, except for plastic surgery patients. In three procedures (1.5%) of the latter type, the patients were examined by the surgeon or resident physician to confirm the side of the surgery and perform the marking. In these three cases, the marking of the surgical site was not done correctly. With respect to the moment before surgical incision (time out), the nurse was not present during the safety pause in both hospitals. No procedure implemented the time out or had the identification of the surgical team verbally confirmed by each member as to their name and function before surgical incision, as recommended by the SSC.

The observation of the time out allowed identifying items that did not comply with the established by the SSC, such as:

- absence of the nurse at the moment of time out since they were busy with other administrative activities;
- circulating nurse could not verbally run through the checklist because they were performing several tasks in the operating room (OR);
- lack of verbal confirmation of the checklist because no professional was specifically assigned to the task.

Concerning the moment before the patient leaves the OR (sign out), 150 procedures (75%) had instruments, needles, and sponges counted. In the observation period, no surgery reported whether the equipment worked properly during the procedure. About this aspect, 75 procedures (37.5%) had technical failures in the monitoring and reading of parameters, such as pulse oximetry, heart rate, and non-invasive blood

pressure, and the equipment had to be replaced. We noted that equipment such as monitors and anesthesia machines were not tested before the surgical procedures and even had expired calibration or no information as to the last calibration or check by the clinical engineering team.

The second part of the investigation stage consisted of administering the questionnaires, which started with the profile data of the interviewees (Table 1). Among the participants, 30 worked in Hospital A and 33 in Hospital B.

Regarding the second part of the questionnaire, Table 2 shows the percentage of answers to questions 1 to 3, with total data from both hospitals. We underline that the number of participants differs in the second and third questions because 3 of the 63 professionals who comprised the sample reported not knowing the SSC.

About the use of the SSC, the end of the questionnaire asked the professionals to pinpoint its main benefits and the difficulties in its implementation. Table 3 shows the answers collected in both hospitals studied.

The intervention phases (synthesis, ideation with pilot testing, and delivery) occurred after analyzing the previous stage (investigation). In the synthesis phase, a report was drafted, and the checklist was elected as the aspect of focus for subsequent steps. The choice of focus is confirmed by the results of the previous stage, which indicated, among other aspects, that the checklist either arrived filled in the patient's medical records, with the stages stamped, or was filled at the end of the anesthesia-surgical procedure, when each professional completed and stamped their part. This scenario reveals the non-compliance with the protocol recommended by the WHO, according to which the SSC must be completed by a single professional.

The results also emphatically showed the resistance of the entire surgical team in running through the checklist, especially when the surgical procedures took place consecutively, one after the other. Furthermore, in all cases observed, surgeons also demonstrated resistance in verbally presenting the team. As to the existence of a standard, we found no specific rules established for the completion of the checklist in the hospitals.

The ideation phase proposed a solution to the full implementation of the SSC and the pilot testing. A model with five steps, called Five-Step Model, was elaborated as follows:

Table 2. Answers to the SSC questionnaire from hospital professionals.

Questions	Yes n (%)	No n (%)
1. Do you know the WHO SSC? (n=63)	60 (95.2)	3 (4.7)
2. Is the SSC used in all surgeries of this hospital? (n=60)	27 (45.0)	33 (55.0)
3. Do you use the SSC? (n=60)	35 (58.3)	25 (41.6)

SSC: surgical safety checklist; WHO: World Health Organization.

Table 1. Profile of the professionals participating in this study (n=63).

Variable	Profession				
	Nurse	Surgeon	Anesthesiologist	Nursing technician	Surgical technologist
Mean age (years)	34.7	35.5	42.3	39.4	29.3
Mean length of service (years)	6.7	5.5	11.7	10.8	3.5
	n (%)	n (%)	n (%)	n (%)	n (%)
Sex					
Male	6 (43.7)	12 (80.0)	7 (53.3)	4 (37.5)	2 (33.3)
Female	8 (56.3)	3 (20.0)	6 (46.7)	10 (62.5)	5 (66.7)
Degree					
Specialist	14 (87.5)	14 (93.3)	13 (86.6)	0 (0.0)	0 (0.0)
High school	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	7 (100)
Master's	2 (12.5)	1 (6.7)	2 (13.4)	0 (0.0)	0 (0.0)
Residence	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Technician	0 (0.0)	0 (0.0)	0 (0.0)	14 (100)	0 (00.0)

Table 3. Benefits and difficulties of implementing the SSC as indicated by the professionals (n=60).

	Answers	
	n	%
Benefits		
Makes procedures safer	31	51.6
Improves the service	21	35.0
Reduces medical errors	30	50.0
Promotes effective communication	21	35.0
Benefits the health facility	23	38.3
Prevents the use of defective equipment	15	25.0
Difficulties		
Another bureaucratic role	17	28.3
The time out takes too long and delays the service	13	21.6
Lack of knowledge about the SSC by the health team	39	65.0

SSC: surgical safety checklist.

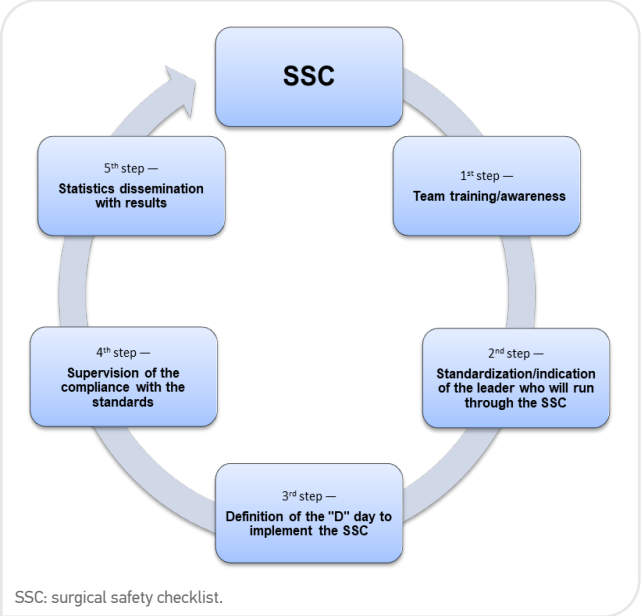

Figure 1. Five-step model proposed to implement the SSC.

- 1st step: training and raising awareness of the surgical team;
- 2nd step: standardization/indication of the leader who will run through the SSC;
- 3rd step: definition of the "D" day to implement the SSC;
- 4th step: supervision of the compliance with the standards;
- 5th point: statistics dissemination with results (Figure 1).

In January 2019, meetings were held in both hospitals to draw support for the pilot testing of the model, with the participation of the director-general, medical director, director of education and research, coordination of medical and nursing residency, coordination of the patient safety center, nursing and SB manager. They agreed on the full adherence to the model and its pilot testing.

Next, the model was tested in both SBs in February and March 2019. In the end, after new daily observation in the two hospitals (for 10 days) and dialog with hospital managers to gather their opinions, we noted an increase in the awareness of the surgical team and more effective use of the SSC. However, in some procedures, the SSC still was not verbally confirmed, and the professionals involved continued to resist its implementation, which shows the need for a medium-term, direct, and ongoing intervention from hospital managers.

DISCUSSION

In the observation period, the results of the first stage (investigation), which assessed the state of the practice as to the procedures that should be performed before induction of anesthesia, such as marking the surgical site, showed that they were not correctly carried out in the two hospitals investigated. According to the SSC, the identification/marking of the surgical site should be performed by the surgeon responsible for the procedure before sending the patient to the OR. The protocol recommends that the patient be awake and aware, if possible, to confirm the site of the procedure. The site where the surgery will be performed should be marked in the patient's body with a marking pen. "The health facility must define processes by writing to deal with exceptions, such as documented patient refusal, so as to ensure surgical safety"[12].

Study shows that about 1 in every 50 thousand surgeries in the USA is performed in the wrong site or the wrong patient, which corresponds to 1,500-2,500 incidents per year. After implementing the SSC in hospital units, "the deaths caused by surgical complications in the wrong site and the wrong patient decreased by almost half (from 1.5% to 0.8%)"[13].

Concerning the time out, that is, the moment before the surgical incision or safety pause, the checklist was not verbally confirmed because no professional was specifically assigned to the task. The same situation was reported in studies

conducted in a university hospital and a general hospital, as during the time out phase, none of the surgeries included the introduction of the surgical team before the procedure, patient identification, and marking of the surgery site[13,14].

At the end of the procedure (sign out), before the patient leaves the OR, the instruments, sponges, and needles must be counted, the surgical specimen must be identified for anatomopathological study, and equipment problems that require servicing must be reported[4]. The observation in both hospitals revealed that the instruments were not counted in the surgeries, even when the surgical technologist was present.

In a study on the inadvertent intracavitary retention of objects, 90% corresponded to textiles, 5.21% to surgical instruments, and 2.84% to needles. Among the reasons reported for this occurrence, the lack of counting was associated with 25% of cases. The most disseminated preventive measure is routinely counting these materials, which is not standardized in many surgical centers[15].

The observation allowed us to reflect on the resistance of professionals to implementing the SSC as a regular practice. Studies indicate that the implementation of the SSC is being stimulated in Brazil. Nevertheless, new routines are not always positively received at first, with resistance by surgical team members, in special surgeons and anesthesiologists, particularly when the effectiveness of the results, although crucial, is not easily demonstrated in the short term[16,17].

With respect to the interviews conducted in the hospitals studied, which involved all 63 (100%) professionals, we found that most of them knew about the existence of the SSC, and only 3 (7%) were had no knowledge of it. Considering that the SSC was implemented, on average, two years before in both hospitals, all professionals should know about it.

This finding corroborates a study that identified many surgeons and surgical residents who did not know the SSC proposed by the WHO and other doctors who, despite having it as a personal application, did not use it[18]. The study also pointed out that, among the nursing team, few members did not know the SSC[18].

Among the advantages of implementing the SSC acknowledged and indicated by the professionals in this study, making the procedure safer was the most cited, followed by reducing medical errors and benefiting the health facility. Considering the exposed, the professionals involved have, in theory, shown trust in the SSC, as they recognized that using it can reduce adverse events, providing more safety to the surgical patient.

As to the difficulties listed by the professionals for the implementation of the SSC, the most frequent answer was the addition of another bureaucratic role to be performed, and also the fact that the time out takes too long and delays the service. The participants also mentioned the team's lack of knowledge about the program. This report confirms the resistance of the target public interviewed to the verbal reading of the checklist, disregarding its role as a tool designed to reduce inherent risks related to the performance of anesthesia-surgical procedures, but shows that they recognize the need for improving knowledge about the SSC among the team.

In a study on adherence to the SSC, 32 publications about the theme identified that "the viability of the surgical safety checklist has become promising in several Brazilian hospitals, although the involvement of the surgical team concerning adherence is still low"[19]. The research indicated the need for a coordinator to facilitate the completion of the checklist, suggesting the nurse as the SB coordinator since they can use this tool as a way of measuring and assessing the care provided to surgical patients[19].

An investigation conducted in the USA on the implementation of the SSC in hospitals concluded that its success is associated with a better perception by the professionals regarding its use, mutual respect among the surgical team, leadership, coordination, and team communication. The study also confirmed that the professionals involved noted an improvement in perioperative safety after the implementation of the SSC[20].

The SSC implementation process is apparently simple but can become complex due to the need for overcoming the team's resistance to change, as they will have their routines in the work environment modified. Also, this change increases with the complexity of the location where the SSC should be implemented[18-20].

With respect to the intervention, after synthesis of the previous stage, we noticed the need for implementing an innovative model for improving the SSC performance, identified after some conflicts, especially the non-acceptance/resistance and the lack of implementation of the full SSC in the hospitals under study. The aim was to contribute some interventions that could reduce such conflicts. In doing so, besides applying the proposed model, we established new practical resources for improving the effectiveness of the SSC, since neither hospital had tools to help implement and execute the program. With the operationalization of the model, we expect a better adherence to the SSC, increasing the quality

of care provided to the surgical patient and helping reduce occasional adverse events and, consequently, hospital costs.

Studies show the importance of the nurse's role in carrying out the SSC, be it by their skill in managing the multidisciplinary team or by their wealth of knowledge, which can benefit health professionals and patients, contributing to improving surgical safety[5-7].

The limitations of the study include its performance in only two hospitals of the health care system in Manaus. Another limitation is the non-validation of the model proposed in the study by experts in the field, which will be done in subsequent work.

CONCLUSION

The analysis of the process of elaboration and implementation of the SSC indicated non-compliance with the phases of the checklist, suggesting risk to patient safety. The role of the nurse in the surgical context consists of identifying problems and encouraging the proposal of solutions for quality and risk-free care. The results pointed to the need for intrahospital solutions involving all professionals to increase adherence to the SSC. Thus, after its implementation in two hospitals, we believe that the model proposed and tested during this study may contribute to the more effective execution of the SSC.

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PATIENT SAFETY CULTURE: PERCEPTIONS AND ATTITUDES OF SURGICAL CENTER WORKERS

Cultura de segurança do paciente: percepções e atitudes dos trabalhadores de centro cirúrgico

Cultura de seguridad del paciente: percepciones y actitudes de los trabajadores del centro quirúrgico

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ABSTRACT: Objective: To evaluate safety culture based on the perceptions and attitudes of professionals who work in the surgical center of a teaching hospital. **Method:** This is an exploratory descriptive cross-sectional study, with a quantitative approach, developed with 110 professionals who work in the surgical center, using the Safety Attitudes Questionnaire. **Results:** The general mean scores showed an incipient safety culture. When evaluating the culture by domains, job satisfaction and stress recognition were assessed as positive, and teamwork climate, safety climate, perceptions of unit/hospital management, and working conditions, as negative. **Conclusion:** The level of safety culture found is below that recommended in the literature. Management actions and working conditions were considered the main factors that contributed to the fragility of this culture. However, the professionals were satisfied with their work unit.
Keywords: Culture. Patient safety. Surgicenters. Health personnel. Health services research.

RESUMEN: Objetivo: evaluar la cultura de seguridad, a través de las percepciones y actitudes de los profesionales que trabajan en el centro quirúrgico de un hospital universitario. **Método:** Estudio exploratorio, descriptivo y transversal, con enfoque cuantitativo, desarrollado con 110 profesionales que trabajan en quirófano, aplicando el Cuestionario de Actitudes de Seguridad (*Safety Attitudes Questionnaire*). **Resultados:** El promedio de la puntuación general mostró una incipiente cultura de seguridad. Al evaluar la cultura por dominios, la "satisfacción laboral" y la "percepción del estrés" se evaluaron como positivas, y el "clima de trabajo en equipo", el "clima de seguridad", la "percepción de gestión de la unidad/hospital" y las "condiciones de trabajo" como negativas. **Conclusión:** El nivel de cultura de seguridad encontrado es inferior al recomendado en la literatura. Las acciones de gestión y las condiciones de trabajo se consideraron los principales factores que contribuyeron a la fragilidad de esta cultura. Sin embargo, los profesionales estaban satisfechos con la unidad de trabajo.
Palabras clave: Cultura. Seguridad del paciente. Centros quirúrgicos. Personal de salud. Investigación sobre servicios de salud.

RESUMO: Objetivo: Avaliar a cultura de segurança por meio das percepções e atitudes dos profissionais que atuam no centro cirúrgico de um hospital de ensino. **Método:** Trata-se de um estudo exploratório, descritivo e transversal, com abordagem quantitativa, desenvolvido com 110 profissionais que atuam no centro cirúrgico, utilizando o Safety Attitudes Questionnaire. **Resultados:** A média geral dos escores evidenciou uma cultura de segurança incipiente. Ao avaliar a cultura por domínios, satisfação do trabalho e percepção do estresse foram avaliados como positivos, e clima de trabalho em equipe, clima de segurança, percepção da gerência da unidade/hospital e condições de trabalho, como negativos. **Conclusão:** O nível de cultura de segurança encontrado está abaixo do preconizado na literatura. As ações gerenciais e as condições de trabalho foram consideradas os principais fatores que contribuíram para a fragilidade dessa cultura, entretanto os profissionais demonstraram-se satisfeitos com a unidade de trabalho.
Palavras-chave: Cultura. Segurança do paciente. Centros cirúrgicos. Pessoal de saúde. Pesquisa sobre serviços de saúde.

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INTRODUCTION

Since 2004, patient safety has become a globally discussed topic, intending to improve the quality of health care by reducing incidents caused by health care that result in damage to the patient[1]. This theme became paramount with the creation of the World Alliance for Patient Safety by the World Health Organization (WHO). It instituted a set of measures, through campaigns, aimed at good care practices called Global Patient Safety Challenge to reinforce safety practices and promote better communication and work among the multidisciplinary team[2].

In Brazil, safety culture was considered one of the principles of risk management targeted at quality and patient safety only in 2013, with the creation of the National Patient Safety Program (*Programa Nacional de Segurança do Paciente* – PNSP) and the publication of the Collegiate Board Resolution (*Resolução da Diretoria Colegiada* – RDC) No. 36. Among the goals discussed in this program, the safety of surgical patients stands out as a priority in health services[3].

It should be noted that the surgical center (SC) is a place that offers complex care through multidisciplinary teams and high technological density, but with a great risk of damage to the patient[4]. The probability of damage may be associated with professional stress, ineffective communication, high workload, and/or dual employment. Therefore, surgical patient safety requires the participation of the multidisciplinary team and organizational actors concerning patient safety culture[5].

Safety culture is defined as a product of values, attitudes, skills, and patterns of individual and collective behaviors that determine the commitment, style, and proficiency of the management of a safe organization. Several instruments in different languages can be used to understand and evaluate safety culture[6].

In Brazil, the Safety Culture Survey and the Safety Attitudes Questionnaire (SAQ) are the most used instruments in hospitals[7]. We chose to develop this study using the Portuguese version of SAQ, as this tool is reliable and sensitive in assessing individual attitudes and perceptions related to safety[8].

National studies on patient safety culture carried out in the South and Northeast regions with multidisciplinary teams from different hospital sectors and primary health care concluded that safety culture could be influenced by the professional's position, the workload, the hospital management, and stress. We emphasize that such studies were performed in intensive care units and inpatient care, demonstrating the clear need for safety culture to be better explained in SC units, considering its high-risk nature.

OBJECTIVE

To evaluate patient safety culture based on the perceptions and attitudes of professionals who work in the SC of a teaching hospital in Northeastern Brazil.

METHODS

This is an exploratory descriptive cross-sectional study, with a quantitative approach, developed at the SC of a public teaching hospital in Aracaju, Sergipe, Brazil.

A total of 110 professionals participated in the study, covering the categories: surgical doctors, anesthesiologists, medical residents, nurses, nursing technicians, nursing assistants, health assistants (stretcher-bearers, clinic secretary), and pharmacy technician.

The investigation included professionals who were directly or indirectly involved with care and had worked in the sector for at least one month, with a minimum workload of 20 hours per week. The study did not include professionals who, for whatever reason, were away during the data collection period – those on leave, vacation, or having a day off. During the collection period, no professional was away from their work activities.

The translated and validated version of the Safety Attitudes Questionnaire (SAQ) — Short Form 2006 — for Brazilian Portuguese was used for data collection. SAQ is an instrument that measures the safety climate perceived by professionals and is divided into two parts. The first part consists of variables that characterize the subject (position, gender, specialty, experience in the specialty). The second part has 41 questions, covering the domains: teamwork climate, job satisfaction, perceptions of hospital and unit management, working conditions, and stress recognition. The answers to each of these questions follow a 5-point Likert scale:

- A: strongly disagree;
- B: slightly disagree;
- C: neutral;
- D: slightly agree;

- E: strongly agree;
- X: not applicable[9].

In this part, we added the variables: age, schooling, working time in the sector (in years), work shift, employment relationships, patient care (direct or indirect).

Data collection was carried out from May to July 2016, by three researchers. The professionals who agreed to participate in the study signed the Informed Consent Form and received explanations about the purposes of the study. The questionnaire was delivered to each participant in a closed envelope. After completion, the participants placed it in a folder left on-site to maintain their confidentiality. All folders were collected at the end of each work shift.

Data were organized and analyzed using the Epi info® software, version 7, with independent double-entry. Demographic and quantitative labor variables were described by measures of central tendency and dispersion, and qualitative categorical variables by simple descriptive statistics.

We analyzed the SAQ by evaluating its 41 questions through a score ranging from 0 and 100 points, with 0 representing the worst perception of the safety climate and 100 representing the best. Questions 2, 11, and 41 have a reverse score. Namely, in these cases, 0 is the best perception of the safety climate, and 100 is the worst. Each question received the following score:

- strongly disagree (A): 0 points;
- slightly disagree (B): 25 points;
- neutral (C): 50 points;
- slightly agree (D): 75 points;
- strongly agree (E): 100 points;
- not applicable (X): no score.

Scores ≥75 were considered positive.

This study complied with Resolution No. 466/2012 on research involving human beings and was approved by the Research Ethics Committee of Universidade Federal de Sergipe (Certificate of Presentation for Ethical Consideration 50133315.8.0000.5546).

RESULTS

Among the 110 professionals who participated in the study, the median age was 35 years old. The median workload was 36 weekly hours. As for the working time in the sector, the median was 18.5 months. Most participants were female (61/55.5%). The professional categories with the largest number of subjects were surgeons and anesthesiologists, as well as medical residents with 32 subjects (29.1%), followed by nursing assistants and nursing technicians (27/24.5%), nurses (9/8.2%), health assistants, and pharmacy technicians (10/9.1%). Regarding schooling, 86 (78.2%) had completed higher education, and 64 (58.2%) had a specialization.

When analyzing domains, stress recognition (77.5%) had the highest mean, while perceptions of hospital management obtained the lowest mean (55.1%). The overall mean was 69.1% (Figure 1).

