PREDATORY JOURNALS: ACKNOWLEDGING TO AVOID

DOI: 10.5327/Z1414-4425201800040001

> Predatory publications look at experienced scholars, who contribute to building the credibility of the journal, and thus attract other unsuspecting authors who, by academic pressure from publications, do not realize the harmful nature of journals that publish in record time[1].

The advent of open access (OA) was a breakthrough to academia, unprecedented in world science history. It allowed rapid dissemination of knowledge and contributed to the international expansion of the latest scientific production[2]. In the wake of the success of this model, predatory publishers grew by publishing biased journals to explore OA in which authors pay fees. Their articles are accepted and published in a short time, discrediting the peer review evaluation system and even the editing of the manuscript, which is apparently not reviewed, as they are published with spelling and grammatical errors.

Authors are seduced by invitations sent by e-mail, in which the journal's characteristics are presented, such as indexing, impact factor, and the journal's title — very similar to consecrated publications —, conveying reputability to the authors. The invitations are commendable, offering publishing facilities such as quick acceptance and promotion, and meet the researchers' need to publish, pressured by universities to have articles in good, high-impact journals. Thus, unsuspecting early-stage academics in developing countries become vulnerable to the opportunities offered by predatory publishers and become targets of the malicious strategy of capturing articles.

On the other hand, the lack of a tactic for the recognition of predatory publications and discussion of the problematic of this genre of "scientific" literature increases the researchers' fragility to publication. If there was a more in-depth debate among researchers, the issue of the quality of articles could be clarified, since such work, if disclosed in doubtful ways, carries the stigma of its publication medium, even if it is good research.

In addition, predatory journals are not clear about their policy of digital preservation. The site exists for a short period, leaving authors unsure where to find their articles, which makes it very difficult to retrieve the information some time after publication. This fact can cause irreparable damage to the researchers, who lose the memory of their production[3].

The International Academy of Nursing Editors (INANE) maintains a directory of trusted nursing journals, which is updated frequently, to assist researchers in our profession. It is an important search site to search for possible publication spaces[4].

Joel Rolim Mancia

Doctor of Nursing from Universidade Federal de Santa Catarina (UFSC), Florianópolis, Brazil. Professor at Universidade do Vale do Rio dos Sinos (UNISINOS), Porto Alegre, Brazil.

REFERENCES

1. Mancia JR, Felli VEA. Prática de publicação "predatória". Enferm Foco. 2013;4(3-4):145. https://doi.org/10.21675/2357-707X.2013.v4.n3/4.535
2. Beall J. Medical publishing triage – chronicling predatory open access publishers. Ann Med Surg. 2013;2(2):47-9. https://doi.org/10.1016/S2049-0801(13)70035-9
3. Beall J. Predatory publishers are corrupting open acess. Nature. 2012;489(7415):179. https://doi.org/10.1038/489179a
4. Oermann MH, Nicoll LH, Chinn PL, Ashton KS, Conklin JL, Edie AH, et al. Quality of articles published in predatory nursing journals. Nursing Outlook. 2018;66(1):4-10. https://doi.org/10.1016/j.outlook.2017.05.005

EVALUATION OF ACADEMICS ON NURSING TEACHING AND LEARNING IN A MATERIAL AND STERILIZATION CENTER

Avaliação de acadêmicos sobre o ensino-aprendizagem de enfermagem em centro de material e esterilização

Evaluación de la académica en enseñanza y aprendizaje en enfermería en un centro de material y esterilización

Emanuela Batista Ferreira e Pereira[1]*, Laryssa Samara Sobral Melo[2], Eriraniele Wanessa Florencio de Souza[2], Brenna Cavalcanti Maciel Modesto[2], Marília Perrelli Valença[3], Claudinalle Farias Queiroz de Souza[4]

ABSTRACT: Objective: To describe the evaluation of Nursing students about the teaching-learning process of the curricular component Nursing in the Material and Sterilization Center. **Method:** A cross-sectional, analytical-descriptive study conducted at a public university with students who had experienced the curricular component prior to data collection. Participants answered an online questionnaire with questions related to teaching-learning. **Results:** Fifty-eight participations were counted, in which the majority evaluated the didactics of theoretical contents as "good" or "great", the workload as "insufficient" and the practice scenarios as limited or distant from what the literature recommends. **Conclusion:** The teaching-learning was well evaluated as to its theoretical and literary character; however, the practical activities were evaluated as insufficient and unsatisfactory by most of the students.
Keywords: Sterilization. Educational measurement. Education, nursing. Education, higher.

RESUMO: Objetivo: Descrever a avaliação de acadêmicos de Enfermagem sobre o processo de ensino-aprendizagem do componente curricular Enfermagem no Centro de Material e Esterilização. **Método:** Estudo analítico-descritivo, transversal, realizado em uma universidade pública, com alunos que haviam vivenciado o componente curricular anteriormente à coleta de dados. Os participantes responderam a um questionário *on-line* com perguntas relacionadas ao ensino-aprendizagem. **Resultados:** Foram contabilizadas 58 participações, em que a maioria avaliou a didática dos conteúdos teóricos como "bom" ou "ótimo", a carga horária como "pouco suficiente" e os cenários de práticas como limitados ou distantes do que recomenda a literatura. **Conclusão:** O ensino-aprendizagem foi bem avaliado quanto ao seu caráter teórico e literário; entretanto, as atividades práticas foram avaliadas como insuficientes e insatisfatórias pela maioria dos discentes.
Palavras-chave: Esterilização. Avaliação educacional. Educação em enfermagem. Educação superior.

RESUMEN: Objetivo: Describir la evaluación de los estudiantes de enfermería sobre el proceso de enseñanza-aprendizaje del componente curricular Enfermería en el Centro de Materiales y Esterilización. **Método:** Un estudio transversal, analítico-descriptivo realizado en una universidad pública con estudiantes que habían experimentado el componente curricular antes de la recopilación de datos. Los participantes respondieron un cuestionario en línea con preguntas relacionadas con la enseñanza-aprendizaje. **Resultados:** se contabilizaron 58 participaciones, en las cuales la mayoría evaluó la didáctica de los contenidos teóricos como "buena" o "excelente", la carga de trabajo como "insuficiente" y los escenarios de práctica como limitados o alejados de lo que la literatura recomienda. **Conclusión:** la enseñanza-aprendizaje fue bien evaluada en cuanto a su carácter teórico y literario; sin embargo, la mayoría de los estudiantes evaluaron las actividades prácticas como insuficientes e insatisfactorias.
Palabras-clave: Esterilización. Evaluación educacional. Educación en enfermería. Educación superior.

[1]Nurse; PhD in Surgery by the Post-Graduate Program in Surgery of Universidade Federal de Pernambuco (UFPE). Associate professor of Faculdade de Enfermagem Nossa Senhora das Graças (FENSG), Universidade de Pernambuco (UPE) – Recife (PE), Brazil.
[2]Nurse by FENSG, UPE – Recife (PE), Brazil.
[3]Nurse; PhD in Health Sciences by the Post-Graduation Program of Faculdade de Ciências Médicas da UPE. Teaching assistant in FENSG, UPE – Recife (PE), Brazil.
[4]Nurse; PhD in Surgery by the Post-Graduate Program in Surgery of UFPE. Associate professor in FENSG, UPE – Recife (PE), Brazil.
*Corresponding author: emanuela.pereira@upe.br
Received on: 03/10/2018 – Approved on: 08/28/2018
DOI: 10.5327/Z1414-4425201800040004

INTRODUCTION

Nursing has the single purpose of providing care to individuals, which can be done directly or indirectly. In the indirect care setting, the Material and Sterilization Center (MSC) emerged with the need for a specific place to manipulate the materials before and after performing invasive surgeries and procedures, with the aim of preventing post-operative complications resulting from precarious conditions of hygiene, asepsis, resources and knowledge[1].

As a major support unit for the health institution, it responds fully to the processes of reception, preparation, sterilization, storage and distribution of health products (HP). Its function is to offer properly processed items, free of contamination and safe for assistance by the health team[2].

The implantation and consolidation of the MSC in hospitals occurred based on the health team's conception that the stages of article processing are fundamental for the prevention and control of healthcare-associated infections (HAI) and consequent association with safety and quality of health care, as well as variables that include hospitalization time and costs for hospital management[2-4].

The management of care, as well as of the MSC, is one of the responsibilities of the Nursing professional, with the task of coordinating activities, evaluating the stages of the work processes, participating in the training actions, establishing staffing, among other duties[2,5].

Thus, the nurse's role in the MSC requires the professional to master the technical-scientific knowledge and interpersonal skills to be acquired in their academic training, which results in good practices in the services offered to the patient[6].

The nurse is the technical responsible for the control and supervision of the actions developed in the MSC, and must have scientific knowledge based on evidence for the development of the steps necessary for the processing of HP in all health care units[5].

However, a study carried out in a public hospital in Porto Alegre, with nurses of the MSC, verified difficulties reported by the professionals during the work process. It was identified that there are doubts and insecurities during the activities performed in the sector, which may compromise the efficiency of the steps of the sterilization process[4].

Faced with this problem, the academic training of Nursing, through mastery of the theoretical-practical foundation, becomes fundamental for the achievement of a satisfactory construction of knowledge and the development of skills and practical skills. It is necessary that educational planning, content didactics and the choice of pedagogical strategies be well grounded in an adequate theoretical and methodological assumption[7,8], in order to favor the acquisition of knowledge and safety in the aforementioned curricular component.

To that end, the generalist, humanist, critical and reflective nursery education guidelines should also potentiate and aggregate the specific knowledge of curricular components such as the MSC to the other topics taught during graduation, and this content should not be treated with less importance or as part only of a specialty[6].

Thus, the emphasis on theoretical and practical teaching, which is innovative and attractive to favor the process of knowledge construction should be able to prepare future professionals to act in front of the challenges of the sector. The role requires accountability and competence based on up-to-date evidence, such as the definition of materials processing methods and the recommended best practices[7,9].

This way, the present research arose from the need to describe how Nursing students evaluate the teaching-learning process of the MSC curricular component during graduation, in order to identify possible weaknesses and/or potentialities that may foster the elaboration and improvement strategies in the process of knowledge construction.

OBJECTIVE

To evaluate the teaching-learning of the curricular component Nursing in the MSC by Nursing students.

METHOD

This is a descriptive, analytical, cross-sectional, field study, with a quantitative approach. The study population was composed of Nursing students and had a sample of 58 participants. The criteria for the inclusion of the subjects were: regular students enrolled in the 5th to 10th module in the Nursing undergraduate course, aged 18 years or over, of both

genders and who answered the questionnaire sent by e-mail during the stipulated period of 30 days.

The place of study of choice was a public institution of education, constituted by courses of superior level in Nursing and others, located in the northern zone of the city of Recife, Pernambuco, Brazil. For the data collection, a pre-structured online questionnaire was used and elaborated in the Google Forms tool, based on the study of Dessotte et al. for evaluation of the curricular component[8].

The collection instrument consisted of three parts: the first was the characterization of the sample (gender, age, course period); the second consisted of seven questions about the experiences and knowledge of the content taught in the MSC curriculum component; and the third investigated the importance of Nursing teaching in MSC in undergraduate courses, the teaching-learning process developed in theoretical-practical classes and suggested teaching strategies to complement the training process[10].

The contents evaluated by the collection instrument were: structure and physical blueprint, HP processing, sterilization monitoring, work process in the MSC, interface between the Hospital Infection Control Commission (HICC) and the MSC.

As for data analysis, descriptive statistics were used, with the absolute and relative frequencies presented by means of numbers and percentages, in the form of a graphic and tables.

Data collection was initiated after approval by the Research Ethics Committee of the University of Pernambuco (CEP/UPE), via *Plataforma Brasil* (CAAE No. 58350516.0.0000.5207), respecting the ethical precepts of research with human beings, based on Resolution No. 466/2012 of the National Health Council (NHC). Each student was invited to participate in the study, being given the Informed Consent Form, along with a link that gave access to the instrument of data collection. Participants responded to the proposed instrument individually and handed it in to the researcher immediately.

RESULTS

The 58 students enrolled from the 5th to 10th module in the baccalaureate course in Nursing who collaborated with the research revealed that they were aged between 19 and 31 years, with an average of 21.8 years. The majority of participants (40.0%) were enrolled in the 9th module.

Table 1 describes the students' assessment of their knowledge about the contents of the Nursing curriculum component in the MSC. It is observed, regarding the knowledge on structure and physical blueprint, that 47.0% of the students claimed to have understood and experienced the content close to what the literature recommends. In the article processing evaluation, 35.0% of the students stated having understood and experienced the content as recommended by the literature and 38.0% close to what the literature recommends. The monitoring of sterilization was approved for learning by 76.0% of the students, with 38.0% of them having understood and experienced close situations to those of the theoretical recommendation and the other 38.0%, according to what the literature advocates.

In the evaluation about the knowledge on the nursing work process in the MSC, 43.0% of the students stated that they had close understanding of the literature, 38.0% understood the subject with differences and 7.0% did not understand it. When the content in question is the interface between the HICC and the MSC, 27.0% of the students claimed a close understanding of what the literature recommends and 40.0% said they did not understand or experience the content.

The importance of Nursing teaching in the MSC during graduation was evaluated as "very important" by 100.0% of the students. Most of them evaluated the didactics of the institution as "great" (41.0%) and "good" (40.0%). Regarding the theoretical and practical hours of the curricular component, 46.0% of the students classified it as "sufficient" and 49.0% as "insufficient". Regarding the practice scenarios, 65.0% of the students stated that the environments presented limitations and partially corresponded to the expectations of the curricular component (Table 2).

Graph 1 indicates that the technical visit and the monitoring were indicated by 86.0 and 83.0% of the students, respectively, as teaching strategies that can contribute to learning. Next, the expository class, with 70.0% of the choices, and the seminars, with 37.0%. Students also chose blogs and educational vlogs (14.0%) and the Virtual Learning Environment — Moodle (17.0%). Other complementary teaching strategies were suggested by 9.0% of the students, such as field classes, congresses and exhibition of videos related to the theme in the classroom.

DISCUSSION

The results of the present investigation point out that all the scholars evaluated the curricular component of the MSC as relevant and essential for future performance as nurses. On the other hand, their majority reported that the theoretical and practical workload is insufficient to reach the skills and competences foreseen in the syllabus of the discipline, which may reflect on the impaired understanding of the content, according to reports.

Similar to what was observed, a descriptive study carried out at the University Center of Volta Redonda, with Nursing students, showed that the students attribute the difficulty to assimilate the content of the MSC discipline to insufficient practical hours[11].

In this perspective, the National Curricular Guidelines (*Diretrizes Curriculares Nacionais* – DCN) grant the educational institution the freedom of structuring the workload to be completed to fulfill the curriculum. Such flexibility means that sometimes the skills and abilities that must be included in the training of the general nurse are neglected in the curriculum. This is what usually happens with the teaching of the MSC[8,12].

In this direction, the theoretical and practical teaching hours involved in the MSC contribute with a small part of the training of nurses. It is necessary that, during that time, activities are carried out not only in the classroom. The approximation of teaching to the reality of health services through practices and internships must be present in

Table 2. Assessment data on the importance of teaching, didactics, workload and practice scenarios.

Assessed categories	n	%
Importance of Nursing education in CME		
Very important	58	100.0
Assessment of didactics		
Excellent	08	14.0
Great	24	41.0
Good	23	40.0
Poor	03	5.0
Theoretical and practical workload		
Sufficient	27	46.0
Indifferent	03	5.0
Insufficient	28	49.0
Practice scenarios		
Meets the expectations of the curricular component	07	12.0
Partially meets the expectations of the curricular component	38	65.0
Does not meet the expectations of the curricular component	12	21.0
Did not respond	01	2.0

MSC: Material and Sterilization Center.

Table 1. Data on the evaluation of the contents taught in the curricular component Nursing in the Material and Sterilization Center, according to the students (n = 58).

Content	Understood and experienced the content as recommended in the literature n (%)	Understood and experienced the content close to what the literature recommends n (%)	Understood and experienced the content with differences from what the literature recommends n (%)	Did not understand or experienced the content n (%)
Structure and physical blueprint	13 (22.0)	27 (47.0)	17 (29.0)	01 (2.0)
Article Processing – cleaning, disinfection and sterilization	20 (35.0)	22 (38.0)	15 (25.0)	01 (2.0)
Sterilization monitoring	22 (38.0)	22 (38.0)	11 (19.0)	03 (5.0)
Work process of Nursing in the MSC	07 (12.0)	25 (43.0)	22 (38.0)	04 (7.0)
The interface between the HICC and the MSC	04 (7.0)	16 (27.0)	15 (26.0)	23 (40.0)

MSC: Material and Sterilization Center; HICC: Hospital Infection Control Commission.

the curricular environment, just as the teachers and preceptors who accompany the students during the practices need to know how to mediate opportunities for all to develop their abilities[7,12].

When it comes to the teaching of Perioperative Nursing, more specifically the MSC, studies point to a gap in general education. Gap that exists because of the undervaluation of the teaching of the curricular component, as well as of the professionals of the area; by the lack, at times, of a faculty compatible with the necessity of the discipline; lack of appropriate laboratories for the practices; by the difficulty of insertion in the real scenario by the large number of students or by obstacles in partnerships with health services[7-14].

In order for the Nursing graduate to assimilate and understand the importance of the MSC, its organization, infrastructure, human resources, as well as the stages of HP processing, effective teaching based on methodological strategies, such as active methodologies, is imperative so that students participate in the construction of their knowledge[5,12].

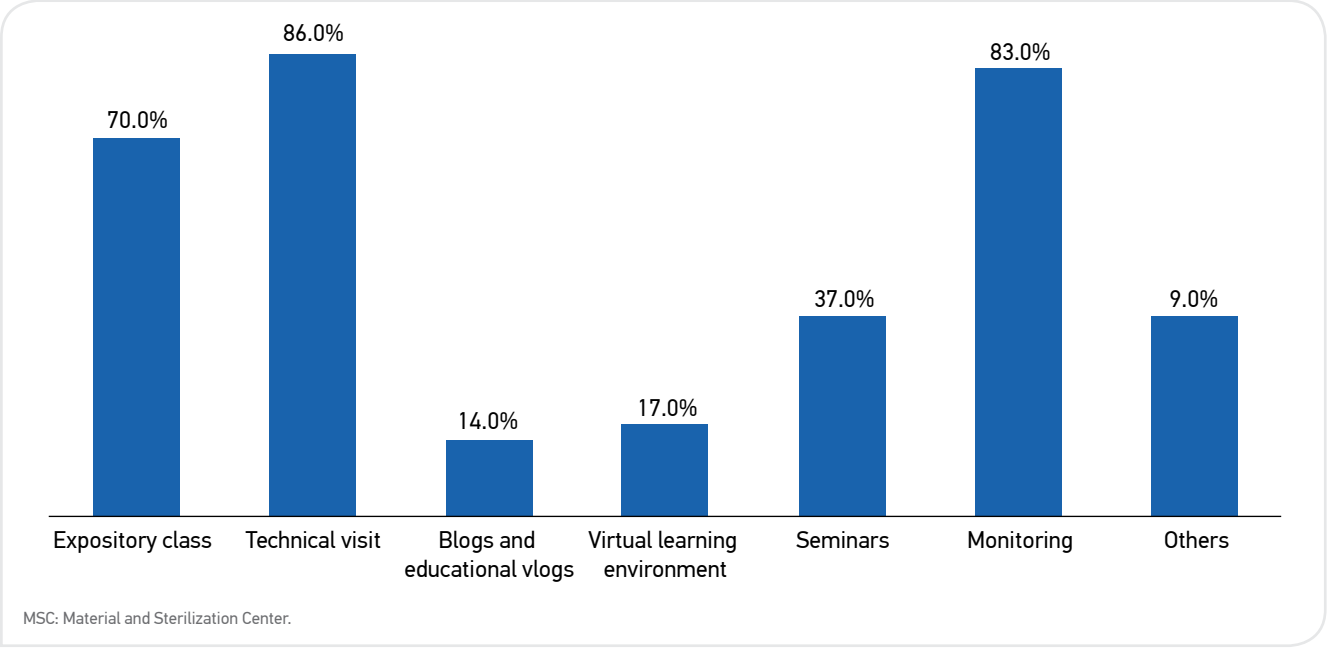
This need for methodological teaching tools, which goes beyond expository classes, was pointed out by the participants of the present study as valuable, which makes it essential that the teaching staff rethink the resources used during the teaching-learning process in the discipline of MSC.

In this direction, the literature points to positive experiences with the adoption of teaching methods that cross the traditional. Strategies such as problem-based learning and online technologies are helping to advance this construction in the training of nurses[15].

