

Control of materials and surgical instruments in the intraoperative period: perception and strategies used by surgical technologists

Controle de materiais e instrumental cirúrgico no intraoperatório: percepção e estratégias utilizadas por instrumentadores

Control de materiales e instrumental quirúrgico en el intraoperatorio: percepción y estrategias utilizadas por instrumentista

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ABSTRACT: Objective: To know the strategies used by surgical technologists to control materials and surgical instruments in the intraoperative period. **Method:** This qualitative descriptive study was carried out in a private hospital. A total of 13 surgical technologists participated in the research. Data were collected during audio-recorded interviews between August and September 2022. The data collection instrument was a structured questionnaire consisting of seven questions, as well as items related to the sample profile. We included trained nursing technicians, working as surgical technologists. Those who were absent during data collection were excluded. Data were analyzed by content analysis. **Results:** The data analysis produced four categories: surgical safety checklist; control of materials and instruments; challenges in following the surgical safety checklist; facilitators to following the surgical safety checklist. **Conclusions:** The study allowed us to know the strategies used by surgical technologists to control the materials arranged on the instrument table during the intraoperative period. The haste of professionals, lack of adherence, and non-compliance with institutional routines are regarded as challenges in following the steps of the surgical safety checklist.

Keywords: Perioperative nursing. Patient safety. Surgical instruments. Intraoperative period. Time out, healthcare.

RESUMO: Objetivo: Conhecer as estratégias utilizadas por instrumentadores para o controle de materiais e instrumental cirúrgico no intraoperatório. **Método:** Estudo descritivo e qualitativo, realizado em hospital privado. Participaram 13 instrumentadores cirúrgicos. Os dados foram coletados entre agosto e setembro de 2022 por meio de entrevistas gravadas em áudio. Como instrumento para coleta dos dados, utilizou-se um roteiro estruturado, contendo sete perguntas, e questões referentes ao perfil da amostra. Foram incluídos técnicos de enfermagem formados, atuantes como instrumentadores cirúrgicos. Foram excluídos instrumentadores ausentes no período da coleta de dados. Os dados foram analisados por meio da análise de conteúdo. **Resultados:** Com base na análise dos dados, emergiram quatro categorias: protocolo de cirurgia segura; controle de materiais e instrumentais; desafios no seguimento do protocolo de cirurgia segura; facilitadores do seguimento do protocolo de cirurgia segura. **Conclusão:** Pôde-se conhecer as estratégias utilizadas por instrumentadores cirúrgicos para o controle dos materiais dispostos na mesa de instrumentação durante o intraoperatório. Pressa de profissionais, falta de adesão e o não seguimento de rotinas institucionais caracterizam-se como desafios para o seguimento das etapas do protocolo de cirurgia segura.

Palavras-chave: Enfermagem perioperatória. Segurança do paciente. Instrumentos cirúrgicos. Período intraoperatório. Time out na assistência à saúde.

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Received: 01/16/2023 – Approved: 04/19/2023

<https://doi.org/10.5327/Z1414-4425202328873>



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RESUMEN: Objetivo: Conocer las estrategias utilizadas por instrumentistas para el control de materiales e instrumental quirúrgico en el intraoperatorio. **Método:** Estudio descriptivo y cualitativo, realizado en hospital privado. Participaron 13 instrumentistas quirúrgicos. Los datos fueron colectados entre agosto y septiembre de 2022 por medio de entrevistas grabadas en audio. Como instrumento para colecta de los datos, se utilizó un guion estructurado, conteniendo siete preguntas, y cuestiones referentes al perfil de la muestra. Fueron incluidos técnicos de enfermería egresados, actuantes como instrumentistas quirúrgicos. Fueron excluidos instrumentistas ausentes en el período de la colecta de datos. Los datos fueron analizados por medio del análisis de contenido. **Resultados:** Con base en el análisis de los datos, emergieron cuatro categorías: protocolo de cirugía segura; control de materiales e instrumentales; desafíos en el seguimiento del protocolo de cirugía segura; facilitadores del seguimiento del protocolo de cirugía segura. **Conclusión:** Se pueden conocer las estrategias utilizadas por instrumentistas quirúrgicos para el control de los materiales dispuestos en la mesa de instrumentación durante el intraoperatorio. Prisa de profesionales, falta de adhesión y el no seguimiento de rutinas institucionales se caracterizan como desafíos para el seguimiento de las etapas del protocolo de cirugía segura.