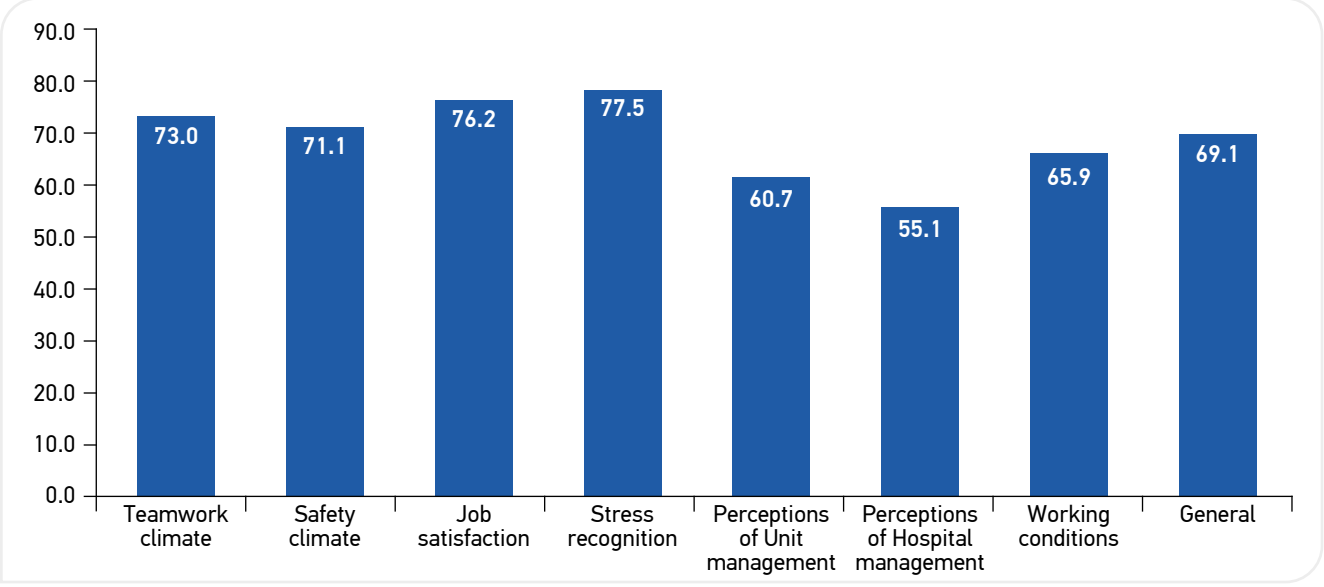

Figure 1. Mean scores obtained by the evaluation of health professionals who work in the surgical center, according to the domains of the Safety Attitudes Questionnaire.

In the teamwork climate domain, 90 (82%) professionals agreed with the item "I have the support I need from other personnel to care for patients." However, only 27 (25%) participants agreed with the item "In this sector, it is difficult to speak up if I perceive a problem with patient care."

Regarding the safety climate domain, 23 (21%) respondents disagreed with the following statement: "Medical errors are handled appropriately in this sector," while 41 (37%) agreed with: "In this sector, it is difficult to discuss errors."

In the job satisfaction domain, the item with the highest score was: "I like my job," with 100 (91%) agreements. A total of 87 (79%) participants agreed with the item "This hospital is a good place to work" (Table 1).

Concerning the stress recognition domain, 92 (84%) professionals agreed with the following statement: "I am less effective at work when fatigued." Eighty-two (75%) individuals agreed with the item "When my workload becomes excessive, my performance is impaired;" 79 (72%) of them agreed with "I am more likely to make errors in tense and hostile situations," and 68 (72.0%) interviewees agreed with "Fatigue impairs my performance during emergency situations" (Table 2).

Regarding the perceptions of unit/hospital management domain, 27 (25%) participants disagreed, and 27 (25%) were neutral about the item "Unit administration supports my daily efforts." Only 32 (29%) individuals agreed with the following statement: "Unit management constructively deals with problem physicians and employees;" 42 (38%) agreed with the item: "I am provided with adequate, timely information about events in the hospital that might affect my work;" and 67 (61%) agreed with the item: "Unit management does a good job" (Table 2).

Regarding the working condition domain, 75 (68%) individuals agreed with the following statement: "The levels of staffing in this clinical area are sufficient to handle the number of patients." A total of 39 (35%) respondents disagreed with the statement "All the necessary information for diagnostic and therapeutic decisions is routinely available to me" (Table 2).

The three domains with the highest mean scores were: stress recognition, job satisfaction, and teamwork climate, respectively. Only the stress recognition and job satisfaction domains obtained mean scores higher than 75. The worst evaluated domain was perceptions of hospital management[10].

Table 1. Responses related to teamwork climate, safety climate, and job satisfaction in the surgical center.

Domain	Disagree* N (%)	Neutral N (%)	Agree* N (%)	NA N (%)
Teamwork climate				
In this sector, it is difficult to speak up if I perceive a problem with patient care.	73 (66)	5 (5)	27 (25)	5 (5)
I have the support I need from other personnel to care for patients.	13 (12)	0 (0)	90 (82)	7 (6)
Safety climate				
Medical errors are handled appropriately in this sector.	23 (21)	18 (16)	64 (58)	5 (5)
In this sector, it is difficult to discuss errors.	51 (46)	13 (12)	41 (37)	5 (5)
Job satisfaction				
I like my job.	2 (2)	2 (2)	100 (91)	6 (5)
This hospital is a good place to work.	10 (9)	6 (5)	87 (79)	7 (6)

*Slightly or strongly; NA: not applicable.

Table 2. Responses related to stress recognition, perceptions of management, and working conditions in the surgical center.

Domain	Disagree* N (%)	Neutral N (%)	Agree* N (%)	NA N (%)
Stress recognition				
When my workload becomes excessive, my performance is impaired.	14 (13)	7 (6)	82 (75)	7 (6)
I am less effective at work when fatigued.	10 (9)	3 (3)	92 (84)	5 (5)
I am more likely to make errors in tense or hostile situations.	18 (16)	8 (7)	79 (72)	5 (5)
Fatigue impairs my performance during emergency situations.	26 (24)	8 (7)	68 (62)	8 (7)
Perceptions of unit/hospital management				
Unit administration supports my daily efforts.	27 (25)	27 (25)	47 (43)	9 (8)
Unit management does a good job.	16 (15)	18 (16)	67 (61)	9 (8)
Unit management constructively deals with problem physicians and employees.	32 (29)	33 (30)	32 (29)	13 (12)
I am provided with adequate, timely information about events in the hospital that might affect my work.	36 (33)	20 (18)	42 (38)	12 (11)
Working conditions				
The levels of staffing in this clinical area are sufficient to handle the number of patients.	20 (18)	5 (5)	75 (68)	10 (9)
All the necessary information for diagnostic and therapeutic decisions is routinely available to me.	39 (35)	9 (8)	51 (46)	11 (10)

*Slightly or strongly; NA: not applicable.

DISCUSSION

Study results showed that relevant aspects of patient safety culture in the SC need to be improved since the mean score evaluation confirms that only two out of six domains obtained values higher than 75, considered the minimum value for a positive safety culture.

The stress recognition domain, which corresponds to the professionals' perception of stressful elements in the performance of their work, achieved the highest score in the study and requires attention. It is noteworthy that the research participants had a high perception of stressful situations in the work environment. This result is consistent with that of a study conducted with professionals in the Federal District to evaluate the safety culture in a public hospital, which also demonstrated, through a positive score, that employees notice when stressors interfere with their work performance[6].

The high perception of stressors in the work environment was also identified in international studies carried out in Norway and Hungary, which showed results similar to those of Brazilian studies, highlighting that professionals had a good perception of stressors in the work environment[6].

As stress is known to be a negative influence on any human activity, professionals must realize that, to provide care to the patient, they first need to take care of themselves, avoiding stress and distress that may predispose them to error[11].

Professionals are aware that excessive workload and fatigue impair their performance and increase the likelihood of errors in tense and hostile situations, thus compromising patient safety. Therefore, we can infer that most professionals recognize stressors, such as fatigue, insufficient human resources, emotional factors, and communication barriers, as something to be positively reversed[10].

Job satisfaction was the domain with the second highest mean score. A study carried out with nursing professionals in Rio Grande do Sul has similar results to that of the statement "I like my job," revealing that 91% of professionals declared liking the work they did, and 82% were proud to work in the area[11]. The satisfaction of health professionals is

considered a positive factor since it directly affects the quality of care provided[12].

Unhappy professionals have high turnover rates associated with adverse events, such as errors in drug administration and incidence of falls. In this sense, job satisfaction is correlated with increased productivity and patient safety, as satisfied professionals can make the workplace safer[13].

Teamwork is the combination of harmonious relationships, interaction, and collaboration between elements in the same physical environment. The study demonstrates the teamwork climate domain as satisfactory, a positive aspect of the institution studied.

The results obtained in the teamwork climate domain are similar to those of a study carried out in Ceará. The investigation indicated that the quality of care is favored in environments where participants can make suggestions, openly discuss a problem, assist one another, and doctors and nurses work in a coordinated way. A favorable work environment depends on how the team members interact. Harmony and respect for differences are the main factors that lead to the development of an environment considered pleasant, safe, and focused, above all, on patient safety[7].

Nonetheless, in the same domain, the participants pointed out that disagreements are not properly resolved and that it is difficult to speak up about a problem regarding patient care, a situation considered negative for safety since problem-solving is impaired, facilitating the occurrence of adverse events in patients[7].

The safety climate domain had a mean score below 75, which suggests that collective interaction and respect among professionals need to be strengthened. Also, 72% of professionals declared that they would feel safe if they needed to be treated in this SC as patients, corroborating the results of a study carried out in Southern Brazil. However, at the same time, they reported that it is difficult to discuss errors and that these errors are not handled properly in the sector[10].

We underline that the significantly low scores of both perceptions of unit management and perceptions of hospital management demonstrate the weakness of hospital administration.

Participants do not feel supported by hospital management, nor do they receive adequate information that might affect their work, which represents a weakness in communication between managers and healthcare professionals. A study carried out in Southern Brazil showed a similar result[13]. This issue requires much attention, as it directly reflects on the quality of care provided. These results point to the need for management to address these issues, as a safety culture will not be built if, primarily, the unit and hospital managers are not involved or sensitized[12].

The working conditions domain obtained a score of 65.9, confirming the need for continuing education and overcoming of difficulties for professionals[14]. This deficit in continuing health education contributes to the low score observed in the perceptions of management. Thus, managers must promote and support the implementation of safe practices based on scientific evidence and care protocols to encourage safe multidisciplinary care, reducing the chance of preventable adverse events.

CONCLUSION

The level of safety culture found at the institution hosting the research is below that recommended by the literature. The professionals involved identified managerial actions as the main contributing factor to the fragility of this culture. Nevertheless, they declared satisfaction with their work.

Data analysis allowed a situational diagnosis. It worked as a warning for the domains that need to be addressed and the strategies that should be developed and improved to strengthen safety culture in the SC. We suggest consistent interventions in the identified domains to promote a safe environment for professionals and patients.

These results can be useful for the managers of this hospital unit because, by identifying the level of safety culture, they can plan actions to promote patient safety, such as continuing education processes and the introduction of new tools, such as the surgical safety checklist, proposed by WHO.

Considering that the study focused on the SC, we recommended replicating this research in other hospital units to identify the weaknesses and potential of each work area, aiming at a change planning based on the evaluation of professionals who work daily in health care.

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QUALITY MEASUREMENT IN THE OPERATING ROOM: WHICH INDICATORS DO WE USE?

Medição da qualidade em centro cirúrgico: quais indicadores utilizamos?

Medida de calidad en centro quirúrgico: ¿qué indicadores usamos?

Bárbara Peres Gama[1]*, Elena Bohomol[2]

ABSTRACT: Objective: To identify the indicators used by nurses working in the operating room and how they are managed. **Method:** Descriptive, cross-sectional, and quantitative study, carried out from October 2018 to February 2019. The sample was a convenience sample, with nurses from Brazilian operating rooms who answered a questionnaire with 53 questions. Data analysis was performed using descriptive statistics and χ^2 statistical test with a significance level of 5%. **Results:** The indicators most managed by nurses were: number of surgeries canceled (81.6%), infection rate of the surgical site (78.5%), and occupation of operating rooms per month (69.6%). There was a significant difference in the management of indicators between hospitals with and without external quality assessment, in terms of training (p=0.000) and sharing the results with the teams (p=0.000), which proved to be equal for the difficulty in using the tool (p=0.803). **Conclusion:** Although the indicators are monitored by nurses and hospitals with external assessment show better results in some items of management and use of indicators, institutions still need to invest in the improvement of professionals and the management of the tool.

Keywords: Nursing. Operating rooms. Management indicators. Quality management. Patient safety.

RESUMO: Objetivo: Identificar quais são e como são gerenciados os indicadores utilizados pelos enfermeiros que atuam em centro cirúrgico. **Método:** Estudo descritivo, transversal e quantitativo, realizado no período de outubro de 2018 a fevereiro de 2019. A amostra foi composta de conveniência, com enfermeiros de centros cirúrgicos brasileiros que responderam a um questionário com 53 questões. A análise de dados foi realizada por meio de estatística descritiva e teste estatístico χ^2, com nível de significância de 5%. **Resultados:** Os indicadores mais gerenciados pelos enfermeiros foram: quantidade de cirurgias canceladas (81,6%), taxa de infecção do sítio cirúrgico (78,5%) e ocupação de salas cirúrgicas por mês (69,6%). Observou-se diferença significante da gestão dos indicadores entre hospitais com e sem avaliação externa de qualidade, nos quesitos treinamentos (p=0,000) e compartilhamento dos resultados com as equipes (p=0,000), que se mostraram iguais para dificuldade em utilizar a ferramenta (p=0,803). **Conclusão:** Apesar de os indicadores serem monitorados pelos enfermeiros e os hospitais com avaliação externa apresentarem melhores resultados em alguns itens de gerenciamento e uso de indicadores, as instituições ainda precisam investir no aprimoramento dos profissionais e na gestão da ferramenta.

Palavras-chave: Enfermagem. Centros cirúrgicos. Indicadores de gestão. Gestão da qualidade. Segurança do paciente.

RESUMEN: Objetivo: identificar los indicadores utilizados por las enfermeras que trabajan en el quirófano y cómo se gestionan. **Método:** Estudio descriptivo, transversal y cuantitativo, realizado entre octubre de 2018 y febrero de 2019. La muestra fue por conveniencia, compuesta por enfermeras de centros quirúrgicos brasileños que respondieron un cuestionario con 53 preguntas. El análisis de los datos se realizó mediante estadística descriptiva y prueba estadística de χ^2, con un nivel de significación del 5%. **Resultados:** Los indicadores más manejados por las enfermeras fueron: número de cirugías canceladas (81,6%), tasa de infección del sitio quirúrgico (78,5%) y ocupación de quirófanos por mes (69,6%). Hubo una diferencia significativa en el manejo de los indicadores entre hospitales con y sin evaluación de calidad externa, en términos de capacitación (p=0,000) y el intercambio de resultados con los equipos (p=0,000), mostrando lo mismo para la dificultad en el uso de la herramienta (p=0,803). **Conclusión:** Aunque los indicadores son monitoreados por enfermeras y hospitales con evaluación externa, muestran mejores resultados en algunos ítems de gestión y uso de indicadores, las instituciones aún necesitan invertir en la mejora de los profesionales y en el manejo de la herramienta.

Palabras clave: Enfermería. Centros quirúrgicos. Indicadores de gestión. Gestión de la calidad. Seguridad del paciente.

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INTRODUCTION

With the advancement of health and the systematization of care, the creation of evidence-based, reliable, and quality technical measures for measuring data was essential to efficiently cover all areas that involve health[1].

Indicators are tools used to analyze, acquire, identify, and measure actions or information related to the quality of care, illness, epidemiology, and health of the contexts covered, serving to synthesize them through numerical concepts. Its elaboration depends on what one wants to investigate, according to the individual needs of each situation. The quality of the information used will result in its effectiveness and reliability[1,2].

The different care processes, the logistical implications, and the vulnerability of the patient demand monitoring of standardized and structured measurements over time, so that the performance assessment and structural adequacy provide conditions of comfort and safety for both the patient and the team. The indicators can signal deviations and allow the problem to be reviewed, preventing these situations from becoming routine[3,4].

When using the indicators, those who can adapt to the characteristics and singularities of the sector must be considered. The operating room (OR) is a complex unit, with demand for spontaneous and emergency assistance and specificities, which needs control over its functioning to provide quality care. The use of indicators provides nurses with guidance for the management of the sector, enables the control of processes, guarantees the quality of services, besides managing their historical series, assessing the improvement processes implemented[3,5].

In this way, risks and negative consequences can be avoided within the OR if the use of quality indicators and the monitoring of management are efficient[3]. Institutions that have continuous assessment processes, such as certification or accreditation programs, are better prepared to provide qualified service and deal more easily with the management of their indicators, managing to maintain their results with greater invariability[6,7].

Different indicators are proposed to manage an OR, such as the occurrence of injury due to positioning, skin injury, falls, electric scalpel burn, maintenance of normothermia in patients, and turnover time in the operating rooms, among others, depending on the institution, the involvement of professionals and demands from top management[3-5]. This research was carried out considering that not all establishments use indicators to manage the OR and that there is also no consensus on which are necessary to monitor the quality of this service. Thus, based on the results found, the authors propose to answer the following question: which indicators are used by nurses to manage an OR?

OBJECTIVE

Identify what the indicators used by nurses working in OR are and how they are managed.

METHODS

A descriptive, cross-sectional study with a quantitative approach, carried out from October 10, 2018, to February 10, 2019. The sample was defined by convenience, with a population of professionals associated with the Brazilian Society of Operating Room Nurses, Anesthetic Recovery and Material and Sterilization Center (SOBECC), who can be nurses, nursing technicians, nursing assistants, students, surgical technicians, or other interested parties.

A structured instrument was developed based on scientific publications on indicators and managed by the online software Research Electronic Data Capture (REDCap). The instrument was composed of two parts: the first with nine questions for the sociodemographic and professional characterization of the participants and the second with 42 closed questions on indicators and management, with the options for answering yes or no, besides two open questions. As part of the questions, 33 indicators mentioned in the scientific literature were listed as possible to be used[2,7]. A pre-test of the instrument was carried out with four volunteers working in the OR area, who pointed out improvements in its structure, requested clarification on ambiguous questions, and suggested the addition of indicators, which were accepted. With the pre-test, it was possible to estimate the time of 20 min to complete the questionnaire.

The Society's guidelines regarding the distribution of the questionnaire were obeyed, whose messages to professionals registered at the national level were managed by the SOBECC secretariat, through an access link, preceded by the Free and Informed Consent Form. Three reminder messages were sent to members during the data collection period. The exclusion criterion adopted was that of professionals who were not

nurses, since there are partners from other professional categories in the society, as previously mentioned.

The data obtained were organized in an Excel® spreadsheet and analyzed using descriptive statistics and the χ^2 statistical test using a significance level of 5% ($p < 0.05$).

The study was approved by the Research Ethics Committee of Universidade Federal de São Paulo, under the Certificate of Presentation for Ethical Appreciation (CAAE) No. 68023617.0.0000.5505, and by the SOBECC board of directors.

RESULTS

One hundred sixty-two people answered the questionnaire, and four were excluded because they were not nurses. Thus, the sample was composed of 158 nurses, 94 (59.5%) of whom were specialists in several areas such as OR, Urgency and Emergency, and Health Management; 81 (51.3%) in assistance positions and 77 (48.7%) in managerial positions; 58 (36.7%) with an average performance over ten years, with the average time of all participants being 10.3 years; 57 (36.1%) from the state of São Paulo, 21 (13.3%) from Rio de Janeiro, and 17 (10.8%) from Rio Grande do Sul; 66 (41.8%) worked in private hospitals and, of these, 70 (44.3%) in specialized hospitals; 53 (33.5%) nurses worked in large hospitals (with more than 300 beds) and 81 (47.5%) in hospitals with external quality assessment certification.

Thirty-three indicators were presented, and the participants indicated their use in the service. All indicators are measured more or less frequently, and 10 of them were managed by more than 50% of the professionals. Among the citations considered less recurrent, indicators managed by less than 25% were evidenced, as can be seen in Table 1.

When asked if they managed other indicators that were not covered by the questionnaire, 27 (17.1%) nurses answered yes and highlighted: number of robotic surgeries per month, turnover time in the operating room, medical delay, monitoring the time when the operating room (OR) stood waiting for the medical team to arrive, number of surgeries that exceeded the scheduled time, injury due to the use of a pneumatic tourniquet, and the effective rate of the safe surgery checklist.

Participants were asked if they would implement other indicators besides those presented and 46 (29.1%) said yes, highlighting: wrong or incorrect surgical schedule, number of surgeries per professional, patient's length of stay in the OR before referral to OR, pre-anesthetic visit, nursing

Table 1. Indicators used by nurses in operating rooms in Brazilian hospitals.

Indicators	n	%
Number of surgeries canceled	129	81.6
Surgical site infection	124	78.5
Occupation of operating rooms per month	110	69.6
Compliance to the safe surgery checklist	103	65.2
Patients with antibiotic prophylaxis at the appropriate time	96	60.7
Occupational accidents of nursing professionals	95	60.1
Falls	94	59.5
Lack of nursing professionals	88	55.7
Skin injuries	86	54.4
Number of surgeries performed without prior scheduling	82	51.9
Training of nursing professionals	78	49.4
Number of surgeries performed per day	72	45.6
Availability of equipment to perform surgery	70	44.3
Systematization of perioperative nursing care	68	43.0
Medication administration errors	66	41.8
Average length of stay in post-anesthetic recovery	66	41.8
Injury due to surgical positioning	65	41.1
Completion of medical records	65	41.1
Average length of stay in the operating room	65	41.1
Surgeries in the wrong place	64	40.5
Electric scalpel skin burn	64	40.5
Turnover of nursing professionals	59	37.4
Service availability (laboratory, radiology, others)	58	36.7
Surgeries on the wrong patient	57	36.0
Surgery delay	56	35.5
Complications following sedation	55	34.8
Risk-adjusted in-hospital surgical mortality	55	34.8
Unscheduled return to the operating room	51	32.3
Presence of the nurse throughout the period of operation	51	32.3
Patients with normothermia maintenance	44	27.8
Patients with fasting abbreviation	33	20.9
Nurses with a specialist degree	33	20.9
Participation of nurses in scientific events	30	19.0

visit, adverse reaction in blood transfusions, and counting of instruments (provided versus returned to the Material and Sterilization Center).

Table 2 shows the comparison between the indicators managed by more than 50% of the participants, according to the hospitals that have or do not have continuous assessment processes. The results show that, out of 10 indicators, eight have a significant difference, so there is more monitoring of indicators in institutions working on their quality management, undergoing external assessment processes.

As for the management of the indicators, most participants reported that they express the reality experienced (120/80.5%), are analyzed by managers/responsible person (128/85.9%), the results are discussed with the nursing team (90/60.4%), improvement processes are implemented based on results (105/70.5%), and there is a historical series of indicators (97/65.1%). However, the majority responded negatively to the questions about the collection of indicators being a simple process (92/61.7%), the results being discussed with the multiprofessional team (77/51.7%), the results being compared with those of other institutions (108/72.5%), and training to manage them (97/65.1%), as shown in Table 3.

Table 4 shows the comparison between the management of indicators between hospitals that have or do not have continuous assessment processes. Even though there is no significant difference, professionals from both hospitals

Table 2. Comparison between the indicators managed by more than 50% of the participants, according to the hospitals that have or not continuous assessment processes.