It is therefore necessary to recognize the new challenges that prevail in current education scenarios and highly complex university curricula, as the exponential accumulation of knowledge and the increasing incorporation of application technologies in the various health areas lead to fragmented training in highly specialized fields and the pursuit of technical efficiency, reducing the workload of the curricular component[12-16].

Therefore, the need for innovative methods that allow for an ethical, critical, reflexive and transformative pedagogical practice that goes beyond the limits of purely theoretical and technical training to effectively achieve the training is reiterated[17].

The limitation of the present research is due to the impossibility of participation of all the students that attended the curricular component of MSC, with a significant number of students who were not willing to participate. Therefore, we suggest new studies that may include an expressive number of participants to obtain new conceptions in relation to the exposed theme.



Graphic 1. Teaching strategies as a complement to the learning of the curricular component Nursing in MSC, according to the students (n = 58).

CONCLUSION

The importance of the Nursing teaching-learning process in the MSC during Nursing graduation was evidenced as essential for the great majority of the students who participated in the research. Teaching strategies were well evaluated, but the need for innovation in traditional teaching was highlighted.

When questioned about the practice fields and time spent in these places, the students stated that they do not meet their expectations regarding the curricular component. Therefore, it is necessary to review the gaps in teaching, so that there is growth in the teaching and learning processes, resulting, thus, in the training of more capable and prepared professionals for the job market.

The university education does not exist only for the acquisition of knowledge; it is the channel for theoretical and practical experiences to take place and grow, as well as the professionals themselves. The university should aim for a solid academic background, providing the student with the necessary tools so that they can safely choose their professional identity.

REFERENCES

1. Gil RF, Camelo SH, Laus AM. Atividades do enfermeiro de centro de material e esterilização em instituições hospitalares. Texto Contexto Enferm. 2013;22(4):927-34. http://dx.doi.org/10.1590/S0104-07072013000400008

2. Brasil. Conselho Federal de Enfermagem. Resolução COFEN nº 424, de 19 de abril de 2012. Normatiza as atribuições dos profissionais de enfermagem em centro de material e esterilização e em empresas processadoras de produtos para saúde. Diário Oficial da República Federativa do Brasil. Brasília; 2012. Seção 1. p.186.

3. Gariola LB, Baratieri T, Costa AM, Bedendo J, Marcon SS, Waidman MAPW, et al. Infecção hospitalar na perspectiva dos profissionais de enfermagem: um estudo bibliográfico. Cogitare Enferm. 2012;17(1):151-7.

4. Ouriques CM, Machado ME. Enfermagem no processo de esterilização de materiais. Texto Contexto Enferm. 2013;22(3):695-703. http://dx.doi.org/10.1590/S0104-07072013000300016

5. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. Resolução RDC nº 15, de 15 de março de 2012. Dispõe sobre requisitos de boas práticas para o processamento de produtos para a saúde e dá outras providências. Diário Oficial da República Federativa do Brasil. Brasília. 2012. Seção 1, p. 43-6. [acessado em 8 maio 2017]. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2012/rdc0015_15_03_2012.html

6. Turrini RNT, Costa ALS, Peniche ACG, Bianchi ERF, Cianciarulho TI. Education in operating room nursing: transformation of the discipline at University of São Paulo School of Nursing (Brazil). Rev Esc Enferm USP. 2012;46(5):1267-72. http://dx.doi.org/10.1590/S0080-62342012000500032

7. Lucon SMR, Braccialli LAD, Pirolo SM, Munhoz CC. Formação do enfermeiro para atuar na central de esterilização. Rev SOBECC. 2017;22(2):90-7.https://doi.org/10.5327/Z1414-4425201700020006

8. Dessotte CAM, Teixeira ASM, Souza CDA, Sonobe HM. Estratégias de ensino em enfermagem perioperatória: uma avaliação discente. Rev SOBECC. 2015;20(4):189-96. https://doi.org/10.5327/Z1414-4425201500040002

9. Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização. Diretrizes de práticas em enfermagem cirúrgica e processamento de produtos para a saúde. 7ªed. São Paulo: SOBECC; 2017.

10. Souza A, Palazzo S, Montezello D. Conhecimento dos profissionais de enfermagem de centro cirúrgico sobre hipotermia em pacientes cirúrgicos oncológicos. Rev SOBECC. 2017;22(4):188-92. https://doi.org/10.5327/Z1414-4425201700040003

11. Hoyashi CMT, Rodrigues DCG, Oliveira MFA. Central de material e esterilização na formação do enfermeiro: proposta de um manual de práticas. Rev Práxis. 2015;14:35-45. https://doi.org/10.25119/praxis-7-14-761

12. Souza CS, Iglesias AG, Pazin-Filho A. Estratégias inovadoras para métodos de ensino tradicionais – aspectos gerais. Med (Ribeirão Preto) [Internet]. 2014 [acessado em 6 set. 2017];47(3):284-92. Disponível em: http://revista.fmrp.usp.br/2014/vol47n3/6_Estrategias-inovadoras-para-metodos-de-ensino-tradicionais-aspectos-gerais.pdf

13. Leite AS, Turrini RNT. Análise do ensino de Enfermagem em Centro Cirúrgico nas escolas de São Paulo. Rev Bras Enferm. 2014;67(4):12-9. http://dx.doi.org/10.1590/0034-7167.2014670403

14. dos Anjos MAM, de Oliveira JC. Perceptions of nurses about the material and sterilization center: a reflection on the organizational culture. Revista ACRED. 2016;6(11):1-9.

15. Pinto AAM, Marin MJS, Tonhom SFR, Ferreira MLS. Métodos de ensino na graduação em enfermagem: uma revisão integrativa da literatura. Rev Investig Qualit Educ. 2016;1:971-80.

16. Cyrino EG, Toralles-Pereira ML. Trabalhando com estratégias de ensino-aprendizado por descoberta na área da saúde: a problematização e a aprendizagem baseada em problemas. Cad Saúde Pública. 2004;20(3):780-8. http://dx.doi.org/10.1590/S0102-311X2004000300015

17. Padoveze MC, Figueiredo RM, Pelaes CES, Otrenti E. Necessidades de aprendizagem de enfermeiros sobre processos de esterilização. Rev SOBECC. 2013;18(3):23-9.

DETERMINANTS FACTORS FOR SUSPENSION OF ELECTIVE SURGERIES IN A HOSPITAL OF THE FEDERAL DISTRICT, BRAZIL

Fatores determinantes para suspensões de cirurgias eletivas em um hospital do Distrito Federal

Factores determinantes para suspensiones de cirugías electivas en un hospital del distrito federal

Jacqueline Ramos de Andrade Antunes Gomes[1]*, Renata Valero Barbosa Franco[2], Dalyanne Souza Vieira Diniz Morais[3], Beatriz Coêlho Barbosa[4]

ABSTRACT: Objectives: To identify the main determinant factors for suspension of elective surgeries in a public hospital of the Federal District, Brazil, and calculate the surgery suspension rate. **Method:** This is a quantitative, retrospective, and descriptive study carried out at the surgical center of a public hospital of the Federal District. **Result:** From January to October of 2015, 6,926 surgeries were scheduled, of which 4,587 were performed and 2,339 suspended, totaling a surgery suspension rate of 33.8%. The main reason for suspension was unjustified causes, with 30.1%. **Conclusion:** The determinants of surgery suspension should be strictly controlled and restricted. To that end, it is essential to raise awareness among all those involved to reduce the rates found. The findings allowed us to conduct a situational analysis of the care provided, identify weaknesses, improve performance, and adapt the work process to the needs of the patient and the area.

Keywords: Surgery. Elective surgical procedures. Surgical center.

RESUMO: Objetivo: Identificar os principais fatores determinantes para a suspensão de cirurgias eletivas em um hospital público do Distrito Federal e calcular a taxa de suspensão de cirurgias. **Método:** Trata-se de um estudo quantitativo, retrospectivo, descritivo, realizado no centro cirúrgico de um hospital público do Distrito Federal. **Resultado:** De janeiro a outubro de 2015 foram programadas 6.926 cirurgias, das quais foram realizadas 4.587 e suspensas 2.339, totalizando uma taxa de suspensão cirúrgica de 33,8%. O principal motivo de suspensão foram causas injustificadas, com 30,1%. **Conclusão:** Os determinantes para suspensão de cirurgias devem ser rigorosamente controladas e restringidas. Para isso, é essencial a conscientização de todos os envolvidos, com o intuito de diminuir os índices encontrados. Os achados permitem realizar uma análise situacional a respeito da assistência prestada e possibilitam identificar fragilidades, melhorar o desempenho e adequar o processo de trabalho às necessidades do paciente e do setor.

Palavras-chave: Cirurgia. Procedimentos cirúrgicos eletivos. Centro cirúrgico.

RESUMEN: Objetivo: Identificar los principales factores determinantes para la suspensión de cirugías electivas en un hospital público del Distrito Federal y calcular la tasa de suspensión de cirugías. **Método:** Se trata de un estudio cuantitativo, retrospectivo, descriptivo, realizado en el centro quirúrgico de un hospital público del Distrito Federal. **Resultado:** De enero a octubre de 2015 fueron programadas 6.926 cirugías, de las cuales fueron realizadas 4.587 y suspendidas 2.339, totalizando una tasa de suspensión quirúrgica del 33,8%. El principal motivo de suspensión, fueron causas injustificadas, con el 30,1%. **Conclusión:** Las determinantes para suspensión de cirugías deben ser rigurosamente controladas y restringidas. Para eso, es esencial la concientización de todos los involucrados, con la idea de disminuir los índices encontrados. Los hallazgos permiten realizar un análisis situacional al respecto de la asistencia prestada y posibilitan identificar fragilidades, mejorar el desempeño y adecuar el proceso de trabajo a las necesidades del paciente y del sector.

Palabras-clave: Cirugía. Procedimientos quirúrgicos electivos. Centro quirúrgico.

[1]Nurse, PhD in Health Sciences at the Universidade de Brasília, coordinator of the Nursing Residency in Surgical Center Program in a Branch of the Federal District Department of Health – Brasília (DF), Brazil.
[2]Nurse specialist in Occupational Health Nursing, occupational health nurse at Universidade de Brasília – Brasília (DF), Brazil.
[3]Nurse specialist in Occupational Health Nursing, nurse at Instituto Federal – Brasília (DF), Brazil.
[4]Nurse, Master's student in Collective Health at Universidade de Brasília, professor of the University Center at Instituto de Educação Superior de Brasília – Brasília (DF), Brazil.
*Corresponding author: jraagdoutoradofsunb@gmail.com
Received: 02/28/2018. Approved: 05/21/2018.
DOI: 10.5327/Z1414-4425201800040003

INTRODUCTION

The surgical act provides parameters for evaluating the quality of care in surgical centers (SC) of hospital institutions and interferes directly with the productivity indicator. The efficiency evaluation criterion used was the suspension rate as an indicator of quality[1]. The surgery suspension rate is calculated by dividing the number of suspended surgeries by the total number of scheduled surgeries, and multiplying it by 100, according to the Ministry of Health (MOH)[2].

Any procedure scheduled in advance is considered elective. In this case, patient and team have more time to prepare for the intervention, minimizing the risk of complications[3].

Surgery is a therapeutic process that has multiple purposes and triggers numerous physiological and psychological reactions in patients. It also puts them at risk of death or loss of organs and can result in disabilities and completely transform their lives and those of the people who surround them[3,4].

The well-being of the person undergoing surgery should be the main focus of the health team[5]. When patients prepare themselves for a surgical procedure, many concerns and expectations about the future intervention automatically arise, and, if canceled, it can cause frustration[1,6].

The numerous problems caused by surgery suspension can be analyzed in two aspects: one based on the repercussions for the individual and his or her family, and another on the evaluation of consequences to the health institution and the professionals who work there[7].

Some of the main reasons for suspension of surgical procedures found in the literature are: administrative and structural issues; inadequate clinical conditions; tardiness of the surgical team; communication problems among medical team, SC, and hospitalization units; lack of necessary material; preoperative failure; and absence of previously requested tests[1,8].

The losses of the institution are numerous, ranging from the preparation of a specific material and the operating room to the human resources mobilized[1,9]. All these factors result in financial loss caused by deficiency of the process, as, in addition to the mentioned factors, patient length of stay rate increases, hospital rotation decreases, and risk of infection related to health care or other complications grows[10].

Estimates point out that approximately 60% of elective surgical cancellations are potentially preventable[1]. A planned and articulated multidisciplinary assistance, the elaboration of projects with efficient management, and constant evaluation of quality, productivity, and impact from the suggested actions are of extreme importance for the proper operation of the SC unit. By adopting these measures, the detection of behaviors and actions that need reviewing become more efficient, preventing the accumulation of weaknesses to be solved[1,4].

Surgical procedures require complex preparation and, when suspended, they cause physical and emotional impact on patients, as well as organizational loss, and high financial cost for institutions. In this regard, it is essential to understand in greater detail the repercussions generated by analyzing the variables involved in surgical practice to minimize damage to patients and rationally use material, financial, and human resources for this activity.

OBJECTIVES

- To calculate the elective surgery suspension rate in a public hospital of the Federal District, Brazil;
- To identify the determinant factors for suspension of elective surgeries in a public hospital of the Federal District.

METHOD

This is a descriptive and retrospective research, with a quantitative approach, held in the SC of a public hospital of the Federal District. A quantitative study aims to observe, record, and describe the characteristics of a sample[11].

The sample consisted of data from 6,926 elective surgeries, included in the archive of surgery schedules of the institution, between January and October of 2015. The inclusion criterion was elective surgeries suspended from January to October of 2015 that had "no reason" as the reported justification for suspension. We excluded unclear and/or incorrectly filled data. This study does not include urgency and emergency surgeries, as the rotation of patients for these procedures is high.

The instrument used for data collection was built by researchers to facilitate data organization and analysis. Based on the justification for surgery suspension, data were recorded on a form and divided into determinant framework topics: care, administrative, structural, absence of patient, unsatisfactory clinical conditions, unjustified causes, non-authorized procedure, and others.

Surgeries that had "no reason" reported as the cause for suspension or the ones replaced were considered unjustified. The option "other" included delays in the previous surgery,

scheduling error, or patient withdrawal. Administrative reasons covered lack of medical records, absence of employees, emergency procedure for another patient at the same time, deficiency of material or equipment, prior surgeries, and patients without surgical indication. Absence of patient was the determinant for those who did not appear to undergo the procedure.

Structural reasons involved lack of beds (including intensive care units), lack of operating room, and failure of maintenance services in the SC. Unsatisfactory clinical conditions encompassed patients weakened in the preoperative period or who changed medical management. Among the care reasons, we have inadequate preoperative preparation (lack of fasting, administration of contraindicated drugs in the preoperative period, lack of blood supply and blood derivatives, lack of pre-anesthetic evaluation, and incomplete additional tests). Non-authorized procedures were those in which there was no hospitalization of the patient, due to the denial of the medical request, hospitalization report, or card from the Brazilian Public Health System (Sistema Único de Saúde — SUS).

We selected the surgery schedules in the hospital archive using the data collection instrument. Data were recorded and subsequently analyzed and compared through the frequency of the variables studied, with the aid of the software Statistical Package for the Social Sciences (SPSS) 22.0. To calculate the surgery suspension rates, we divided the number of suspended surgeries by the total of elective surgeries and multiplied it by 100[2].

Regarding ethical aspects, the project was submitted to the Research Ethics Committee of the Fundação de Ensino e Pesquisa em Ciências da Saúde (FEPECS) of the Federal District Department of Health, and approved under the Certificate for Ethical Assessment (CAAE) number 52294315.4.0000.5553, as advocates the Resolution no. 466/2012 of the National Health Council, which addresses the guidelines for research involving humans beings[12].

RESULTS

In the period evaluated (from January to October of 2015), 6,926 surgeries were scheduled, of which 4,587 were performed and 2,339 suspended, totaling a surgery suspension rate of 33.8%. Of the scheduled surgeries, 610 (8.8%) were replaced with no reason reported. Thus, they were included in the "unjustified" group.

The highest quantitative of surgery suspension occurred in June, July, and August, totaling together 38.5%, as shown in Figure 1.

In the surgery schedules, we found all suspensions and their corresponding reasons. Of the 584 suspended surgeries classified as "other," 100.0% of them were caused by delays in the previous surgery. Based on this information, we classified the reasons in groups of determinants defined by the study, according to Table 1.

DISCUSSION

The studied hospital presented suspension rate of 33.8%, a number higher than those found in the literature, which range from 14.14 to 27.4%[1,5,8,9]. The high rate could be a reflection of lack of action planning involving the whole

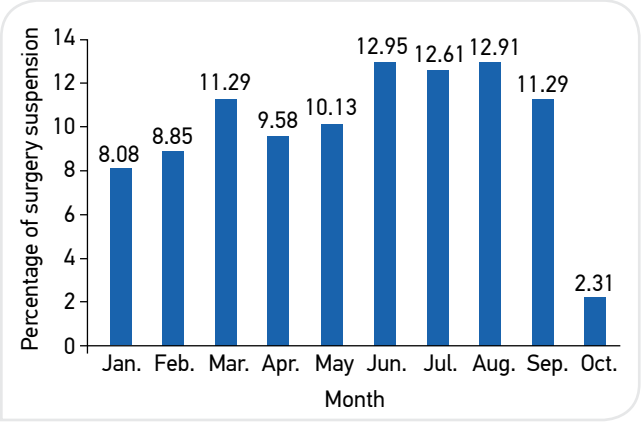


Figure 1. Percentage of surgeries suspended from January to October of 2015.

Table 1. Quantitative of surgeries suspended according to reason.

Reason	Absolute quantitative of surgery suspension	Percentage
Unjustified	703	30.1
Other	584	25.0
Administrative	510	21.8
Absence of patient	249	10.6
Structural	157	6.7
Unsatisfactory clinical conditions	82	3.5
Care	51	2.2
Non-authorized procedure	02	0.1

process of surgery scheduling. According to the literature, high rates are common in public hospitals[9], representing a negative evaluation for the institution as it is a reference in the unity of federation.

During the research period, 610 surgeries were replaced, with no reason reported in the surgery schedules. Thus, procedures that did not occur were considered suspended and unjustified. This fact culminated in a high percentage, leading the unjustified suspensions to the first place with 703 procedures, which represents 30.1% of causes.

In regard to elective surgeries, reasons to not perform the procedure include failure in preoperative visits, inadequate construction of surgery schedule, such as the advance period of its construction, surgeon's lack of planning, scheduling of dummy patient to hold an operating room, and surgery scheduling error. All these factors can be solved, which would directly affect the reduction of surgery suspension rates. Likewise, correctly reporting the reasons for replacement could bring more reliability to data. This finding shows the need to raise awareness among professionals because the only way to propose measures to fix an issue is by knowing its causes[1].

The months with the highest surgery suspension rates were June, July, and August, which together totalize 38.4% of suspensions. The main determinant factor for surgery suspension was unjustified causes (30.1%), followed by other reasons (25.0%).

The result differs from data found in other studies, which mention among main factors unsatisfactory clinical condition of the patient and care reasons, for lack of tests[1,5,9]. In the present study, these two reasons were in sixth and seventh places, with 3.5 and 2.2%, respectively, which may be due to lack of data that could characterize the real reasons to suspend surgery or the deficit of professionals in the institution.

Results for administrative reasons were significant, totaling 21.8% and deviating from a study carried out in a hospital in São Paulo, Brazil, in which the rate was of only 13.9%[6]. This cause could be associated with the incorrect distribution of professionals and scarcity of material in the institution.

Structural aspects represent 6.7% of surgery suspension; lack of beds was the most frequent justification in this group, corroborating the literature[7]. This factor can relate to failures in surgery planning, which could be solved by confirming the beds on the day before surgery.

Regarding the total quantitative, the average of surgeries canceled per month was 234. To minimize this rate, we suggest that the SC managers carry out a monthly situational analysis to detect possible causes that prevent the correct workflow and design suitable actions to solve the problems found.

The main determinant of monthly surgery suspensions in February, April, May, June, and July was "unjustified." In January, March, and August, the main reason was "other," and in September and October, administrative problems.

This large number of administrative issues in September and October was due to the health workers strike that occurred in these months and greatly affected the running of the SC. Only emergency surgeries were performed in this period, causing the suspension of elective surgeries for lack of human resources.

Literature shows that 60% of the determinant factors for surgery suspension could be anticipated and avoided. To this end, the SC managers must redefine models, set goals, study the peculiarities of the area, and group weaknesses and capabilities so they can review the planning of surgery schedules, the preoperative visit, the management of material, and human resources[5,6]. Obtaining proper control of these factors provides greater safety for the patient, decreases unnecessary hospitalization time, significantly reduces costs, and optimizes the productivity of the area[4].