Palabras clave: Enfermería perioperatoria. Seguridad del paciente. Instrumentos quirúrgicos. Período intraoperatorio. Pausa de seguridad en la atención a la salud.

INTRODUCTION

Surgical care is an essential component of health systems around the world, and, although important progress has been made in recent decades, the quality and safety of surgical care still have weaknesses that can lead to adverse events, defined as any incident that harms the patient¹. In October 2004, the World Health Organization (WHO) launched the World Alliance for Patient Safety. This initiative was a response to Resolution 55.18, passed by the World Health Assembly (WHA), which recommended that the WHO and member states pay more attention to patient safety¹.

Estimates indicate that 230 million surgical procedures were performed annually worldwide. Among them, around 7 million resulted in adverse events, of which 1 million cases progressed to death¹. Current data reveal that the number of surgeries has progressively increased over the years, estimating the annual performance of 313 million procedures around the world².

The surgical suite is a complex environment, with multiple processes permeated by risks, thus requiring professionals to work as a team, focusing on the quality and safety of patient care. In this context, half of the cases of adverse events in surgeries could be avoided by adopting systematic safety practices¹.

To this end, the Safe Surgery Saves Lives initiative aims to contribute to improving the quality standard and safety of surgical procedures by implementing the surgical safety checklist, which has three phases: sign in (phase that checks the patient's identification, information, and health status, in addition to site marking, i.e., marking of the site where the incision will be made); time out (phase before the surgical

incision that confirms patient and procedure data); and sign out (phase at the end of the surgery, with the final review of sponges, gauze, surgical instruments, and specimens to be sent for anatomopathological evaluation, as well as confirmation of the procedure performed)^{1,3-5}.

The count of sponges, gauze, and surgical instruments at the beginning and end of a procedure is part of the surgical safety checklist and seeks to mitigate the risk of retained surgical items in a body cavity. The surgical technologist is responsible for counting these objects and for the surgical instrument table, a role usually performed by the nursing technician⁶.

Retained surgical items in a body cavity during surgical procedures are considered a never event, that is, an adverse situation that should never happen because it could be avoided by following the recommended safety measures described in the surgical safety checklist⁷.

In 2018, 2,387 never events occurred in Brazil. Unintended retained surgical items in patients after surgery was the third most reported never event, responsible for 1.9% of cases, evidencing the relevance of expanding the discussion about the theme⁷.

In this scenario, the following research question was raised: What are the strategies used by surgical technologists to control materials and surgical instruments in the intraoperative period?

OBJECTIVE

To know the strategies used by surgical technologists to control materials and surgical instruments in the intraoperative period.

METHOD

The study complied with Resolution No. 466/12 of the Brazilian National Health Council. The Research Ethics Committee approved the project, under CAAE no. 59847422.1.0000.5344. This study followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist⁸.

This is an exploratory descriptive qualitative study, carried out in a private hospital in Southern Brazil. The hospital has 28 hospitalization beds, four operating rooms, and eight post-anesthesia care unit beds. The most common surgical specialties in the facility are: general surgery, plastic surgery, colorectal surgery, gynecology, urology, and traumatology. An average of 350 surgeries are performed per month.

Data were collected during interviews conducted from August to September 2022, following a questionnaire consisting of seven open questions about: the surgical safety checklist; strategies to control materials and surgical instruments in the intraoperative period; factors that hinder and facilitate following the surgical safety checklist; in addition to questions regarding the sample profile, such as age, level of education, time since graduation, and length of experience as a surgical technologist.

The researcher who collected the data was trained for the task before the interviews. A pilot test was performed with two people randomly chosen who did not participate in the research.

Inclusion criteria were being a trained nursing technician working as a surgical technologist for at least a month in the facility. Surgical technologists who were absent during data collection due to days off, vacations, or leaves of absence were excluded from the study.

The facility has 15 surgical technologists, all of whom were invited to participate in the study. The main author invited each surgical technologist individually and in person. Those who agreed to participate in the study received two copies of the Informed Consent Form (ICF) to sign — one for the participant and the other for the researcher. At that point, with the ICF, the objective of the study, how it would be carried out, and the risks and benefits involved were explained. Two surgical technologists were on vacation or leave of absence during data collection; thus, 13 individuals participated in the study.