Indicadores	With assessment n=71		No assessment n=84		p*
Number of surgeries canceled	63	88.7	64	76.2	0.043
Surgical site infection	65	91.5	57	67.8	0.000
Occupation of operating rooms per month	59	83.0	51	60.7	0.002
Compliance to the safe surgery checklist	59	83.0	44	52.4	0.000
Patients who received antibiotic prophylaxis at the appropriate time	56	78.9	38	45.2	0.000
Occupational accident of nursing professionals	47	66.2	47	55.9	0.193
Fall	52	73.2	40	47.6	0.001
Lack of nursing professionals	44	62.0	43	51.2	0.177
Skin injury	48	67.6	38	45.2	0.005
Number of surgeries performed without prior scheduling	44	62.0	37	44.0	0.03

*χ^2 test (0.05).

Table 3. Items related to the management of indicators.

Management items	Yes		No		Total
	n	%	n	%	
Do the indicators you use express the institutional reality you work on?	120	80.5	26	17.5	146
Do you think collecting indicators is a simple process?	54	36.2	92	61.7	146
Do the managers/responsible persons analyze the indicators?	128	85.9	19	12.7	147
Are the results discussed with the nursing team?	90	60.4	57	38.2	147
Are the results discussed with the multiprofessional team?	67	45.0	77	51.7	144
Are improvement processes implemented based on indicators?	105	70.5	40	26.8	145
Is there a historical series of indicators that provide a view of the results over time?	97	65.1	46	30.9	143
Are the results compared with those of other institutions?	39	26.2	108	72.5	147
Did you have the training to manage the indicators?	51	34.2	97	65.1	148

n<158 due to lack of response.

Table 4. Comparison of management items with "yes" answers for hospitals with and without external assessment.

Management items	With assessment n=71		No assessment n=84		p-value*
Do the indicators you use express the institutional reality you work on?	59	83.1	61	72.6	0.12
Do you think collecting indicators is a simple process?	24	33.8	30	35.7	0.803
Do the managers/responsible persons analyze the indicators?	63	88.7	65	77.4	0.63
Are the results discussed with the nursing team?	52	73.2	38	45.2	0.000
Are the results discussed with the multiprofessional team?	41	57.7	26	30.9	0.000
Are improvement processes implemented based on indicators?	54	76.0	51	60.7	0.041
Is there a historical series of indicators that provide a view of the results over time?	56	78.9	41	48.8	0.000
Are the results compared with those of other institutions?	22	31.0	17	20.2	0.124
Did you have the training to manage the indicators?	33	46.5	18	21.4	0.000

*x^2 test (<0.05).

believe that the process of collecting indicators is not simple (p=0.803). What is verified is the low investment in the training of nurses in both types of institutions, but those who have assessment processes still have it more frequently than those who do not have it (p=0.000).

Among these questions, there are still four others that showed a significant difference, pointing out that there is more involvement of the nursing and multiprofessional teams in the discussion of the results (p=0.000 and p=0.000, respectively), analysis of the tool over time (p=0.000) and greater concern with improvements based on indicators (p=0.041) in institutions subjected to external assessment processes.

DISCUSSION

The research allowed to know the nurses working in OR and their institutions, as well as what are the indicators used. One of the data that stands out is that most professionals have the title of specialist and occupy an assistance position, which allows identifying a group of professionals prepared to act on behalf of the patient in a sector with such complexity. A study carried out in seven public and private hospitals in two Brazilian cities to assess the perception of nurses about their importance in relation to work and the management of the sector pointed out a population of participants mostly of specialists (80%). This fact makes us reflect on the differentiation in professional training to work in the area[8]. However, our research showed that having a specialist title is not an indicator that is frequently monitored by institutions.

Another national study, carried out in a philanthropic hospital in Minas Gerais to understand the perception of nursing professionals regarding the obstacles present during care in the intraoperative period, presented an organizational structure with nurse managers, supervisors, and mostly assistants, revealing the performance differentiated from their work compared to the body of nursing technicians[9].

The group of professionals in this research pointed to the monitoring of a range of indicators, as observed in the results. However, studies suggest that the indicators should not be closed and can be modified based on the needs of the patient or services. In a literature review, the authors cited as important indicators for monitoring injuries, falls, electric scalpel burns, injuries due to positioning, and infection of the surgical site[3]. Another publication suggested indicators such as operative time, the first surgery of the day, and non-operative time, related to the time management of surgeries, the availability of materials, and the OR preparation[10].

However, these same indicators stand out, which should be monitored in their entirety, for example, that of infection related to health care. According to Ordinance No. 2,616/1998, from the Ministry of Health, it is mandatory for all institutions to prevent and monitor indicators related to infection rates, so that there is no harm to patients[11].

Another indicator is compliance with the safe surgery list and the use of antibiotic prophylaxis as part of the safe

surgery checklist. Since 2013, the National Patient Safety Program has presented numerous initiatives for the implementation and proper management of this protocol, with specific indicators. However, there are still difficulties in the institutions, such as failure in the filling process, lack of compliance by the entire team, and problems with the reported information[12]. On the other hand, there is a commitment to try to improve compliance with this protocol by changing the institutional culture, continuing education, training, and internal audits[13].

One of the less frequent indicators found in this research is the fasting abbreviation. Its importance is because it provides a better sensation during the preoperative period and helps in post-surgical recovery, because the longer the fasting period, the greater the metabolic response, increasing the hormonal response related to the inflammatory process and influencing the healing process[14]. A study highlights the importance of building a pleasant service environment in times of discomfort, in addition to forecasting more efficient recovery for the patient[14].

The indicators cited in the literature and considered classics, such as falls, injuries caused by surgical positioning, electric scalpel burns, and injuries are fundamental. However, their monitoring is low in the studied group, revealing a worrying result. Studies mention the need for the nurse's commitment to ensure that damages are not caused to patients during their stay in the OR, to avoid aggravations in their conditions, and to provide adequate recovery, not prolonging their time in the hospital environment[3,15].

The research showed the dynamism of monitoring indicators based on the needs of each service, the reason why they must be continuously assessed. This idea became evident when the participants mentioned other indicators not covered by the research, such as, for example, the use of robotic surgery in the surgical environment. It is expected that this indicator will be monitored in a few hospitals since it is a different technology. This brings challenges in the development of nurses' skills concerning this type of surgery. To be able to manage this indicator, one must be aware of how the procedure works, what are the needs of the patient, the team, materials, and physical space, as well as the operation of the nursing team[16].

Although they are not a majority, there was a large contingent of professionals working in hospitals with quality certification. Institutions that undergo these processes manage the indicators more than those that do not. This statement is corroborated by an Arab study that presents results in relation to the monitoring of indicators, impacting the improvement of care and the results to the patient before and after accreditation[17].

This research brought the importance of managing the indicators and their knowledge by all those involved. It is evident that using the tool correctly and discussing its results with the teams generates greater commitment and understanding of the assistance and the processes to be instituted to improve the assistance. Through management and proper understanding of the tool, nurses will be able to maintain better-structured control of activities by pointing the aspects to be improved and the positive points of their service, which will make them clearer and more efficient[15].

Sharing these results with the teams is essential, since they are all part of the patient care process, with the nurse responsible for managing the OR so that the activities performed are effective[18].

Hospitals that have this feature have better environments to work on concerning patient care and the provision of professionals. There are constant incentives to carry out notifications of adverse events so that improvements can be made to the service. Also, there is a significant change in records since there is an understanding of the importance of proper registration[19].

Organizational learning involves continually reviewing processes and developing leadership committed to patient safety, as it provides ongoing support for improvement efforts and initiatives at different hierarchical levels. The hospital culture proposes a process for reporting adverse events and non-punitive actions for errors, to encourage professionals to identify failures, communicate them and learn from them instead of blaming themselves, in addition to encouraging teamwork, which, according to the study, it is presented as an issue highlighted by nurses as extremely important to provide care. Furthermore, the accreditation process can help in the development of institutional learning, as it influences the improvement and management of processes by the team and the commitment to comply with what is recommended regarding the patient safety culture[12,20].

However, further research on the use of indicators in OR and its management can be proposed, addressing the information systems of the institutions, the process of event reporting, and the analysis of the root cause, essential conditions for the continuous improvement of assistance[21].

The limitations of the study refer to the fact that information was presented with significant differences about

nurses who work in hospitals with assessment processes. However, there is no way to know the number of hospitals represented by them, which may be a bias in the present study. As a methodological option, the indicators were presented by their title and not by their formula, which may have generated different understandings in the participants and influenced their responses.

CONCLUSION

This study allowed us to verify what the indicators are and how nurses manage them in the OR, with all indicators being managed in a greater or lesser number. The number of surgeries canceled, the infection rate of the surgical site, occupation of operating rooms per month, compliance to the safe surgery checklist, and patients who received antibiotic prophylaxis at the appropriate time are among the most monitored indicators. In contrast, patients with a fasting abbreviation, specialist nurses, and nurses' participation in scientific events are the least monitored indicators.

It is noted that nurses understand the need for the tool, since other indicators, such as robotic surgery, are cited as part of their care reality.

The management of the indicators is present, but it is still considered a difficult process by most professionals, with no significant difference between institutions with and without external quality assessment for this item. There is a lack of training in both types of hospitals, but with a significant difference, since accredited institutions have more training to manage the tool, besides discussing their results with the nursing and multiprofessional team.

It is noticed that the institutions assessed have significantly better results with some indicators and management items. From this, it can be inferred that they are better prepared for care, to create improvements based on their results, and closer to achieving excellence in care, since the indicators allow avoiding financial and material waste and provide a broad view of care, therefore reducing risks and injuries to patients.

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MEDICAL WASTE: PROFILE AND COST ANALYSIS IN A SURGICAL SITE

Resíduos de serviços de saúde: perfil e análise de custos em um centro cirúrgico

Residuos de los servicios de salud: análisis de perfil y costos en un centro quirúrgico

Danielly Negrão Guassú Nogueira[1]*, Giovana Alves Santos[2], Alexandrina Aparecida Maciel Cardelli[3], Valeria Castilho[4]

ABSTRACT: Objective: To determine the waste generation profile and measure the costs of materials used in medical waste management in a surgical site. **Method:** This is an exploratory-descriptive survey, with a quantitative approach, in the case study modality. The site was the surgical site of the University Hospital of Universidade de São Paulo. The stratified sample was of 1,120 surgeries, and the waste was weighed for 82 days. **Results:** The surgical site waste accounted for 6.38% of the total hospital waste. The most representative group was A-infectious (50.62%). The mean generation was 3.72 kg per surgery. Most of the waste was generated in the operating room (55.93%), and oral maxillary surgeries generated most of the waste in terms of mass. The cost per kilo was: Group A (R$ 1.10), Group B (R$ 5.70), Group D Recycled (R$ 0.96), Group D Nonrecycled (R$ 1.01) and Group E (R$ 3.23). **Conclusion:** The mean total cost per surgery was R$ 8.641, and its reduction depends on strategies of purchasing consumable supplies that had greater impact on costs.

KEYWORDS: Medical waste. Surgicenters. Costs and cost analysis.

RESUMO: Objetivo: Determinar o perfil de geração e mensurar os custos dos materiais utilizados no gerenciamento de resíduos de serviços de saúde em um centro cirúrgico. **Método:** Trata-se de pesquisa exploratória, descritiva, com abordagem quantitativa, na modalidade estudo de caso. O local foi o Centro Cirúrgico do Hospital Universitário da Universidade de São Paulo. A amostra estratificada foi de 1.120 cirurgias, e os resíduos foram pesados por 82 dias. **Resultados:** Os resíduos do Centro Cirúrgico representaram 6,38% do total hospitalar. O grupo mais representativo foi A-infectantes (50,62%). A média de geração foi de 3,72 kg por cirurgia. A sala de operação foi o local que mais gerou resíduos (55,93%), e as cirurgias buco-maxilares as que mais geraram resíduos, em termos de massa. O custo de um quilo foi: Grupo A (R$ 1,10), Grupo B (R$ 5,70), Grupo D Reciclado (R$ 0,96), Grupo D Não Reciclado (R$ 1,01) e Grupo E (R$ 3,23). **Conclusão:** O custo total médio por cirurgia foi de R$ 8,641, e sua redução depende da negociação de compra dos itens de consumo que tiveram maior representatividade nos custos.

Palavras-chave: Resíduos de serviços de saúde. Centros cirúrgicos. Custos e análises de custo.

RESUMEN: Objetivo: Determinar el perfil de generación y medir los costos de los materiales utilizados en la gestión de los Residuos De Los Servicios De Salud en un Centro Quirúrgico. **Método:** Esta es una investigación exploratoria, descriptiva, con un enfoque cuantitativo, en la modalidad de estudio de caso. El sitio fue el Centro Quirúrgico del Hospital Universitario de la Universidad de São Paulo. La muestra estratificada fue de 1.120 cirugías y los residuos se pesaron durante 82 días. **Resultados:** Los residuos del Centro Quirúrgico representaron el 6,38% del total del hospital. El grupo más representativo fue A-infeccioso (50,62%). La generación promedio fue de 3,72 kg por cirugía. El quirófano fue el lugar que generó la mayor cantidad de residuos (55,93%) y las cirugías orales-maxilares las que generaron la mayor cantidad de residuos, en términos de masa. El costo de un kilo fue: Grupo A (R$ 1,10), Grupo B (R$ 5,70), Grupo D Reciclado (R$ 0,96), Grupo D No Reciclado (R$ 1,01) y Grupo E (R$ 3,23). **Conclusión:** El costo total promedio por cirugía fue de R$ 8,641 y su reducción depende de la negociación de compra de los artículos de consumo que tuvieron mayor representatividad en los costos.

Palabras clave: Residuos sanitarios. Centros quirúrgicos. Costos y análisis de costo.

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INTRODUCTION

The medical waste (MW) has worried health managers in the third millennium, in which models of medical waste management must guide their decisions on environmental and social responsibility for economic development[1]. This implies the creation of public policies and legislation oriented towards environment sustainability and the protection of human health.

The MW encompass a wide range of waste, with different characteristics and classifications, including those produced in health facilities, administrative areas, kitchens, and gardens, including packaging and recyclable supplies, and those generated by workers and patients. By this mean, from 75 to 90% of MW can be comparable to households or general waste, or, non-hazardous. The rest, from 10 to 25%, are considered hazardous and represent a series of environmental and health risks that should be better managed worldwide[2].

Hazardous MW has assumed great importance in recent years, more because of the risk involved in poorly managed waste than for the volume generated, estimated between 1 and 3% of the total municipal solid waste in a municipality[2,3].

The two main laws in Brazil related to MW are the Resolution of the Board of Directors (*Resolução da Diretoria Colegiada* – RDC) No. 222, March 28, 2018, of the National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária* – Anvisa)[4], defining MW internal management, encompassing segregation, packaging, identification, internal transportation, temporary storage, treatment and external storage; and the Resolution of the National Council of Environment (*Conselho Nacional do Meio Ambiente* – CONAMA) No. 358, April 29, 2005, defining MW management that is external to the health facility with collection, external transport and final destination[5].

Waste is classified as Group A, B, C, D and E. Group A accounts for waste that may have the presence of biological agents; Group B, waste containing chemicals that may be hazardous to public health or to the environment; Group C includes radioactive waste; Group D, general recyclable and non-recyclable waste, similar to household type; and Group E covers sharps[4,5].

MW management is a process that involves many interconnected activities; it is related to the working condition, infrastructure, development of human resources involved in the management, disposal practices by all categories of health workers, and risk of workplace injury with sharps and chemical contaminants. Investments in the acquisition of specific safety boxes for each group, purchase of containers, waste compactors and the use of warning plates do not guarantee an adequate level of MW management[6].

The current challenge is to generate less waste. Data from 2016[7] showed an increase of 3% compared to the previous year, and this percentage has been increasing since 2012, even with the regulation of the National Policy on Solid Waste[8] and marketing and educational strategies to promote conscious consumption and to avoid wasting materials in healthcare services. Another challenge is to ensure the segregation at the actual source to make sure recycling is possible and hazardous waste is sent to a safe destination[6].

Although the importance of MW management is recognized, there is still some difficulty for the operationalization of the Medical Waste Management Plan (MWMP), as prescribed by law. So waste keeps being generated, affecting the population health and causing a negative impact on the environment.

In many hospitals, nurses are responsible for the MWMP and must have a broad management perspective focused on work process analysis and cost management, essential tools to seek support in obtaining resources for improvements.

The surgical site (SS) is an important and complex site with respect to costs due to the complexity of its logistic distribution, involving various equipment and materials, type of care provided and different processes and subprocesses, directly and indirectly related to surgeries[9].

The nurse clearly needs to have knowledge and involvement in the management of material resources that will result in MW, in order to develop a generation profile, to measure the costs and to manage this waste.

Until now, in Brazil, there has been no relevant publications that demonstrate the profile and the cost composition of the MW management process. Some demonstrate the expense with a final destination, which, in most of the healthcare institutions, is outsourced and has contracts per weight, kilos or tons.

The information produced in this study is expected to contribute to cost reduction proposals, possible resizing of containers, changes in collection and transport frequency, flows of materials and post-consumption packaging, waste classification and elimination criteria, as well to improving the management of healthcare organizations by drawing comparison with other institutions with the same profile.

Based on the very recommendations of the legislation, it is difficult to perform calculations and there is a concern

about how to make them, since, most of time, unknown costs are used.

OBJECTIVE

To determine the generation profile and measure the costs of the materials used in MW management in a SS.

METHOD

This is an exploratory, descriptive, quantitative survey, in the case study modality, carried out in the city of São Paulo, State of São Paulo, in the SS of the University Hospital of Universidade de São Paulo (UH-USP).

To measure the final cost of each subprocess (group of waste from the legislation) generated in the operating rooms (OR) of the SS, the number of surgeries performed was used as a target population.

Considering the number of surgeries performed in the last four years, the stratified probability sampling was calculated with statistical power of 95%, resulting in n=1,120 surgeries.

Data collection was carried out from September to November 2015. MW subprocesses have been mapped based on the classification of RDC no. 356/2004, that was in force until 2018, when the legislation of Anvisa was updated, and the RDC no. 222/2018[4] is now in force, which was used to discuss the data of this study because it did not change the previous classification.

For 82 days, the waste was weighed, and it was measured in kilograms (kg), considering the MW site of generation, before being placed in the containers. The bags received a sticker label with different colors for those from the OR, the postanesthetic recovery room and sites that generate common waste. The records were typed in spreadsheets from A to D, by shifts of work, with information about the OR, the patient's name, the surgery performed, the medical specialty, the weight of MW of Group A, the weight of plastics and of paper waste. This information was collected at the end of the surgeries, when the circulating nurse of the OR requested the cleaning service. The weighing took place in the SS facilities, inside the temporary storage, avoiding the possibility of mixing with waste from other sectors.

MW subprocesses were described for measuring cost, with the identification of the person in charge, the design of flowcharts, the inventory of material quantity and costs, the identification of the number of surgeries, and the calculation of the partial cost of each subprocess[6]. The acquisition cost of supplies and equipment were obtained from the stockroom and the property management.

Costs were calculated in Brazilian currency (real), which symbol is R$. For depreciation calculation of the equipment, it was considered its value divided by the period of 60 months and, after, divided by 30 days, obtaining the cost per day, that was still divided by the number of generation points of each subprocess. The value of a generation point was multiplied by the number of points of each subprocess of the groups of RDC no. 222/2018[4]. The generation points of each group of waste were considered division units, with their specificities.

All surgeries, at the end of the anesthetic-surgical procedure, generate infectious MW, plastic and paper segregated within the OR, which, in this survey, were called direct generation; sharps and chemical MW that are discarded in the same container for various surgeries and various anesthetic procedures were called indirect generation.

The categorical variables were descriptively analyzed, and comparisons were made by analysis of variance (Anova), or Kruskal-Wallis test. A Bonferroni post hoc test was performed to evaluate the inference about means or, still, their quality.

The study was previously approved by the Research Ethics Committee of UH-USP (Report no. 1251/12), complying with the Resolution no. 466/2012 of the National Health Council.

RESULTS

To present the data referring to the MW generation profile, it is important to consider that the SS facility represents 6.38% of the general production of MW of the UH-USP.

Table 1 presents the MW distribution of the UH-USP and the SS under study, by their classification into groups.

Regarding the site of generation of MW in the SS, of the total of 8,102.64 kg, 4,532.01 kg (55.93%) were from the OR; 325.68 kg (4.02%) from postanesthetic recovery room and 3,244.95 kg (40%) from the support area. Among MW generated in the latter area, 2,309.44 kg (28.5%) were non-recyclable, produced in toilets, leftover food from the pantry, paper-towel from station surgical sinks, and 935.51 kg (11.5%) were recyclable, coming from the administrative areas of the facility.

When the production of MW was analyzed, specifically in ORs, it was found that of the total chemical waste (132.900 kg) generated, 110.800 kg were originated in drug leftovers, 21.100 kg in the leftovers of formaldehyde vials, in addition to 1 kg of power cells and batteries. As for sharps (235.65 kg), 159.35 kg were discarded in 151 specific boxes (7 Liter), resulting in a mean of 1.94 kg per box, and 76.30 kg were discarded in 12 large boxes (Clean Box®) used for large-format materials in laparoscopic surgeries and orthopedic surgeries.

Table 2 shows the distribution of descriptive data of the total MW per specialty in the OR.

The mean of total MW in the OR was 3.72 kg per surgery. The specialty that most generated MW was Oral maxillary, with an average of 4.55 kg, followed by Gynecology, with 4.21 kg.

Due to the stratification in seven surgical specialties, there was a wide variation in the mean MW generation, because of the particularities of each one. Hence, the statistical test Anova (post hoc Bonferroni) was performed, presented in Figure 1.

Concerning the average total of MW produced among the specialties, a statistically significant difference was verified (Anova F20, 95, $p<0.01$). Oral maxillary surgeries,

Table 1. Distribution and classification of medical waste of the University Hospital of Universidade de São Paulo (UH-USP) and the surgical site (SS).

Waste Classification (Report nº 344/98 and RDC nº 306/05)	UH-USP		SS	
	(kg)	%	(kg)	%
Infectious (with sharps) A+E	38,865.40	30.62	4,101.34	50.62
General nonrecycled D	74,166.40	58.42	2,309.44	28.50
Chemical B	780.80	0.62	132.90	1.64
General recycled D	13,132.10	10.34	1,560.26	19.26
Total	126,944.70	100.00	8,103.94	100.02

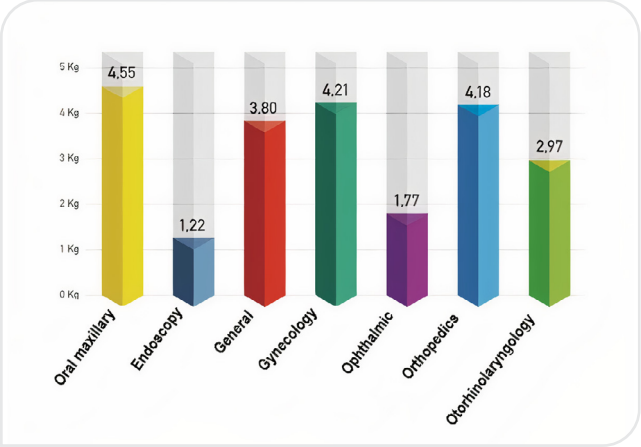

Figure 1. Distribution of the mean total of medical waste in operating rooms of the University Hospital of Universidade de São Paulo, according to medical specialties.