The health team is of great relevance to this study since it consists of professionals working in the system and responsible for the dynamics of the institution, with emphasis on the nursing staff, that has a fundamental role in preparing and managing the patient in the preoperative period. These professionals need to know the situation experienced and the existing problems in their working environment so that they can be more effective. This research provides the basis for knowledge and possible planning and execution of a better care organization, resulting in improvement for the patient and the institution.

Study limitations were lack of readable manuscripts and incomplete surgery schedules. Conducting a study about operationalization of the SC is pertinent, as it could allow the institution to analyze the productivity and performance of the area more accurately. Research on cost analysis of surgeries suspended and performed could favor the reflection of the team and SC managers.

CONCLUSION

The study allowed us to conduct a situational analysis of the care provided, making it possible to improve performance and adapt the work process to the needs of the patient and the SC.

The purposes of this research are to guide and help the management of the area and the professionals who work there, using the results obtained to minimize problems caused by surgery suspension for patients, relatives, and the institution.

The determinant factors for surgery suspension should be strictly controlled and restricted. The overall suspension rate found in this study was 33.8%. The main determinant factor was unjustified causes with 30.1%, followed by other reasons (25.0%), administrative issues (21.8%), absence of patient (10.6%), and structural aspects (6.7%).

Lastly, it is worth emphasizing the need to raise awareness among the professionals involved, such as the medical team and the nursing staff, to correctly fill the data on suspended surgeries in the computerized system, offering training on the subject, and allowing them to plan actions with greater effectiveness.

REFERENCES

1. Carvalho TA, Sobral CB, Marinho PML, Rodriguez EOL, Campos MPA. Suspensão de cirurgias em um hospital universitário. Rev SOBECC. 2016;21(4):186-91. https://doi.org/10.5327/Z1414-4425201600040002

2. Moraes PGS, Pacheco NMD, Silva RGS, Silva PCV. Clinical and organizational factors related to cancellation of surgical procedures. J Nurs UFPE [Internet]. 2017 [citado 26 nov. 2017];11(7):2645-53. Disponível em: https://doi.org/10.5205/1981-8963-v11i7a23436p2645-2653-2017

3. Carvalho RWF, Pereira CU, Laureano Filho JR, Vasconcelos BCE. O paciente cirúrgico: parte I. Rev Cir Traumatol Buco-maxilo-fac [Internet]. 2010 [citado 30 nov. 2017];10(4):85-92. Disponível em: http://www.revistacirurgiabmf.com/2010/V10n4/12.pdf

4. Cihoda JH, Alves JR, Fernandes LA, Souza Neto EP. Analysis for the causes of surgical cancellations in a Brazilian university hospital. Care Management J [Internet]. 2015 [citado 29 nov. 2017];16(1):41-7. Disponível em: https://doi.org/10.1891/1521-0987.16.1.41

5. Sampaio CEP, Gonçalves RA, Seabra Júnior HC. Determination of surgery suspension factors and their constributions with nursing assistance. Care Online [Internet]. 2016 [citado 30 nov. 2017]:8(3):4813-20. Disponível em: http://dx.doi.org/10.9789/2175-5361.2016.v8i3.4813-4820

6. Moreira LR, Xavier APR, Moreira FN, Souza LCM, Araújo OC, Santos TMB, et al. Avaliação dos motivos de cancelamento de cirurgias eletivas. Enfermagem ver [Internet]. 2016 [citado 27 nov. 2017];19(2). Disponível em: http://periodicos.pucminas.br/index.php/enfermagemrevista/article/view/13156/10301

7. Hori Y, Nakayama A, Sakamoto A. Surgery cancellations after entering the operating room. JA Clinical Reports [Internet]. 2016 [citado 27 nov. 2017];2(40). Disponível em: https://doi.org/10.1186/s40981-016-0066-1

8. Callegari DC, Batista HMT, Silveira GBM, Bentes IMS, Rocha RPB, Sampaio LA, et al. Monitoring the suspension of surgical procedures. Int Arch Med [Internet]. 2015 [citado 30 nov 2017]:8. Disponível em: http://dx.doi.org/10.3823/1710

9. Macedo JM, Kano JA, Braga EM, Garcia MA, Caldeira SM. Cancelamento de cirurgias em um hospital universitário: causas e tempo de espera para novo procedimento. Rev SOBECC. 2013;18(1):26-34.

10. Botazini NO, Carvalho R. Cancellation of surgeries: an integrative literature review. Rev SOBECC. 2017;22(4):230-44. http://dx.doi.org/10.5327/Z1414-4425201700040008

11. Fontelles MJ, Simões MG, Farias SH, Fontelles RGS. Metodologia da pesquisa científica: diretrizes para a elaboração de um protocolo de pesquisa. Rev Eletron Educação [Internet]. 2009 [citado 28 nov. 2017]:6(1). Disponível em: https://cienciassaude.medicina.ufg.br/up/150/o/Anexo_C8_NONAME.pdf

12. Brasil. Conselho Nacional de Saúde (CNS). Resolução nº 466, de 12 de dezembro de 2012. Aprova as diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. Diário Oficial da União. 13 jun. 2013.

SIGNS AND SYMPTOMS RELATED TO INHALATION OF SURGICAL SMOKE BY SURGEONS

Sinais e sintomas relacionados à inalação da fumaça cirúrgica por cirurgiões

Signos y síntomas relacionados con la inhalación del humo quirúrgico por cirujanos

Jéssica Ribeiro Aranha[1]*, Renata Perfeito Ribeiro[2], Amanda Salles Margatho[2], Nathanye Crystal Stanganelli[3], Evelin Daiane Gabriel Pinhatti[4], Júlia Trevisan Martins[2]

ABSTRACT: Objective: To determine the association between the prevalence of signs and symptoms related to the inhalation of surgical smoke and time in practice of the exposed surgeons. **Method:** A cross-sectional, descriptive, quantitative field study was conducted. The data were collected by one of the authors in an individual interview with 45 surgeons, with the aid of an instrument aimed at collecting sociodemographic information and data on variables referring to signs and symptoms related to the inhalation of surgical smoke described in the literature. **Results:** The sample consisted mostly of male surgeons, mostly from the obstetrics and gynecology clinic. There was no statistical significance between the association of signs and symptoms related to smoke inhalation and time in practice of the exposed surgeons ($p>0.05$). **Conclusion:** There was a higher prevalence of eye irritation symptoms and foreign-body sensation in the throat in surgeons with more than 30 years of practice; 60.0% of surgeons did not believe that the symptoms were related to the inhalation of surgical smoke. It is recommended that an exhaust fan be installed in the operating room and that an N95 mask be used by workers exposed to this risk to minimize the signs and symptoms of smoke inhalation.

Key words: Surgeons. Signs and symptoms. Electrocoagulation. Occupational health.

RESUMO: Objetivo: Verificar a associação entre a prevalência de sinais e sintomas relacionados à inalação da fumaça cirúrgica e o tempo de atuação desde a formatura dos cirurgiões expostos. **Método:** Estudo de campo, transversal, descritivo, quantitativo. Os dados foram coletados por uma das pesquisadoras em entrevista individual com 45 cirurgiões, com o auxílio de um instrumento contendo dados sociodemográficos e variáveis referentes aos sinais e sintomas relacionados à inalação da fumaça cirúrgica descritos na literatura. **Resultados:** A amostra foi composta, em sua maioria, de cirurgiões do sexo masculino, com prevalência da clínica de ginecologia e obstetrícia. Não houve significância estatística entre a associação dos sinais e sintomas relacionados à inalação da fumaça e o tempo de atuação desde a formatura dos cirurgiões expostos ($p>0,05$). **Conclusão:** Houve maior prevalência dos sintomas irritação nos olhos e sensação de corpo estranho na garganta entre os cirurgiões com mais de 30 anos na função desde a formatura; 60,0% dos cirurgiões não acreditam que os sintomas estejam relacionados à inalação da fumaça cirúrgica. Recomenda-se, para a minimização dos sinais e sintomas, a instalação de exaustores de fumaça em salas cirúrgicas e o uso da máscara N95 pelos trabalhadores expostos a esse risco.

Palavras-chave: Cirurgiões. Sinais e sintomas. Eletrocoagulação. Saúde do trabalhador.

RESUMEN: Objetivo: Determinar la asociación entre la prevalencia de signos y síntomas relacionados con la inhalación de humo quirúrgico y el tiempo en la práctica de los cirujanos expuestos. Método: Se realizó un estudio de campo cuantitativo, descriptivo y de corte transversal. Los datos fueron recopilados por uno de los autores en una entrevista individual con 45 cirujanos, con la ayuda de un instrumento destinado a recopilar información sociodemográfica y datos sobre variables relacionadas con signos y síntomas relacionados con la inhalación de humo quirúrgico descrita en la literatura. Resultados: la muestra estuvo compuesta principalmente por cirujanos varones, principalmente de la clínica de obstetricia y ginecología. No hubo significación

[1]Nurse; Resident in Perioperative Nursing, Department of Nursing, Universidade Estadual de Londrina (UEL) – Londrina (PR), Brazil.
[2]Nurse; Ph.D., Adjunct Professor, Department of Nursing, UEL – Londrina (PR), Brazil.
[3]Nurse; Masters student, Post-Graduation Program in Nursing, Department of Nursing, UEL – Londrina (PR), Brazil.
[4]Nurse; Ph.D. student, Post-Graduation Program in Nursing, Department of Nursing, UEL – Londrina (PR), Brazil.
*Corresponding author: jessica_aranha10@hotmail.com
Received: 03/27/2018 – Approved: 08/28/2018
DOI: 10.5327/Z1414-4425201800040005

estadística entre la asociación de signos y síntomas relacionados con la inhalación de humo y el tiempo en la práctica de los cirujanos expuestos (p>0.05). Conclusión: Hubo una mayor prevalencia de síntomas de irritación ocular y sensación de cuerpo extraño en la garganta en cirujanos con más de 30 años de práctica; El 60,0% de los cirujanos no creía que los síntomas estuvieran relacionados con la inhalación de humo quirúrgico. Se recomienda que se instale un ventilador de extracción en la sala de operaciones y que los trabajadores expuestos a este riesgo utilicen una máscara N95 para minimizar los signos y síntomas de la inhalación de humo.

Palabras clave: Cirujanos. Signos y síntomas. Electrocoagulación. Salud laboral.

INTRODUCTION

The Surgical Center (SC) can be considered one of the most complex units of the hospital in view of its specificities and the constant health risk both for the patient, in relation to the necessary surgical intervention, and for the workers due to the procedures while providing care[1].

Electrocautery is one of the radiofrequency-based technologies used regularly in the SC in different specialties, to facilitate the visualization of the operative field and to reduce bleeding and surgical time[1].

The instrument used may be monopolar or bipolar. The monopolar one, because of its versatility and efficiency, is more often used in the dissection and coagulation of vessels. Bipolar cauterization, on the other hand, is used in delicate tissues, which are placed between the electrodes[2]. There is no difference between monopolar and bipolar electrocautery with regard to the amount of the chemicals generated during its use and released into the air in the form of surgical smoke[3].

Surgical smoke is formed by the incomplete cauterization of the tissues and is composed of toxic gases that can accumulate as living or dead organic material, where this can be harmful to the health of those who inhale it, as in the case of surgeons, anesthetists and the nursing team of the SC.

This smoke can contain viruses, bacteria and chemical and biological contaminants; 95% of it is composed of water, and the other 5% consists of particles potentially harmful to health[4,5]. The toxic gases of fetid odor, formed from the surgical smoke, release small particles that can cause respiratory complications and pathogens that can be transmitted to the surgical team[6,7] The substances produced by the surgical smoke can be absorbed by the skin or respiratory tract of the exposed surgeons during their work activities, in the form of dust, smoke, mist, gases or vapors, and this smoke is one of the main chemical risks present in operating rooms (OR) [8].

The chemical risk of surgical smoke is related to odor, particle size and gas concentration. The great threat is represented by the odor-causing toxins, which are released into the air when the tissue is cauterized by electrocautery. This odor is characteristic of chemicals formed from the combustion of proteins and lipids during electrocautery[4,9-12]. These chemicals cause headache, sore throat, nausea, vomiting, eye irritation, weakness, dizziness[13], burning in the pharynx, nasal congestion, sneezing and mucosal irritation in the nose and mouth[1].

Surgical smoke contains polycyclic aromatic hydrocarbons (PAH)[14,15], volatile organic compounds (VOC)[16], carbon monoxide (CO)[3] and toluene[17], among others. These chemical compounds are responsible for mutagenic[18] and/or carcinogenic effects[19], depending on the worker's exposure time.

In a study aimed at comparing the risks related to the inhalation of surgical smoke in laparoscopic procedures with open procedures, it was observed that the surgical smoke produced remained in the patient's abdominal cavity and then released after the trocar valve was opened[16]. The analysis of this smoke revealed the presence of carcinogenic substances such as ethanol, dichloroethane, benzene and ethylbenzene.

There are no studies in the Brazilian or international literature that shows a connection between exposure to surgical smoke and the presence of related signs and symptoms in exposed surgeons. With this in mind, we posed the following question: is there an association between the prevalence of signs and symptoms related to the inhalation of surgical smoke and the exposed surgeon's time in practice?

OBJECTIVE

To determine the association between the prevalence of signs and symptoms related to the inhalation of surgical smoke and the exposed surgeon's time in practice.

METHOD

We conducted a cross-sectional, descriptive, quantitative field study from February to June 2016.

The study population consisted of surgeons from several clinics in a city in the northern Paraná, Brazil, who had a certain private medical agreement with the municipality. The inclusion criterion was surgeons who were exposed to the inhalation of surgical smoke produced by electrocautery at least once a week. The exclusion criterion was surgeons who smoked, since they could show symptoms similar to those produced by exposure to surgical smoke.

Surgeons were selected on the basis of information from the health insurance they carried. The data were collected by one of the authors, in an individual interview, in the surgeon's office, after scheduling it with the secretary.

The data collection instrument used was composed of the sociodemographic variables sex, age, clinic and the surgeon's years in practice, and clinical variables regarding the presence of signs and symptoms related to the inhalation of surgical smoke, namely headache, foreign-body sensation in the throat, nausea, vomiting, eye irritation, weakness, dizziness[13], burning in the pharynx, nasal congestion, mucosal irritation in the nose and mouth and sneezing[1]. At the end of the interview, the surgeons were questioned if they considered that the presence of these signs and symptoms could be related to the inhalation of surgical smoke.

For statistical analysis, the software Statistical Package for the Social Sciences (SPSS), version 20.0 for Windows, was used. Descriptive analyses of simple frequency were performed for the categorical variables, and mean and standard deviation (SD), along with minimum and maximum values were determined for the numerical variables. Fisher's exact test was used to assess the possible associations between the signs and symptoms related to the inhalation of surgical smoke and the surgeon's time in practice. The level of significance was set at 0.05.

The project was approved by the Research Ethics Committee, via Plataforma Brasil, under CAAE No. 46229915.0.0000.5231, according to Resolution No. 466/2012 of the National Health Council. The study was explained to the surgeons, who after agreeing to participate, signed an informed consent form.

RESULTS

The sample of this study consisted of 45 surgeons. Table 1 shows their sociodemographic characteristics.

Table 2 shows the association between the prevalence of signs and symptoms related to the inhalation of surgical smoke and the exposed surgeons' time in practice.

Table 3 shows the prevalence of signs and symptoms related to electrocautery smoke inhalation.

When questioned whether the presence of signs and symptoms was related to inhalation of surgical smoke, 60% (n = 27) of interviewees answered no and 40% (n = 18) believed that there was a relationship.

DISCUSSION

In a similar study conducted in Mexico, 86% of the interviewees were male, as shown here[1]. However, these authors found that the most frequent symptoms displayed a different prevalence than what was seen in our study; the following rates were reported: foreign-body sensation in the throat, 58%; burning in the pharynx, 22%; nausea, 4%; and nasal congestion, 2%. The specialties with higher rates of exposure to electrocautery smoke were neurosurgery, general surgery and obstetrics and gynecology.

In the work environment of surgeons, surgical smoke containing gases and chemical particles of different sizes is

Table 1. Sociodemographic characterization of surgeons exposed to surgical smoke inhalation.

Variable	Up to 30 years in practice (n=21)	More than 30 years in practice (n=24)
	n (%)	n (%)
Age in years, mean (SD)	51 (4.0)	64 (6.0)
Minimum	43	56
Maximum	59	79
Sex		
Male	16 (46.7)	22 (48.9)
Female	5 (11.1)	2 (4.4)
Clinic		
Obstetrics and Gynecology	12 (26.7)	9 (20.1)
Urology	5 (11.1)	4 (8.9)
Vascular	0 (0.0)	4 (8.9)
Thoracic	2 (4.4)	1 (2.2)
Neurology	0 (0.0)	3 (6.7)
Cardiac	0 (0.0)	2 (4.4)
Orthopedics	1 (2.2)	0 (0.0)
Proctology	1 (2.2)	0 (0.0)
Pediatrics	0 (0.0)	1 (2.2)

SD: standard deviation.

a cause for concern regarding the health of these workers, since most of the symptoms occur in practice in the long term[6,10]. Although it was not statistically significant, there was a higher prevalence of symptoms of eye irritation and foreign-body sensation in the throat (Table 2) among surgeons with more than 30 years in practice.

In turn, electrocautery smoke poses a number of health risks:

- Inhalation: Ninety percent of the particles present in surgical smoke are so small that they can penetrate into the alveoli of the worker. These particles usually cause irritation of the nose and throat and respiratory problems, and allergic reactions may also occur. The smaller these particles, the more dangerous they are from the chemical point of view[20].
- Poor air quality: During cutting and coagulation with electrocautery, there is an unpleasant odor in the air, which reduces air quality in the OR, to the point that the team gets headaches and nausea[20].
- Impaired vision: Electrocautery smoke can make vision difficult during procedures, because it restricts the vision of the operative field and also irritates the eyes[20].
- Surgical masks: Contrary to popular belief, these conventional masks do not provide sufficient protection against surgical smoke, since they do not prevent the inhalation of toxic gases and aerosols. They have been developed to protect the patient from infections during surgical procedures[20]. They also form a barrier to protect the surgeon's face from large drops and spills of blood and other body fluids[21], but they do not provide adequate protection against electrocautery smoke[13].

The option would be the use of top-quality filter masks or double masks, which could increase filtration capacity, and a smoke extraction device positioned 2 to 5 cm from where electrocautery is being used, thus ensuring the surgical team's safety[13]. Another option is an N95 mask, which prevents the passage of atmospheric particulate matter considered dangerous and which is therefore indicated as a great tool for the prevention of signs and symptoms related to the use of electrocautery[22].

Table 2. Association between prevalence of signs and symptoms related to surgical smoke inhalation and time in practice.

Variable	Up to 30 years in practice (n=21)	More than 30 years in practice (n=24)	p*
	n (%)	n (%)	
Eye irritation			
Yes	4 (8.9)	4 (8.9)	0.83
No	17 (37.8)	20 (44.4)	
Sneezing			
Yes	3 (6.7)	1 (2.2)	0.23
No	18 (40.0)	23 (51.1)	
Foreign-body sensation in throat			
Yes	1 (2.2)	2 (4.4)	0.63
No	20 (44.4)	22 (48.9)	
Burning in pharynx			
Yes	1 (2.2)	1 (2.2)	0.92
No	20 (44.4)	23 (51.1)	
Nasal congestion			
Yes	2 (4.4)	0 (0.0)	0.12
No	19 (42.2)	24 (53.3)	
Weakness			
Yes	0 (0.0)	1 (2.2)	0.34
No	21 (46.7)	23 (51.1)	
Headache			
Yes	0 (0.0)	1 (2.2)	0.34
No	21 (46.7)	23 (51.1)	
Dizziness			
Yes	0 (0.0)	1 (2.2)	0.34
No	21 (46.7)	23 (51.1)	
Nausea and/or vomiting			
Yes	1 (2.2)	0 (0.0)	0.28
No	20 (44.4)	24 (53.3)	

*Fisher exact test.

Table 3. Prevalence of signs and symptoms related to electrocautery smoke inhalation.

Signs and symptoms	n (%)
Eye irritation	8 (17.8)
Sneezing	4 (8.9)
Foreign-body sensation in throat	3 (6.6)
Burning in pharynx	2 (4.4)
Nasal congestion	2 (4.4)
Weakness	1 (2.2)
Headache	1 (2.2)
Dizziness	1 (2.2)
Nausea and/or vomiting	1 (2.2)
Mucosal irritation in nose and mouth	0 (0.0)

Surgical smoke is recognized as potentially hazardous to the health of exposed workers[23]. The solution to the management of this smoke and its symptoms is its complete evacuation, so that the air is constantly clean, ensuring a safe environment for healthy work[24].