The interviews were conducted in person in a private room of the hospital and were authorized by the facility's

management. The interviews were audio-recorded to be transcribed later, for better data analysis. To ensure the confidentiality and anonymity of the research participants in the transcriptions, they were identified with the letter "E" (first letter of the word "*entrevistado*" — interviewee, in Portuguese) followed by a number representing the order of the interviews conducted (for example, E1, E2, and so on). The mean interview time was 30 minutes.

Each participant received the transcript of their interview by e-mail so that they could confirm if they agreed with the content or provide potential corrections or comments. All participants answered the e-mail stating that they agreed with the text transcribed. No changes were requested.

Data were analyzed from the content analysis perspective, which involves three stages: pre-analysis; exploration of the material; treatment of the results obtained and data interference and interpretation⁹.

Data analysis identified units of analysis, and, based on their grouping, four open codes (surgical safety checklist; control of materials and instruments; challenges in following the surgical safety checklist; facilitators to following the surgical safety checklist) were detected and organized into categories.

Quotes from participants were cited to help describe the results.

RESULTS

Regarding sample characterization, all study participants were women. The age group ranged between 23 and 48 years, with a mean age of 34.9 years. All participants were nursing technicians trained as surgical technologists and worked in the surgical suite of a hospital in Southern Brazil.

The recorded interviews were transcribed, and the data collected were analyzed to identify the strategies used by surgical technologists to control materials and surgical instruments in the intraoperative period. Data analysis identified units of analysis, and, based on their grouping, four categories were detected:

- a. Category 1: surgical safety checklist;
- b. Category 2: control of materials and instruments;
- c. Category 3: challenges in following the surgical safety checklist;
- d. Category 4: facilitators to following the surgical safety checklist.

Category 1: surgical safety checklist

Participants refer to the surgical safety checklist as a tool that the surgical suite team should follow to ensure patient safety, as demonstrated in the following statements:

“[...] it is a checklist, a factor that contributes to the effectiveness of the surgery, ensuring the safety of our patient [...], making us confirm all data with the surgeon, such as [the] surgery they will perform, the surgical site, if [the patient] has any allergies, and fasting, if they are fasting for that procedure.” (E4)

“The checklist, it promotes patient safety, in every way [...], and the nursing team, the medical team has the purpose of providing all care regarding patient safety.” (E1)

“[...] safe surgery is an institutional proposal to ensure patient safety during surgery so that they can leave as they were before surgery.” (E12)

Participants also report that the surgical safety checklist contributes to reducing the risk of errors and adverse events, as noted in the following declarations:

“To my knowledge, this checklist was made precisely to prevent harm and errors that can affect patients, such as the surgical site and even the issue of possible subsequent infections; so at first, my understanding is that it is a safety measure for us, technicians, that we should adopt for the patient.” (E7)

The participants mentioned that the surgical safety checklist has several steps, which are performed at different times during the perioperative period, such as patient identification, site marking, instrument and material counts, confirmation of *nil per os* (NPO) and allergies, among others, as can be observed in the next quotes:

“Regarding the surgical safety checklist, I know that we have [...], the time out, the checklist, that we have to perform [...] as soon as the patient enters the room, with the entire team present, in which we check the patient’s information, allergy data, we check if the patient is fully fasting, the surgical site [...], count the instruments on the table, everything that goes in, gauze,

sponges, needles of different types, we have to control it all at the beginning of the surgery, during the incision, in the intraoperative, too, and at the end.” (E3)

“We start by identifying the patient, if it’s the right patient, the right surgery, confirm the surgical site, the instruments, if they are not wet, if they are appropriate for the type of surgery requested.” (E5)

“In this organization, which is concerned with patient safety, there are items that we always follow, including site marking, confirming the patient’s surgical site; there are several things involved in patient safety: sterilized materials, sterilization indicators, among others.” (E8)

Category 2: strategies to control materials and instruments

The surgical technologist is responsible for the strict control of all materials unpacked for surgery, such as gauze, sponges, needles, and surgical instruments. The following statements show that counting is performed at the beginning and end of surgery and exemplify the strategies used by the participants for this control:

“Usually, at the beginning of the procedure, we count instruments, needles, sponges, and gauze and report the information to the circulating nurse of the room, who writes everything on the board where patient data are recorded [...]. In there, we write the number of materials and instruments unpacked, everything by the book, we record the threads and needles used and, at the end of the procedure, we count all the needles to see if the number will match the one recorded.” (E13)