Table 2. Weight distribution (kg) of medical waste in surgical sites of the University Hospital of Universidade de São Paulo, according to medical specialties.

Medical specialty	Mean	Standard deviation	Median	Minimum	Maximum
Oral maxillary (n=40)	4.55	2.11	4.33	1.35	10.78
Endoscopy (n=28)	1.22	0.83	0.98	0.40	3.65
General (n=621)	3.80	2.12	3.38	0.20	18.15
Gynecology (n=114)	4.21	1.79	4.05	1.10	9.75
Ophthalmic (n=46)	1.77	0.85	1.70	0.50	4.70
Orthopedics (n=185)	4.18	2.24	3.85	0.35	12.80
Otorhinolaryngology (n=86)	2.97	1.05	2.75	1.35	5.70
Total (n=1,120)	3.72	2.09	3.35	0.20	18.15

on average, produced more total MW when compared to endoscopic, ophthalmological and otorhinolaryngological surgeries (post hoc Bonferroni $p<0.05$). Secondly, we have gynecological surgeries in relation to endoscopic, ophthalmological and otorhinolaryngological surgeries (post hoc Bonferroni $p<0.05$).

The distribution of material costs in OR by MW groups is presented in Table 3.

In Table 3, the fixed cost of R$ 5.526 per surgery was reached after the incorporation of the costs of each subprocess, so that subprocess A contributes with R$ 3.414 (61.78%), subprocess D with R$ 0.714 (12.92%), B with R$ 0.677 (12.25%) and E with R$ 0.721 (13.04%). It has been found that in the A-Infectious subprocess 94.90% of the costs are concentrated on the surgery supplies, that are the white collecting bags; in subprocess B-Chemical, the highest concentration was in common-use supplies, that are chemical containers, with a unit cost of R$ 12.50, plus bags, labels and seals, with a representative sample of 89.06%. In subprocess E-Sharps, the variable supplies, that are small and large-size containers, accounted for 91.53% of costs. The unit cost of the 7-Liter storage boxes, R$ 2, is below market values, possibly due to the hospital purchasing strategy; large sharps boxes cost R$ 32 per unity.

Figure 2 shows the MW cost per kilo.

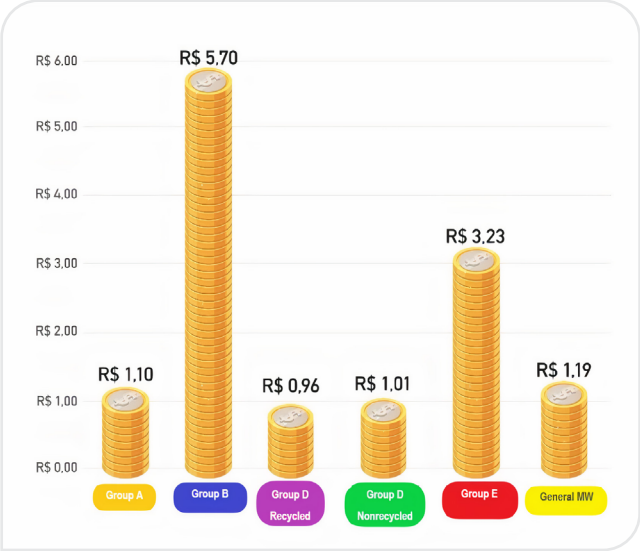

Figure 2. Distribution of cost calculations (R$) per kilo of medical waste of the University Hospital of Universidade de São Paulo, classified by groups of the Resolution of the Board of Directors no. 222/22/2018.

DISCUSSION

The proportion of SS waste in relation to the hospital was hardly representative when compared to that of international studies[10]. The proportion of waste from Group A-Infectious

Table 3. Distribution of the cost of materials in the management of medical waste in operating rooms in the University Hospital of Universidade de São Paulo.

Subprocess (groups of MW)	Direct costs (R$)				Indirect costs (R$)				Total cost per surgery (R$)		Total cost of the sample (n=1,120)	Total cost per day (n=82)
	Fixed supplies per surgery		Fixed equipment		Common use supplies per surgery		Common use equipment SS		R$	%	R$	R$
	R$	%	R$	%	R$	%	R$	%				
A-Infectious	3.240	94.90	0.029	0.849	-	-	0.145	4.24	3.414	100%	3,823.68	46.630
D-Recyclable Paper and plastic	0.606	84.87	0.002	0.289	-	-	0.106	14.84	0.714	100%	799.68	9.752
B-Chemical	--	--	0.014	2.067	0.603	89.06	0.06	8.86	0.677	100%	758.24	9.246
E-Sharps	---	--	0.001	0.138	0.660	91.53	0.060	8.321	0.721	100%	807.52	9.847
Total	3.846	69.56	0.046	0.83	1.263	22.88	0.371	6.72	5.526	100%	6,189.12	75.477

MW: medical waste; SS: surgical site.

was the expected due to the high concentration of invasive procedures and other surgical outcomes, such as blood transfusion, bladder catheterization and central venous puncture.

The percentage of recycled waste from the SS facility was higher than that of the rest of the hospital, that can be attributed to the recycling of paper and plastic within the OR, an innovative strategy in the perioperative area, and also to the disposal practices of the workers, who already had the practice of recycling in their work process during the surgery.

The data of this survey are similar to another study conducted in the SS of large hospitals, where infectious and sharps waste represented 52.60%, general waste 35.46%, and recycled waste 9.29%[11]. It was verified that the UH-USP presented a higher percentage of recycling, but the generation of chemical waste was lower. As the Group B-Chemical is considered a hazardous waste, the smaller its generation, the better the management performance of the service is considered.

The World Health Organization (WHO)[12] recommends that MW, that may be health and environmental hazard, should vary from 10 to 25% of the total generated in each institution. There is no international classification criterion; however, when analyzing MW of SS, Groups A, B and E meet the risk referred to, and the rate was high, exceeding the recommendation. However, the generation values of the UH-USP made a total of 31.24% and were slightly closer to the WHO recommendations.

The OR was the site that generated most of MW, according to a study published from Turkey, analyzing environmental-friendly practices in operating rooms[10]. It is important to know the representativeness of each site within the facility so that efforts are prioritized, and strategies formulated to combat waste and implement the reduction of MW generation, as well as the planning of educational actions in sites where it will have a greater impact.

Considering also that the OR is the site where surgeries take place, which are the SS products, and, consequently, where the revenues are generated, the degree of detail of the MW generation profile, related to the number of surgeries and the amount of waste generated in the period, showed that the specialty of General Surgery was the one that had the highest representative sample. This specialty generated most of MW in terms of mass; however, after the inference about means and after the statistical significance among the various specialties was proven, it was the oral maxillary and gynecological surgeries that produced most of such waste.

The mean generation of MW per surgery for infectious waste was 3.24 kg; for plastics, 0.28 kg; and paper, 0.20 kg. The mean of these three groups was 3.72 kg, coming directly from ORs. Whereas sharps contributed with 0.210 kg, and the chemicals with 0.119 kg per surgery, not coming directly from ORs, since the same container is used in several surgeries.

A study conducted in a medium-sized hospital concluded that the mean generation rate per SS surgery was 1.253 kg of MW of Groups A and E, and 0.337 kg of waste of Group D, making a total of 1.590 kg/surgery, values lower than in this survey. However, in this study, chemical waste was not included; the complexity of the surgeries is lower and, furthermore, the method of weighing the waste may have influenced the results because it was not done per surgery or at the generation site[3].

The higher concentration of costs could be visualized in fixed and common use supplies in the SS and leads to reflection on the importance of the microeconomic perspective in healthcare cost management. To model the processes and, consequently, reduce costs, the nurse's management actions may be connected to a better description of a material in the bidding processes, to larger purchases, with planning for delivery by installments, and purchasing strategies to minimize costs of items with greater representativeness in the cost composition.

The mean total cost per surgery was the sum of the costs of the OR and of the quantity of units of the other points of generation by the ratio of the survey sample (n=1. 120). Thus, the mean total cost would be R$ 8.641, receiving R$ 5.526 from the OR, R$ 0.531 from postanesthetic recovery room, R$ 0.485 from recycled general waste, and R$ 2.099 from the nonrecycled waste in the support area. Thus, such a cost could be transformed into a waste collection rate to be added to the collection rates of ORs or procedures per specialty, being the best way to pay for this service and then price it. If the calculation were based on the mean weight of surgeries (3.72 kg) and in the mean cost of MW (R$ 1.19), this value would be R$ 4.426, which would be 1.9 time lower.

The data of this study confirm the few results of the literature that chemical waste has the highest cost and the recyclable the lowest value, when compared to infectious waste[13].

The cost of disposing cost of hazardous waste is eight times higher than that of the disposal of general waste. Waste that is not adequately segregated should be treated as infectious waste, increasing significantly the overall disposal costs[14,15].

It should be considered that the alternatives of treatment and final destination of MW of Groups A, B and E are also

the highest, as described in international studies[1,14,15], which, although they have the limitation of not reporting the cost composition, show that these groups of waste have higher costs in all management process, highlighting the importance of segregation at the site of origin.

Most of the waste generated in the ORs is recyclable waste (Group D), such as paper, cardboard, and plastic. Waste of this category that is not contaminated by body fluids is typically easy to recycle[1,15].

The cost per kilo of each MW group can be used as an indicator of the process quality of management of such waste.

In this study, the advance in knowledge was the determination of the generation profile and the measurement of managing costs of MW, with detailing of items that have the highest representation in the total cost composition, which may be the proposition of a cost measurement model, based on costing methods, to be replicated in other services as an alternative to the pricing of a service that is not charged descriptively.

Surgical teams should include environmental issues in SS management decisions to work jointly with support services. In this sense, it is important to have a green team, that is a multidisciplinary group to think about institutional strategies to eliminate waste, prioritize the rational use of drugs, and improve costing methods and provision of services in the SS[3].

CONCLUSION

It was concluded that the mean MW generation was 3.72 kg per surgery, being Group A-infectious the most representative waste group; the OR was the site that generated most of the waste. The average total cost was R$ 8.641 per surgery, and its reduction depends on purchasing strategies to minimize costs of consumable items that had greater representativeness in costs.

The generation and management of MW will always be influenced by new economic, political, technological, social, and cultural circumstances of the healthcare team, such as consumption pattern, worker disposal practices and material resource management.

The positioning of health institutions in the face of sustainability principles will certainly be reflected in the management processes to achieve the efficiency of these processes, in which resources can be used consciously and adequately so that MW management goals can be achieved with quality and safety.

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COMPASSIONATE CARE IN SURGICAL PATIENT RECOVERY: THE DAILY NURSING TEAM

Disposição afetiva para o cuidado na recuperação: o cotidiano da equipe de enfermagem

Disposición afectiva para la atención en la recuperación: el equipo diario de enfermería

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ABSTRACT: Objective: The aim of this study was to discuss the implementation of protocols for patient care in the postanesthesia care unit, considering the provision of compassionate care by the nursing team in their daily routine, in a hospital in the western region of Santa Catarina, Brazil. **Method:** Qualitative study based on ethnography and participant observation. The research subjects were nine nursing professionals. Data were collected in the first half of 2019, considering Bardin's content analysis, from which three categories emerged. **Results:** Nursing professionals understand the importance of providing compassion in patient care during recovery, listing the high demand for activities and surgeries and the insufficient staff as difficulties for providing compassionate and effective care in their daily routine. There is low adherence to the assistance protocols available in this unit, despite the recognition of their importance in patient care. **Conclusion:** Limiting factors for compassionate care of patients in postanesthesia recovery were the high daily demand in this unit, inadequate staff and care of critical patients for long periods.

Keywords: Nursing assessment. Recovery room. Nursing care. Compassion.

RESUMO: Objetivo: Discutir a implementação dos protocolos para o cuidado ao paciente na sala de recuperação pós-anestésica, considerando a disposição afetiva da equipe de enfermagem no seu cotidiano, em um hospital da região oeste de Santa Catarina. **Método:** Pesquisa qualitativa, com base na etnografia e na observação participante. Os sujeitos da pesquisa foram nove profissionais da enfermagem. Os dados foram coletados no primeiro semestre de 2019, considerando-se a análise de conteúdo de Bardin, de onde emergiram três categorias. **Resultados:** Os profissionais de enfermagem compreendem a importância da disposição afetiva no cuidado aos pacientes na recuperação, elencando a alta demanda de atividades e cirurgias e o número de funcionários insuficiente como dificuldades para um cuidado afetivo, efetivo e empático em seu cotidiano. Há baixa adesão aos protocolos assistenciais disponibilizados no setor, apesar do reconhecimento de sua importância no cuidado direcionado aos pacientes. **Conclusão:** Como fatores determinantes apresentaram-se a alta demanda diária do setor, o quantitativo de funcionários inadequado e o atendimento a pacientes críticos por longos períodos na recuperação anestésica.

Palavras-chave: Avaliação em enfermagem. Sala de recuperação. Cuidados de enfermagem. Afeto.

RESUMEN: Objetivo: Discutir la implementación de protocolos para el cuidado del paciente en la sala de recuperación postanestésica, considerando la disposición afectiva del equipo de enfermería en su vida diaria, en un hospital en el oeste de Santa Catarina. **Método:** Investigación cualitativa, basada en etnografía y observación participante. Los sujetos de investigación fueron nueve profesionales de enfermería. Los datos se recopilaron en la primera mitad de 2019, considerando el análisis de contenido de Bardin, del cual surgieron tres categorías. **Resultados:** Los profesionales de enfermería entienden la importancia de la disposición afectiva en la atención al paciente en recuperación, enumerando la alta demanda de actividades y cirugías y el número

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insuficiente de empleados, como dificultades para la atención afectiva, efectiva y empática en su vida diaria; baja adherencia al uso de protocolos de atención disponibles en el sector, a pesar del reconocimiento de su importancia en la atención dirigida a los pacientes. **Conclusión:** Como factores determinantes fueron la alta demanda diaria en el sector, el número inadecuado de empleados y la atención de pacientes críticos durante largos períodos en la recuperación anestésica.

Palabras clave: Evaluación en enfermería. Sala de recuperación. Atención de enfermería. Afecto.

INTRODUCTION

The patient's recovery period is from the moment of leaving the operating room to discharge from the postanesthesia care unit (PACU). During this period, it is necessary for the entire team to be active in patient care, offering support for the patient's needs, in addition to continuous observation of his/her evolution, as the patient needs to recover consciousness and achieve stabilization of homeostasis and all vital parameters. Therefore, the team needs to perform continuous and individualized care, with the goal of recovering health and preventing risks[1].

The patient undergoes a whole change in his/her physiology during the surgical procedure, as well as in the balance of the body's systems. Therefore, the care provided by the nursing team is extremely relevant, especially in the PACU, where the patient is faced with various risks in the postoperative period, requiring attentive and integrated care. Accordingly, the attention given to recovery is aimed at providing safety and preventing and identifying complications and instability of the patient's clinical picture, and it is important to know how to act in these cases[2].

As an integral factor of well-articulated care, it is essential to understand how the patient sees himself/herself, being immersed in the tension of the hospital environment, especially in the PACU. When faced with the surgical experience, the patient suffers being away from the usual routine and placed in this other world, which can provide pleasant or uncomfortable experiences. The patient experiences invasive bodily procedures and compromise of privacy, whether in the operating room or in the recovery room in the immediate postoperative period (IPOP). He/she starts to face a routine of care and experiences that is limited to his/her bed, which lasts the whole duration of hospitalization[3].

The daily routine experienced in the PACU is cited by most nursing professionals as one of the main difficulties with regard to the quality of care. Despite being an inconvenience to the team, the daily routine presents itself as an opportunity to develop new strategies to reformulate the way of caring, through respectful touching and compassion towards others. In this sense, it requires specific qualification of professionals, aimed at humanized, warm and individual care[4].

For this care in the PACU to be effective, it is first necessary to have an adequate nursing staff, so that the demand is distributed equally and so that the service is strictly supported by the standards and protocols instituted in the unit. For care to be systematized according to the needs of each patient, it is necessary to use protocols, such as the assessment of airways, breathing and circulation (ABC) at initial admission of the patient, with a head-to-toe approach aimed at identifying the initial parameters after anesthesia, the checklist based on the modified Aldrete and Kroulik index, Ramsey sedation scale, Steward index and pain assessment scale, all decisive at the time of discharge from the PACU[5].

In this sense, to understand how this relationship occurs, the following question/problem arises: how does the use of protocols, standards and routines guide the compassionate care for the patient in the PACU?

OBJECTIVE

The aim of this study was to discuss the use of protocols and standards for patient care in the PACU, considering the provision of compassionate care by the nursing team in their daily routine.

METHOD

This research was part of a larger study titled "Body and corporeality in the routine of the operating room: embroidering care and training in the labyrinth of the nursing team", which was institutionalized and received ethical approval

from the research ethics committee of the Federal University of Fronteira do Sul (UFFS), Chapecó, Santa Catarina, under process No. 3.130.487.

This was an ethnographic study with a qualitative approach, which studies the world of meanings and human relations, as well as human reality in society[6]. The ethnographic study works with the establishment of relationships to choose informants, transcribe texts, raise hypotheses, map specific fields, and immerse oneself in daily activities, reporting them in a field diary, where data collection is done with a detailed description of the routine experienced by human beings involved in the research[7].

The study was carried out in the PACU of the surgical center of a hospital in western Santa Catarina, Brazil, in which an average of 18 nursing professionals work. The research subjects were nine of these professionals, one nurse and two nursing technicians per shift. It should be noted that the others were not available to participate in the research.

Data collection was performed at the surgical center, in the PACU, in May and June 2019, in alternating morning, afternoon and night periods. The data collection instruments were a semi-structured interview and a field diary, filled out through participant observation.

The data were processed through Bardin's content analysis [8], according to the following steps:

- organization of the analysis;
- coding;
- categorization;
- processing the results, making inferences and interpreting the results.

RESULTS

Considering the thoughts and perceptions of the interviewees, three categories were created on the basis of the main elements and themes emerging from the interviews, which comprised the following topics: performance of the nursing team in relation to the standards and protocols of the PACU; a look at compassion in nursing care in the PACU; effective care in the PACU: possibility?

These categories are shown below in Charts 1, 2 and 3.

Chart 1. Categorization of standards and protocols.

Category/Topic	Record unit	Subjects' thoughts	Observations
Topic 1 Performance of the nursing team in relation to the standards and protocols of the PACU	• Overload • Inadequate staff • Observation • Paying attention to risks • Team support • Teamwork • Busy daily routine • Demand • Tiring routine • Patient flow • Physical structure • Staff	P1: "The morning team is more resistant to the new routine, some new protocol that we are going to add, they are a little more resistant. Not in the afternoon, in the afternoon it is very quiet, what you propose to them, they do, they usually do not question, they do not oppose, thus, they respect the hierarchy a little more than in the morning. The morning goes on, but like that, kind of jams, you have to manage conflicts with the morning team." P2: "The team follows the routines, the requested standards, the protocols very well. If I have a serious patient, sometimes we have an ICU patient too, you know, and I can't pay attention to others, colleagues assume, they'll lend a helping hand, no patient is ever left in pain, the necessary attention is given. Even that wall from 1 to 6 pm was only outside ones, then the person who was there was very burdened, you know, because you have to feed, you have to lift up, there are a ton of things you have to do in those four hours, a lot of medications. And now the outside ones will be kind of distributed, so everyone will be able to work." P3: "It is a united team, we help each other a lot, from receiving a patient, from being happy, from caring, in short, everything, you know. Our routines are changing a lot, but we are trying to adapt in the best possible way to always provide care to the patient, and they are already changing to better serve the patient, so as not to leave the patient too long waiting, in pain, anyway, to improve service. The way to receive and distribute patients, they used to receive everyone on the wall from one to four, nowadays	• Mechanized routine and non-interaction with patients • Delay in checking vital signs • Lack of explanation about the procedures performed • Lack of explanations for questions asked by patients • Power relations • Lack of use of protocols by the team • Release of patients by the anesthetist based solely on the analysis of vital signs, or questioning patients about their ability to move their lower limbs • Troubled relationship with some professionals • Professionals stressed by external factors, reflecting on how to offer assistance

Continue...

Chart 1. Continuation.

Category/Topic	Record unit	Subjects' thoughts	Observations
		not, it is one per wall, so there is time for the person who is there on that wall to receive, organize that patient, take good care, leave him well organized until he receives the next one. There will be negative points for the distance, perhaps, from the patient who stays from one to four to reach the bathroom, but there will also be positive points, so we are trying to adapt to find a better way to minimize the inconvenience of having to walk even to the bathroom, maybe a chair, a support, a walker, but we are organizing this."	• Comments on patients • Lack of motivation of professionals to work • Lack of patience from professionals, due to the great demand of the unit • Feeling inferior to other professionals • Lack of attention to patients.
		P4: "In fact, I think we have all the protocols, so we try to follow what is there as much as possible, but often, due to excessive workload, inadequate staff, we are unable to provide the service that would be necessary, right? But this way, we try to do all the protocols, when the patient arrives, we look at the bracelet, do all the part of the patient's reception, that clinical evaluation that we do in the beginning, head-to-toe, do the evolution. In fact, we didn't have this evolution, it was implemented only now. We made a small evolution in the beginning, so, only "patient arrived in recovery and was received, monitored" and gave. And then, as it was seen that a lot was lost, we just put the most emergency things, the emergencies that happened, we put it, there was a lot of loss, if it was lost if the patient had a wound from the operation, sometimes there are patients who arrive with a hematoma that was not seen before, suddenly sometimes even from the position he was in the room, sometimes a phlebitis in an arm of a serum that has already come from the room, so we started to observe this thing. Sometimes he arrives, when passing a bed there to get to recovery, she has access that is already blocked or out, a drain that has come loose on the way, so everything like that, then when he went to the room, he realized that sometimes the drain was out, but it had already arrived for us like this, so some things, some protocols, some things that were put in more so that we had less risk, hence now also the identification bracelet that we identify there, and patients have already arrived with the wrong bracelet and all the wrong medical records that came from hospitalization with the failure, you know, so even if you take care, it still happens to be so wrong."	
		P5: "It is a team that should be better assisted, I think that by the direction, by the nursing professionals, by the number of patients that pass through here during all our working hours, because it is a room with a lot of procedures, we feel quite difficult at times of attendance, right, because there is a lot of demand. As for the team, no, our team is a good team to work with, but due to the demand for work that is very busy, which should be more ..."	
		P6: "The daily routine is very hectic, there is a lack of staff to do that job of receiving, of making identification, because there is no time, there are days that are quiet, you can receive the patient, you talk to the patient, you doctor, do the your work, but there are days that you disappoint because it seems that something is missing, because you were unable to do what you should have done due to the demand, but most of all everything is right. The daily life is very hectic, there is a lack of staff to do that job of receiving, of making identification, because there is no time, there are days that are quiet, you can receive the patient, you talk to the patient, you doctor, do the your work, but there are	

Continue...