Therefore, capturing the surgical smoke means collecting it during a surgical procedure and removing it to a distant area, to be filtered. An example is a local exhaust fan, recommended by professional organizations and government health agencies. This apparatus is connected to activated carbon filters, which absorb chemicals and odors present in the smoke. The ultra-low penetration air (ULPA) filters remove 99.9% of contaminants that measure 0.12 microns or more in diameter, filtering the air of large amounts of surgical smoke[5,25].

The reasons for not using smoke removal devices are related to the lack of knowledge about the risks of inhalation of this smoke, and are often the decisive factors in choosing whether or not to use exhaust devices. Lack of interest in surgical smoke removal can be explained by the following reasons: anxiety associated with any change in routines; lack of knowledge about sources that recommend the removal of surgical smoke; annoyance caused by the noise from the smoke extractor; unavailability of devices that allow high smoke capture efficiency; the need for the entire surgical team to be involved with smoke removal devices[26]. These findings support the data presented here, which revealed the disbelief of most surgeons (60.0%) about the risks of showing signs and symptoms related to the use of electrocautery.

The limitation of this study was the small number of surgeons who participated, where they were often not available to attend one of the researchers. The small sample size may be related to the non-significant associations between the presence of signs and symptoms related to the inhalation of surgical smoke and the time in practice of the exposed surgeons.

However, this study advances our scientific knowledge regarding the negative consequences of the inhalation of surgical smoke. Knowing the changes that this inhalation can cause in surgeons is of great importance for the implementation of measures that minimize this exposure.

CONCLUSION

This study did not find a statistical significance for an association of signs and symptoms of surgical smoke exposure and the time after training among the surgeons studied. However, there was a higher prevalence of eye irritation symptoms and foreign-body sensation in the throat among surgeons with more than 30 years in practice. It is noteworthy that 60.0% of them did not believe that the symptoms were related to the inhalation of surgical smoke. It is recommended that smoke extractors be installed in the OR and that the N95 mask be used by workers exposed to surgical smoke, to minimize the signs and symptoms of this smoke exposure.

Finally, new studies are suggested in relation to the N95 mask, to obtain scientific evidence that justifies the use of this individual protection equipment for filtering out the chemical components of surgical smoke, since there are reported studies that these substances are harmful to exposed workers. In addition, follow-up studies to determine the time of onset of signs and symptoms of exposure and the development of scales that can measure them will also be important.

REFERENCES

1. Navarro-Meza MC, González-Baltazar R, Aldrete-Rodríguez MG, Carmona-Navarro DH, López-Cardona MG. Síntomas respiratorios causados por el uso delelectrocauterio em médicos em formaciónquirúrgica de un hospital de México. Rev Peru Med Exp Salud Publica [Internet]. 2013 [acessado em 5 fev. 2018];30(1):41-4. Disponível em: http://dx.doi.org/10.1590/S1726-46342013000100008
2. Cervantes-Sánchez CE, Cu-Zetina C, Seviano-Rico E, Rojero-Vallejo J, Lazos-Ochos M, Gutiérrez-Vega R. Incisión cutânea: bisturi vselectrocauterio. Estudio experímental em ratas. Rev Med Hosp Gen Mex. 2002;65(1):11-4.
3. Gianella M, Hahnloser D, Rey JM, Sigrist MW. Quantitative chemical analysis of surgical smoke generated during laparoscopic surgery with a vessel-sealing device. Surg Innov. 2014;21(2):170-9. https://doi.org/10.1177/1553350613492025
4. Ulmer BC. The hazards of surgical smoke. AORN J. 2008;87(4):721-34.
5. National Institute for Occupational Safety and Health. Control of smoke from laser/electric surgical procedures [Internet]. Estados Unidos: National Institute for Occupational Safety and Health; 1996 [acessado em 15 set. 2017];96-128. Disponível em: https://www.cdc.gov/niosh/docs/hazardcontrol/pdfs/hc11.pdf

6. Hensman C, Baty D, Willis RG, Cuschieri A. Chemical compositions of smoke produced by high-frequency electrosurgery in a closed gaseous environment: an in vitro study. Surg Endosc. 1998;12(8):1017-9.

7. Moot AR, Ledingham KM, Wilson PF, Senthilmohan ST, Lewis DR, Roake J, et al. Composition of volatile organic compounds in diathermy plume as detected by selected ion flow tube mass spectrometry. ANZ J Surg. 2007;77(1-2):20-3. http://dx.doi.org/10.1111/j.1445-2197.2006.03827.x

8. Scaldelai VS, Oliveira CAD, Milaneli E, Oliveira JBC, Bolognesi PR. Manual prático de saúde e segurança no trabalho. São Caetano do Sul: Yendis; 2009.

9. Eickmann UI, Falcy M, Fokuhl L, Rüegger M, Bloch M, Merz B. Surgical smoke: risks and preventive measures [Internet]. Hamburgo: International Social Security Association; 2012 [acessado em 10 mar. 2018]. Disponível em: http://prevencion.umh.es/files/2012/04/2-surgical_ smoke.pdf

10. Barrett WL, Garber SM. Surgical smoke: a review of the literature. Surg Endosc. 2003;17(6):979-87. https://doi.org/10.1007/s00464-002-8584-5

11. Yeh CR. Surgical smoke plume: principles and function of smoke, aerosol, gases and smoke evacuators. Surg Serv Manag. 1997;3(4):41-5.

12. Boorder T, Verdaasdonk J, Klaessens J. The visualisation of surgical smoke produced by energy delivery devices: significance and effectiveness of evacuation systems. Proc of SPIE [Internet]. 2007 [acessado em 15 jul. 2017];6440;64400R-1. Disponível em: http://www.buffalofilter.com/files/4614/1409/4386/The_visualisation_of_surgical_smoke_produced_by_energy_delivery.pdf

13. Alp E, Bijlc D, Bleichrodt RP, Hansson B, Voss A. Surgical smoke and infection control. J Hosp Infect. 2006;62(1):1-5. https://doi.org/10.1016/j.jhin.2005.01.014

14. Tseng HS, Liu SP, Uang SN, Yang LR, Lee SC, Liu YJ, et al. Cancer risk of incremental exposure to polycyclic aromatic hydrocarbons in electrocautery smoke for mastectomy personnel. World J Surg Oncol. 2014;12:31. https://dx.doi.org/10.1186%2F1477-7819-12-31

15. Claudio CV, Ribeiro RP, Martins JT, Marziale MHP, Solci MCD, Dalmas JC. Hidrocarbonetos policíclicos aromáticos produzidos pela fumaça do eletrocautério e uso de equipamentos de proteção individual. Rev Latino-Am Enferm. 2017;25:e2853. https://dx.doi.org/10.1590/1518-8345.1561.2853

16. Choi SH, Kwon TG, Chung SK, Kim TH. Surgical smoke may be a biohazard to surgeons performing laparoscopic surgery. Surg Endosc. 2014;28(8):2374-80. https://doi.org/10.1007/s00464-014-3472-3

17. Wu YC, Tang CS, Huang HY, Liu CH, Chen YL, Chen DR, et al. Chemical production in electrocautery smoke by a novel predictive model. Eur Surg Res. 2011;46:102-7. http://dx.doi.org/10.1159/000322855

18. Tomita Y, Mihashi S, Nagata K, Ueda S, Fujiki M, Hirano M, et al. Mutagenicity of smoke condensates induced by CO2-laser irradiation and electrocauterization. Mutat Res. 1981;89(2):145-9.

19. Agency for Toxic Substances and Disease Registry. Polycyclic Aromatic Hydrocarbons (PAHs) [Internet]. 2011 [acessado em 28 fev. 2018]. Disponível em: http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=25

20. Maquet Getinge Group. Smoke evacuation unit: MEDAP-Fumovac 900. Surgical smoke endangers the OR team [Internet]. 2017 [acessado em 20 jan. 2018]. Disponível em: http://online.tolmed.info/media/brochures/fumovac_brochure_en-5_nonus.pdf

21. Benson SM, Novak DA, Ogg MJ. Proper use of surgical N95 respirators and surgical masks in the OR. AORN J. 2013;97(4):457-67. https://doi.org/10.1016/j.aorn.2013.01.015

22. Institute for Safe Medication Practices. ISMP's list of error-prone abbreviations, symbols, and dose designations [Internet]. 2015 [acessado em 15 nov. 2017]. Disponível em: https://www.ismp.org/tools/errorproneabbreviations.pdf

23. Association of periOperative Registered Nurses (AORN). RP Summary: recommended practices for electrosurgery. AORN J. 2012;95(3):388-90.

24. Ball K. Update for nurse anesthetists. Part 1. The hazards of surgical smoke. AANA J. 2001;69(2):125-32.

25. Lee KW, Mukund R. Filter collection. In: Baron PA, Welleke K, eds. Aerosol measurement, principles, techniques and applications. Nova York: Wiley Interscience; 2001. p.197-229.

26. Schultz L. An analysis of surgical smoke plume components, capture and evacuation. AORN J. 2014;99(2):289-98. https://doi.org/10.1016/j.aorn.2013.07.020

LINKS BETWEEN DIAGNOSTICS, RESULTS AND NURSING INTERVENTIONS FOR PATIENTS IN THE TRANSOPERATIVE PERIOD

Ligações entre diagnósticos, resultados e intervenções de enfermagem para pacientes no período transoperatório

Conexiones entre diagnósticos, resultados e intervenciones de enfermería para pacientes em el período transoperatorio

Djulia Camila Berwanger[1], Fabiana Gonçalves de Oliveira Azevedo Matos[2]*, Débora Cristina Ignácio Alves[3], João Lucas Campos de Oliveira[4]

ABSTRACT: Objectives: To build and to validate the links between the main diagnoses, results and nursing interventions for the patients in the transoperative period. **Method:** Methodological study developed in three stages: integrative revision of the literature, to identify the most common diagnoses, results and nursing interventions in the transoperative period; construction of theoretical material, based on the prior research and experience of the authors, containing the link between the main diagnoses, results and interventions; and submission of the material built to the evaluation of content by experts nationally recognized by the performance in the said area of knowledge. The investigation was approved by the Ethics Committee on Research. **Results:** The final version of the constructed material was composed of the link of 27 diagnoses, 25 results, 26 interventions and 141 nursing activities. **Conclusion:** It is believed that the results of the study can be used to substantiate the clinical practice of nurses in the surgical center. Knowing the most common elements of the process of caring in the transoperative period optimizes the assistance provided, giving more autonomy and security for decision making.

Keywords: Operating room nursing. Perioperative nursing. Nursing process. Nursing diagnosis. Nursing care.

RESUMO: Objetivos: Construir e validar as ligações entre os principais diagnósticos, resultados e intervenções de enfermagem para pacientes no período transoperatório. **Método:** Estudo metodológico desenvolvido em três etapas: revisão integrativa da literatura, para identificar os diagnósticos, resultados e intervenções de enfermagem mais comuns no período transoperatório; construção de material teórico com base na pesquisa prévia e na experiência das autoras, contendo a ligação entre os principais diagnósticos, resultados e intervenções; e submissão do material construído à avaliação de conteúdo por especialistas nacionalmente reconhecidos pela atuação na referida área de conhecimento. A investigação teve aprovação do Comitê de Ética em Pesquisa. **Resultados:** A versão final do material construído ficou composta da ligação de 27 diagnósticos, 25 resultados, 26 intervenções e 141 atividades de enfermagem. **Conclusão:** Acredita-se que os resultados do estudo possam ser utilizados para fundamentar a prática clínica de enfermeiros que atuam em centro cirúrgico. Conhecer os elementos mais comuns do processo de cuidar no período transoperatório otimiza a assistência prestada, conferindo mais autonomia e segurança para a tomada de decisão.

Palavras-chave: Enfermagem de centro cirúrgico. Enfermagem perioperatória. Processo de enfermagem. Diagnóstico de enfermagem. Cuidados de enfermagem.

[1]Nurse; residente of Nursing in the Medical and Surgical Clinic of *Hospital Universitário do Oeste do Paraná* (HUOP) – Cascavel (PR), Brazil.
[2]Nurse; PhD in Sciences by the School of Nursing of Universidade de São Paulo (USP); professor at Universidade Estadual do Oeste do Paraná (Unioeste) – Cascavel (PR), Brazil.
[3]Nurse; PhD in Sciences by the School of Nursing of USP; professor at Unioeste – Cascavel (PR), Brazil.
[4]Nurse; PhD in Nursing; associate professor in the School of Nursing at Universidade Federal de Mato Grosso (UFMT) – Cuiabá (MT), Brazil.
*Corresponding author: fabianamatos@hotmail.com
Received on: 02/28/2018 – Approved on: 05/20/2018
DOI: 10.5327/Z1414-4425201800040002

RESUMEN: Objetivos: Construir y legitimar las conexiones entre los principales diagnósticos, resultados e intervenciones de enfermería para pacientes en el período transoperatorio. **Método:** Estudio metodológico, desarrollado en tres etapas: revisión integrativa de la literatura, para identificar los diagnósticos, resultados e intervenciones de enfermería más comunes en el período transoperatorio; construcción de material teórico basado en la investigación previa y en la experiencia de las autoras, conteniendo la conexión entre los diagnósticos principales, resultados e intervenciones; y sujeción del material construído a la evaluación del contenido por expertos nacionalmente reconocidos por actuar en la referida área de conocimento. La investigación tuvo la aprobación del Comité de Ética en Investigación. **Resultados:** La versión final del material construído quedó compuesta por la conexión de 27 diagnósticos, 25 resultados, 26 intervenções y 141 atividades de enfermería. **Conclusión:** Se cree que los resultados del estudio podrían utilizarse para justificar la práctica clínica de enfermeros que actúan en el quirófano. Conocer los elementos más comunes del proceso de cuidar en el período transoperatorio, optimiza la asistencia prestada, otorgando más autonomía y seguridad para la toma de decisión.

Palabras clave: Enfermería de quirófano. Enfermería perioperatoria. Proceso de enfermería. Diagnóstico de enfermería. Atención de enfermería.

INTRODUCTION

Nursing, through acquired technical-scientific knowledge, uses systematic care methodologies to organize and provide assistance according to the necessary care identified. Thus, the use of the nursing process (NP) in nursing clinical practice allows the use of Standardized Language Systems (SLS) of the elements of the care process, including diagnosis, results and nursing interventions[1]. When standardized, these elements work as organizers and accelerators of clinical nursing reasoning[2], once that they clarify concepts, point out clinical indicators, describe actions and assist the measurement of results[1].

For the purpose of standardizing the writing of nursing diagnoses, the North American Nursing Diagnosis Association (NANDA) was created in the 1970s. In 2002, this organization was renamed NANDA International (NANDA-I), in order to reflect the world scenario represented by it[3]. Similarly, in consideration of standardizing the nursing actions prescribed by nurses and the nursing results to be achieved, other nursing classifications were created, such as the Nursing Interventions Classification (NIC)[4] and the Nursing Outcomes Classification (NOC)[5], some of the most internationally popular classifications.

Such classifications of standardized languages comprise a robust and systematized working apparatus for use in conjunction. "Establishing links between these three languages helps clinicians and students in choosing the most appropriate outcomes and interventions to their clients' nursing diagnoses"[6].

To guide the nursing care performed in the pre, trans and postoperative periods, a model called the Systematization of Perioperative Nursing Care (Sistematização da Assistência de Enfermagem Perioperatória—SAEP)[7] was developed in the mid-1980s, and its purpose is to assist surgical patients and their relatives in a secure, complete, individualized and continuous manner[8,9]. However, due to the complex dynamics of the surgical center (SC) and the need to fulfill several assistance and management activities inherent to the sector, nurses find it difficult to perform SAEP in their daily practice[9,10].

OBJECTIVES

To build and validate the connections between the main diagnoses, results and nursing interventions for the patient in the transoperative period.

METHOD

It is a methodological study developed in three distinct stages. In the first stage, a literature review was carried out to identify the main diagnoses, results and nursing interventions listed for patients in the transoperative period.

The integrative review was realized in journals indexed in the following electronic databases: Medical Literature Analysis and Retrieval System Online (MEDLINE), Scientific Electronic Library Online (SciELO) and Latin American and Caribbean Health Sciences Literature (Literatura Latino-Americana e do Caribe em Ciências da Saúde—LILACS). The bibliographic survey used the following descriptors, according to the parameters by the Health Sciences Descriptors (DeCS): "Operating room nursing", "Nursing diagnosis" and "Nursing care", combined one another by Boolean operators

"AND" and "OR". In addition, the following free terms were used: "Transoperative nursing diagnosis" and "Perioperative nursing care".

The inclusion criteria for scientific articles were: papers published in Portuguese, Spanish or English, whose full texts are available online in the selected databases and with no time limit for the publication, due to the scarcity of studies on the subject. The final sample consisted of 20 scientific articles.

In the second stage, the authors put together a theoretical material with the main diagnoses, results and nursing interventions for patients in the transoperative period, based on the integrative literature review and their clinical experiences in perioperative nursing, which were listed according to NANDA-I[3], NOC[5], and NIC[4], respectively. This material contains the connection between 27 diagnoses, 25 results, 26 interventions and 137 nursing activities.

In the third stage, the material collected was submitted to content validation by nationally recognized experts for their work in the said area of knowledge. Nurses who have published on perioperative diagnoses, results or nursing interventions were considered specialists; they developed researches on diagnoses, results and nursing interventions, perioperative nursing or nursing in medical and surgical clinic during their master's or doctorate courses; and they had, at the time, a minimum one-year clinical practice in the SC unit, or at a medical or surgical clinic. The identification of the expert nurses was done by means of an online research to the curriculum of Lattes Platform contained in the portal of the National Council of Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico—CNPq).

After analyzing the curricula, 23 specialists were consulted via e-mail about their interest in participating in the study. Of the nurses consulted, 10 accepted to contribute with the research; seven did not agree, justifying problems with their work agenda; and six did not reply the e-mails sent. However, of the 10 nurses who agreed to take part in the study, only seven returned the completed instrument within the time frame for data collection.

The data collection instrument, a guide on how to fill out this instrument and the informed consent form, were sent to the nurses who accepted to join the study. Data collection was performed from September to December 2017. The evaluation of specialists aimed to verify the relevance (*yes* or *no*) of the elements in the care process to the reality experienced by patients during the transoperative period.

Acceptable agreement among evaluators was determined based on the total number of experts participating in the study. When there is participation of six or more evaluators, it is recommended that the agreement rate is not less than 0.78[11]. Data analysis was done using descriptive statistics, expressed in absolute (n) and relative (%) frequencies.

The study was approved by the Research Ethics Committee, Certificate for Ethical Assessment (CAAE) No. 70825517.5.0000.010.

RESULTS

The total number of nurses who participated in the study as specialists (n=7; 100%) was female, had a doctorate degree and at least one published article on nursing diagnoses, results and/or nursing interventions in the perioperative period.

All the diagnoses (n=27, 100%), results (n=25, 100%) and nursing interventions (n=26, 100%) proposed reached adequate agreement among the evaluators. Of the 137 (100%) nursing activities evaluated, only two (n=2; 1.5%) obtained agreement below 80% among the evaluators, and they were excluded from the instrument. Six other nursing activities were incorporated at the suggestion of the specialists.

Thus, the material containing the connections between the main diagnoses, results and interventions for the patient in the transoperative period consisted of 27 diagnoses, 25 results, 26 interventions and 141 nursing activities. Chart 1 shows the version validated by the specialists. The presentation of the study data in the chart is in alphabetical order of diagnoses.

DISCUSSION

As the objective of the study was to propose connections between the structuring elements of nursing care, it is important to emphasize that this whole process depends on the correct identification of the diagnoses, since accurate clinical interpretations favor the prescription of adequate care, which, in turn, promote the achievement of desirable health outcomes[12]. Therefore, conducting the discussion of the results was focused on the representativeness of the nursing diagnoses listed for the patient who experienced the transoperative moment.

Chart 1. Connection between diagnoses, results and nursing interventions in the transoperative period.