“Counting at the beginning in the operating room, counting gauze, sponges, blades, threads, and, at the end of the procedure, we check, before the excision [is] closed.” (E2)

“The strategy I use is to always count and try to arrange them on my table in a way that I can control them, especially because the doctors themselves, they end up taking materials from our table and, if we don’t have this discernment of separating them in a way that is good for us, we end up getting lost.” (E7)

“The counting of materials before the procedure, as well as sponges and e, because often the package doesn’t have the quantity described, like, 10 gauze, we count them, and the package doesn’t have all 10, so it’s important to count them before and after surgeries.” (E10)

We asked the participants if materials and instruments are also counted during the intraoperative period. The answers were not uniform: some participants reported not controlling the materials and instruments during the intraoperative period because they need to focus on the surgical procedure and on promptly assisting the surgeon, while others stated that they counted and controlled them during surgery as well.

“In the intraoperative, no. I do it at the beginning and at the end. I don’t do it in the intraoperative because I think it diverts a lot of my attention from the surgical procedure. I need to focus on the surgical procedure to meet the demands of the surgeon and their assistant.” (E1)

“Before the doctor starts the suture, we [...] count the sponges, and at the end of the surgery, we count the needles.” (E6)

“[...] I also count the gauze and sponges during surgery, [...], every package that is opened, usually of gauze, is supposed to have 10, while sponge packages have 5, and we always count them to make sure.” (E13)

Category 3: challenges in following the surgical safety checklist

Several materials and surgical instruments that will be used during surgery are arranged on the instrument table. Participants were asked which material or instrument they considered the most difficult to control: unanimously, the most cited was gauze, as shown in the next declarations:

“Gauze, because they stick together in the package; then, when you count one by one, they remain. It’s not easy to arrange them.” (E6)

“I find it harder to control gauze because sometimes we don’t see the doctor taking one from our table and

putting it in the cavity, we don’t see it; so, in my opinion, gauze is more difficult to control.” (E13)

“The material that I find the most difficult to control is gauze because the surgeon can use gauze all the time and asks for it, the assistant asks; sometimes, they also end up taking it, the material, from the table, and so I find it hard to control.” (E1)

“I think the video gauze require a lot from us, the surgical technologists, because they’re detailed, right? They’re very small, you know, and we need to have a very tight control both of what the surgeon is doing in the intraoperative, watching the surgery along with them to see if the gauze remains there, and also of the signalization for us to know that there is a gauze inside the cavity because, in certain cases, if we have a complication, an urgency, and no signalization that this gauze is inside, and we can’t see it anymore, we can forget it, if we don’t do the final checklist, the sign out.” (E3)

We underline that the participants mentioned the surgeons’ performance as interference with following the patient safety process, pointing out actions such as resisting doing the time out, taking materials directly from the instrument table, performing the surgery without the assistant surgeon, and asking the surgical technologist for this assistance, among others, as noted in the following quotes:

“[...] the difficulty factors, I think today, we still have a lot of difficulties [...] with surgeons; not all of them, of course, you know? But many of them don’t want to follow the surgical safety checklist to the letter, and this ends up somewhat affecting our work and our care for the patient, the care of safe surgery itself.” (E1)

“The surgeon, who often comes without assistance; also, the fact that they throw the gauze straight into the trash, without giving them to the surgical technologist, or taking some materials from the table, not waiting, rushing, not waiting for us to pick up the material.” (E4)

“Doctors without an assistant [surgeon], we often act as assistants and surgical technologists at the same time, making it very difficult.” (E5)

“In my opinion, there, what makes it difficult is not being able, sometimes, to do the time out, the instrument count, is the medical team going too fast, doing everything in a hurry.” (E13)

“I think all processes are feasible if we are willing to do them. What can sometimes make it a little difficult is the rush of surgeons, but we must know that all processes, they have to be done so as not to harm the patient.” (E9)

Category 4: facilitators to following the surgical safety checklist

Several actions can contribute to a safe surgical process for the patient. When we asked the participants what factors they consider facilitators to following the surgical safety checklist in the intraoperative period, these were their suggestions: using the checklist board in the operating room; having time to perform the steps of the surgical safety checklist calmly; checking if the team is attentive to the process; and investigating if the facility is committed to patient safety, mobilizing employees. These answers are evidenced in the next statements:

“Getting in calmly beforehand, being able to follow this checklist, counting, managing to separate them without any pressure: these are some of the factors.” (E8)

“[...] when the medical team knows the correct procedure to be done, then they calmly do the time out, with time to count the instruments, gauze, everything as it should be, confirm the surgical site. I think it helps a lot.” (E13)

“[...] what I think makes it much easier, and is very important for our daily routine, is the board on which we record the time out; in there, we put the patient’s information, which surgery will be performed, the surgical site, previous diseases, allergies, medications in use, I think this is a, it’s a tool we have that facilitates our daily routine a lot.” (E9)

“I think that what helps is the institution’s own pressure, they are always demanding that we, you know, follow the entire surgical safety checklist, so this makes them get in touch and push the doctors all the time because

this can lead to errors in the future, right? So, the institution itself is a facilitator.” (E7)

“To follow the checklist, we need to have the knowledge, right? We always have to research, try to know how the checklist works, so we can use it in the room, along with the team, right?” (E11)

One participant highlights the importance of having an assistant surgeon in procedures that require this professional for patient safety:

“Having the assistant [surgeon] playing their role, so that we don’t have to assist and control the instruments at the same time [...]. I think that’s it, that and the checks.” (E4)

DISCUSSION

The surgical safety checklist, proposed by the WHO in 2009 and adopted in Brazil since then, aims to improve the safety of patients who need to undergo a surgical procedure⁴. In the present study, the results indicate that surgical technologists recognize the surgical safety checklist as a tool that contributes to reducing errors and adverse events and, therefore, promotes patient safety.

Each step of the checklist seeks to reduce the risks inherent in the surgical process³. The checklist allows the team to review whether all information related to the patient, the surgery that will be performed, medications, allergies, fasting time, and examinations is correct. Site marking makes it possible to ensure that the surgery will be performed on the correct limb, side, and level. Time out is the last phase that verifies patient information, surgery to be performed, surgical site, allergies, examinations, antibiotic prophylaxis, and other possible information before surgical incision. Counting materials and instruments before and after surgery helps prevent the unintended retention of surgical items in body cavities. These aspects demonstrate the importance of each step of the surgical safety checklist for patient safety.

Moreover, the results indicate that the surgical safety checklist should be followed by all health professionals who work in the surgical suite, evidencing the need to implement a safety culture in the facility. Regarding the control of materials used in the surgical site, the description of the

checklist steps shows the necessity of counting the instruments and materials at the beginning and end of the surgical procedure^{6,10}.

These are some of the strategies cited by the participants: materials and surgical instruments must be counted at the beginning and end of the surgery; gauze should be counted whenever a package is opened because they mention that there may be differences between the number of items and the one described in the package; materials and instruments must be arranged on the surgical table so as to allow visual control of what is laid on the instrument table; opened and used sharp objects, such as blades and needles, should be kept by the surgical technologist to be disposed only at the end of the surgery, after checking the number of unpacked materials; the counting of materials and surgical instruments must be written on the information board in the operating room.

Some materials, such as threads, gauze, sponges, and single instruments, are sometimes unpacked during surgery, as needed, and must be controlled by the surgical technologist to avoid retained surgical items in body cavities^{11,12}. Study participants point out that the main difficulty is controlling gauze because they are small and, when saturated in blood, they can be camouflaged in the cavity, making their identification difficult and justifying the need for strict control of materials.

Concerning gauze and sponges, the hospital can acquire gauze with radiopaque thread, which allows radiographic detection. This technological advance does not reduce the responsibility of the surgical team in controlling materials during the intraoperative period.

Report on health-related incidents reveals that the surgical suite is the fourth place with the highest number of reported incidents, preceded by hospitalization units, intensive care services, and the urgency and emergency department, evidencing the importance of adhering to the surgical safety checklist to promote greater patient safety in this context⁷.

Study involving eight hospitals from different countries showed that the rate of deaths and surgical complications decreased by more than 30% after the implementation of a surgical checklist¹³. Its implementation has a low cost, and the mean time to apply the three verification phases is estimated at three minutes. A single professional should run through the checklist. This so-called checklist coordinator is responsible for its application in the operating room¹⁴.