Chart 1. Continuation.

Category/Topic	Record unit	Subjects' thoughts	Observations
		days that you disappoint because it seems that something is missing, because you were unable to do what you should have done due to the demand, but most of all everything is right."	
		P7;"It is a very pressured routine, because the hospital does not cooperate, there used to be five of us and now we are three, the nurse is willing to help us to do everything. The routine is always the same, it is pushed when we get an ICU patient, here it is a semi-ICU when there are no more beds in the ICU, there were days when there were seven ICU patients and we had to cope, and a mother with a cesarean section and a baby mixed with the ICU and postoperative patients."	
		P8: "It's just that we weren't talking before, the issue of daily routine here is very busy, there is a very large flow of patients. During the day there are even more employees, but at night there are few, and so, in that rush. It means receiving a patient, writing down signs, medicating, changing fluids, seeing how the dressing is doing, and there is no way to do anything else. As for standards and routines, most of us are unable to comply, because we do not have enough staff, we do the basics, but there is no way to do it."	
		P9: "The physical condition of the environment, little staff. The time we arrived, just me and her in the crowded room, a few here, a few there, when you looked then all was already behind, here we had to do it, so it's difficult like that, right, so sometimes even you you think about being a little better, in this case, try to do a little better, but it's time and there's no way."	

PACU: postanesthesia care unit; ICU: intensive care unit.

Chart 2. Categorization of compassion in care.

Category/ topic	Record unit	Subjects' thoughts	Observations
Topic 2 A look at compassion in nursing care in the PACU	• Care • Compassionate difficulty • Empathy • Cooperative team • Cooperation between team members • Patient comfort • More assistance • Risk forecasting • Attention to symptoms • Offer the best of you • Assist the patient • Agile care	P1: "I think that, of the two teams, so, they all have, I think, a proper way of taking care, so, there are some exceptions, in my opinion, but I think it's kind of personal, like that, with the personality of one or two people that I have in the morning team that I find more difficult, so, as to the compassionate part, you know, sometimes feeling empathy, putting yourself in the other's place, you know, I think that in the morning I can see that there is a little more of this. In the afternoon, not like that, the afternoon team, as it is cooperative, she is more united, she is different, so in this part they gain a little too, you know, about the compassionate part."	• Little compassion for patients • Inappropriate comments • Little interaction with patients • Lack of dialogue in the reception of patients • Lack of explanations about medications and procedures • Lack of patience with patients and family • Doing duties without talking/explaining to the patient • Forgetfulness of comfort measures • Decreased willingness to work • Little understanding of the patient's situation
		P2: "I think it is more or less that even we don's comment now, the mood when one is busy, another helps, if you need to give medication, go and give medication, it is not because the patient belongs to the other who will not medicate, one helps the other. It goes after resolving things."	
		P3: "The patient reported pain, no matter how much I am with that bed or the colleague is busy, or is having a snack, or is somewhere, I go there or anyone goes there, sees the medication, asks if they are allergic, in short, our whole routine, care	

Continue...

Chart 2. Continuation.

Category/ topic	Record unit	Subjects' thoughts	Observations
	• Attention • Like what you do • Feeling happy • Caring with affection • Attention to the patient • Contact with the patient • Priorities • Talk to the patient and listen to complaints • General care • Job well done • Attention	is administered, the patient is not left without medication, or without perhaps reaching for a glass of water if he/she can, or whatever. What is within our reach, for the best comfort of the patient, would be this."	• Lack of proactivity by some professionals • Little dialogue • Lack of checking on patients.
		P4: "We try to provide the best possible, but as we lack an employee, we needed more assistance, sometimes you are overloaded, you have an ICU patient and four more, and then you cannot give that assistance, even to the ICU patient as you should, nor for others, so it is also something that will have to be improved, but we try to improve our routines every day, sometimes when we are without a nurse we try to do our routine, our work, we do not stop because there is no nurse, and sometimes we look for the nurse inside, and always realizing the things that can happen, we are attentive to the symptoms that may lead to a stop, why is he sweating? Why is the pressure low or high? In cesarean sections, we take great care of the bleeding so that it does not cause shock. Many times it has just happened to be attentive there, to prevent them from stopping, so these are things that we try to improve every day more."	
		P5: "I think that with everything we try to give the best of ourselves, but I think we still fail in some points, you know, we still need to be better assisting the patient, in agility, sometimes there is some complaining about pain and we take a little while to attend to the patient because the demand is very high, not always, but some days are very difficult, like today it's okay, today you can pay more attention, but there are days that are very difficult, especially on Saturdays, because on Saturday there is only one team, which is five people, at lunchtime you have to share it, then sometimes you can medicate the patient, but you take time to go back to see if the pain has eased, if the nausea has passed, here there are points."	
		P6: "This part here is very personal, because it is up to each one, each professional. There are professionals who are in the wrong place and don't realize it and I don't know why. We notice when we don't like what we do, the person has to be doing his/her job and has to be happy. Since a question asked by the patient, there are patients who come here and ask a lot of questions, why this, why that, because there are some who come here, because of the anesthesia they don't even know they had surgery, but 'what time I'm going to have surgery','how long will it take', then we explain that they have already had surgery, that they are already in recovery, that they will stay for so many hours, that anything is to call, and we notice that in this part we have to be technical, for you to look at them, give them affection, we feel that there are professionals who are different, but that is true for everybody."	
		P7: "We have little contact with patients, they come here and stay for an average of two to three hours, we try to do as much as possible, assisting, if there were more staff it would be much better, we would be able to give much more attention, we would have more contact with the patient. There are patients who receive very little attention, when it is a busy day, then we pay very little attention because there is no way, there were threeof us with 18 patients, and how can you pay good attention? Sometimes you don't even talk to the patient, see the signs, take care if you're not feeling ill and give priority to those who need it most."	

Continue...

Chart 2. Continuation.

Category/ topic	Record unit	Subjects' thoughts	Observations
		P8: "That's it too, we don't have time to stop and talk to the patient, listen to the complaints, it's: 'are you in pain?', 'I am', go there, give medication, it's not that story, 'what happened ',' how are you really doing', it's more general care even."	
		P9: "Here you would need at least a couple more staff to be able to do a job well done, so you can pay attention both to what you are doing and to the patient, to be able to come and talk to the patient. Sometimes the patient wants to tell you the story of why he is in a post-op bed, but if you stop to listen to the story, why do they tell details, then what are you going to do? You will be alone with that patient, and the rest will sometimes complain about pain."	

PACU: postanesthesia care unit; ICU: intensive care unit.

Chart 3. Categorization of possibilities.

Category/ Topic	Record unit	Subjects' thoughts	Observations
Topic 3 Effective care in the PACU: possibility	• Vision of wrong things • Lack of staff • Lack of support • Abandonment of patients • Work overload • Flexible team • Cooperation • Insistence • Help from monitors • Lack of attention • Rush • Little compassionate care • Holistic look • Stress, no time • Carelessness in care	P1: "So, when we have a meeting, once a month, I do the monthly meeting and when there is something new to pass as well, that's an extra meeting, they always add, like, what they think is not cool, that has to change, if they realize that a colleague is 'oh, he didn't do something right' or 'he answered the door in a rough way' or something, they come to report, and then we end up calling the employee to talk, right, so they have a vision, like, of things that are wrong and that have to change, some that you will talk to end up not accepting, they have a little resistance, 'oh but I'm like this, my way is like this and I will not change', because we are in a sector so you have to put yourself in the place of the next, like this, because so much of the patient who is there, who woke up, does not know where he is, if it is over, if he has done it, as the family member who is out there, because the family member is out there and does not know what is happening inside, right, so they are there out there, they are distressed, so sometimes I have a little difficulty, like, with whoever answers the door, you know, how to treat the family member who is there at the door, and the patients here too, it is one and another person, like this, who has a more closed personality, who is more difficult to deal with, but the team in general."	• Little compassioin for patients • Little interaction with patients • Lack of dialogue in the reception of patients • Lack of explanations about medications and procedures • Lack of patience with patients and family • Doing duties without talking/explaining to the patient • Forgetfulness of comfort measures • Little understanding of the patient's situation • Lack of proactivity by some professionals • Little dialogue • Lack of checking on patients.
		P2: "And the same surgeries that we have during the week, that we have three nurses, the coordinator and two more, on the weekend there is only one to handle all. Sometimes there is a shortage of staff as well. We can't take the initiative to do things, even we know, but we can't even give a medication because the doctor has to come and evaluate and prescribe it, you know, because without being prescribed you can't do it."	
		P3: "Yes, we encounter various difficulties in taking care of the patient. If a patient is calm, fine, we can help, the nurse is always close, it is more than a week that we only have one nurse in the unit, so it is more difficult, right. So we find maybe a little bit of difficulty in the lack of this support, right, maybe there is a lack of a nurse on the weekend to help us. In the case of an emergency, the doctor comes to help us too, but it is a little more difficult, if we have ICU patients, the anesthesia personnel are	

Continue...

Chart 3. Continuation.

Category/ Topic	Record unit	Subjects' thoughts	Observations
		no longer part of caring for the ICU patient, so we call the ICU, again no one comes, call P2, call I don't know who, it's kind of abandoned patients. So, this part that we find more difficult. 'I come, I do our routine', ours would be much better, but this way it is more difficult for us to take care, because sometimes there is an emergency, we call someone, call another, it has already happened. So if there was someone in this part to support, our work it would be much better and maybe even the patient would be more satisfied, he/she would not be so at risk either."	
		P4: "The team helps each other with the tasks, but there is a lack of staff, overload when having to take care of an ICU patient and three or four more surgical patients."	
		P5: "It is a good team, if it helps a lot, there is no side of anyone not wanting to help the other, or if you ask for help, colleagues do not refuse, it is a very flexible team to work with."	
		P6: "It is a set, that part of receiving the patient, of the colleague being there, us being there, doing our work, that thing of the anesthesiologist cooperating, like when the pain is giving the medication, when the patient is released (closed) the time, patient is fine, vital signs all right, no bleeding) the anesthetist comes, sometimes we have to go two or three times to look for him/her, sometimes there are some who don't like to be releasing every little bit, every two hours come here and evaluate. Until a while ago it was like that, now it has changed. During the day, we are more closely together with the doctors, at night there is the duty, in this case, during the day each is in a room, and at night there is the duty to evaluate and release. What we notice most is that doctors feel safer to leave the patient here and not send them to the room. I think, therefore, that recovery is a postoperative, not an ICU. If it is an emergency, you have the surgery, you have a bed, you have everything, but if you can wait, like, wait a bed in the ICU to have surgery, because here we do it, take care of the ICU patient, do everything, but the ICU patient needs more care and sometimes we are full of postoperative and we can no longer provide the care they need, we already have five, six ICU patients here. During the day, there are seven staff, at night only two are needed."	
		P7: "I really like it because these multiparameter monitors help a lot, because you don't pay much attention anymore, so these monitors are our eyes. As weaknesses, these mothers who stay here with the children, the children are very fragile, not that we do not want to serve them, but I think they should not be here in recovery along with other operations, other pathologies. We do the care, but we have a lot to be desired."	
		P8: "For sure, I think frailty is more the issue, which is the lack of very compassionate care, I also think, and in general too, in the holistic look of the patient, I think it is a long way, but because you don't have time, you don't realize it, it's a very big demand for few people, because like that, outside there is an employee to take care of nine, 11 patients, but they are not postoperative, if the patient is going to be ill, it is in the first two, three, four hours, it is the time the patient needs most. If you look there, the signs are zero, 15, 30, 45 minutes, and you can't always do that, most of the time you can't do it. The first hours demand	

Continue...

Chart 3. Continuation.

Category/ Topic	Record unit	Subjects' thoughts	Observations
		the greatest care, and we can't do it as it has to be done, there's no way, there are too few people."	
		P9: "I think that's it, lack of staff, there has to be more employees, in this case, so we can do our work better, in every way, both in taking care of the patient and taking care of people, sometimes, right, because sometimes we get overwhelmed, we get stressed, and sometimes you stop caring for the patient because of the stress itself, due to lack of time, causing stress, and then you end up sometimes, like, you can't pay attention to the patient, being sloppy maybe, but not because you want to, for lack of time. It is that feeling of wanting to do it and not being able to do it. You know you could do it, but you can't do it because you don't have the time to be there with them."	

PACU: postanesthesia care unit; ICU: intensive care unit.

DISCUSSION

Caring for the patient in the PACU is one of the main concerns and responsibilities of the nursing team, since it involves the human being in situations of vulnerability, exceeding the technical limits, to cover the therapeutic dimension. In this sense, humanized care perceives the patient in his/her entirety, and thus, nursing professionals may be able to identify the more subjective signs that the patient expresses about his/her health status[9,10].

Performance of the nursing team in relation to the standards and protocols of the postanesthesia care unit

Given the historical context of the care provided to the patient by the nursing staff in the PACU, currently, the act of caring has replaced empirical belief with scientific knowledge and evidence, promoting greater safety in the care of post-surgical patients. In view of the specificities of each surgical procedure, the unit's standards and assistance protocols aim to direct and qualify care, making it possible to obtain positive results, thereby encouraging the nursing team to evolve through adherence to scientific knowledge in their professional practice[9].

The nursing team recognizes the importance of using assistance protocols for care and, despite the intense patient flow in the unit, evidence-based practice appears in the work of professionals, even in the face of some difficulties imposed by the profession's daily routine.

It is worth mentioning that standards and protocols are important, but in our experience with the team, it was noticed that, even with the implementation and training processes proposed by the training team of the hospital where the study was conducted, the sequence of care according to the protocols did not happen that way[10]. The evolution takes place in the form of simple annotation as well as evaluation. We emphasize that the systematization of perioperative nursing care (SPNC) is not effective. Therefore, there is no comprehensive patient analysis.

Taking into account the context previously discussed, it is essential that the nursing professional makes a careful analysis of the patient while in the PACU, especially since this is the most critical time of the postoperative period, in which the patient may show instabilities[10].

In general, in some shifts, it was observed that there was a more attentive care, where technically some issues are observed, but care with hygiene and patient comfort does not occur. In this sense, it was also noticed, according to the reports, that during the entire perioperative period the patient does not receive systematic care, since in many cases he/she arrives at the PACU with some intraoperative complications that are sometimes neglected.

It was noted that there was a lack of communication between the team members, no continuity of care and, consequently, no systematization, despite the existence of protocols that support and reaffirm their importance. As a result, there is a break in the care process, creating a scenario of accountability for other sectors. Some dialogues denote the implementation of new protocols, such as the safe surgery

checklist, aimed at patient safety and at minimizing injuries, but these protocols are not effectively followed by the team, which makes patients vulnerable during the process.

When considering the perspective of patient safety, both the standards that guide professional work and SPNC have the same purpose. The aim of SPNC is to organize and direct the performance of nursing professionals, related to the care of the patient as a whole[11].

The nursing team recognizes the importance of teamwork when it comes to patient care, knowing that the daily routine often makes actions unfeasible, but with the cooperation of professionals, it is possible to care for patients in all aspects, with the intention of better serving them.

We observed that the team sought to adapt to the unit's flow and physical structure to better serve patients. However, it was evident that this redistribution of patients did not allow for more attentive care. On days with greater flow, it was noticed that there was a delay in meeting many patient demands, such as medications, measurement of vital signs, and other necessary procedures.

A recent study reported similar findings, where it showed that the omission of care is characterized by essential actions not performed or partially performed, results that corroborate those of another highlighted study and this theme[12]. For the authors, the team's commitment to providing quality nursing care, according to the specific needs of each patient and in a timely manner, is essential[12].

It should be noted that the data in this study are in line with those found in other studies, considering that the main reasons identified for the omission of care were problems related to inadequate staff, patients with urgent situations and unexpected increase in the volume of patients or severity of their condition, in addition to material resources and equipment not available or unsuitable for use[12].

The positive perception of the nursing team in relation to their work environment was associated with a lower frequency of care omission. Due to the dynamics of the unit, it is essential that the nursing team work in an integrated manner; after all, this is a strategy that allows nurses to carry out precisely the actions to be developed, according to the established assistance protocols, with the aim of obtaining better results regarding the qualification of patient care[13].

The PACU is a specific unit that develops intensive care directed to the IPOP, requiring a careful and insightful look from the team in relation to the different specificities evaluated in the post-surgical patient. Thus, the objective is to carefully analyze the patient's health situation for better articulation of care, according to what he/she needs[14].

A look at compassion in nursing care in the postanesthesia care unit

It is known that the PACU is a dynamic environment, with high patient turnover, restricted to access and with the need for attention to patients and their families. Compassion in nursing care does not require any tool to teach you step by step, but it depends on the conduct and the way of conducting the care of each professional on the team. Being compassionate and performing an equally caring work requires the constant polishing of our values as collaborators of a team and as people. Understanding the patient's situation, putting oneself in his/her place, involving the patient in the care and feeling good about the activity that is performed are some aspects that qualify nursing care[10].

The team must develop actions aimed at promoting quality in the care directed to the specificities of each patient, reducing possible postoperative risks. For this, professionals need to develop a critical, attentive and sensitive look at the patient, identifying situations that require intervention[15].

The team works together to assist patients, minimizing discomfort arising from the anesthetic-surgical procedure. On the other hand, during the field observation, several failures were indicated in relation to patients' requests, associated with the team and their attention and meeting their demands. Often, the adverse events that occur in the hospital environment are iatrogenic, but for a more detailed assessment of the patient, it is necessary to consider the environmental conditions of care practices, the structural aspects and the complexity of this patient being attended to[16].

The most relevant aspect mentioned and that directly affects the quality of care is inadequate staff. On the other hand, in our experience with the PACU team, it was noticed that, in view of the great demand, the nursing team was unable to provide safe, compassionate and effective care for all patients.

In being with the team, it was noted that many left something to be desired in some important aspects in caring for the patient, such as: patience in resolving doubts, affection and compassion when providing care, empathy when receiving the patient in the unit, among other aspects that interfered with the recovery of patients, consequently lengthening their stay in the unit. In this sense, because it is a dynamic environment, PACU professionals find it difficult to establish a bond with patients. This is either due to the short time spent

in the hospital, or due to the lack of time to dedicate themselves, because of the large number of patients to be treated, which hampers the establishment of appropriate close and attentive relationships.

The PACU is an environment that allows little connection between professionals and patients. On the other hand, in the course of our experience, it was realized that it is possible to establish a closer connection with the patient, as the nurse professional needs to talk to the patient to guide the recovery and the measures to be taken. In view of the above, the daily routine of the nursing team makes it difficult to create a bond with patients, but not impossible, in view of the benefits for the patient as well as the nursing professionals, who know that their performance is linked to one of the pillars of nursing.

Effective care in the postanesthesia care unit: possibilities?

When talking about care in the PACU, a wide range of possibilities opens up for the nursing team. Information technologies have been widely used with regard to storage of and access to data that can make assistance more dynamic and effective. This technology, based on protocols that support the development of the profession, for example, is responsible for enhancing clinical reasoning and decision-making by professionals, considering that systematic care allows early identification and treatment of possible complications of the anesthetic-surgical process.[17].

The nursing team understands the importance of effective patient care, listing necessary changes to better serve them in the PACU and their families in the waiting room, working in an integrated way in trying to solve the difficulties encountered in the daily work.

Professionals recognize the need for change in some aspects, which was proved by our experience with the unit. In this context, when the nursing team sees decrease in number and in the quality of the service offered, the compassion with which care is developed is also affected. Being compassionate with the patient goes beyond the limits of compassion, of compassion itself, but it is found in dialogue, in respectful touch, in a caring and understanding look at the patient's situation. When professionals, for some reason, are not with this focus, the care provided to the patient becomes just a task activity, omitting the real essence of nursing care in the PACU and making the daily routine of the team monotonous[15].

Postoperative patients have a potential risk of complications in the PACU, which are often preventable, provided they are detected early. Therefore, upon entering the unit, the patient is monitored with the aid of a multiparameter instrument that informs professionals about possible changes in vital signs, which is indispensable for the patient's safe recovery[18].

With regard to the bond established between the nursing team professionals in the work environment, the demand requires that there be a relationship of cooperation, so that they can meet the flow of patients and so that the care provided at least meets the basic needs of each patient who passes through the unit[19].

FINAL CONSIDERATIONS

The application of specific assistance protocols of the PACU contributes to the systematization and safety of the care provided to patients, in view of the complexity of care in this unit during IPOP. However, it is worth mentioning that our findings showed staff resistance regarding the use of the standard assistance protocols and the minimum use of systematized records during the care provided to patients. In order for the assistance to be systematized according to each need, it is necessary to use protocols, such as the ABC assessment at the initial admission of the patient, the safe surgery checklist, Aldrete and Kroulik index, Ramsey sedation scale, Steward index and pain scale, which are decisive when the patient is discharged. Due to the great demand of the unit, other factors that hinder the effectiveness of care are presented, such as the inadequate number of professionals.

In this perspective, the PACU is not only configured as a unit in which the patient waits for the effects of anesthesia to pass, but it must be recognized as an environment consisting of critical and complex situations, where multidisciplinary care must be intensive to guarantee continuity in the treatment of patients. Patients and promote the success of the surgical procedure performed. Thus, our developed and socialized research showed the importance of using safe care at all times during the operative period, especially in the IPOP.

We conclude that further studies on the PACU are needed to reaffirm the importance of using assistance protocols for guiding care, seeking patient safety and the evolution of nursing as a profession, and to expand this achievement in other health care services that aim to improve the quality of care provided and its success.

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THE NURSE'S WORK IN THE STERILE PROCESSING DEPARTMENT: AN INTEGRATIVE REVIEW

O trabalho do enfermeiro no centro de material e esterilização: Uma revisão integrativa

Trabajo de enfermería en el centro de material y esterilización: Una revisión integrativa

Francisco Marcelo Leandro Cavalcante[1], Lívia Moreira Barros[2]

ABSTRACT: Objective: To identify in the scientific literature the activities of nurses who work in the sterile processing department. **Method:** This is an integrative literature review performed by searching the databases Scopus, Latin American and Caribbean Health Sciences Literature (LILACS), Scientific Electronic Library Online (SciELO), PubMed, and Virtual Health Library (VHL). The descriptors used were esterilização / sterilization, competência profissional / professional competence, and central supply hospital associated with the keywords enfermeiro / nurse and central sterile supply. We found 1,330 articles and selected 11 of them to compose the sample. **Results:** Key aspects related to nurses' work stood out, such as sector management and development of educational activities, as well as the challenges faced by these professionals, including nonrecognition and underappreciation, lack of preparation and continuing education, occupational risks, excessive workload, low wages, and physical and mental exhaustion. **Conclusion:** We could contextualize and understand the activities and their main resulting challenges related to the development of nurses' work in the sterile processing department, thus contributing to the dissemination, recognition, and reflection on this theme.