Nursing diagnoses (NANDA-I)	Nursing outcomes classification (NOC)	Nursing interventions classification (NIC)
Anxiety (00146)	**Anxiety level (1211)** (Indicator: verbalized anxiety)	**Anxiety reduction (5820)**
		Use calm and reassuring approach.
		Listen carefully.
		Stay with the patient to promote safety and decrease fear.
		Administer medications to reduce anxiety, as appropriate.
Impaired transfer ability (00090)	**Transfer performance (0210)** (Indicator: transfer from one surface to the other)	**Self-Care assistance: transfer (1806)**
		Select appropriate transfer technique for patients.
		Use proper body mechanics during movements.
		Keep the patient's body properly aligned during movements.
		Assess the patient at the end of the transfer for proper body alignment, clearing devices, bedding without folds, unnecessarily exposed body region, adequate comfort and raised safety bars.
		Take care of the patient's privacy during the transfer.
		Lock the bed/stretcher wheels during patient transfer.
Impaired verbal communication (00051)	**Communication (0902)** (Indicator: accurate interpretation of received messages)	**Communication enhancement: speech deficit (4976)**
		Recognize emotional and physical behaviors as forms of non-verbal communication.
		Provide alternative methods of communication.
		Adjust communication style to meet customer needs (speak in front of the patient, listen carefully, present one idea at a time, speak slowly, use written communication).
Acute confusion (00128)	**Neurological status (0909)** (Indicator: awareness)	**Environmental management: safety (6486)**
		Identify patient safety needs based on physical and cognitive conditions.
		Use protective devices to avoid dangerous situations.
Decreased cardiac output (00029)	**Cardiac pump effectiveness (0400)** (Indicator: systolic blood pressure)	**Shock prevention (4260)**
		Monitor possible sources of fluid loss (drains, probes, lesions).
		Monitor circulatory condition (blood pressure, skin color, skin temperature, heart sounds, heart rate and frequency, presence and quality of the peripheral pulse, capillary filling).
		Monitor oximetry and ECG.
		Insert and maintain high-caliber IV access.
		Administer IV fluids and specific medications according to protocol/medical prescription.
Ineffective airway clearance (00031)	**Respiratory status (0415)** (Indicator: airway permeability)	**Airway suctioning (3160)**
		Use personal protective equipment (PPE) such as gloves, goggles and face shield.
		Check the need for oral and/or tracheal aspiration.
		Listen for breathing sounds before and after aspiration.
		Use sterile disposable equipment for each aspiration procedure.
		Use the lowest suction pressure required to remove secretions (80 to 120 mmHg for adults).
		Monitor the level of consciousness and cough reflex.

Continue...

Chart 1. Continuation.

Nursing diagnoses (NANDA-I)	Nursing outcomes classification (NOC)	Nursing interventions classification (NIC)
Acute pain (00132)	**Client satisfaction: control of pain (3016)** (Indicator: controlled pain)	**Pain management (1400)**
		Ensure analgesic care for patients.
		Explore with the patient the factors that improve/worsen the pain.
		Evaluate pain changes to identify potential injuries to the patient (frequency, intensity / severity, duration, etc.).
		Guidance on the principles of pain management.
		Observe, record and communicate nonverbal indications of pain (facial expression, protective gestures, tachycardia, sweating, hypertension).
		Maintain body alignment.
		Investigate drug allergy before drug administration.
		Check, record and report changes in vital signs.
		Apply the pain level scale: ( ) No pain: 0 to 2; ( ) Moderate pain: 3 to 7; ( ) Severe pain: 8 to 10.
Impaired tissue integrity (00044)	**Tissue integrity: skin & mucous membranes (1101)** (Indicator: tissue integrity)	**Incision site care (3440)**
		Inspect the incision site for changes (bleeding, redness, edema, evisceration, etc.).
		Maintain correct positioning of drains and/or probes.
		Perform dressing change when necessary.
		Perform and register trichotomy of the skin, observing indication and area to be operated.
		Perform and record ergometric procedures, observing the characteristics of the area to be operated and using standardized antiseptic solutions.
Fear (00148)	**Fear level (1210)** (Indicator: verbalized fear)	**Emotional support (5270)**
		Make sympathetic or empathetic statements.
		Support the use of appropriate defense mechanisms.
		Stay with the patient and provide the assurance of safety and protection during the period.
Nausea (00134)	**Discomfort level (2109)** (Indicator: nausea)	**Nausea management (1450)**
		Observe nonverbal signs of discomfort.
		Identify factors that may cause or contribute to nausea.
		Make sure the effectiveness of the anti-emetic drugs administered.
		Observe and record the frequency, duration, and severity of nausea episodes.
Ineffective breathing pattern (00032)	**Respiratory status (0415)** (Indicator: frequency, rhythm and respiratory depth)	**Respiratory monitoring (3350)**
		Monitor breathing frequency, rhythm, depth, and effort.
		Observe the thoracic movements, noting asymmetry, use of the accessory muscles and retraction of the supraclavicular and intercostal muscles.
		Monitor O_2 saturation levels.
		Open airways using the technique of chin elevation or jaw traction.

Continue...

Chart 1. Continuation.

Nursing diagnoses (NANDA-I)	Nursing outcomes classification (NOC)	Nursing interventions classification (NIC)
Risk for aspiration (00039)	**Aspiration prevention (1918)** (Indicator: identifies risk factors)	**Aspiration precautions (3200)**
		Monitor the level of consciousness, cough and gag reflex, and capacity of swallowing.
		Keep airway working.
		Keep the tracheal cuff inflated, as appropriate.
		Use prokinetic agents, if appropriate.
		Keep O_2 system and airway aspiration accessible for immediate use.
		Aspirate airways, record and communicate characteristics and amount of secretions.
Risk for contamination (00180)	**Risk control (1902)** (Indicator: identifies risk factors)	**Environmental risk protection (8880)**
		Assess the environment in relation to actual and potential risks.
		Monitor the incidence of diseases and injuries related to environmental hazards.
Risk for compromised human dignity (00174)	**Client satisfaction: protection of rights (3008)** (Indicator: maintaining privacy)	**Patient rights protection (7460)**
		Ensure patient privacy during procedures.
		Check patient's special and individual needs.
		Observe religious preference.
		Intervene in situations involving insecure and inadequate care.
		Maintain confidentiality with patient health information.
Risk for peripheral neurovascular dysfunction (00086)	**Immobility consequences: physiological (0204)** (Indicators: venous stasis, muscle strength, joint movement)	**Positioning: transoperative (0842)**
		Determine range of motion and joint stability.
		Check for peripheral circulation and neurological status.
		Coordinate the transfer and placement with the anesthetic stage or level of consciousness.
		Use auxiliary equipment to support limbs and head.
		Maintain the patient's body alignment.
		Use of devices to prevent the formation of venous thrombi.
		Assess, record and report changes in skin (color, edema, texture, heat, ulceration) at the site of application of the tourniquet.
		Communicate the surgeon about the time of the tourniquet at regular intervals.
		Evaluate, record and report skin changes under the cuff after removal, as well as evaluate peripheral pulse, sensitivity/ability to move the fingers after deflating the cuff.
Risk for unstable blood glucose level (00179)	**Blood glucose level (2300)** (Indicator: blood glucose)	**Risk identification (6610)**
		To review the history of health and previous documents regarding the evidences of previous medical and nursing diagnoses and treatments.
		Monitor blood glucose.
		Monitor hyper/hypoglycaemia signs.

Continue...

Chart 1. Continuation.

Nursing diagnoses (NANDA-I)	Nursing outcomes classification (NOC)	Nursing interventions classification (NIC)
Risk for perioperative hypothermia (00254)	**Thermoregulation (0800)** (Indicator: hypothermia)	**Temperature regulation (3902)**
		Establish a continuous central temperature monitoring device.
		Monitor, record and communicate signs and symptoms of hypo- or hyperthermia.
		Control body temperature before surgery begins.
		Adjust room temperature to the needs of the patient.
		Minimize the patient's exposure during the surgical preparation and the procedure itself.
		Install and regulate active heating device.
		Monitor room temperature.
		Check, record and report changes in vital signs
Risk for infection (00004)	**Risk control: infectious process (1924)** (Indicator: adoption of immediate measures to reduce risk)	**Infection control: transoperative (6545)**
		Monitor and maintain room temperature between 20 and 24ºC.
		Monitor and maintain the relative humidity of the room between 20 and 60%.
		Limit and control traffic.
		Check that prophylactic antibiotics are being given appropriately.
		Use universal precautions.
		Control the proper use of private clothing.
		Check the integrity of the sterile package.
		Check sterilization indicators.
		Open supplies and instruments using aseptic technique.
		Assist in the paramenting of team members.
		Monitor the sterile field to detect sterility breaks and correct errors.
		Apply antimicrobial solution to the surgery site.
		Check the number of surgical pads and gauzes used in surgeries and cavities.
Risk for perioperative positioning injury (00087)	**Pre-Procedure preparation (1921)** (Indicator: knowledge of risks and potential complications)	**Positioning: transoperative (0842)**
		Determine range of motion and joint stability.
		Use auxiliary equipment for immobilization.
		Apply padding over bony prominences.
		Maintain the patient's body alignment.
		Monitor patient position during surgery.
		Record the position and equipment used.
		Position the patient in such a way as to favor ventilation/perfusion.
		Assess, record and report changes in the skin (color, edema, texture, heat, injury).
		Application of the Scale for Risk Assessment for the Development of Injuries from Surgical Patient Positioning (ELPO)* ( ) Lower risk: 7 to 19; ( ) Higher risk: 20 to 35.

Continue...

Chart 1. Continuation.

Nursing diagnoses (NANDA-I)	Nursing outcomes classification (NOC)	Nursing interventions classification (NIC)
Risk for corneal injury (00245)	**Tissue integrity: skin & mucous membranes (1101)** (Indicator: mucosal lesions)	**Eye care (1650)**
		Remove contact lenses.
		Apply eye protection.
		Apply lubricating ointment.
		Keep eyelids closed with duct tape.
Risk for thermal injury (00220)	**Tissue integrity: skin & mucous membranes (1101)** (Indicator: tissue integrity)	**Surgical precautions (2920)**
		Provide electrosurgical unit, neutral plate and active electrode.
		Confirm proper operation of the electrosurgical unit.
		Confirm that the patient is not in contact with metal parts.
		Confirm absence of cardiac pacemaker, other electrical implants or metal prostheses that contraindicate the use of electrosurgical cauterization.
		Place the neutral plate on dry, intact skin with as few hairs as possible on a large muscle mass and as close to the operative site as possible.
		Remove residual flammable preparative agents before starting surgery.
		Use device to store the active electrode during surgery.
Risk for impaired oral mucous membrane (00247)	**Tissue integrity: skin & mucous membranes (1101)** (Indicator: mucosal lesions)	**Airway insertion and stabilization (3120)**
		Mark the endotracheal tube in the position of the lips or nostrils, using the centimeter markings in the ET, fix the artificial airway (oropharyngeal or nasopharyngeal) in a suitable place with adhesive tape and document it.
		Monitor oral mucosa.
Risk for falls (00155)	**Safe health care environment (1943)** (Indicator: fall prevention policy)	**Positioning: transoperative (0842)**
		Lock the wheels of the stretcher and the surgical table.
		Use appropriate number of people to transfer the patient.
		Apply safety band and upper limb restriction.
		Monitor patient position during surgery.
		Apply Morse Drop Scale** ( ) Low risk: 0 to 24; ( ) Medium risk: 25 to 44; ( ) High risk >=45.
Risk for latex allergy response (00042)	**Immune hypersensitivity response (0707)** (Indicator: allergic reactions)	**Latex precautions (6570)**
		Ask the patient or other appropriate person about the history of systemic reaction to natural rubber latex (facial or scleral edema, watery eyes, urticaria, rhinitis, wheezing in the chest).
		Monitor the patient's signs and symptoms of a systemic reaction.
Risk for bleeding (00206)	**Blood loss severity (0413)** (Indicator: visible blood loss)	**Bleeding precautions (4010)**
		Monitor the occurrence of signs and symptoms of persistent bleeding.
		Check for suspension of the use of anticoagulant substances.
		Administrate blood components and derivates.
		Maintain patent venous access, of large caliber.

Continue...

Chart 1. Continuation.

Nursing diagnoses (NANDA-I)	Nursing outcomes classification (NOC)	Nursing interventions classification (NIC)
Risk for deficient fluid volume (00028)	**Fluid balance (0601)** (Indicator: blood pressure)	**Hypovolemia management (4180)**
		Monitor possible sources of fluid loss.
		Monitor circulatory condition (blood pressure, skin color, temperature, heart rate and frequency, presence and quality of peripheral pulses and capillary filling).
		Monitor ECG.
		Insert and maintain large caliber venous catheter.
		Observe, communicate and record the intensity and frequency of nausea/emesis.
Impaired spontaneous ventilation (00033)	**Post procedure recovery status (2305)** (Indicator: O_2 saturation)	**Ventilation assistance (3390)**
		Maintain a patent airway.
		Position patient to relieve dyspnea.
		Encourage deep, slow breathing, change of position and cough.
		Monitor signs of respiratory muscle fatigue.
		Initiate/maintain prescribed oxygen therapy.
		Monitor respiratory and oxygenation status.

NANDA-I: North American Nursing Diagnosis Association International; ECG: Electrocardiogram; IV: intravenous; ET: Endotracheal Tube; *ELPO Scale validation can be done through the link: <http://www.scielo.br/pdf/rlae/v24/pt_0104-1169-rlae-24-02704.pdf>;**Morse Scale validation can be done through the link: <http://www.scielo.br/pdf/reeusp/v47n3/0080-6234-reeusp-47-3-00569.pdf>.

According to the NANDA-I classification, the 27 diagnoses presented in the study are contained in seven of the 13 domains of said classification: safety/protection (n=14, 51.9%), activity/rest (n=4, 14.8%), nutrition (n=2, 7.4%), perception/cognition (n=2, 7.4%), coping/tolerance to stress (n=2; 7.4%), comfort (n=2, 7.4%), and self-perception (n=1, 3.7%).

It is important to highlight that most of the diagnoses listed belonged to the "safety/protection" domain, and of these, most were classified as "risk diagnoses" (n=12, 85.7%).

Risk diagnoses are related to the individual's vulnerability to develop an undesirable response to their clinical condition[3]. Based on this definition, it is possible to understand why almost 60% (n=84; 59.6%) of the nursing activities proposed to assist the patient in the transoperative moment are aimed at promoting their safety and preventing risk diagnoses from becoming real diagnoses. While acknowledging its therapeutic purpose, it is undeniable that any anesthetic-surgical procedure constitutes potential harm to the patient's health.

In order to identify nursing diagnoses with high degrees of accuracy, nurses must carry out a detailed survey of the clinical and emotional conditions of surgical patients, the environmental conditions, the professionals' paramentation, the type of anesthesia, the surgical technique to be used, the technique of the health team, the circulation of people in the operating room, the condition of the surgical materials and the actions to be taken considering the inherent risks of the procedure[13].

Currently, it is essential to prioritize actions that ensure patient safety and minimize the occurrence of adverse events associated with health care[14]. Patient safety is directly connected to the institutional work process, in which lack of care protocols or inadequate care planning may increase the risk of harm to patients' health[15]. Resolution actions of nurses working in SC contribute to the maintenance of patient safety and reflect in the adequate post-surgical recovery[16,17].

The theoretical material developed favors nursing care with scientific foundation and is in agreement with the profile of the patient in the transoperative period. In this sense, the major contribution of the study is the effort to consolidate knowledge on nursing care to be performed during the transoperative period. As a limitation of the investigation, it is pointed out that the research was designed with the purpose of meeting the needs of the patient who goes through the surgical experience without considering the specialty of the patient's intervention, age range or gender as variables.

Failure to take into account the particularities of a given clientele may make the study too broad and unspecific.

CONCLUSION

The final version of the theoretical content consisted of 27 diagnoses, 25 results, 26 interventions and 141 nursing activities.

It is believed that the results presented may be used to support the clinical practice of nurses working in SC. However, it is important to highlight that the connections proposed here should not replace the clinical judgment of perioperative nurses.

The need for further studies that explore the practical application of the proposed connections in different scenarios and in specific populations is emphasized.

REFERENCES

1. Carvalho EC, Cruz DALM, Herdman TH. Contribuição das linguagens padronizadas para a produção do conhecimento, raciocínio clínico e prática clínica da Enfermagem. Rev Bras Enferm. 2013; 66(esp):134-41. http://dx.doi.org/10.1590/S0034-71672013000700017

2. Chaves IC, Jacoby LC, Cecchetto FH. Diagnósticos de enfermagem mais frequentes aos pacientes submetidos à cirurgia cardíaca nos períodos pré, trans e pós-operatórios. Rev Cuidado Enf – Cesuca [Internet]. 2016[citado 14 fev. 2018];2(2):1-15. Disponível em: http://ojs.cesuca.edu.br/index.php/revistaenfermagem/article/view/953

3. Herdman TH, Shiguemi K. Diagnósticos de enfermagem da NANDA: definições e classificações 2015-2017. Porto Alegre: Artmed; 2015.

4. Bulechek GM, Butcher HK, Dochterman J, Wagner CM. Classificação das intervenções de enfermagem - NIC. 6ª ed. São Paulo: Elsevier; 2016.

5. Johnson M, Moorhead S, Maas ML, Swanson E. Classificação dos resultados de enfermagem – NOC. 5ª ed. São Paulo: Elsevier; 2016.

6. Jonhson M, Moorhead S, Bulechek G, Butcher H, Maas M, Swanson E. Ligações NANDA-NOC-NIC: condições clínicas: suporte ao raciocínio e assistência de qualidade. Rio de Janeiro: Elsevier; 2012.

7. Castellanos BEP, Jouclas VMG. Assistência de enfermagem perioperatória: um modelo conceitual. Rev Esc Enferm USP. 1990;24(3):359-70.

8. Lemos CS, Suriano MLF. Desenvolvimento de um instrumento: metodologia de ensino para aprimoramento da prática perioperatória. Rev SOBECC. 2013;18(4):57-69.

9. Sena AC, Nascimento ERP, Maia ARCR, Santos JLG. Collective preparation of a nursing care instrument for immediate preoperative patients. Rev Baiana Enf [Internet]. 2017[citado 14 fev. 2018];31(1):e20506. Disponível em: https://portalseer.ufba.br/index.php/enfermagem/article/view/20506/14111 http://dx.doi.org/10.18471/rbe.v31i1.20506

10. Lemos CS, Poveda VB, Peniche ACG. Construction and validation of a nursing care protocol in anesthesia. Rev Latino-Am Enferm. 2017;25:e2952. http://dx.doi.org/10.1590/1518-8345.2143.2952

11. Alexandre NMC, Coluci MZO. Validade de conteúdo nos processos de construção e adaptação de instrumentos de medidas. Ciênc Saúde Coletiva [Internet]. 2011[citado 14 fev. 2018];16(7):3061-8. Disponível em: http://www.scielo.br/pdf/csc/v16n7/06.pdf

12. Matos FGOA, Cruz DALM. Development of an instrument to evaluate diagnosis accuracy. Rev Esc Enferm USP. 2009;43(Esp):1088-97. http://dx.doi.org/10.1590/S0080-62342009000500013

13. Botarelli FR, Queiroz QJR, Fernandes APNL, Araújo JNM, Ferreira Júnior MA, Vitor AF. Diagnóstico de enfermagem risco de infecção em pacientes no pós-operatório: estudo transversal. Online Braz J Nurs [Internet]. 2016[citado 14 fev. 2018];15(2):245-53. Disponível em: http://www.objnursing.uff.br/index.php/nursing/article/view/5299 http://dx.doi.org/10.17665/1676-4285.20165299

14. Oliveira MM, Mendonça KM. Análise da visita pré-operatória de enfermagem: revisão integrativa. Rev SOBECC. 2014;19(3):164-72.

15. Reis GAX, Valera IMA, Inoue KC, Souza VS, Costa MAR, Matsuda LM. Implantação das estratégias de segurança do paciente: percepções de enfermeiros gestores. Vigil Sanit Debate [Internet]. 2016[citado 15 fev. 2018];4(4):132-8. Disponível em: https://visaemdebate.incqs.fiocruz.br/index.php/visaemdebate/article/view/801/350 http://dx.doi.org/10.22239/2317-269X.00801

16. Dalcól C, Garanhani ML. Management role of surgical center nurses: perceptions by means of images. Rev Eletr Enf [Internet]. 2016[citado 15 fev. 2018];18:e1168. Disponível em: https://revistas.ufg.br/fen/article/view/34888 https://doi.org/10.5216/ree.v18.34888

17. Henriques AHB, Costa SS, Lacerda JS. Nursing care in surgical patient safety: an integrative review. Cogitare Enferm [Internet]. 2016[citado 15 fev. 2018];21(4):1-8. Disponível em: http://revistas.ufpr.br/cogitare/article/view/45622/pdf_en

HYPOTHERMIA IN THE IMMEDIATE POST-OPERATIVE PERIOD: PERCEPTION OF NURSING TECHNICIANS

Hipotermia no pós-operatório imediato: percepção de técnicos de enfermagem

Hipotermia en el periodo postoperatorio inmediato: percepción de los técnicos de enfermería

Aline da Silva Sanguiné[1], Gisele Fabiane do Nascimento Ramos[2], Jaqueline Regina Boschetti[3], Patricia Treviso[4]*

ABSTRACT : Objective: To understand the perception of nursing technicians working in the post-anesthetic care unit (PACU) of a large philanthropic hospital in Porto Alegre regarding hypothermia in the immediate postoperative period (IPO). **Method:** an exploratory, descriptive, field study with a qualitative approach. The data collection was performed from April to May 2017, by means of a recorded interview, using a script composed of 10 questions. Thematic analysis was used to treat the data. **Results:** Nineteen nursing technicians participated in the study. The data analysis resulted in four categories: perception about the definition of hypothermia; complications of hypothermia for the patient in the IPO; actions to prevent and reverse hypothermia; experiences related to situations of hypothermia. **Conclusion:** The interviewees demonstrated knowledge about nursing care for the prevention and reversal of hypothermia in patients in the IPO in the PACU.