Study participants also indicated as challenges the resistance of some professionals in adhering to and using the surgical safety checklist and the haste of surgeons in performing the procedures, not following the surgical safety

checklist and institutional routines, a behavior that can result in errors and harm to the patient. Patient safety should be a priority for all professionals working during the perioperative period. The scenario of a surgical procedure involves the orchestrated work of the multidisciplinary team and requires attention and adherence to pre-established routines and protocols, regardless of the type of surgery¹¹.

In general, the professionals working in the operating room are the anesthesiologist, the main surgeon, the assistant surgeon, the surgical technologist, and the circulating nurse. The work of a surgical technologist demands close attention and strong discipline, since this professional will be largely responsible for controlling the instrument table, including surgical instruments and materials, such as gauze, sponges, and surgical threads. Also, they must be fully integrated into the surgical team⁶. In this context, we highlight the importance of the surgical technologist being the only one with access to the instruments and materials on the surgical table, giving them to the surgeon as requested, in order to ensure greater control of the items arranged on the table. The non-compliance with this process may hinder the control of materials and instruments, a situation cited by study participants.

Another challenging scenario mentioned by a study participant was the need to provide surgical assistance when the assistant surgeon is absent. We emphasize that this is not the role of the surgical technologist, according to legislative prerogatives¹⁵.

The nursing team leader must enforce the legal terms with the support of hospital managers. No surgical procedure should start without the entire surgical team present in the surgical suite, at the risk of compromising patient safety, except in emergencies, as stressed in the law¹⁵.

The participants indicate the time out board in the operating room as a facilitator to a safe surgery process, as it allows professionals to see the main information about the surgical procedure, such as patient identification, the proposed surgery, the surgical site, and the number of unpacked surgical instruments and specimens collected during surgery for laboratory analysis⁶.

We emphasize the importance of the entire team working in the surgical suite knowing the surgical safety checklist and when each phase should be completed, considering that patient safety should permeate the entire care process, from the moment the patient arrives at the facility until their discharge¹⁶. After all, in order for safety to become part of the institution's culture, it must be the premise of all professionals who work there.

Contributions of the study to the nursing field

This study allowed us to know the strategies used by surgical technologists to control materials and surgical instruments in the intraoperative period, in addition to the challenges that still permeate their work and the patient safety context in the intraoperative period. The results can provide support for the implementation of enhancement strategies to ensure patient safety and improve the work of the surgical technologist as a member of the surgical team.

Study limitations

Study limitations include the small number of study participants and the fact that the results reflect the scenario of a single hospital. However, the research findings reveal relevant data on patient safety and the working context of surgical technologists.

CONCLUSION

The study allowed us to know the strategies used by surgical technologists to follow the surgical safety checklist and control materials arranged on the surgical instrument table during the intraoperative period. These strategies are: materials and surgical instruments must be counted at the beginning and end of the surgery; gauze and sponges should be counted; materials and instruments must be arranged on the surgical table so as to allow visual control of what is laid on the instrument table; opened and used sharp objects, such as blades and needles, should be kept by the surgical technologist to be disposed only at the end of the surgery, after checking the number of unpacked materials; the counting of materials and surgical

instruments must be written in the information board in the operating room.

The main challenges in following the surgical safety checklist evidenced in the study are the haste of professionals in carrying out the activities and the lack of adherence to institutional routines by some of these professionals. On the other hand, implementing the surgical safety checklist in the facility was considered an important factor for patient safety in the surgical suite.

FUNDING

None.

CONFLICT OF INTERESTS

The authors declare there is no conflict of interests.

AUTHORS' CONTRIBUTION

MME: Project administration, Formal analysis, Conceptualization, Data curation, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing, Software, Supervision, Validation, Visualization. RS: Formal analysis, Writing – review & editing, Validation, Visualization. AASP: Formal analysis, Writing – review & editing, Validation, Visualization. DW: Writing – review & editing, Validation, Visualization. GNSRS: Writing – review & editing, Validation, Visualization. FAASS: Writing – review & editing, Validation, Visualization. PT: Project administration, Formal analysis, Conceptualization, Investigation, Methodology, Writing – review & editing, Supervision, Validation, Visualization.