Keywords: Nurses. Sterilization. Professional competence. Nurse's role.

RESUMO: Objetivo: Identificar, na literatura científica, as atividades do enfermeiro que atua no centro de material e esterilização. **Método:** Trata-se de revisão integrativa da literatura, com busca nas bases de dados Scopus, Literatura Latino-Americana e do Caribe em Ciências da Saúde (Lilacs), Scientific Electronic Library Online (SciELO), PubMed e Biblioteca Virtual em Saúde (BVS). Os descritores utilizados foram *esterilização* / sterilization, *competência profissional* / professional competence e central supply hospital associados às palavras-chave *enfermeiro* / nurse e central sterile supply. Encontraram-se 1.330 artigos, dos quais 11 foram selecionados para compor a amostra. **Resultados:** Evidenciaram-se pontos centrais referentes ao trabalho do enfermeiro, como gerenciamento do setor e desenvolvimento de atividades educativas, além dos desafios enfrentados, como não reconhecimento e desvalorização, falta de preparo e de educação permanente, riscos ocupacionais, carga horária de trabalho excessiva, má remuneração e desgastes físico e mental. **Conclusão:** Foi possível contextualizar e compreender as atividades e os principais desafios delas decorrentes no desenvolvimento do trabalho do enfermeiro no centro de material e esterilização, contribuindo, dessa forma, para a divulgação, o reconhecimento e a reflexão a respeito da referida temática.

Palavras-chave: Enfermeiros e enfermeiras. Esterilização. Competência profissional. Papel do profissional de enfermagem.

RESUMEN: Objetivo: Identificar, en la literatura científica, las actividades de enfermeros que trabajan en el Centro de Material y Esterilización. **Método:** Esta es una revisión de literatura integradora, que busca en las bases de datos SCOPUS, Literatura Latinoamericana y del Caribe en Ciencias de la Salud (LILACS); Biblioteca científica en línea electrónica (SCIELO), PubMed y biblioteca virtual de la salud (BVS). Los descriptores utilizados fueron esterilización / sterilization, competencia profesional / professional competence, asociados a las palabras clave enfermeiro / nurse y centro de suministros estériles / central sterile supply. Se encontraron 1.330 artículos, de los cuales 11 fueron seleccionados para componer la muestra. **Resultados:** se evidenciaron puntos centrales relacionados con el trabajo de la enfermera, como la gestión del sector y el desarrollo de actividades educativas, además de los desafíos enfrentados, como la falta de reconocimiento y apreciación, la falta de preparación y educación permanente, los riesgos laborales, la carga de trabajo excesiva, mal pago y agotamiento físico y mental. **Conclusión:** fue posible contextualizar y comprender las actividades y los principales desafíos derivados de ellas en el desarrollo del trabajo de la enfermera en el centro de materiales, contribuyendo así a la difusión, reconocimiento y reflexión sobre este tema.

Palabras clave: Enfermeras y enfermeros. Esterilización. Competencia profesional. Rol de la enfermera.

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INTRODUCTION

The Sterile Processing Department (SPD) is the sector responsible for the processing of healthcare products (HPs), whose aim is to provide properly processed materials for healthcare services. In this sector, the processes of recycling, cleaning, sterilization, inspection, packaging, and distribution of materials for the various consumer units take place[1,2].

The SPD plays a crucial role in ensuring that HPs are sterilized and delivered with excellent quality, favoring clean care and the reduction in rates of healthcare-associated infections (HAIs)[3]. The sector provides indirect patient care, supplying safe medical devices, which will contribute to direct care. Its main objectives are the processing, storage, and distribution of materials, a context that involves the duties of nurses within this work environment[4].

The nurse is responsible for managing and operationalizing all stages that compose the processing of materials, in addition to supervising the activities of the nursing team working in the sector[5]. In this sense, nurses' performance requires specific knowledge of the various equipment, medical commodities, surgical instruments, and how to process them, as well as the management of the SPD[6,7].

Nurses' competence in the performance of their activities ensures the effectiveness of the SPD processes, in addition to collaborating with the prevention of HAIs. However, the importance of their work in the nursing team needs to be continuously highlighted, discussed by the team, and presented to the other units of the institution, in such a way that these professionals can receive their due recognition and no longer remain invisible[8].

Thus, the development of new studies on the work of nurses in the SPD is justified, with emphasis on their assignments, activities, and the relevance of their work, as well as the challenges faced when performing their duties.

OBJECTIVE

To identify in the scientific literature the activities of nurses who work at the SPD.

METHOD

This is an integrative literature review, performed according to the following steps: definition of the problem and the guiding question, establishment of criteria for inclusion and exclusion of studies, search for articles in the literature and their critical evaluation, interpretation and discussion of results, and presentation of the review[9]. The guiding question of this study was: what are the activities performed by nurses working in the SPD?

The databases used to search for the articles were: Scopus, Latin American and Caribbean Health Sciences Literature (LILACS), Scientific Electronic Library Online (SciELO), PubMed, and Virtual Health Library (VHL). We used terms *esterilização*/sterilization and *competência profissional*/professional competence in the Health Sciences Descriptors (DeCS), and central supply hospital in the Medical Subject Headings (MeSH), associated with the keywords *enfermeiro*/nurse and central sterile supply, and combined with the Boolean operator *AND* and/or *OR*, aiming to obtain the highest possible number of results. The following combinations were searched: *enfermeiro*/nurse *AND esterilização*/sterilization; nurse *AND* central supply hospital *OR* central sterile supply.

For the sample composition, we applied the following inclusion criteria: articles written in Portuguese, English, or Spanish, with no limitation on publication date, addressing the work of the nurse in the SPD, and available in full text. The exclusion criteria were: publications concerning workers' health, as well as dissertations, theses, editorials, integrative reviews, repeated articles, and articles unrelated to the theme of this study.

The analysis of the articles was initially based on the reading of the title and the abstract. Subsequently, the selected studies were analyzed with an adapted instrument that provided information regarding the identification of the articles (title, authors, year of publication, name of the journal), methodological description, and level of scientific evidence, as proposed by Melnyk and Fineout-Overholt[10].

With respect to the level of scientific evidence, we used the following classification:

1. Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials or clinical guidelines based on systematic reviews of randomized controlled trials;
2. Evidence produced by at least one well-designed randomized controlled trial;

3. Evidence from well-designed trials without randomization;
4. Evidence from well-designed cohort and case-control studies;
5. Evidence resulting from a systematic review of descriptive and qualitative studies;
6. Evidence obtained from a single descriptive or qualitative study;
7. Evidence from respected authorities' opinions and from expert committee reports[10].

The search resulted in a total of 1,330 articles, of which we excluded 1,225 after reading the title and abstract, as they did not answer the guiding question, and 90 because they were repeated; hence, 11 articles remained in the final sample. Figure 1 describes the process of searching and selecting articles in the databases.

RESULTS

The 11 selected articles were published from 2004 to 2019, with the highest incidence in 2006 (n=2) and 2013 (n=2). All articles were conducted in Brazil, with level 6 of scientific evidence, with prevalence of qualitative and descriptive studies. Most studies aimed at analyzing and understanding the nurses' work process in the SPD and/or outlining their assignments and activities.

Table 1 presents information about the publications, including title, authors, year of publication, objectives, journal, database, methodological description, and level of scientific evidence.

Table 2 describes the management, educational, and support activities of nurses who work in the SPD in categories listed according to the analysis of the studies.

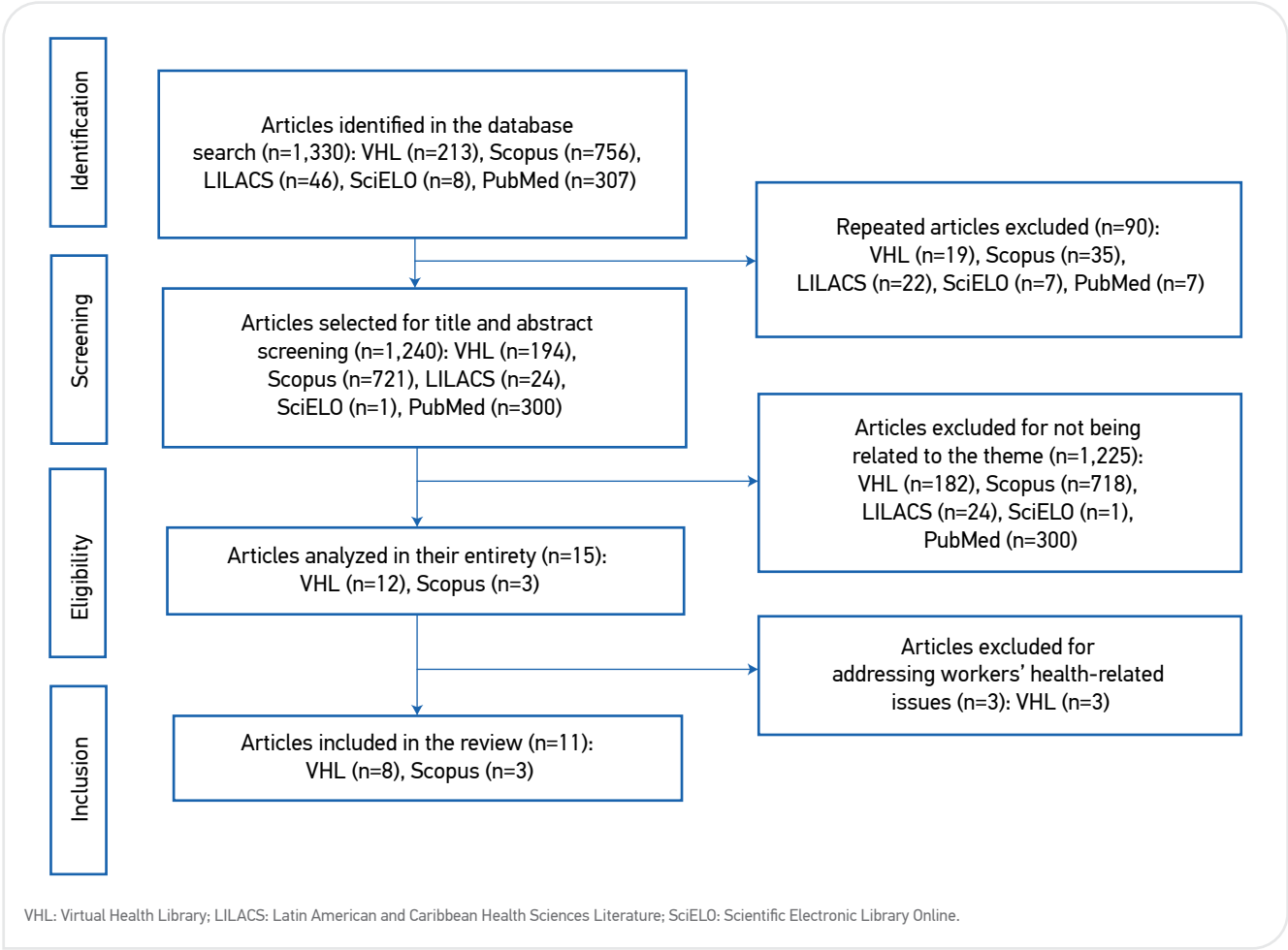

Figure 1. Flowchart of data search.

Table 1. Article description. Sobral, CE, Brazil, 2020.

n	Title	Author(s)/Year of publication	Objectives	Journal/Type of study/Database/ Level of evidence
1	"Investigation in Central of Material and Sterilization using Grounded Theory"	Pezzi and Leite, 2010.[11]	To identify the meaning of the management practice in a sterile processing department for nurse managers/supervisors of this unit concerning human resources; to describe the nurse management process regarding human resources from the perspective of nurse managers/supervisors of the SPD; to create a theoretical model for human resource management.	*Revista Brasileira de Enfermagem* / Qualitative Research / VHL / Level 6
2	"Logistics of a surgical block implementation in the forest: the nurse's role"	Sales et al., 2016[12]	To report the experience of volunteer nurses at the Civil Society Organization of Public Interest *Expedicionários da Saúde* during the implementation of the surgical center and the sterile processing department of a field hospital in an indigenous village in Northern Brazil.	*Revista SOBECC* / Experience Report / VHL / Level 6
3	"Nursing tasks in the material storage center of hospital institutions"	Gil et al. 2013[13]	To identify the activities of nurses in the sterile processing department of hospitals, according to the activity profile and frequency of performance.	*Revista Texto e Contexto Enfermagem* / Descriptive cross-sectional study / VHL / Level 6
4	"Nursing activities in central supply and sterilization: A contribution to personnel design"	Costa and Fugulin, 2011[14]	To identify and validate the activities performed by the nursing team in sterile processing departments to help define the unit's workload.	*Revista Acta Paulista de Enfermagem* / Methodological Study / Scopus / Level 6
5	"Nurse's role in cleaning process at a material and sterilization center"	Strieder et al., 2019[15]	To contextualize the role of nurses in the process of cleaning hospital materials in a sterile processing department.	*Revista SOBECC* / Experience Report / VHL / Level 6
6	"The nursing working process at the material and sterilization center: perceptions of undergraduate students"	Taube et al., 2008[16]	To identify how undergraduate students perceive the working process of the nurse in the sterile processing department.	*Revista Ciência, Cuidado e Saúde* / Qualitative Descriptive Study / VHL / Level 6
7	"Nursing in the process of sterilization of materials"	Ouriques and Machado, 2013[17]	To analyze the work process of nursing professionals working in the surgical center and the sterile processing department as to the sterilization of surgical materials in a public hospital in Porto Alegre (RS), Brazil.	*Revista Texto e Contexto Enfermagem* / Descriptive exploratory research / Scopus / Level 6
8	"Nursing at the sterilized material center – continuing education practice"	Souza and Ceribelli, 2004[18]	To characterize the continuing education practices offered to the staff involved in nursing activities at sterile processing departments of hospitals located in the micro-region of São José dos Campos (SP), Brazil.	*Revista Latino-Americana de Enfermagem* / Qualitative descriptive study / VHL / Level 6
9	"The nurse work process in the center of material and sterilization"	Taube and Meier, 2007[20]	To describe the group perception of nurses about elements of their work process in the sterile processing department.	*Revista Acta Paulista de Enfermagem* / Qualitative descriptive study / Scopus / Level 6
10	"The nurse of the Material and Sterilization Center and the perception of his social role"	Bartolomei and Lacerda, 2006[21]	To understand how nurses work in the sterile processing department and organize themselves as a social group, perceiving their social roles and relating them both to the dominant health care structure and to the identifying nature of nursing – the care process.	*Revista Gaúcha de Enfermagem* / Qualitative study / VHL / Level 6
11	"The nurse's work at a hospital supply center and his/her place in the care for nursing work"	Bartolomei and Lacerda, 2006[22]	Study on nurses' work at the sterile processing department aiming at analyzing their social reality and transforming role in the care process in health and nursing.	*Revista da Escola de Enfermagem da USP* / Strategic research with discourse analysis / VHL / Level 6

SOBECC: Brazilian Association of Nurses in Surgical Center, Anesthesia Recovery and Center for Material and Sterilization; VHL: Virtual Health Library; USP: Universidade de São Paulo.

Table 2. Description of activities performed by nurses in the sterile processing department.

Category	Activities	Articles
Management activities	Management and coordination of the work process in the unit	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
	Human and material resource management	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
	Supervision of activities carried out in the unit	1, 2, 3, 4, 6, 7, 8, 9
	Definition of the work schedule in each work unit of the nursing team	2, 3, 4, 5, 6, 7, 8
	Supervision of the operation of equipment used in each work unit	2, 3, 4, 6, 7
	Monitoring of tests carried out with products, inputs, and equipment	1, 3, 4, 6
	Supervision and control of receipt of consigned materials	3, 4, 6
	Supervision and control of the use of consigned materials	3, 4
	Supervision and control of return of consigned materials	3, 4
	Confirmation of the daily surgery schedule, verifying the delivery of consigned materials	3, 4
	Confirmation of the surgery schedule, verifying the availability of sterile materials and clothing	3, 4
	Inspection of the sterilization control documentation	1, 3, 4, 6
	Monitoring and control of the supply of sterile materials and clothing	3, 4, 6
	Monitoring and evaluation of maintenance of materials and equipment	1, 3, 4, 6
	Monitoring and evaluation of equipment quality and validation	1, 3, 4, 6
	Participation in administrative and management meetings involving the unit	1, 3, 4
	Monitoring the evaluation of quality indicators in the unit	1, 2, 3, 4
	Managing productivity control in the unit	1, 2, 3, 4, 6
	Problem solving	2, 3, 4, 5, 8
	Preparation of protocols	1
Educational activities	Monitoring, planning, and promotion of training programs	1, 2, 3, 4, 5, 10
	Participation in programs, commissions, courses, and events involving the unit	3, 4, 10
	Participation in the evaluation of employees' performance	3, 4, 5, 10
	Research development	3, 4
	Participation in the definition of programs to prevent occupational risks and promote the safety of workers	1, 2, 3, 4, 5, 7
Support activities	Providing support to consumer units, with distribution and receipt of their materials	1, 3, 4
	Providing indirect patient care	1, 2, 3, 8, 9

DISCUSSION

The bibliographic survey evidenced the central axes of the nurses' work in the SPD, such as the management of the sector and the development of educational activities. In addition, we could identify some of the challenges faced by these professionals.

The role of nurses in the SPD begins in the unit planning stage, as they are responsible for choosing the appropriate material and human resources for the activities performed in the sector. Nurses must select, train, and allocate the staff, considering the operationalization and activities carried out in the unit[11,12].

These professionals play a key role, from the planning and organization stages to the execution of work, guaranteeing the systematic operationalization of processes involving storage, conservation, distribution, transportation, and handling of equipment and materials, aiming to maintain the integrity of the products, their shelf life, and quality in order to ensure patient safety regarding the provided care[12].

According to studies, the managerial work of nurses in the SPD involves several activities such as: coordination of

the work process in the unit; supervision of activities carried out in the unit; definition of the work schedule in each unit of the nursing team; monitoring of the team's performance; supervision of the operation of equipment used in each work unit; inspection of the sterilization control documentation; monitoring of tests carried out with products, inputs, and equipment; confirmation of the daily surgery schedule, verifying the delivery of consigned materials; participation in administrative and management meetings involving the unit; monitoring the evaluation of quality indicators in the SPD[13,14].

In this context, management is one of the main tasks of nurses and comprises several functions, such as planning and structuring of services, elaboration of administrative and operational instruments, and administration of human and material resources. The immediate purposes of the administrative activities conducted by nurses consist of organizing and controlling the work process, while the mediate purpose consists of facilitating the care in order to provide the patient's cure[13].

Concerning the management of human resources, we underline that the nurses' work involves humanistic values, personal and professional commitment, technical-scientific knowledge, understanding of human relations, and dedication to the health of individuals indirectly assisted, thus consisting of a challenging work of great responsibility[11,12]. As team coordinators, nurses seek to integrate the other professionals by favoring interpersonal relationships and strengthening teamwork, which contributes to the competent practice at all stages of the SPD work process, providing safe and quality care[15,16].

The management of material resources also stands out, especially when considering the increase in technological devices. The nursing team provides several products for the various consumer units, such as emergency room, outpatient clinics, surgical center, obstetric center, and intensive care unit. The nurses' management is paramount and must be resolute and effective to avoid possible errors in the many operational processes[13].

Activities related to the supervision of equipment operationalization are among the tasks of nurses in the SPD, which are mentioned in the studies. They require knowledge of the equipment and its proper operation, as well as staff training, to ensure that the care provided to patients is reliable and safe[13,14].

Moreover, studies indicate that nurses perform educational activities, including: monitoring, planning, and promotion of training programs; participation in programs, commissions, courses, and events involving the SPD unit; participation in the evaluation of employees' performance. Nurses are responsible for carrying out educational activities, through continuing education, seeking to qualify the team to perform their tasks rationally and competently, aiming at minimizing potential failures in the process of cleaning, preparation, disinfection, sterilization, and storage of HPs[11,13,14,17,18].

Research development is another task mentioned, considered an important activity for the improvement of the SPD work process; however, authors pointed out the nurses' low participation in this activity, which constitutes a hindrance to the improvement, valorization, and dissemination of the work developed by nurses at the SPD[13].

Therefore, the challenges faced by nurses and their team in the unit include nonrecognition, underappreciation, and lack of preparation and continuing education, which contribute to low self-esteem, dissatisfaction, professional ineptitude, and high turnover in the sector. In addition, some situations related to characteristics of the work process and organization involve physical, chemical, biological, and ergonomic risks, deficiencies in structural organization, nurses who have two or more jobs, excessive workload, low wages, and physical and mental exhaustion, which predispose professionals to diseases and may compromise their health and quality of life[11,17,19].

The literature has no studies on the reasons why nurses choose to work in the SPD or the historical evolution of their work process in this care field, but the challenges faced by these professionals and the lack of direct care to the patient may be the main factors that discourage nurses from working in this unit.

We also emphasize that nurses recognize the importance of their work in the SPD and are concerned with the social representation of the unit, mainly because they do not receive due recognition for the development of this process of living care in the act, guided by light, hard-light, and hard technologies, which contribute to the direct care and ensure the safety of procedures and interventions provided to patients[20,21].

A study points out the nurses' difficulty in defining the elements of the SPD work process, especially regarding the work object and the final product. In this sense, the work process of nurses in this sector involves management, care, teaching, and research, which allows them to work with different work objects, i.e., material and human resources, transforming them into indirect patient care and making the characterization of this work process and the measurement of its results complex[22].

Studies reveal that, although the activities performed by nurses in the SPD remained similar over the years, they have improved, with these professionals mastering scientific evidence and management and systematizing tools related to the work process, thus optimizing the operationalization of the support provided in the SPD in a qualified, integrated, collaborative, and efficient manner.

Therefore, we emphasize that the work of nurses in the SPD is both challenging and crucial for the quality of health care directly and indirectly provided. Hence, nurses must ground their work in updated competencies and skills, with human, ethical, and technical-scientific basis, seeking to contribute to the full potential of the nursing team in the various healthcare practices[6,13].

To that end, they need adequate working instruments and conditions, such as appropriate physical structure, fair wages, quality equipment and materials, protocols and standards, effective communication skills, balanced staff allocation, competent management, and scientific knowledge[13,23]. The qualified participation of nurses in the SPD and in the discussion of issues relevant to health care is paramount for producing knowledge in the field, assisting in professional growth and the transformation of reality in order to gain appreciation[13].

Taking this into consideration, we must promote the work of nurses at the SPD to make it visible, recognizing its importance and demonstrating that their activities are not merely limited to cleaning materials, but also involve specific scientific knowledge to be carried out with dexterity, in addition to effectively collaborating with the care provided by all professionals.