Keywords: Hypothermia. Postoperative period. Licensed practical nurses. Recovery room.

RESUMO: Objetivo: Conhecer a percepção de técnicos de enfermagem que atuam na sala de recuperação pós-anestésica (SRPA) de um hospital filantrópico de grande porte de Porto Alegre sobre hipotermia no pós-operatório imediato (POI). **Método:** Estudo de campo, exploratório, descritivo e qualitativo. A coleta de dados foi realizada no período de abril a maio de 2017, por meio de entrevista gravada em áudio, utilizando um roteiro composto de 10 questões. Utilizou-se a análise temática para tratamento dos dados. **Resultados:** Participaram do estudo 19 técnicos de enfermagem. A análise dos dados possibilitou elencar quatro categorias: percepção sobre a definição de hipotermia; complicações da hipotermia para o paciente no POI; condutas de prevenção e reversão de hipotermia; vivências relacionadas a situações de hipotermia. **Conclusão:** Os entrevistados demonstraram conhecimento sobre os cuidados de enfermagem para prevenção e reversão da hipotermia em pacientes no POI que se encontram na SRPA.

Palavras-chave: Hipotermia. Período pós-operatório. Técnicos de enfermagem. Sala de recuperação.

RESUMEN: Objetivo: Comprender la percepción de los técnicos de enfermería que trabajan en la unidad de recuperación postanestésica (URPA) de un gran hospital filantrópico en Porto Alegre sobre la hipotermia en el período postoperatorio inmediato (POI). **Método:** un estudio exploratorio, descriptivo, de campo con un enfoque cualitativo. La recolección de datos se realizó de abril a mayo de 2017, mediante una entrevista grabada, utilizando un guión compuesto por 10 preguntas. El análisis temático se utilizó para tratar los datos. **Resultados:** Diecinueve técnicos de enfermería participaron en el estudio. El análisis de los datos dio como resultado cuatro categorías: percepción sobre la definición de hipotermia; Complicaciones de hipotermia para el paciente en el POI; Acciones para prevenir y revertir la hipotermia; Experiencias relacionadas con situaciones de hipotermia. **Conclusión:** los entrevistados demostraron conocimientos sobre el cuidado de enfermería para la prevención y reversión de la hipotermia en pacientes en la POI en la URPA.

Palabras clave: Hipotermia. Periodo posoperatorio. Enfermeros no diplomados. Sala de recuperación.

[1]Undergraduate Nursing Student at the IPA Methodist University Center - Porto Alegre (RS), Brazil.
[2]Nurse; Nursing Services Administration Specialist. Nurse at the Irmandade da Santa Casa de Misericórdia de Porto Alegre (ISCMPA) – Porto Alegre (RS), Brazil.
[3]Nurse; Nephrology Nurse Specialist. Nurse at ISCMPA - Porto Alegre (RS), Brazil.
[4]Nurse; PhD in Health Sciences; Professor of the Undergraduate Nursing Course at the IPA Methodist University Center - Porto Alegre (RS), Brazil.
*Corresponding author: ptreviso15@gmail.com
Received: 21/04/2018 – Approved: 01/09/2018
DOI: 10.5327/Z1414-4425201800040006

INTRODUCTION

The perioperative period is composed of three phases. The first is the preoperative phase, which begins with the scheduling of the surgical intervention and ends with the transfer of the patient to the operating room (OR)[1]; the second is the intraoperative phase which begins with the patient's entry into the OR and finishes with their admission to the post-anesthetic care unit (PACU); and the third is the postoperative phase, which occurs when the patient arrives at PACU and finishes with the follow-up assessment in the clinical or home environment[1].

In the immediate postoperative period (IPO), which comprises the first 24 hours after surgical procedures which require anesthesia, nursing care aims at observing, identifying and conducting appropriate patient care until recovery from anesthetic effects, i.e., until the patient has normal motor and sensory functions, is oriented, has stable vital signs, and without evidence of hemorrhage or complications[2].

During this period, the patient may present several complications resulting from anesthesia and surgery as well as from previous pathologies. Hypothermia is among the postoperative complications to which the surgical patient is subjected to[2]. A great amount of patients submitted to anesthesia present with hypothermia, due to changes in thermoregulation caused by the anesthetic effect that can reduce up to 20% of the metabolic heat production[3,4], but also due to other factors, such as low temperature of the OR, infusion of cold liquids, blood loss, prolonged surgery time, among others[5].

Hypothermia is a common event in the perioperative period[6]. It is defined as the reduction of the core body temperature below 36° C. In Brazil, there are indications that it affects approximately 70% of the patients submitted to surgical procedures[7], and may be intentional (therapy) - consciously provoked by the medical team for a specific treatment - or unintentional (accidental) treatment - usually occurring in trauma victims , extensive surgical procedures, among others[8].

Unintentional hypothermia in anesthetic-surgical patients occurs because of the effects caused by anesthetic agents on the physiology of thermoregulation, the decrease of the patient's metabolism and exposure to the cold environment of the OR. These factors can cause several complications to the surgical patient, therefore, hypothermia should be avoided or quickly treated[9]. Cardiac arrhythmias, coagulation abnormalities and platelet function, which may lead to increased blood loss, increased risk of mortality and surgical site infection (SSI) are among the complications caused by hypothermia, as well as thermal discomfort, increase in the patient's stay in the PACU and, consequently, an increase in length of hospitalization[6].

Knowledge and understanding about the pathophysiology, complications and forms of prevention are important and necessary for nurses working in PACU to perform their role competently and safely, contributing to the full recovery of the patient[4,10].

The control of the patient's body temperature in the postoperative period is a challenge for the nursing staff, who often have difficulties in providing care in situations of hypothermia. In this scenario, understanding the perception of nursing technicians may contribute to the implementation of improvements in care. In this study, we sought to further develop the hypothermia theme, considering its importance in patient recovery in the IPO. The question that guided this research was: What is the perception of nursing technicians who work in the post-anesthetic recovery room on hypothermia in the immediate postoperative period?

OBJECTIVE

To identify the perception of professional nursing technicians who work in the post-anesthetic recovery room on hypothermia in the immediate postoperative period.

METHOD

This is an exploratory, descriptive, field study with a qualitative approach. It was performed in a large philanthropic hospital in Porto Alegre (RS), which provides care to patients from the Brazilian Unified Health System (SUS), and individuals with private health insurance. The hospital has a PACU with 22 beds.

All nursing technicians who worked for at least six months in the institution, morning, afternoon, evening and nights in the PACU were invited to participate in the study. Those who were on vacation, health leave or absent from the institution during the period of data collection were excluded.

Data were collected from April to May 2017, after the approval of the research project by the Research Ethics Committees (REC) of the institution (1.908.865)

and co-participant (1.940.765). The study was guided by Resolution 466/2012 of the National Health Council (CNS).

Study participants signed two Free and Informed Consent Forms (IC), one form stayed with the researcher and the other stayed with the participant. Regarding the interviews, a questionnaire composed of ten questions was elaborated by the researchers, addressing the temperature levels considered normal, routine body temperature verification, factors that can induce hypothermia in the perioperative period, identification of changes caused by the process of hypothermia, strategies to revert this condition and a question to identify if the participant had already experienced some situation with a hypothermic patient, how the condition was identified and what action was taken. In addition to the 10 questions, questions were asked regarding the sample profile.

A pilot test was conducted with five nursing technicians which aimed to check the understanding of the questions of the research instrument. The interviews were previously scheduled with each participant as well as with the nursing manager of the department in order not to disturb the progress of the activities of the service in question. The interviews lasted approximately 20 minutes and were held in an administrative room in order to maintain and respect the privacy of the subjects. The interviews were recorded and later transcribed in order to help the analysis process.

In order to evaluate the data, the thematic analysis methodology proposed by Minayo[11] was used:

- pre-analysis: continuation of the initial objectives of the research, joining it with the collected material; floating reading, which consists of a greater appropriation of the data, by means of exhaustive reading; careful organization of the material; and definition of keywords or categories;
- exploration of the material, which consists in electing, classifying and aggregating the categories;
- treatment of the results achieved, with a correlation of the data obtained with the theory, aiming to complement the questioning of the study.

RESULTS AND DISCUSSION

Nineteen nursing technicians participated in the study; all who agreed to be part of the study were interviewed. Regarding the sample profile, the average age of the participants is 35 years of age, the majority (17) is female, 10 also work in another institution and the average amount professional experience as a nursing technician is 12 years. As for experience in the PACU, one professional has been working for 7 years and the one with the least amount of working time in the sector has been working there for 14 months.

Based on the answers of the professionals who participated in the study, the units of text were identified, i.e., phrases and words that appear in the responses of the participants in a repeated way and that infer an expression that represents them[12]. Based on this, four categories are listed:

- Category 1: perception about the definition of hypothermia;
- Category 2: complications of hypothermia for the patient in the IPO;
- Category 3: hypothermia prevention and reversal;
- Category 4: experiences related to situations of hypothermia.

To identify the participants of the research, we chose the nomenclature A1 to A19, composed of "A" for anonymous, and followed by the number corresponding to the order of the interviews. The categories are presented and discussed below.

Category 1: perception about the definition of hypothermia

In the post-anesthetic recovery period, the patient is cared for by the PACU nursing team, in which the nursing technician is one of the professionals who will be closest to the patient during all possible changes that may occur during this period, including changes in thermoregulation.

Hypothermia is defined as the loss of heat to the environment, i.e., the state in which the body temperature of an individual is below the normal value, characterized by a blood temperature of below 36ºC, and present in the patients submitted to different surgeries[13].

In the questioning about the definition of hypothermia, the responses were similar in relation to the concept and focus on it as a "low body temperature" situation, which can be seen in the following statements: "Hypothermia is a low body temperature" (A2); "It is the excessive decrease in normal body temperature" (A5).

Hypothermia is responsible for severe complications in the body, especially in the patient in the IPO. The surgical patient undergoes situations that demand the proper functioning of the metabolic functions, which can be altered by hypothermia[3,4,14].

The human body has a core body temperature (brain, heart, lung and splanchnic organs) between 36.6 and 37.6ºC. Hypothermia is a temperature lower than 36ºC[7]. Regarding the values considered for hypothermia, the majority of interviewees highlighted according to the concept: "It would be, in this case, a temperature lower than 36º" (A9); "When it is less than 36º" (A17)

Two participants reported a different value from the others: "AT [axillary temperature] lower than 34º" (A1); "34.5º" (A2).

Knowledge of normal levels and changes in body temperature by the team that provides care to the patient is fundamental so that prevention and reversion measures can be applied and quality of care is guaranteed [4,14].

In the PACU, the nursing team provides care to recover and prevent complications arising from anesthetic and surgical procedures, therefore, it is essential to verify and monitor vital signs, including body temperature.

When the patient arrives at PACU, vital signs should be monitored every 15 minutes in the first hour, every 30 minutes in the second hour, and hourly thereafter if the patient remains stable[9]. As for the routine temperature verification in the PACU, all participants reported similar information, according to the following sample: "In the first hour, every 15 minutes, in the second hour, every 30 minutes and then once every hour" (A1); "At PACU, we check, when the patient arrives, every 15 minutes until one hour goes by, then every 30 minutes, and after the third hour we check once every hour" (A18).

The role of the nursing professional in the postoperative period is to assist patients and their families, clarify doubts and assess the patients' health status at all stages of treatment[9]. When identifying a change in body temperature, the nursing action should be fast so that hypothermia is avoided. Professionals should be aware of changes that may arise at this stage of the IPO and be prepared to intervene safely and with quality. Several factors that can induce hypothermia were mentioned: "There are several, one is the length of surgery time, the type of surgery, anesthesia, general condition of the patient, right?" (A9); "Surgery as a whole contributes to the patient's loss of body heat, light clothing, anesthetic medications, cold room environment, blood loss, delayed surgery" (A19).

Many of the interviewees reported that the temperature of the air conditioning, during the intraoperative period, interferes in the temperature of the patient. In addition, there are other risk factors for hypothermia, such as the nature and size of the surgery; large blood loss; changes caused by the anesthetic procedure; skin antisepsis with cold chemical agents; fully uncovered patient; infusions of cold solutions; and opening of the abdominal and / or thoracic cavity, among others[3,5,9] – which are all justifications for the whole team to be attentive to the thermoregulation of the patient in this period:

> "Infusion of IV cold [intravenous], cavity and open wounds, old age, inhaling cold gases, the air conditioning of the operating room with low temperature and also the anesthetic drugs, these are the ones I know" (A16).

Unintentional hypothermia occurs due to the effects caused by anesthetic agents on the physiology of thermoregulation, low patient metabolism and exposure to the cold environment of the OR[3]. These factors can cause several complications to the surgical patient, therefore, hypothermia should be avoided or promptly treated when it occurs[9]. Many of the respondents reported: "I think it would be the change in metabolism by drugs used during anesthesia during the procedure, low room temperatures and long exposure to these low temperatures" (A10); "Well, during the transoperative period the patient loses heat and their temperature falls, the action of anesthetic drugs can also generate heat loss; ah, another factor is the use of cold agents during surgery" (A11).

Hypothermia can cause various physiological changes, such as the release of catecholamines, by sympathetic-adrenergic stimulation, to control body temperature and increase glucose production from hepatic glycogen[15]. In hypothermia, glucose utilization is depressed due to reduced metabolic activity of the liver, inhibition of enzyme activity, and reduced production of insulin in the pancreas; even the administration of insulin is insufficient to normalize blood glucose. Some speeches emphasize metabolic issues: "I think the factors that can induce are diseases like diabetes, cold environment, circulation problems and hypothyroidism" (A6); "Generally, exposure to cold, low blood glucose levels, medications" (A8).

Temperature control is an important aspect of patient safety. Considering this, it is fundamental that the health teams are aware of the temperature, as well as the signs and symptoms of the patient arriving at the PACU. It must be emphasized that the qualification of nursing professionals must be based on the problematic of their work process[14].

Category 2: complications of hypothermia for the patient in the immediate postoperative period

The patient in the IPO in the PACU is vulnerable to several complications, which can reach different systems, in particular the cardiovascular system, which can lead to myocardial ischemia, tachycardia, arterial hypertension and deep venous thrombosis [13]. When asking the participants if hypothermia could lead to other complications and, if so, what they were, the answers were diverse: "Yes, it can cause some complications ... gangrene, cardiac arrhythmia, bradycardia, among others" (A9); "I think so, freezing, tissue death, damage to nerves and blood vessels can occur; this decrease in body temperature can also cause a decrease in cellular activity, having other complications and also causing the patient's death" (A12).

Hypothermia can also compromise the immune system, reducing the immunity of the patient, which can lead to the incidence of SSIs and deficits in coagulation factors, such as platelet activation and coagulopathy[16]. One participant reported: "Yes, and one of the major risk factors is surgical site infection" (A6).

Other complications are the hydroelectrolytic changes, such as hypokalemia, hypomagnesemia and hypophosphatemia; and endocrine-metabolic changes, such as low corticoid levels, insulin decline, high peripheral insulin resistance, increased TSH (thyroid stimulating hormone) and, consequently, thyroxine and hypoglycemia and hyperglycemia[16]. The participants confirmed the above with the following statements: "Freezing or tissue death, gangrene, damage to nerves and blood vessels, death" (A3); "Yes, alteration of consciousness, cold extremities" (A7).

In the PACU, the patient becomes vulnerable to several complications, especially those with respiratory, circulatory and gastrointestinal origins. Mild hypothermia is classified as 34 to 35.9ºC, moderate as 30 to 33.9ºC and severe as below 29.9ºC[17]. Regarding complications, participants were asked if hypothermia in the IPO was considered a physiological alteration, and how would it be classified: a minimal, moderate or high impact, and what would be the justification. The answers varied:

- "In most patients, it is minimal, because of the room, because of the blood loss, but it is also moderate, which according to the anesthetics, anesthesia has a big effect on temperature. [...]" (A2);
- "If it were a physiological change, it would be moderate to minimal, because patients usually arrive in the post-anesthetic care unit with a temperature of 35.5Cº" (A6).

In mild hypothermia, the patient may exhibit symptoms of atrial arrhythmias, reduced heart rate, altered consciousness, reduced respiratory rate, swallowing reflex depression, pupil dilation, tremor reduction, hyporeflexia, hypotension and possible electrocardiogram alterations[16]. The following responses are observed: "In my opinion, it would be moderate, which could cause bleeding from the OS [operative site], respiratory dysfunction" (A7); "I believe it is moderate, due to the complications caused in the postoperative period" (A9).

When the temperature is lower than 30ºC, it has a great effect, as it increases the risks of the patient entering into a coma, apnea, non-reactive pupils, oliguria, ventricular arrhythmias, asystole, and even death[16]. Aware of such knowledge, some interviewees highlighted: "For me, I classify it as having a great effect, because, if there is decreased cellular activity, it will interfere with the healing of the OS and the anesthetic recovery" (A11); "A ,great impact. Because one of the first postoperative care actions is to keep the patient warm, to avoid a decrease in patient activity" (A13).

As for the factors that can induce hypothermia, the following are highlighted; anesthetic agents, environment temperature, time of exposure of the patient in places with low temperature, administration of cold venous infusions, systemic disorders, among others. In this parameter, some factors were cited, according to the knowledge of each interviewee: "It may repeat..[sic] ... vasoconstriction, delay in healing, general discomfort of the patient" (A1).

As for the signs of temperature changes, the following were characterized: "Cold and pale skin, chills, temperature below 36°C, bluish extremities" (A4); "Well, the patient shivers uncontrollably, has a weak pulse, difficulty in controlling the movements of the body" (A18).

Therefore, monitoring temperature during intraoperative anesthesia is of great importance, as it provides early detection of hypothermia and / or complications, and may facilitate thermal control in the patient's IPO in the PACU.

Category 3: Actions to prevent and reverse hypothermia

Knowing how to identify, recognize and understand care related to hypothermia is of great importance to the

professional so that they are be able to assist the patient, and provide care with quality, safety and efficacy. Perioperative heating reduces blood loss, pain, tremors, and risk of SSI in the IPO[19].

Regarding measures and the prevention of hypothermia, the participants highlight that making use of heating devices is the principal nursing practice for the prevention and reversal of hypothermia:

- "Warming the patient in the operating room with blankets and thermal blankets, using covers on the lower limbs can also be used, infuse heated solutions, warm the head with caps, monitor temperature" (A11);
- "So, [...] when the patient arrives to us, we put blankets on them, and keep maintain room temperature in the PACU" (A14).

Care for the maintenance of the patient's normothermia is performed by means of monitoring body temperature as the main nursing intervention to prevent and reduce risks of future complications[6]. In view of the measures to prevent hypothermia, participants highlight that warming up the patient is strategic care: "The main thing is to warm the patient" (A5); "Warm the patient up immediately and keep the thermometer on the monitor for strict temperature control" (A6).

Other strategies can still be used, such as active and passive heating. Passive heating is a low-cost and effective method of covering and warming the patient with sheets, covers or cotton blankets, wrapping the lower limbs with laminated cotton and crepe bandage is practised. Active measures of heating include; electric blanket, thermal blanket, heated water mattress, irrigation and venous infusion with heated fluids, among others. All of these methods for warming the patient can reduce heat loss by 30% during surgery and in the PACU[14,18].