REFERENCES

1. World Health Organization. World alliance for patient safety. The second global patient safety challenge. Safe surgery saves lives [Internet]. Geneva: WHO; 2008 [accessed on Nov. 21, 2022]. Available at: http://apps.who.int/iris/bitstream/handle/10665/70080/WHO_IER_PSP_2008.07_eng.pdf?sequence=1
2. Weiser TG, Haynes AB, Molina G, Lipsitz SR, Esquivel MM, Uribe-Leitz T, et al. Size and distribution of global volume surgery in 2012. *Bull World Health Organ.* 2016;94(3):201-9F. <https://doi.org/10.2471/BLT.15.159293>

3. Brasil. Ministério da Saúde. Protocolo para cirurgia segura [Internet]. Brasília: Ministério da Saúde; 2013 [accessed on Nov. 21, 2022]. Available at: <https://proqualis.net/sites/proqualis.net/files/0000024279j862R.pdf>
4. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. Assistência segura: uma reflexão teórica aplicada à prática [Internet]. Brasília: Anvisa; 2017 [accessed on Nov. 21, 2022]. Available at: https://www.saude.gov.br/images/imagens_migradas/upload/arquivos/2017-09/2017-anvisa---caderno-1---assistencia-segura--uma-reflexao-teorica-aplicada-a-pratica.pdf
5. Silva RH, Gatti MAN. Segurança do paciente e cirurgia segura: uma revisão integrativa. *Vittalle*. 2020;32(2):121-30. <https://doi.org/10.14295/vittalle.v32i2.9697>
6. Associação Brasileira de Enfermeiros de Centro Cirúrgico. Recuperação Anestésica e Centro de Material de Esterilização. Diretrizes de práticas em enfermagem perioperatória e processamento de produtos para a saúde. 8ª ed. São Paulo: SOBECC; 2021.
7. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. Boletim segurança do paciente e qualidade em serviços de saúde nº 20: incidentes relacionados à assistência à saúde [Internet]. Brasília: Anvisa; 2019 [accessed on Nov. 21, 2022]. Available at: <https://www.gov.br/anvisa/pt-br/centraisdeconteudo/publicacoes/servicosdesaude/boletim-seguranca-do-paciente/boletim-seguranca-do-paciente-e-qualidade-em-servicos-de-saude-n-20-incidentes-relacionados-a-assistencia-a-saude-2018.pdf>
8. Souza VRS, Marziale MHP, Silva GTR, Nascimento PL. Translation and validation into Brazilian Portuguese and assessment of the COREQ checklist. *Acta Paul Enferm*. 2021;34:eAPE02631. <https://doi.org/10.37689/acta-ape/2021A002631>
9. Bardin L. Análise de conteúdo. São Paulo: Edições 70; 2011.
10. Colégio Brasileiro de Cirurgiões. Manual de cirurgia segura [Internet]. Porto Alegre: Colégio Brasileiro de Cirurgiões; 2010 [accessed on Nov. 22, 2022]. Available at: <https://cbc.org.br/wp-content/uploads/2015/12/Manual-Cirurgia-Segura.pdf>
11. Treviso P, Siqueira MS, Souza AZC, Peralta T, Pereira COM, Moriya GAA. Retenção de objetos intracavitários em procedimentos cirúrgicos: medidas de segurança propostas por enfermeiros especialistas. *Rev SOBECC*. 2022;27:E2227777. <https://doi.org/10.5327/Z1414-4425202227777>
12. Gomes ET, Santos ML, Araújo SSSL, Assunção MCT, Püschel VAA. Surgical count and patient safety in the perspective of the operating room circulating nurse. *Rev SOBECC*. 2019;24(1):37-42. <https://doi.org/10.5327/Z1414-4425201900010008>
13. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat AHS, Dellinger EP, et al. A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med*. 2009;360(5):491-9. <https://doi.org/10.1056/NEJMs0810119>
14. Santos SMP, Bonato M, Silva EFM. Checklist de cirurgia segura: conhecimento da equipe cirúrgica. *Enferm Foco*. 2020;11(4):214-20.
15. Conselho Federal de Enfermagem. Resolução COFEN-280/2003 de 16 de junho de 2003. Dispõe sobre a proibição de profissional de enfermagem em auxiliar procedimentos cirúrgicos [Internet]. Brasília: COFEN; 2003 [accessed on Nov. 21, 2022]. Available at: http://www.cofen.gov.br/resoluo-cofen-2802003_4316.html
16. Ribeiro HCTC, Quites HFO, Bredes AC, Sousa KAS, Alves M. Adesão ao preenchimento do checklist de segurança cirúrgica. *Cad Saúde Pública*. 2017;33(10):e00046216. <https://doi.org/10.1590/0102-311X00046216>