CONCLUSION

The results of this literature review allow contextualizing and understanding the work of nurses at the SPD. Among the main tasks of professionals working in the sector are the management and coordination of the SPD work process; management of human and material resources; participation in administrative and management meetings involving the SPD; monitoring the evaluation of quality indicators in the unit; monitoring, planning, and promotion of training programs; and participation in programs, commissions, courses, and events involving the unit.

Therefore, we expect to foster the role of nurses and other professionals working at the SPD, thus helping them gain visibility and receive due recognition and appreciation. Furthermore, we intend to provide evidence on the subject both for professional practice and for nursing training.

We suggest the development of new studies seeking to investigate the motivational factors of professionals for working in the SPD, which address the historical evolution of the nurses' work in the SPD, as well as interventionist research, aiming to identify and fulfill the professionals' needs for qualification and continuing education.

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INSTITUTIONAL CAUSES FOR ELECTIVE SURGERY CANCELLATION

Causas institucionais para cancelamento de cirurgias eletivas

Causas institucionales para la cancelación de cirugías electivas

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ABSTRACT: Objective: To analyze scientific productions about elective surgery cancellation due to institutional causes. **Method:** Integrative literature review, systematized by the acronym Problem, Interest, and Context (PICo), according to PICo strategy and procedures defined by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Bibliographic search was carried out in September 2018 and updated in May 2020 in the following databases: Medical Literature Analysis and Retrieval System Online (MEDLINE)/PubMed, Latin American and Caribbean Health Sciences Literature (Lilacs), Nursing Database (BDEnf) of the Virtual Health Library (VHL), Scopus (Elsevier) of the Periodical Portal of the Coordination for the Improvement of Higher Education Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* – CAPES), and Scientific Electronic Library Online (SciELO). Publications from 2008 to 2020 in Portuguese, English, and Spanish were retrieved. **Results**: We found 920 studies in the bibliographic search, 263 of them were duplicates, and 657 remained for selection. In the end, 15 studies were included in the review. **Conclusion:** The institutional causes identified were delay in the previous surgery, leading to unavailability of operating rooms, structural problems, lack of or defects in equipment, and insufficient human resources.

Keywords: Surgery department, hospital. Surgicenters. Elective surgical procedures. Hospital administration.

RESUMO: Objetivo: Analisar as produções científicas sobre cancelamento de cirurgias eletivas pelas causas institucionais. **Método:** Revisão integrativa da literatura, sistematizada pelo acrônimo Participante, Interesse e Contexto (PICo), de acordo com a estratégia PICo e procedimentos definidos pelo Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). A busca bibliográfica foi realizada em setembro de 2018 e atualizada em maio de 2020, nas bases de dados Sistema Online de Busca e Análise de Literatura Médica (MEDLINE)/PubMed, Literatura Latino-Americana e do Caribe em Ciências da Saúde (Lilacs) e Base de Dados em Enfermagem (BDEnf) da Biblioteca Virtual em Saúde (BVS), Scopus (Elsevier) do Portal de Periódicos da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) e Biblioteca Eletrônica Científica Online (SciELO). Foram consideradas publicações de 2008 até 2020, nos idiomas português, inglês e espanhol. **Resultados:** Foram identificados, na busca bibliográfica, 920 estudos, sendo 263 duplicados, restando 657 para seleção. Ao final, foram incluídos 15 estudos na síntese. **Conclusão:** As causas institucionais identificadas foram o avanço de horário da cirurgia anterior, gerando a indisponibilidade de salas cirúrgicas, problemas estruturais, falta ou defeitos em equipamentos e recursos humanos insuficientes.

Palavras-chave: Centro cirúrgico hospitalar. Centros cirúrgicos. Procedimentos cirúrgicos eletivos. Administração hospitalar.

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RESUMEN: Objetivo: Analizar producciones científicas sobre la cancelación de cirugías electivas por causas institucionales. **Método:** Revisión bibliográfica integral, sistematizada por el acrónimo Participante, Interés y Contexto (PICo), de acuerdo con la estrategia y los procedimientos PICo definidos por el Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). La búsqueda bibliográfica se realizó en septiembre de 2018 y se actualizó en mayo de 2020, en las bases de datos MEDLINE/Pubmed, LILACS y BDEnf de la Biblioteca Virtual en Salud, SCOPUS (Elsevier) del Portal de revistas Capes y SciELO. Consideró publicaciones de 2008 a 2020, en portugués, inglés y español. **Resultados:** En la búsqueda bibliográfica, se identificaron 920 estudios, 263 de los cuales se duplicaron, dejando 657 para la selección. Al final, se incluyeron 15 estudios en la síntesis. **Conclusión:** Las causas institucionales identificadas fueron el tiempo de avance de la cirugía previa, generando la falta de disponibilidad de quirófanos, problemas estructurales, falta o defectos en los equipos y recursos humanos insuficientes.

Palabras clave: Servicio de cirugía en hospital. Centros quirúrgicos. Procedimientos quirúrgicos electivos. Administración hospitalaria.

INTRODUCTION

Currently, surgeries are diagnostic and therapeutic modalities that benefit thousands of people because they solve countless health problems, improve quality of life, reduce discomforts, such as pain, restore mobility and human senses (partially or totally), besides other advantages.

Surgery scheduling and preparation involves numerous actions and professionals. It is a complex process that, if not effectively planned, may result in suspension or cancellation.

Surgery cancellation is often seen by professionals as a natural phenomenon, as part of the institutional routine. However, health professionals should understand that these occurrences need to be minimized[1]. The volume of surgical procedures and the number of cancellations are indicators of hospital quality and productivity[2].

Surgery cancellation represents losses to the institution, such as: delays in the surgical schedule, losses to other patients waiting their turn to be operated, increase in operational and financial costs, prolonged hospitalization, and higher risk of hospital-acquired infection[2].

Surgery cancellation is still a challenge for hospitals. Studies also cite the following reasons for suspension of scheduled procedures: process failures such as medical team absence or delay, which slows the operating room (OR) occupancy flow; communication failures between medical team, surgical center (SC), and hospitalization units; lack of materials or supplies; surgical preparation failures, among others. In these cases, surgery cancellation results in losses to the institution, delays in the surgical schedule, and losses to other patients, who also wait their turn to be operated[3]. In this context, the research question is: what are the institutional causes for elective surgery cancellation and/or suspension?

OBJECTIVE

To analyze information about elective surgery cancellation available in specialized literature, identifying institutional causes.

METHOD

This is an integrative literature review that enables synthesis and analysis of the scientific knowledge produced on the subject investigated. An integrative review can have different purposes; in other words, it can be directed to concept definition, theory review, or methodological analysis of studies included about a particular topic[4].

Based on the question presented, the main subjects were identified and systematized according to the Problem, Interest, and Context elements, known as PICo strategy, which is a mnemonic adapted by the Joanna Briggs Institute[5]:

- P: Surgery cancellation and/or suspension;
- I: Surgery cancellation and/or suspension indicators for the elaboration of an instrument for verification or prior check aimed at calling patients;
- Management instruments and/or tools for calling patients to the SC;
- Co: surgical center.

Standardized terms and their synonyms were identified in the Health Sciences Descriptors (*Descritores em Ciências da Saúde* – DeCS) and Medical Subject Headings (MeSH) controlled vocabularies.

The search strategy involved using quotation marks (“) to restrict compound terms and establish their order. Boolean and/or search operators AND – term intersection; OR – compound terms and/or synonym cluster; and NOT – exclusion

operator, were used in the Scopus database of the Periodical Portal of the Coordination for the Improvement of Higher Education Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* – CAPES).

The following portals and databases were accessed: Medical Literature Analysis and Retrieval System Online (MEDLINE), consulted via PubMed; Scopus (Elsevier) through the CAPES Periodical Portal'; Nursing Database (BDEnf) among others of the Virtual Health Library (VHL) regional portal. The Scientific Electronic Library Online (SciELO) was also searched. Documents written in Portuguese, Spanish, and English from 2008 to 2020 were retrieved.

Bibliographic search was carried out in September 2018 and updated in May 2020. Table 1 presents VHL and MEDLINE/PubMed examples.

Retrieved documents were stored in the Endnote Web reference manager and, after removing the duplicates, they were exported to and organized in an Excel spreadsheet with the following data: article number, author, title, year, volume/number/page, database, abstract, and keywords.

Articles that indicated the institutional causes for surgery cancellation were included.

On the other hand, articles addressing instruments for cancellation management, operating room planning, statistical analysis of cancellations without indication of causes, and articles on outpatient or emergency surgery or providing only a reflective approach were excluded.

After data analysis and interpretation, the publications were summarized, describing common findings.

The study followed the preparation steps recommended by Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[6], as shown in Figure 1.

RESULTS

Chart 1 describes the studies, presenting their title, period, year, country, type, and summary of results. A total of 920 documents were identified, with 263 duplicates, and 657 remaining for analysis and selection.

Among them, 604 documents were excluded by the assessment of title, abstract, and type of document (book and integrative review). Out of the 53 documents that had their full text analyzed, 31 were excluded because they did not address causes/motives of surgery cancellation and did not have their full text available; 22 papers were qualitatively evaluated, and 7 were excluded due to eligibility.

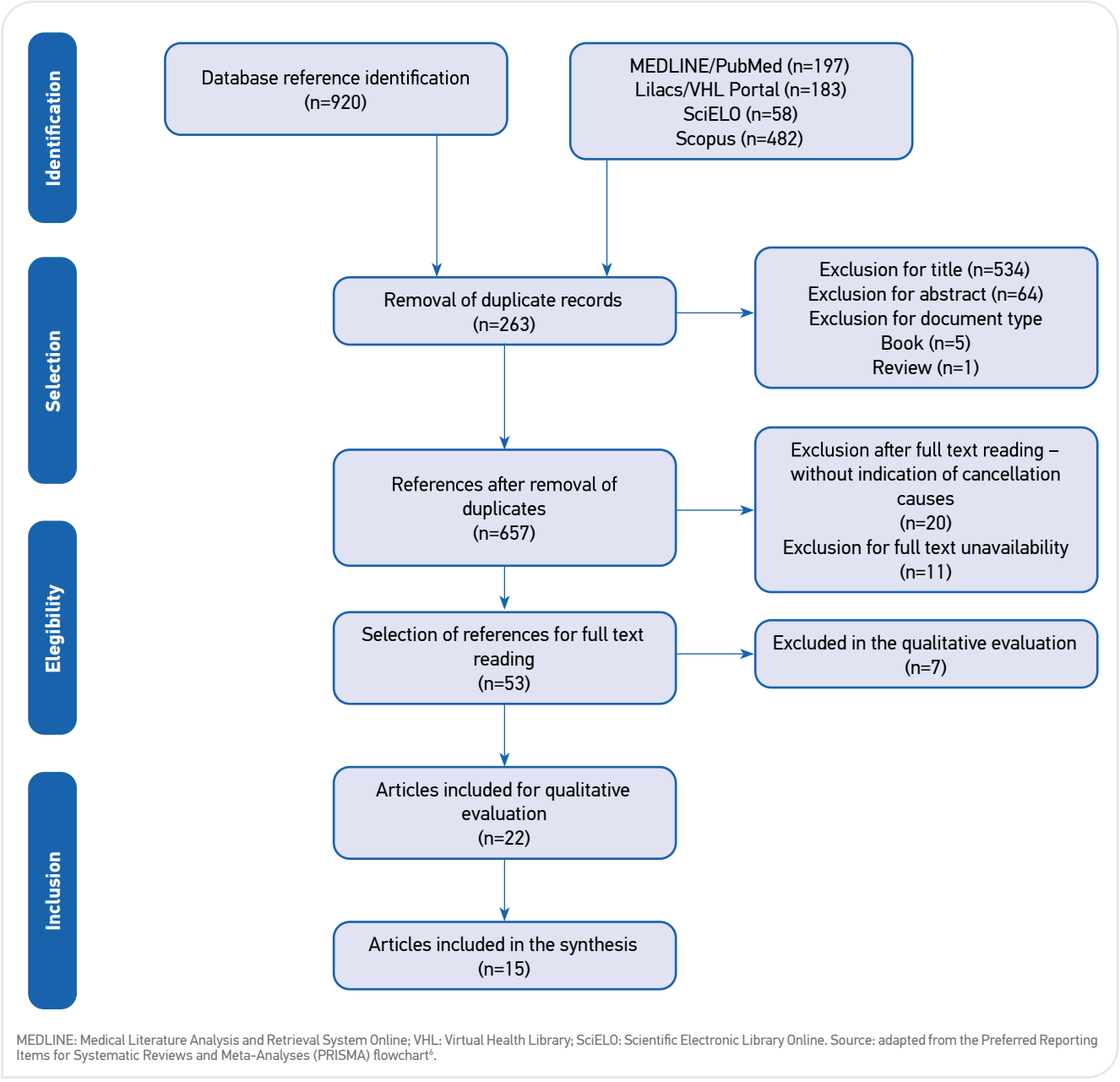
In summary, this review comprised 15 articles published predominantly in international journals (n=10), followed by Latin American (n=4) and Brazilian journals (n=1). They were published in 2011 (n=1), 2012 (n=1), 2016 (n=2), 2017 (n=1), 2018 (n=5), 2019 (n=3), and 2020 (n=2). China and Brazil predominate in the distribution by countries, with two studies each. As to study type, most papers had a retrospective design (n=8), followed by prospective (n=4), cross-sectional (n=2), and descriptive (n=1). There was no predominance of authors.

Delays in the previous surgery, OR unavailability, and hospital management problems stood out as reasons for cancellation. Other issues mentioned include lack of surgeons,

Table 1. Search strategies carried out in 2018 and updated in 2020.

Databases	Strategies	N
VHL	tw:((cancelamento OR suspensão OR cancelada) AND (cirurgia OR cirugia OR operações OR cirurgicos OR cirurgicas OR operação)) AND (instance:"regional") AND (db:("LILACS" OR "BDENF" OR "IBECS" OR "BBO" OR "colecionaSUS" OR "SES-SP" OR "tese" OR "BINACIS") AND la:("pt" OR "es" OR "en") AND year_cluster:("2012" OR "2010" OR "2016" OR "2008" OR "2017" OR "2011" OR "2013" OR "2014" OR "2015" OR "2018"))	144
VHL	tw:((cancelamento OR suspensão OR cancelada) AND (cirurgia OR cirugia OR operações OR cirurgicos OR cirurgicas OR operação)) AND (instance:"regional") AND (db:("LILACS" OR "BDENF" OR "IBECS" OR "BBO" OR "colecionaSUS" OR "SES-SP" OR "tese" OR "BINACIS") AND la:("pt" OR "es" OR "en") AND year_cluster:("2012" OR "2010" OR "2016" OR "2008" OR "2017" OR "2011" OR "2013" OR "2014" OR "2015" OR "2018")) AND (year_cluster:[2018 TO 2020])	10
PubMed	("Operating Rooms"[MeSH Terms] OR ("Operating Rooms"[Title/Abstract] OR "Operating Room"[Title/Abstract])) AND (Cancellations[Title/Abstract] OR suspension[Title/Abstract]) AND (("2010/01/01"[PDAT] : "3000/12/31"[PDAT]) AND (English[lang] OR Portuguese[lang] OR Spanish[lang]))	85
PubMed	("Operating Rooms"[MeSH Terms] OR ("Operating Rooms"[Title/Abstract] OR "Operating Room"[Title/Abstract])) AND (Cancellations[Title/Abstract] OR suspension[Title/Abstract]) AND (("2018/01/01"[PDAT] : "2020/12/31"[PDAT]) AND (Portuguese[lang] OR Spanish[lang] OR English[lang]))	23

VHL: Virtual Health Library.



MEDLINE: Medical Literature Analysis and Retrieval System Online; VHL: Virtual Health Library; SciELO: Scientific Electronic Library Online. Source: adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart[6].

Figure 1. Primary study selection process flowchart.

facility and space failures, lack of staff, emergency surgery demand, lack of equipment, lack of intensive care beds in the postoperative period, procedure no longer necessary, scheduling failures, and lack of oxygen and blood.

DISCUSSION

The studies involved countries with different Human Development Index (HDI), such as England, United States, China, Spain, Saudi Arabia, Mexico, India, Colombia, Argentina, Brazil, Tanzania, Pakistan, and Ethiopia[7-21].

Surgery cancellation rates were higher in developing countries compared to developed ones[13,19,21]. In developing countries, whose resources are limited, elective surgery suspension is a common phenomenon in most hospitals[7,12,15,17].

Reasons for surgery suspension were classified and divided into institutional, patient, and staff causes in all studies. This review addressed institutional issues responsible for surgery suspension. Analyses focused on elective surgeries and

Chart 1. Study characterization based on title, journal, publication year, country of origin, study type, and results.

Title	Journal/year Country/study type	Results
"Incidence, causes and pattern of cancellation of elective surgical operations in a university teaching hospital in the Lake Zone, Tanzania"[7]	*African Health Sciences* 2011 Tanzania Prospective study	The most common causes for surgery cancellation were operating room unavailability and inadequate facilities in 53.0% and 28.4% of cases, respectively. Most of these cancellations were attributed to hospital management (82%), and 93% of them were avoidable.
"Cancellation of elective operations on the day of intended surgery in a Hong Kong hospital: point prevalence and reasons"[8]	*Hong Kong Medical Journal* 2012 China Retrospective cross-sectional study	Operating room unavailability due to delay in the previous surgery was the most frequent cancellation cause (n=310).
"Tasas y causas de suspensión de cirugías en un hospital público durante el año 2014"[9]	*Enfermería Universitaria* 2016 Argentina Descriptive cross-sectional study	Causes related to logistics or management were responsible for 44.2% of surgery suspensions, while clinical causes (non-surgical) represented 40.8%. Anesthesia-related causes accounted for 5.4% of the total surgery suspensions.
"Elective surgery cancelation on day of surgery: An endless dilemma"[10]	*Saudi Journal of Anesthesia* 2016 Saudi Arabia Statistical analysis retrospective study	Four reasons explained about 80% of cancellations. The most frequent cause (27.0%) was patient non-attendance, followed by clinical conditions (24.3%) and lack of operating rooms (19.5%). Unavailability of employees / equipment / implants represented 0.7% of cancellations.
"Contributing factors of elective surgical case cancellation: a retrospective cross-sectional study at a single-site hospital"[11]	*BioMed Central Surgery* 2017 China Retrospective study	Work-related causes were the main reasons for surgery cancellation and represented 25.8% of them, followed by unspecified reasons (25.8%), coordination causes (15.1%), patient-related causes (13.0%), support system problems (11.8%), and physicians (8.5%).
"Incidence and causes of cancellations of elective operation on the intended day of surgery at a tertiary referral academic medical center in Ethiopia"[12]	*Patient Safety in Surgery* 2018 Ethiopia Cross-sectional study	The most common reasons for cancellation were factors related to the surgeon (35.8%), the patient (28.7%), administrative problems (21.2%), and anesthesia (14.4%). Cancellation occurred mainly due to inadequate scheduling (20.5%), unavailability of surgeons (8.9%), of oxygen and blood (8%), and of equipment (5.5%).
"Cancelled operations: a 7-day cohort study of planned adult inpatient surgery in 245 UK National Health Service hospitals"[13]	*British Journal of Anaesthesia* 2018 England Prospective observational cohort study	Cancellation causes: lack of available beds (31%), unavailability of operating rooms (12.7%), lack of equipment (2.3%).
"El análisis factorial para aumentar el rendimiento del quirófano y disminuir la cancelación de cirugía electiva"[14]	*Cirujano General* 2018 Mexico Prospective study	Operating room unavailability (48.5%), emergency surgery (17.1%), and patient's clinical condition (10.5%) were the main causes for cancellation.
"Determinants factors for suspension of elective surgeries in a hospital of the Federal District, Brazil"[15]	*Revista SOBECC* 2018 Brazil Descriptive retrospective quantitative study	From January to October 2015, 6,926 surgeries were scheduled, with 4,587 performed and 2,339 suspended, totaling a surgery suspension rate of 33.8%. Unjustified causes were the main reason for suspension (30.1%).

Continua...

Chart 1. Continuation.

Title	Journal/year Country/study type	Results
"A prospective study on operation theater utilization time and most common causes of delays and cancellations of scheduled surgeries in a 1,000-bedded tertiary care rural hospital with a view to optimize the utilization of operation theater"[16]	*Anesthesia, Essays and Researches* 2018 India Prospective study	Operating room unavailability (62.22%) and patient's clinical conditions (14.44%) were the most frequent reasons for cancellation. The highest cancellation rate occurred in cancer surgeries (27.27%).
"Canceled elective general surgical operations in Khyber teaching hospital, Peshawar, Pakistan"[17]	*Rawal Medical Journal* 2019 Pakistan Cross-sectional study	Operating room unavailability was the most common reason for surgery cancellation (240/23.46%); 238 (23.2%) surgeries were canceled due to clinical conditions, with uncontrolled blood pressure being the most frequent (102/49.76%).
"Causas de cancelación de cirugía programada en una clínica de alta complejidad de Popayán, Colombia"[18]	*Revista Facultad de Medicina* 2019 Colombia Descriptive retrospective cross-sectional study	Cancellation rate was 2.7%; 56.7% of the causes were attributed to patients, 40.5% to providers, and 2.7% to insurance companies. Institutional causes included equipment unavailability or damage, lack of supplies, and health product processing problems.
"Retrospective analysis of suspended surgeries and influencing factors during an 8-year period"[19]	*Cirugía Espanola* 2019 Spain Retrospective observational study	Cancellation causes: patient's clinical conditions (17.6%); operating room unavailability (26.8%), patient non-attendance (6.3%). Avoidable causes accounted for 64.8%, and unavoidable causes represented 35.2%.
"Incidences and causes of surgery cancellation in a university hospital in Barranquilla, Colombia, in 2016"[20]	*Enfermería Global* 2020 Colombia Retrospective observational study	Among cancellation causes, 99 (40.6%) were attributed to patients, 93 (38.1%) to the institution, and 52 (21.3%) to medical orders. In total, 41% of cancellations could have been avoided. Cancellation rate was 7.6%.
"Same-Day Cancellation in Vascular Surgery: 10-Year Review at a Large Tertiary Care Center"[21]	*Annals of Vascular Surgery* United States 2020 Retrospective study	75% of surgery cancellations were considered unpredictable, 12.5% predictable, and 12.5% undetermined. Patient's clinical conditions (55%), cancellation by the patient (12%), no longer necessary procedures (10%), and management or scheduling conflicts (10%) were the most common reasons for cancellation.

their suspension causes. Emergency and urgent surgeries were disregarded since their suspension would be unjustifiable.

Surgery cancellation affects patients, the surgical team, and the hospital, reducing patient satisfaction and professional morale[11,13].