Category 4: experiences related to situations of hypothermia

The interview script was finalized with a question about the personal experience of each participant regarding a situation of hypothermia, how it was identified and what nursing action was performed at the time. All participants reported that they had experienced some kind of hypothermic patient care: "Yes, the patient arrived with tremors, chills, cold and purple extremities. I covered him with two blankets, put a warm blanket at 43 degrees for quick heating, and gloves filled with hot water over the feet" (A14); "Yes, the patient came in shivering a lot, cold extremities, slow heart rate and breathing too, pale skin. He was heated with blankets and with the thermal blanket at 43 degrees." (A19)

Some interviewees reported that they had not experienced any serious hypothermia, but described how they how they act should it occur: "I have not experienced a very serious situation, but as I said, if it had happened, I would have advised the PACU nurse and would provide blankets, to reverse the situation quickly" (A12); "I never witnessed a serious situation, but for the symptoms such as shivering, cold extremities, low AT, I would provide blankets for heating" (A18).

The fact that all participants report having experienced some situation with hypothermic patients indicates that this complication is common in the IPO as well as highlighting the importance of the nursing team and the use of care strategies during the perioperative period, aiming to prevent this circumstance as well as the need for early reversal when it does occur.

CONCLUSION

This study made it possible to identify the perception of nursing technicians working in the PACU regarding hypothermia in the IPO, demonstrating that the participants are aware of the definition of this condition, the values that determine it and the main triggering factors. In situations in which hypothermia can cause complications in the IPO, the interviewees indicated symptoms such as decreased cellular activity, physiological and metabolic changes, SSIs, among others, that may evolve to a situation without hypothermia reversion.

The findings indicate that the participants use several care strategies to prevent and reverse hypothermia in the IPO, using both passive and active heating methods.

Therefore, it is believed that the clarification about the perception of nursing technicians regarding hypothermia can support and stimulate the search and improvement of new knowledge, as well as highlighting the importance of nursing care in the perioperative period with regard to the prevention and reversion of complications in the postoperative period, as well as promoting new studies in this area.

REFERENCES

1. Smeltzer SC, Bare BG, Hinkle JL, Kleever KH. Brunner & Suddarth: tratado de enfermagem médico-cirúrgica. 12ª ed. Rio de Janeiro: Guanabara Koogan; 2011.

2. Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização. Diretrizes de práticas em enfermagem cirúrgica e processamento de produtos para a saúde. 7ª ed. São Paulo: SOBECC; Barueri: Manole; 2017.

3. Lopes IG, Magalhães MAS, Sousa ALA, Araújo IMB. Prevenir a hipotermia no perioperatório: revisão integrativa da literatura. Rev Enfer Ref. 2015;4(4):147-55. http://dx.doi.org/10.12707/RIV14027

4. Dutra LCB, Meneses RO. Avaliação da hipotermia não intencional em sala de recuperação anestésica. Rev Rede Cuid Saúde. 2017;11(1):1-15.

5. Ribeiro MB, Peniche, AC, Silva SCF. Complicações na sala de recuperação anestésica, fatores de risco e intervenções de enfermagem: revisão integrativa. Rev SOBECC. 2017;22(4):218-29. http://dx.doi.org/10.5327/Z1414-4425201700040007

6. Poveda VB, Martinez EZ, Galvão CM. Métodos ativos de aquecimento cutâneo para a prevenção de hipotermia no período intraoperatório: revisão sistemática. Rev Latino-Am Enferm. 2012;20(1):1-9. https://doi.org/10.1590/S0104-11692012000100024

7. Muniz GS, Teles NSB, Leitão IMTA, Almeida PC, Leitão MC. Hipotermia acidental: implicações para os cuidados de enfermagem no transoperatório. Rev SOBECC. 2014;19(2):79-86. http://dx.doi.org/10.4322/sobecc2014.009

8. Ribeiro E, Navarro NT, Armede VCB, Rodrigues HS, Valle JP, Duran ECM. Frequência de hipotermia não intencional de cirurgias eletivas. Rev SOBECC. 2016;21(2):68-74. https://doi.org/10.5327/Z1414-442520160002000

9. Carvalho R, Bianchi ERF. Enfermagem em centro cirúrgico e recuperação. 2ª ed. São Paulo: Manole; 2016.

10. Mendoza IYQ, Peniche ACG, Puschel VAA. Conhecimento sobre hipotermia dos profissionais de enfermagem do centro cirúrgico. Rev Esc Enferm USP. 2012;46(4):123-9. http://dx.doi.org/10.1590/S0080-62342012000700018

11. Minayo MCS. O desafio do conhecimento: pesquisa qualitativa em saúde. 12ª ed. São Paulo: Hucitec; 2010.

12. Caregnato RCA, Mutti R. Pesquisa qualitativa: análise de discurso versus análise de conteúdo. Texto Contexto Enferm. 2006;15(4):679-84. http://dx.doi.org/10.1590/S0104-07072006000400017

13. Mattia AL, Barbosa MH, Rocha AM, Farias HL, Santos CA, Santos DM. Hipotermia em pacientes no período perioperatório. Rev Esc Enferm USP. 2012;46(1):60-6. http://dx.doi.org/10.1590/S0080-62342012000100008

14. Souza A, Palazzo S, Montezello D. Conhecimentos dos profissionais de enfermagem de centro cirúrgico sobre hipotermia em pacientes cirúrgicos oncológicos. Rev SOBECC. 2017;22(4):188-92. https://doi.org/10.5327/Z1414-4425201700040003

15. Pestel GJ, Kurz A. Hypothermia – it's more than a toy. Anestesiol. 2005;18:151-6.

16. Biazzotto CB, Brudniewski M, Schmidt AP, Auler Júnior JOC. Perioperative hypothermia. Rev Bras Anestesiol. 2006;56(1):89-106.

17. Pereira NHC, Rocha ADM, Mattia ALD. Infusão venosa aquecida relacionada à prevenção das complicações da hipotermia intraoperatória. Rev SOBECC. 2014;19(2):74-8. http://dx.doi.org/10.4322/sobecc2014.013

18. Danczuk RFT, Nascimento ERP, Silveira NRH, Hermida PMV, Rasia AR. Métodos de aquecimento na prevenção da hipotermia no intraoperatório de cirurgia abdominal eletiva. Esc Anna Nery. 2015;19(4):578-84. http://dx.doi.org/10.5935/1414-8145.20150077

19. Nascimento PDF, Bredes AC, Mattia ALD. Complicações em idosos em sala de recuperação pós-anestésica. Rev SOBECC. 2015;20(2):64-72. https://doi.org/10.5327/Z1414-4425201500020002

PRODUÇÃO CIENTÍFICA SOBRE CENTRO CIRÚRGICO EM TESES E DISSERTAÇÕES: ESTUDO BIBLIOMÉTRICO

Scientific production about surgical center in theses and dissertations: a bibliometric study

Producción científica sobre centro quirúrgico en tesis y disertaciones: estudio bibliométrico

Alexmália Fiorini da Costa Balonecker[1], Cintia Silva Fassarella[2]*, Priscilla Alfradique de Souza[3], Ricardo de Oliveira Meneses[4], Aline Affonso Luna[2], Mariana Brito de Souza Nunes[1], Rosilene Alves Ferreira[1]

ABSTRACT: Objective: To identify the academic production coming from dissertations and theses about surgical centers by nurses who have completed master's degrees and doctorates in Brazil. **Method:** Bibliometric, descriptive and retrospective study, with documentary research in three Brazilian databases, using the publications of 11 higher education institutions, from 2005 to 2016. **Results:** A total of 40 academic productions were identified. Of these, 13 are theses (32.5%) and 27 are dissertations (67.5%). The years with the most publications (17.5%) were 2009 and 2013. The University of São Paulo and the University of São Paulo — Ribeirão Preto are the institutions with the highest number of studies, with 32.5 and 25.0%, respectively. The methodological approach most adopted by the researchers was the quantitative one (40.0%) and the main theme dealt with perioperative care (60.0%). **Conclusion:** The scientific production in this area has presented incipient, when compared to the total number of post-graduation publications *stricto sensu* on nursing in the national scenario. However, what has been published is aimed at hospital care, showing correlation of the studies with the practice of perioperative nursing.
Keywords: Surgicenters. Intraoperative period. Operating room nursing. Bibliometrics.

RESUMO: Objetivo: Identificar a produção acadêmica advinda de dissertações e teses sobre centro cirúrgico de enfermeiros que concluíram mestrados acadêmicos e doutorados no Brasil. **Método:** Estudo bibliométrico, descritivo e retrospectivo, com pesquisa documental em três bases de dados brasileiras, recorrendo às publicações de 11 instituições de ensino superior, no período de 2005 a 2016. **Resultados:** Identificou-se um total de 40 produções acadêmicas. Dessas, 13 são teses (32,5%) e 27 são dissertações (67,5%). Os anos com maior publicação (17,5%) foram 2009 e 2013. A Universidade de São Paulo e a Universidade de São Paulo — Ribeirão Preto são as instituições com maior representatividade de estudos, com 32,5 e 25,0%, respectivamente. A abordagem metodológica mais adotada pelos pesquisadores foi a quantitativa (40,0%) e a temática principal tratou da assistência perioperatória (60,0%). **Conclusão:** A produção científica nessa área tem se apresentado incipiente, quando comparada ao número total de publicações de pós-graduação *stricto sensu* de enfermagem no cenário nacional. Entretanto, o que se tem publicado está voltado para assistência hospitalar, demonstrando correlação dos estudos com a prática de enfermagem perioperatória.
Palavras-chave: Centros cirúrgicos. Período intraoperatório. Enfermagem de centro cirúrgico. Bibliometria.

RESUMEN: Objetivo: Identificar la producción académica proveniente de disertaciones y tesis sobre centros quirúrgicos por enfermeras que hayan completado maestrías y doctorados en Brasil. **Método:** estudio bibliométrico, descriptivo y retrospectivo, con investigación documental en tres bases de datos brasileñas, utilizando las publicaciones de 11 instituciones de educación superior, de 2005 a 2016. **Resultados:** Se identificaron un total de 40 producciones académicas. De estas, 13 son tesis (32,5%) y 27 son disertaciones (67,5%). Los años con la mayor cantidad de publicaciones (17,5%) fueron 2009 y 2013. La Universidad de São Paulo y la Universidad de São Paulo – Ribeirão Preto son las instituciones con mayor número de estudios, con 32,5 y 25,0%, respectivamente. El enfoque metodológico más adoptado por los investigadores fue el cuantitativo (40,0%) y el tema principal fue el cuidado perioperatorio (60,0%). **Conclusión:** La producción científica en esta área ha presentado incipientes, en comparación con el número total de publicaciones de postgrado en stricto sensu sobre enfermería en el escenario nacional. Sin embargo, lo que se ha publicado está dirigido a la atención hospitalaria y muestra la correlación de los estudios con la práctica de la enfermería perioperatoria.
Palabras-clave: Centros quirúrgicos. Periodo intraoperatorio. Enfermería de quirófano. Bibliometría.

[1]Nurse; resident in Nursing in Surgical Centers, Material and Sterilization Centers of Hospital Universitário Pedro Ernesto (HUPE), State University of Rio de Janeiro (UERJ) – Rio de Janeiro (RJ), Brazil.
[2]PhD in Nursing; teaching assistant at UERJ and associate professor at Universidade do Grande Rio (Unigranrio) – Rio de Janeiro (RJ), Brazil.
[3]PhD in Nursing, teaching assistant at UERJ – Rio de Janeiro (RJ), Brazil.
[4]Master in Nursing, teaching assistant at UERJ – Rio de Janeiro (RJ), Brazil.
*Corresponding author: cintiafassarella@gmail.com
Received on: 03/27/2018 – Approved on: 06/24/2018
DOI: 10.5327/Z1414-4425201800040008

INTRODUCTION

The surgical center (SC) is a complex field with a large interface in the hospital context, consisting of several interdependent areas to allow optimal conditions to perform the anesthetic-surgical procedure. In ideal aseptic circumstances, the SC aims to promote patient safety and structure and comfort for the team assisting them[1,2].

In order for the SC to become a complex sector, a history of great changes, technological innovations and acquisition of professional competence was traversed. At the beginning of the nineteenth century, many factors hampered the event and the course of surgeries: precarious instruments, improper raw material and inadequate physical plant. Throughout the 21st century, with the advancement of anesthesia, surgical procedures became more and more specialized and precise[3].

With the historical evolution of surgeries, it was necessary the development of specialized human resources inserted in this scenario. Nursing, as part of the SC team, is essential for the development of integral care, quality and is also responsible for maintaining a safe, comfortable and clean environment[4].

Perioperative nursing began informally, with the professional acting with the "barber-surgeons", in the cleaning of material and in the stabilization of patients. The consolidation of surgical nurse performance was strongly influenced by the creation of the current Association of Perioperative Registered Nurses (AORN), whose mission is to unify perioperative nurses, provide education and recommend standards for the care of surgical patients[5].

In Brazil, this mission is carried out by the Brazilian Association of Nurses of Surgical Center, Anesthetic Recovery and Material and Sterilization Center (SOBECC). With the advancement of these associations, some concepts were developed, as well as the concern with the nurses' scientific performance[5].

To consolidate quality nursing care, scientific evidence is indispensable. One of the ways of identifying the available scientific productions and obtaining an informative consensus is bibliometric research. This enables relevant counts, such as production by region, publication time, search by area of knowledge, literature related to the study citation, and impact factor of a scientific publication[6,7].

Bibliometrics is characterized as the metric that works with documents, articles, authors, among other events. It is not only concerned with their quantitative aspect; it is also important to verify the relevance and impact of authors, journals, institutions, groups or countries in the most various areas of knowledge[8].

Bibliometric studies are based on a set of empirical laws and principles, derived from information science, whose purpose is to investigate the quantitative aspects of the production, dissemination and use of available and recorded information, thus contributing to the evaluation of the current state of science, as well as research management. It is through its bibliometric indicators that the researcher has the possibility to draw a profile of the scientific world[8,9].

Given the importance of nursing care to the surgical patient and the increase in surgical procedures due to illness, trauma and life expectancy, it was considered necessary to know the scientific productions about SC in this context, since it is still seen as an unknown area. In addition, it is considered that the production of knowledge disseminated by academic master's dissertations (AMD) and doctoral theses (DT) can contribute to the development of the qualification of teaching and nursing practice.

In this sense, it is questioned: what is the academic scientific production about SC from dissertations and theses of nurses who have completed academic masters and doctorates in Brazil? What are the main objects of studies addressed by nurses in SC who have completed an academic and doctoral degree in Brazil? What are the types of studies most used by these nurses who have completed masters and doctorates in Brazil?

OBJECTIVES

Overall objective

To identify the academic production on SC from the dissertations and theses of nurses who concluded master's degrees and doctorates in Brazil.

Specific objective

To identify the main objects of study contemplated in master's dissertations and doctoral theses, the methodology used, as well as the universities that produced these studies.

METHOD

It is a bibliometric, descriptive and retrospective study, carried out through documentary research. This method allows objective evaluation of scientific production, being used in several areas of scientific knowledge. Bibliometric research, as a technique,

involves the reading, selection and archiving of topics of interest to the research in question, with the purpose of knowing the scientific contributions that have been produced on a certain subject[9]. The research sources were produced with the SC theme, performed by nurses and registered in three Brazilian databases. These were the theses and dissertations database of the Coordination of Improvement of Higher Education Personnel (*Coordenação de Aperfeiçoamento de Pessoal de Nível* – CAPES), in the Sucupira Platform, the Brazilian Digital Library of Digital Theses and Dissertations (*Biblioteca Digital Brasileira de Teses e Dissertações Digitais* – BDTD), the Brazilian Institute of Information in Science and Technology (*Instituto Brasileiro de Informação em Ciência e Tecnologia* – IBICT) , and the Nursing Studies and Research Center of the Brazilian Nursing Association (*Centro de Estudos e Pesquisas em Enfermagem da Associação Brasileira de Enfermagem* – CEPEn-ABEn).

The following Descriptors in Health Sciences (*Descritores em Ciências da Saúde* – DeCS) were used: surgicenters, intraoperative period, bibliometrics and nursing for the first two bases. At CEPEn-ABEn, individual readings of the available catalogs per year were carried out, being done by a single researcher.

The research covered completed AMD and DT in the period from 2005 to 2016, coming from universities with a minimum grade of 5. Such period delimitation was based on CAPES's four-year evaluation of Qualis, which aims to follow up and improve the evaluation processes of graduate programs *stricto sensu* (master's and doctorate). Thus, all these programs are subject to a careful periodic evaluation, receiving scores in the following scale: 1 and 2 indicate minimum scores – those who receive these grades have their license to operate and the recognition of the masters and doctorate courses offered by them canceled; 3 indicates regular performance, meeting the minimum quality standard; 4 is considered a good performance; and 5 is the maximum grade, only for masters programs with good performance. Scores 6 and 7 indicate performance equivalent to the high international standard, attributed exclusively to doctorate courses. The Ministry of Education, through the National Education Council (*Conselho Nacional de Educação* – CNE), recognizes the results of the evaluation of the new courses and the recurrent analysis of CAPES.

In order to search the databases, inclusion criteria were AMD and DT productions with themes related to the transoperative period, studies produced by university nurses with CAPES scores from 5 and publications from 2005 to 2016. Exclusion parameters used were DT and AMD that were not available in full for reading, professional master's dissertations and subjects associated with the obstetric center.

The present study was carried out through the following steps: identification of the theme and guiding question; establishment of predefined criteria; search and selection of scientific production in the database from March to July, 2017; and tabulation of the data in a spreadsheet using the Microsoft Office Excel 2016 software. The variables delimited in the study were treated through quantitative descriptive analysis.

RESULTS

The following quantitative information were identified in relation to academic production: 3,720 in the CAPES platform, 4,103 in CEPEn and 839 in the BDTD platform, totaling 8,662 AMD and DT academic productions.

8,622 productions were excluded because they did not meet the pre-established inclusion criteria. At the end, 40 academic productions that met the inclusion criteria adopted for the present study were analyzed (Table 1). Of these productions, 13 are DT (32.5%) and 27 are AMD (67.5%).

The higher education institutions with DT and AMD that fit the inclusion criteria of the present study were: Federal University of Minas Gerais (*Universidade Federal de Minas Gerais* – UFMG), Federal University of Rio Grande do Sul (*Universidade Federal do Rio Grande do Sul* – UFRGS), Federal University of Santa Catarina (*Universidade Federal de Santa Catarina* – UFSC) Federal University of Rio de Janeiro (*Universidade Federal do Rio de Janeiro* – UFRJ), Federal University of Rio Grande (*Universidade Federal do Rio Grande* – UFRG), Federal University of Ceará (*Universidade Federal do Ceará* – UFC), State University of Campinas (*Universidade Estadual de Campinas* – UNICAMP), University of São Paulo (*Universidade de São Paulo* – USP), University of São Paulo - Ribeirão Preto (*Universidade de São Paulo — Ribeirão Preto* – USP-RP), Federal University of São Paulo (*Universidade Federal de São Paulo* – UNIFESP) and Rio de Janeiro State University (*Universidade do Estado do Rio de Janeiro* – UERJ). We highlight a predominance of publications of educational institutions in the Southeast region (Table 2).

As for the type of methodological approach, it is verified that the quantitative academic productions are the most common (40.0%), followed by the qualitative ones (30.0%), according to Table 3. Five studies present quantitative-qualitative approach, four used the method of integrative review of literature and one approached the research with the systematic review of literature.

When the studies did not explicitly inform in their abstract the type of methodological approach, the relationship

between objective, data collection instrument, analysis and results was used to understand the treatment used; this occurred mainly in productions with quantitative-qualitative approaches.

Regarding the objects of study approached by the scientific productions in DT and AMD, after individual analysis of each production, four areas were categorized:

1. Transoperative assistance;
2. Workers' health;
3. Costs;
4. Nursing management (Table 4).

Table 1. Scientific production of doctorate theses and academic master's dissertations on surgical centers per year.

Ano	Theses		Dissertations		Total	
	N	%	N	%	N	%
2016	1	2.5	1	2.5	2	5.0
2015	1	2.5	1	2.5	2	5.0
2014	3	7.5	2	5.0	5	12.5
2013	1	2.5	6	15.0	7	17.5
2012	1	2.5	1	2.5	2	5.0
2011	2	5.0	3	7.5	5	12.5
2010	0	0.0	2	5.0	2	5.0
2009	2	5.0	5	12.5	7	17.5
2008	1	2.5	3	7.5	4	10.0
2007	0	0.0	1	2.5	1	2.5
2006	0	0.0	1	2.5	1	2.0
2005	1	2.5	1	2.5	2	5.0
Total	13	32.5	27	67.5	40	100

Table 2. Regions and institutions most represented in theses and dissertations from 2005 to 2016.