Surgery suspension is one of the most important criteria for hospital accreditation. A high-quality facility has rates close to zero. Nurses play an important role in reducing surgery suspension by understanding patients' needs, doing careful screening, and communicating with the entire surgical team[13,14].

Surgery cancellation postpones patient treatment, causes team rework, idleness, and possible complications due to prolonged hospitalization[13,18,21].

Analysis of studies included in this review identified failures in the time of use of ORs[7,8,13,14,16]. Reduction in surgical procedure time, if not well managed, may result in idleness. Controlling the procedure progress is fundamental to speed up room turnover[8,10,15,17,19]. These failures in time of use management result in OR unavailability, as indicated in different studies[7,8,13,14,16].

Surgery cancellation causes a burden on society. Studies have revealed that each surgery cancellation costs between US$ 1,430 and US$ 1,700, on average, to United States hospitals[10,15].

Frequently, the hospital has an increase in financial and operational costs due to the waste of sterile materials and supplies, as well as the OR occupancy. In most cases, surgeries are suspended with the patient already in the OR. In this

case, open materials are considered contaminated and then discarded. Professionals scheduled to assist in the procedure remain idle while awaiting a medical decision. In addition, surgery cancellation has a negative impact on hospital quality[15].

Regarding failures in the elective procedure schedule, surgery cancellation is one of the main causes of surgical adverse events. In addition, work overload, distractions by other patients and work colleagues, occurrences in the unit, inattention during the change-of-shift report, and lack of communication among team members are important factors[13,15].

Proposals to reduce surgery suspension include: decreasing OR turnover, starting the first elective surgery of the day strictly on time, and adjusting equipment and supplies necessary for each procedure, as well as increase in OR efficiency[16,17].

Planned surgical scheduling was also suggested, involving information about patients, arrangements for equipment, and checking the necessary tests, such as cross-matching[15].

Statistical analysis was recommended to elaborate an accurate institutional profile, which changes according to each facility, allowing the identification of specific gaps. Surgeons with high rates of suspension in their procedures should have their surgery scheduling carefully observed. Also, studying the causes of these suspensions, as well as searching for solutions, was advised. Monday was considered the day requiring the most attention regarding surgery scheduling, given the high number of suspensions[8].

A limitation of this study is its restriction to temporal samples from different hospitals around the world.

CONCLUSION

Surgery suspension is a global, complex, and multifactorial problem. This study focused on the analysis of institutional problems. Causes for cancellation and/or suspension of elective surgeries were obtained from the articles evaluated.

Management of OR time of use was cited in many studies in two different situations: prolonged procedures and procedures lasting less than expected.

Other SC management problems were identified, including lack of oxygen, blood, water, and intensive care beds for the immediate postoperative period. Some studies provided justifications for these issues, such as repairs in the structures of an SC. Lack of human resources, including surgeons and anesthesiologists, was also mentioned.

OR efficiency requires a thorough numerical analysis in order to present the reality of each facility. Elective surgery suspension has many repercussions and involves patients and their families, the quality of hospital services, costs, and health professionals, even from a moral point of view.

Particular attention should be given to surgery scheduling rules, improvement and financial investment in infrastructure, technologies, and human resources, interpersonal communication, patient information planning and monitoring, equipment and supplies, and analysis of cancellation causes.

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SURGICAL CENTER: RECOMMENDATIONS FOR THE CARE OF PATIENTS WITH SUSPECTED OR CONFIRMED COVID-19

Centro cirúrgico: recomendações para o atendimento de pacientes com suspeita ou portadores de covid-19

Centro quirúrgico: recomendaciones para el cuidado de pacientes con covid-19 sospechado o confirmado

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ABSTRACT: Objective: To present the recommendations to reorganize surgical center in the care of patients with suspected or confirmed COVID-19. **Method:** Critical literature review of the literature, with publications from 2019 and 2020 related to scientific production, technical standards, guidelines and recommendations of societies for managing the surgical center in the care of patients during the new coronavirus pandemic. **Results:** The management of human and material resources is essential to meet the perioperative care demand; reorganize surgical procedures; ensure the safety of health professionals; organize an operating room with required materials; plan the patient's post-anesthetic recovery; and perform cleaning and disinfection of the operating room. **Conclusion:** The recommendations direct nurses to apply best practices in patient care, in line with scientific evidence recommended by reference institutions, to promote safe and quality care for patients and professionals.
Keywords: Surgicalcenters. Perioperative care. Crew resource management, healthcare. Pandemics. Coronavirus infections.

RESUMO: Objetivo: Apresentar as recomendações para reorganização do centro cirúrgico no atendimento a pacientes com suspeita ou confirmação de COVID-19. **Método:** Revisão crítica da literatura, com publicações dos anos de 2019 e 2020 relacionadas à produção científica, a normas técnicas, às diretrizes e recomendações de sociedades, para o gerenciamento do centro cirúrgico na assistência a pacientes durante a pandemia do novo coronavírus. **Resultados:** A gestão dos recursos humanos e materiais é primordial para: atender à demanda assistencial perioperatória; reorganizar os procedimentos cirúrgicos; garantir a segurança dos profissionais de saúde; organizar a sala cirúrgica com materiais necessários; planejar a recuperação pós-anestésica do paciente; e realizar limpeza e desinfecção da sala cirúrgica. **Conclusão:** As recomendações apresentadas direcionam os enfermeiros a aplicar as melhores práticas no atendimento aos pacientes, em consonância com evidências científicas recomendadas por instituições de referência, para promoção de assistência segura e de qualidade aos pacientes e profissionais.
Palavras-chave: Centros cirúrgicos. Assistência perioperatória. Gestão de recursos da equipe de assistência à saúde. Pandemias. Infecções por coronavírus.

RESUMEN: Objetivo: presentar las recomendaciones para la reorganización del Centro Quirúrgico en la atención de pacientes con COVID-19 sospechado o confirmado. **Método:** Revisión crítica de la literatura, con publicaciones de los años 2019 y 2020, relacionadas con producción científica, estándares técnicos, Guías y Recomendaciones de Sociedades, para el manejo del CQ en la asistencia a pacientes durante la pandemia del nuevo coronavirus. **Resultados:** La gestión de los recursos humanos y materiales es fundamental para atender la demanda de cuidados perioperatorios, reorganizar los procedimientos quirúrgicos; garantizar la seguridad de los profesionales de la salud; organizar el quirófano con los materiales necesarios; planificar la recuperación postanestésica del paciente y realizar la limpieza y desinfección del quirófano. **Conclusión:** Las recomendaciones presentadas a enfermeras directas para aplicar las mejores prácticas en la atención al paciente, en línea con la evidencia científica recomendada por las instituciones de referencia, para promover una atención segura y de calidad a pacientes y profesionales.
Palabras clave: Centros quirúrgicos. Atención perioperativa. Gestión de recursos de personal en salud. Pandemias. Infecciones por coronavirus.

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INTRODUCTION

December 2019 will be marked in the history of humanity as the month in which a series of pneumonia cases of unknown etiology broke out in Wuhan City, China, which would culminated in a pandemic with characteristics not yet experienced in the 21st century. With the sequencing of the viral agent genome by the Chinese Center for Disease Control and Prevention, the virus could be identified as belonging to the Coronavirus family, later named as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[1] Between December 2019 and March 2020, coronavirus disease (COVID-19) reached all continents, becoming a pandemic,[2] with the first cases recorded in Brazil in February 2020.[3]

The World Health Organization (WHO) named the COVID-19 and classified it into two different or complementary forms of manifestation.[4-6]. This disease can manifest itself with milder symptoms, such as fever, cough, sore throat, and headache; or severe acute respiratory syndrome (SARS), with more severe symptoms, such as dyspnea, tachypnea, and hypoxemia, leading to death.[7] Therefore, symptoms may evolve, leading patients to hospitalization and treatment in intensive care units (ICU).[1]

Faced with the context of a global crisis caused by the pandemic, the reorganization of health services to meet the growing assistance demand has become imminent.[8,9] Worldwide, health institutions are being mobilizing and are building safety protocols to care for patients with suspected COVID-19 and for those who may carry the disease, considering airway contact via droplets or aerosols as the main route of transmission.[4,6,10] Procedures for manipulating the respiratory tract, such as intubation, endotracheal aspiration, and extubation, involving aerosolization of particles, are evaluated as high risk and can infect health professionals.[5,6,11]

The removal and death of several health professionals worldwide, especially those on front lines, such as nursing professionals and doctors, mobilized federal councils in Brazil, which developed and published specific recommendations to prevent these professionals from being contaminated. The Brazilian Nursing Council (*Conselho Federal de Enfermagem* - Cofen) published two versions of the general recommendations for organizing health services and preparing nursing teams during the pandemic. [2] With regard to anesthetic-surgical procedures, scheduling scales are thought to assist urgent and emergency interventions, in order to prioritize care for victims of COVID-19.[9,13,14]

International surgical associations, such as the American College of Surgeons, American Society of Anesthesiologists, Association of periOperative Registered Nurses, and American Hospital Association also recommended the suspension of elective surgeries during the COVID-19 pandemic and worked together, drafting a joint statement that contains a script with principles and questions to be evaluated in planning the resumption of elective surgeries.[15] This script recommends the return of elective surgeries only if the city meets the following criteria:

- stable reduction in new COVID-19 cases in the geographical area for at least 14 days;
- authorization by health authorities;
- ability to safely treat all patients who need hospitalization;
- adequate number of beds;
- availability of sufficient personal protective equipment (PPE) for the work team;
- forecasting and supplying necessary medications and supplies;
- adequate number of employees trained to care, without compromising safety.[15]

Nurses are considered to be the fundamental professionals for reorganizing perioperative care, meeting the exceptional and necessary demand to offer safety to professionals and patients during this public health emergency. Thus, summarizing recent publications with guidelines on essential practices in the Surgical Center (SC), assisting nurses in this task force is of utmost importance. To this end, we sought to review the recommendations essential to the adequacy of the SC in the care of patients with suspected or confirmed COVID-19.

In this context, the research question was: What are the best practices mentioned in the literature on the care of people with COVID-19 in the SC?

OBJECTIVE

To present the existing recommendations for the reorganization of the Surgical Center (SC) in the care of patients with suspected or confirmed COVID-19, ensuring safety for patients and the multidisciplinary team.

METHOD

This is a critical literature review, with publications from 2019 and 2020 related to scientific production, technical standards, as well as guidelines and recommendations of societies to manage the SC in the care of patients during the new coronavirus pandemic. The critical point of view focused on the analysis of the recommendations issued in this production, intending to know them to support the SC reorganization in the care of patients with suspected or confirmed COVID-19.

RESULTS

Recommendations published by the following bodies, companies or associations, national and international were selected:

- Brazilian Association of Surgical Center Nurses, Anesthetic Recovery and Material and Sterilization Center (*Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização)*;
- Association of periOperative Registered Nurses (AORN);
- Brazilian Health Regulatory Agency (*Agência Nacional de Vigilância Sanitária* - ANVISA);
- Brazilian Society of Anesthesiology (*Sociedade Brasileira de Anestesiologia*);
- American College of Surgeons;
- American Society of Anesthesiologists;
- American Hospital Association;
- Centers for Disease Control and Prevention.

Since the construction of the present article took place at the beginning of the pandemic, when the theme was new, recent publications from internationally recognized scientific journals were selected, totaling five articles, which supported the critical analysis.

After reading the selected materials, the existing recommendations for reorganizing the SC in the care of patients with suspected or confirmed COVID-19 were identified, resulting in the following topics addressed:

- reorganization of surgical procedures;
- safety of health professionals;
- operating room organization;
- patient's post-anesthetic recovery;
- cleaning and disinfection of the operating room.

DISCUSSION

Reorganization of surgical procedures: a new reality

For the organization of SCs throughout Brazil during the COVID-19 pandemic, several discussions on the recommendations of the world scientific community points to the suspension of elective procedures, reducing the contingent of circulation in institutions and prioritizing patients of urgent, emergency, and cancer procedures.[13-15]

Other relevant actions are to provide the necessary health supplies — such as surgical masks, N95 masks, personal protective aprons, and ventilatory assistance materials[8] — and optimize them for the care of patients with COVID-19, both in their screening process and in protecting the professionals involved.

Considering that COVID-19 is a new disease, it still requires epidemiological monitoring to know its potential for contamination beyond the respiratory tract. Therefore, it still requires research that identifies etiological factors related to its development and prevention.[8]

The orientation is that patients with positive COVID-19 should not undergo surgery at this time, unless they have a life-threatening emergency, or if the surgery cannot be postponed. In cases of patients with unknown COVID-19 status , the ideal is performing the preoperative test and, in the case of care, always using PPE. [8,13] The difficult decision to postpone the procedure is often essential in the face of this global situation,[9] which benefits health professionals and patients.[16]

In laparoscopic surgeries, the maintenance of artificial pneumoperitoneum can expose the surgical team to the risk of contamination with aerosols. Previous studies referring to other viruses show that these organisms are dispersed through the pneumoperitoneum expulsion gases and trocars.[8,16,17] Special management should be adopted during laparoscopy, with the control of pneumoperitoneum pressure to a minimum, without, however, compromising the vision of the surgical field. Likewise, cautery should be used with less power and aspiration with filtration during the removal of smoke and aerosols.[8,14,16-18]

Safety of health professionals

In the organization of health institutions to meet the anesthetic-surgical procedures of suspected and confirmed patients

of COVID-19, the health team should consider discarding the participation of employees from risk groups (diabetes, hypertension, and cardiovascular diseases,[6,12] age over 60, chronic respiratory or kidney disease, patients with tuberculosis and leprosy, or other chronic infectious diseases, transplanted from solid organs and bone marrow, immunosuppression by diseases and/or drugs, patients with chromosomal diseases and with states of immunological fragility, in addition to pregnant women).[12] Changing shifts among employees is recommended to care for these patients, as well as relocation of pregnant and lactating employees so that there is no risk of direct contact with suspected or confirmed patients for coronavirus infection.[12]

For protection against the risk of contamination, the use of any type of adornment (wedding rings, chains, rings, watches, earrings, and badges hanging from a cord) should be prohibited, because they make it difficult to clean hands properly and also encourage the accumulation of microorganisms.[6,12]

Professionals must have adequate training and understanding to use and take off PPE,[6,13] cap, disposable apron or cloak, N95 mask, glasses or face protection, closed and waterproof gloves, and shoes.[6,11,12,16,17] Although ANVISA does not recommend the use of two gloves (double glove),[5] a systematic review concluded that there is no evidence that additional protection reduces infection in the patient. However, the second pair of gloves significantly reduces the perforations in the internal gloves,[19] which can become a protection for the surgical team. The use of two gloves as a way to reduce the risk of self-contamination is recommended, changing the pair of external gloves whenever there is contact with blood and fluids, keeping the pair of internal gloves, if they are clean.[11] AORN advises that all vested members of the surgical team wear two pairs of sterile gloves.[20] In turn, the authors of the present article believe in the following: it is better to adopt excess of care than lack of it. Hand hygiene with water and soap or 70% alcohol must be performed before and after wearing PPE, in the five moments recommended by WHO: before touching the patient, before performing aseptic procedures, after touching the patient, after the risk of exposure to body fluids, and after contact with areas close to the patient.[5,6]

N95 masks must be used, because they offer protection from aerosols.[6,10,13,15,16] Their prolonged use, that is, not removing the device for six to eight hours, can be implanted when caring for patients with COVID-19.[6,21] With regard to the controversial aspect of reusing these masks, there is no consensus as to the number of times safe for reuse yet. Some considerations discourage reuse, due to the risk of contamination by the professional when handling them.[6] However, given the context of rationing and optimization of health supplies, professionals need training for the proper implementation of reusing such masks, according to current recommendations.[21] The mask must be changed after performing aerosol-generating procedures, when there is contamination by blood and other secretions, or after attending a patient with co-infection that requires contact precaution.[6]

Before scheduling procedures and organizing the work schedule, as from the admission to the SC, professionals need to be using all PPE to receive the patient with COVID-19, who must be taken directly to the operating room, and must not stay in receptions or pre-operative rooms.[6] During the procedure, all professionals must have full PPE, keep the operating room doors closed until its end and place an identification on the room door alerting for a patient protocol with COVID-19.[6]

Paying special attention to take off PPE is essential due to the risk of contamination by the professional.[6] According to the recommendations of ANVISA,[5] taking off the vest must be done as follows:

- still inside the room: remove gloves and apron, and desinfect hands;
- when leaving the room: washing the hands, removing the hat, goggles or face shield, washing the hands, removing the N95 mask, washing the hands;
- at the end: cleaning the goggles or face shield.

After the procedure, all professionals should bathe before continuing their duties.[6,16]

To transport the patient, professionals must be wearing PPE and the patient must wear a surgical mask.[5] In procedures with aerosolization of respiratory secretions, the use of N95 mask is imperative.[5,11]

Operating room organization

Upon surgical scheduling, patients with suspected or confirmed coronavirus infection must be reported.[6,13] Using the same operating room to care for patients with suspected or confirmed COVID-19 until the end of the pandemic is suggested, as well as ensuring that there is a minimum scheduling interval of one hour between two procedures, time defined for desinfecting the room.[6,16]

Providing the same operating room and the same specific anesthesia machine to assist these patients until the end

of the pandemic is also recommended.[6,11] Procedures with aerosol generation, such as intubation, should preferably be carried out in a room with negative pressure or air conditioning turned off (neutral pressure).[5,6,10,17]

Intubation should be performed by the most experienced professional, by rapid sequence induction, to avoid manual ventilation inside the patient's mask. Intubation with the patient awake must be avoided and closed suction circuits must be used.[11] Using a bacterial/viral filter with efficiency greater than 99.5% HMEF (heat and moisture exchangers) barrier is another recommendation, connected between the patient's tube and the ventilation circuit. If possible, using a bacterial filter to filter the exhaled air should be adopted, in case of filter failures near the patient, and a third bacterial filter in the inspired air line.[6,10] If available, a video laryngoscope should be used to minimize closeness with the patient's face.[11,13] In need of changing the fan, a grasping forceps is needed to occlude the tube and avoid generating aerosols.[6,11,13]

Prioritizing disposable equipment and materials in the operating room, with kit assembly, is highly recommended. All unused material that entered the operating room must be discarded.[6] In the operating room, keeping only what is strictly necessary is the goal. Materials that remain in the operating room, such as equipment, anesthesia equipment, and monitors, must be covered with waterproof and disposable fields in order to reduce contamination and facilitate cleaning.[6,22]

The entire team must wear PPE in an appropriate manner to receive the patient, sent directly to the operating room, using effective communication between all its members.[6,11] As for the number of professionals, it is recommended to restrict it to what is required for the procedure to be performed,[6,14] indicating that a circulating nursing technician should be available in the external area to attend the operating room and promote better adherence to the recommendations, as well as disposing, inside the operating room, of only essential materials.[5,6,13,16]

Patient's post-anesthetic recovery

Given the risk of spreading COVID-19, patients with a suspected or confirmed diagnosis of coronavirus who do not need to be transferred to the ICU for recovery must remain in the operating room until their complete recovery. This is because the team is already properly attired with the PPE for care to be carried out, in order to avoid contact with other people.[6,11,16]

Recommendations guide patients to remain throughout their recovery and be transported directly to the destination unit with a surgical mask and, if necessary, with oxygen support, which should be inside the mask.[6] After discharge from the SC, the aprons and gloves used by professionals must be removed inside the operating room.[6,16]

Operating room cleaning and disinfection

Cleaning the room must only start after the patient leaves.[18] When taking off the vestment, double gloving is recommended, and the first glove should be changed whenever there is contact with contaminated material.[6] The nursing team is responsible for organizing instruments in hermetically sealed and identified plastic containers to prevent possible contamination, and to send them to the institution's materials and sterilization center,[5,6] as well as to change the entire airway circuit, soda lime, filters, and disinfect the anesthesia machine and soda lime canister.[6,11]

For cleaning the operating room, complete use of PPE is recommended to prevent contact and aerosols, keeping negative pressure or air conditioning off.[6] Thorough cleaning of surfaces and equipment must be performed.[5,13] Disinfection of surfaces should only be carried out after cleaning.[5] Surface cleaning should be done with neutral detergent, followed by disinfection.[13] Disinfection can be done with 70% alcohol, sodium hypochlorite, products based on quaternary ammonium compounds, or another disinfectant desgined for this purpose.[5,12,13,23] There are specific recommendations for cleaning and disinfecting surfaces that have had contact with a suspected or confirmed COVID-19 patient with solutions based on quaternary ammonium or sodium hypochlorite.[6]

Cleaning with maximum efficiency is recommended, with special attention to surfaces close to the patient (operating table, chairs, among others), including electronic equipment (infusion pumps, monitors, screens, cables, and others), furniture,[5,6,16,22] anesthesia machine,[6,22] especially in frequently touched areas (switches, knobs, buttons, and controls).[22] Visible dirt (blood and secretions) must be removed with paper towels and cleaned before disinfection.[16]

Hospitals must establish a unidirectional cleaning method and sequence, from the cleanest to the dirtiest place.[22] After cleaning equipment and surfaces, final cleaning must be performed by the cleaning team, which must include walls and floors.[18] A checklist should be used to standardize and ensure that all items and cleaning procedures are performed.[22]

There are no special recommendations for washing contaminated clothing, but care must be taken in transporting and handling them.[5,22]

All waste from care procedures must be considered in category A1, according to the Resolution of the Collegiate Board (*Resolução da Diretoria Colegiada* - RDC) No. 222, of March 28, 2018, by ANVISA,[6,22,24] and discarded in a specific bag of infectious waste.[5,6]

Study limitations

Given the exceptionality of the current scenario, a study limitation is the constant updating of publications related to the theme, restricted to recommendations by societies and specialists, as well as those based on studies regarding past epidemics. However, there is still little research on the new coronavirus and the effectiveness of the measures recommended by experts in the COVID-19 pandemic panorama.

Contributions to practice

In view of the current pandemic scenario, which requires health services to reorganize their workflows, professionals must have sufficient knowledge about prevention and control measures. In this way, the present study contributes as a literature synthesis, providing fundamental information and evidence, as well as subsidies, for the maintenance of health and safety during the COVID-19 pandemic in the perioperative scope.

FINAL CONSIDERATIONS

The review of existing recommendations for the reorganization of the SC in the care for patients with suspected or confirmed COVID-19 was conducted, ensuring safety for patients and the multidisciplinary team.

Among the recommendations pointed out, we highlight the management of human and material resources to meet the perioperative care demand, with reorganization of elective surgical procedures, guaranteeing the safety of health professionals, organization of the operating room with required materials, planning of post-recovery anesthetic treatment, and cleaning and disinfection of the operating room.

The objective of this article is to contribute, in order to share with professionals in the area, with the main updated recommendations for care in the perioperative context. Thus, quality and safe care is sought for all individuals involved in this process, from scheduling surgery to post-surgical recovery.

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