Region	Institution	Theses		Dissertations		Total	
		N	%	N	%	N	%
Sudeste	USP	5	12.5	8	20.0	13	32.5
	USP-RP	5	12.5	5	12.5	10	25.0
	UFMG	1	2.5	2	5.0	03	7.5
	UFRJ	1	2.5	3	7.5	04	10.0
	UNICAMP	1	2.5	0	0.0	01	2.5
	UNIFESP	0	0.0	2	5.0	02	5.0
	UERJ	0	0.0	4	10.0	04	10.0
South	UFRGS	0	0.0	2	5.0	02	5.0
	UFSC	0	0.0	1	2.5	01	2.5
Total		13	32.5	27	67.5	40	100

USP: University of São Paulo; USP-RP: University of São Paulo *campus* Ribeirão Preto; UFMG: Federal University of Minas Gerais; UFRJ: Federal University of Rio de Janeiro; UNICAMP: State University of Campinas; UNIFESP: Federal University of São Paulo; UERJ: University of the State of Rio de Janeiro; UFRGS: Federal University of Rio Grande do Sul; UFSC: Federal University of Santa Catarina.

Table 3. Scientific production of doctorate theses and academic master's dissertations on surgical centers, according to research methods.

Variables	N	%
Qualitative studies		
Descriptive, exploratory	8	20.0
Case study with semi-structured interview	1	2.5
Ethnomethodological	1	2.5
Clinical study	1	2.5
Data grounded theory	1	2.5
Quantitative studies		
Cross-sectional, descriptive, exploratory	7	17.5
Retrospective	1	2.5
Observational	2	5.0
Non-experimental, correlational, prospective	2	5.0
Comparative	1	2.5
Experimental	2	5.0
Case study, descriptive, exploratory, correlational, longitudinal	1	2.5
Quanti- and qualitative studies		
Epidemiological, cross-sectional study	1	2.5
Observational	2	5.0
Transversal, descriptive and exploratory	1	2.5
Retrospective	1	2.5
Prospective	2	5.0
Reviews: integrative and systematic	5	12.5
Total	40	100.0

Table 4. Scientific production of surgical center, by object of study.

Object of study	Total	
	N	%
Transoperative assistance		60.0
Worker's health	10	25.0
Costs	03	7.5
Management	03	7.5
Total	40	100.0

DISCUSSION

In the period from 2005 to 2016, there were 13 DT publications, representing 32.5% of the scientific productions of the total of that period, specially the year 2014, with the largest number of publications (7.5%). As for AMD, during the whole period, there were publications on the SC theme, highlighting the years 2009 and 2013, with 12.5 and 15.0%, respectively.

When compared to the number of academic productions between AMD and DT, a predominance of publications on SC of master's degree programs (67.5%) is evident. This fact can be explained both by the expressive quantity of master's degree courses in Brazil and by the time of preparation and defense of the dissertations being inferior to those of theses, thus favoring publications in a shorter period. This result corroborates another bibliometric study, in which the prevalence of AMD production was observed in relation to DT productions[10].

Among the educational institutions represented by the sample analyzed in this bibliometric study, most universities are located in the Southeast region[10]. This result can be justified by the fact that all universities with significant or expressive scientific production compose the ranking of the 50 best universities in Brazil, except USP, since this institution does not participate in the National Examination of Student Performance (*Exame Nacional de Desempenho dos Estudantes* – Enade), a test used as basis for the score system[11].

However, the scientific production of USP (32.5%) and USP-RP (25.0%) is predominant. USP is a public institution, maintained by the state of São Paulo and linked to the Secretariat of Economic Development, Science, Technology and Innovation (*Secretaria de Desenvolvimento Econômico, Ciência, Tecnologia e Inovação* – SDECTI). Among the Brazilian public universities, it is the one with the largest number of undergraduate and postgraduate positions, being also responsible for training the largest number of masters and doctors in the world, as well as responsible for half of all scientific production in the state of São Paulo and more than 25.0% of the Brazilian production[12].

As for the methodological approaches found in the academic productions studied, the most frequent was the quantitative (45%), followed by the qualitative one (30%), corroborating another bibliometric investigation. It is noticed that there is a tendency to carry out studies with the first, since it allows statistical verification between variables and possible generalization; on the other hand, qualitative methods are more focused on patterns that give meaning to the phenomena and that contribute to the understanding of the experience as a whole[9].

The prevalence of qualitative studies in bibliometrics is also observed. Thus, there is a certain division between the two methodologies, because if, on the one hand, there is a need to quantify certain phenomena by means of statistics, on the other hand, it is fundamental to have an understanding of non-quantifiable aspects that allow the understanding of the experience in a more humanized way, allowed only by the qualitative methodology[9,10,13].

It is understood, however, that the technological advances in surgery, the complexity of the care and the vulnerable state of the surgical patient require that the nurse's role in the SC be backed up in clear knowledge of one's work and conception that the target is the performing of perioperative care for the success of the anesthetic-surgical procedure with safety[14]. When considering the percentage of publications on transoperative care (60%), it is possible to infer that this topic is of paramount importance in the search for improved surgical patient care.

Analyzing the objects of study of each production selected for the present work, we highlight the theme involving transoperative assistance, with subjects on humanization in the practice of nursing care, prevention of surgical site infection, patient safety, dynamics of transoperative nursing care, hypothermia, nursing diagnosis, systematization of nursing care, surgical positioning, antibiotic prophylaxis and transoperative complications.

Understanding the greater representativeness of the thematic category "patient care", according to the results found, this one has to focus on questions about nursing care practice, aiming at patient safety, correlating it with the concern of the second worldwide challenge by the World Health Organization (WHO), "Safe surgeries save lives". This program aims to improve the safety of surgical care in the world by defining a central set of safety standards that can be applied in all countries and scenarios[15,16].

Thus, surgical care has been an essential component of health care, and its need has been increased with the also increasing demand for surgical interventions, due to cardiovascular diseases, neoplasias and trauma, resulted from increased life expectancy and violence[1,15].

Despite the stimulation of production in this area by some international and national agencies and the increasing number of surgical procedures in the Brazilian population, the present study evidenced a low scientific production with SC by nurses, especially in the intraoperative period, an area of extreme relevance for the performance of the nurse.

The use of the available resources in the databases contributed to the accomplishment of this study, an important fact for the nursing profession, since it collaborates to disseminate the knowledge and development of the category. However, data collection on the basis of CEPEn was limited as it was not possible to carry out the search in the years 2006 and 2007 due to unavailability of the catalogs. In addition, another factor that made it difficult to perform the research was the fact that theses and dissertations are grouped into available catalogs per year, which does not allow the filtering by descriptors.

CONCLUSION

This study allowed to identify the academic scientific production about SC by nurses who completed academic masters and doctorates, in addition to describing the types of methodological approaches and their main objects studied. In the last 11 years, it has been observed that nurses are producing inconstantly on this subject.

The research also contributed to the identification of the objects of study and methodologies most used by nurses in the SC area, which may be significant in guiding the choice of future scientific productions. It is considered that there is still a need for greater investment in quantity and quality in scientific production, so as to emphasize the importance of transoperative nursing care.

With this bibliometric analysis, it will be possible to configure a relevant panorama for nursing, demonstrating patterns of research and identification of trends for future academic scientific production.

REFERENCES

1. Carvalho R, Bianchi ERF, eds. Enfermagem em centro cirúrgico e recuperação. 2ª ed. Barueri: Manole; 2016.
2. Possari JF. Centro cirúrgico: planejamento, organização e gestão. 4ª ed. São Paulo: Iatria; 2009.
3. Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização (SOBECC). Diretrizes de práticas em enfermagem cirúrgica e processamento de produtos para a saúde. 7ª ed. São Paulo: SOBECC/Barueri: Manole; 2017.
4. Carvalho R, ed. Enfermagem em centro cirúrgico e recuperação anestésica. Manuais de Especialização Einstein. Barueri: Manole; 2015.
5. Cruz EA, Soares E. A tecnologia em centro cirúrgico e o processo de trabalho do enfermeiro. Esc. Anna Nery R Enferm. 2004;8(1):109-15.
6. Bieging P, Busarello RI, Aquino V. Perspectivas na comunicação: audiovisual, publicidade e rede social. São Paulo: Pimenta Cultural; 2016.
7. Areias FZ, Abrão FMS, Moura LF, Silva RCL, Costa SFG, Silva CRL. Análise bibliométrica de artigos sobre laringectomia total. Rev Bras Enferm. 2016;30(3):1-11. http://dx.doi.org/10.18471/rbe.v30i3.15790
8. Alencar MSM, Bochner R, Dias MFF, Antunes MAS. Análise de produção científica brasileira sobre nanotecnologia e saúde. Rev Eletron Comum Inf Inov Saúde [Internet]. 2017 [acessado em 4 nov. 2017];11(1). Disponível em: https://www.reciis.icict.fiocruz.br/index.php/reciis/article/view/1199 http://dx.doi.org/10.3395/reciis.v11i1.1199
9. Ferreira MAL, Pereira AMNA, Martins JCA, Figueiredo MCB. Cuidados paliativos e enfermagem nas dissertações e teses em Portugal: um estudo bibliométrico. Rev Esc Enferm USP. 2016;50(2):313-19. http://dx.doi.org/10.1590/S0080-623420160000200019
10. Spindola T, Pimentel MRRA, Barros AS, Franco VQ, Ferreira LEM. Produção de conhecimento acerca das doenças sexualmente transmissíveis na população jovem: pesquisa bibliométrica. J Res Fundam Care Online [Internet]. 2015 [acessado em 22 nov. 2017];7(3):3037-49. Disponível em: http://dx.doi.org/10.9789/2175-5361.2015.v7i3.3037-3049
11. Brasil. Ministério da Educação. Enade – apresentação [Internet]. [acessado em 8 dez. 2017]. Disponível em: http://portal.mec.gov.br/enade
12. Brasil. Fundação CAPES. Brasília: Ministério da Educação; 2009 [acessado em 8 dez. 2017]. Disponível em: http://www.capes.gov.br/
13. Baggio MA, Rodrigues MA, Erdmann AL, Figueiredo MCAB, Vieira MMS. Produções de teses e dissertações da enfermagem em Portugal de 2000-2010: estudo bibliométrico. Texto Contexto Enferm. 2014;23(2):250-60. http://dx.doi.org/10.1590/0104-07072014002190012
14. Turrini RNT, Costa ALS, Peniche ACG, Bianchi ERF, Cianciarullo TI. Ensino de enfermagem em centro cirúrgico: transformações da disciplina na Escola de Enfermagem da USP (Brasil). Rev Esc Enferm USP. 2012;46(5):1268-73. http://dx.doi.org/10.1590/S0080-62342012000500032
15. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. Organização Mundial da Saúde. Segundo desafio global para a segurança do paciente. Cirurgias seguras salvam vidas. Rio de Janeiro: Organização Pan-Americana de Saúde; 2009.
16. Gawande A. Checklist: como fazer as coisas bem-feitas. Rio de Janeiro: Sextante; 2011.

SYSTEMATIZATION OF PERIOPERATORY NURSING ASSISTANCE IN PATIENT SAFETY: AN INTEGRATIVE REVIEW

Sistematização da assistência de enfermagem perioperatória na segurança do paciente: revisão integrativa

Sistematización de la asistencia de enfermería perioperatoria en la seguridad del paciente: revisión integrativa

Marielli Trevisan Jost[1]*, Karin Viegas[2], Rita Catalina Aquino Caregnato[3]

ABSTRACT: Objective: To know the approach of scientific articles on the systematization of perioperative nursing care related to patient safety. **Method:** Integrative review with searches in the databases of the Virtual Health Library, National Library of Medicine (PubMed), and the journals of the Coordination of Improvement of Higher Education Personnel (CAPES). Articles were evaluated according to the level of evidence, using the evaluation tool proposed by the Joanna Briggs Institute (JBI). **Results:** Ten articles were identified, of which eight were published in national journals, and two in international journals. The studies were classified according to levels of evidence (LoE): three with LoE 5 and seven with LoE 6. **Conclusions:** There are few publications on the systematization of perioperative nursing care related to patient safety. The articles selected present a low level of evidence and the approach is directed towards patient safety, being restricted to the use of the checklist and implementation of the systematization of perioperative nursing care.
Keywords: Perioperative care. Perioperative nursing. Surgical center. Patient safety.

RESUMO: Objetivo: Conhecer a abordagem de artigos científicos sobre a sistematização da assistência de enfermagem perioperatória relacionada à segurança do paciente. **Método:** Revisão integrativa com buscas nas bases de dados da Biblioteca Virtual em Saúde, da *National Library of Medicine* (PubMed) e dos periódicos da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES). Artigos avaliados conforme o nível de evidência utilizando o instrumento de avaliação proposto pela *Joanna Briggs Institute* (JBI). **Resultados:** Identificaram-se dez artigos, sendo oito publicados em periódicos nacionais e dois em internacionais. Os estudos foram classificados conforme níveis de evidência (NE): três com NE 5 e sete com NE 6. **Conclusões:** Consideram-se poucas as publicações sobre sistematização da assistência de enfermagem perioperatória relacionada à segurança do paciente. Os artigos selecionados apresentam baixo nível de evidência e a abordagem direciona-se à segurança do paciente, restringindo-se à utilização do *checklist* e implementação da sistematização da assistência de enfermagem perioperatória.
Palavras-chave: Assistência perioperatória. Enfermagem perioperatória. Centro cirúrgico. Segurança do paciente.

RESUMEN: Objetivo: Conocer el enfoque de los artículos científicos sobre la sistematización de la atención de enfermería perioperatoria relacionada con la seguridad del paciente. **Método:** Revisión integradora con búsquedas en las bases de datos de la Biblioteca Virtual en Salud, la Biblioteca Nacional de Medicina (PubMed) y las revistas de Coordinación de Mejora del Personal de Educación Superior (CAPES). Los artículos fueron evaluados según el nivel de evidencia, utilizando la herramienta de evaluación propuesta por el Instituto Joanna Briggs (JBI). **Resultados:** se identificaron diez artículos, de los cuales ocho se publicaron en revistas nacionales y dos en revistas internacionales. Los estudios se clasificaron según los niveles de evidencia (*levels of evidence* – LoE): tres con LoE 5 y siete con LoE 6. **Conclusiones:** Existen pocas publicaciones sobre la sistematización de la atención de enfermería perioperatoria relacionada con la seguridad del paciente. Los artículos seleccionados presentan un bajo nivel de evidencia y el enfoque se dirige hacia la seguridad del paciente, y se limita al uso de la lista de verificación y la implementación de la sistematización de la atención de enfermería perioperatoria.
Palabras clave: Atención perioperativa. Enfermería perioperativa. Centro quirúrgico. Seguridad del paciente.

[1]Nurse at Sarmento Barata Surgical Center, Santa Clara Hospital, Irmandade da Santa Casa de Misericórdia de Porto Alegre – Porto Alegre (RS), Brazil.
[2]Associate Professor at the Professional Master's Program in Nursing of Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA) – Porto Alegre (RS), Brazil.
[3]Adjunct Professor III at Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA) – Porto Alegre (RS), Brazil.
*Corresponding author: marielli.jost@gmail.com
Received: 04/20/2018 – Approved: 06/24/2018
DOI: 10.5327/Z1414-4425201800040009

INTRODUCTION

The systematization of nursing care (SNC) is a method that aims to improve the care provided by nurses to patients[1], seeking to provide a safe and quality care, improving communication between the teams[2]. Thus, its importance is evident for nursing professionals, bringing several benefits to the patient and to the healthcare team[3].

According to the Resolution of the Brazilian Federal Nursing Council (COFEn) no. 358/20094, every health institution that provides professional nursing care should use SNC, allowing the implementation of its technical-scientific and humanization knowledge in the practice of care, organizing the professional approach regarding method, personnel, and instruments, operationalizing the nursing process (NP).

The surgical center (SC) is one of the most complex units of a hospital, consisting of human resources, materials, equipment, and highly complex technologies, aimed at the care of surgical patients in the perioperative period[5]. Nurses working in this area can use perioperative nursing care systematization (PNCS) to promote quality care to surgical patients in a continuous, participative, individualized, and documented way. All periods related to a surgical act are understood as perioperative, namely: preoperative, transoperative, and postoperative[6].

In 2004, the World Alliance for Patient Safety was launched by the World Health Organization (WHO), seeking to improve patient safety. From this alliance, a global challenge was established, whose objective was to raise the quality standards of health services for safe surgery[7]. In this sense, the Joint Commission International (JCI)[8] promoted the international goals for patient safety: to identify patients correctly; improve effective communication; improve the safety of high-alert medications; ensure surgeries with correct intervention site, correct procedure, and correct patient; reduce the risk of health care-associated infections; and reduce the risk of patient harm resulting from falls.

Brazil is part of the WHO Global Alliance for Patient Safety and, in 2013, the Ministry of Health (MS) established the National Patient Safety Program (PNSP), through Administrative Rule no. 529[9], contributing to the qualification of the health care. Thus, the National Health Surveillance Agency (ANVISA) published the Resolution of the Collegiate Board of Directors (RDC) no. 36/2013[10], establishing actions to promote patient safety and aiming at improving quality in institutions.

Aiming to implement and guarantee the quality of care, health institutions currently use accreditation programs, such as that of the National Accreditation Organization (ONA), recognized as a competent entity for the development of the hospital process, coordinated by the Brazilian Accreditation System (SBA), which integrates organizations and health services, entities, and accrediting institutions for patient safety and improved healthcare[11].

In order to provide quality and safe assistance to surgical patients, the involvement and participation of the entire multiprofessional team is necessary[12]. Establishing effective communication is critical to building partnerships for more qualified and safe perioperative care, as it helps to reduce errors during care processes[13,14]. Therefore, effective communication is key to the profession in the healthcare field[15].

Considering the importance of PNCS for the improvement of quality and of the safety of surgical patients, this study aimed to guide and provide subsidies for its implementation in a SC.

OBJECTIVE

To know the approach of published scientific articles to PNCS related to patient safety.

METHOD

This is an integrative review, a research method that aims to synthesize the results obtained on a certain subject, contributing to deepening the knowledge on this subject, and is used in evidence-based practices. This method is carried out in six stages: identification of the theme; definition of the article inclusion and exclusion criteria and choice of databases; identification of selected studies; synthesis of studies; analysis and interpretation of collected data; and presentation of results[16].

The guiding question was: what is the approach of published scientific articles to the systematization of nursing care in the perioperative period related to patient safety?

The electronic databases used were: Virtual Health Library (VHL), National Library of Medicine (PubMed) and journals of the Coordination of Improvement of Higher Education Personnel (CAPES).

The inclusion criteria were: scientific articles published with free online access, in full, in Portuguese or Spanish or English, in the last 10 years, from 2008 to 2017. Exclusion criteria were:

publications classified as editorials, letters, dissertations, theses, manuals and protocols, and articles that did not address the research question.

The data collection period occurred from November 1 to November 15, 2017, using controlled descriptors obtained from DeCS and the Medical Subject Headings (MeSH): "perioperative care" ("*assistência perioperatória*"); "patient safety" ("*segurança do paciente*"); "nursing process" ("*processo de enfermagem*"); "perioperative nursing" ("*enfermagem perioperatória*"); and "surgical centers" ("*centro cirúrgico*"). An uncontrolled descriptor was also used: "systematization of assistance" ("*sistematização da assistência*"). These descriptors were combined with each other by the Boolean operators "AND" and/or "OR", as shown in Chart 1.

The articles were evaluated and classified regarding their scientific rigor according to the characteristics of each study, using the evaluation tools proposed by the Joanna Briggs Institute (JBI)[17]. After this evaluation, the classification by level of evidence (LoE) was performed, according to validity and reliability. In this stage, an instrument was used, based on the Rating System for the Hierarchy of Evidence for Intervention/Treatment Question for the classification of the LoE of studies. The levels refer to:

- systematic reviews or meta-analyzes of relevant randomized clinical trials (LoE 1);
- one or more randomized controlled trials (LoE 2);
- controlled clinical trials without randomization (LoE 3);
- control cases and cohort studies (LoE 4);
- systematic reviews of descriptive studies and qualitative studies (LoE 5);
- evidence of a single descriptive or qualitative study (LoE 6);
- expert opinion reports (LoE 7)[18].

Chart 1. Descriptors combined with Boolean operators used in the article search stages.

Search stages	Combinations of descriptors with Boolean operators
1ª	(perioperative nursing AND systematization of assistance)
2ª	(surgical center AND systematization of assistance)
3ª	(perioperative care AND nursing process)
4ª	(perioperative care AND patient safety)
5ª	(perioperative nursing OR perioperative care) AND (systematization of assistance OR nursing process)
6ª	(perioperative nursing OR perioperative care) AND (patient safety OR nursing process)

RESULTS

Initially, the databases were searched according to the cross-referencing of the previously mentioned descriptors, shown in Table 1.

In the initial search, the titles were read, and 30 articles were selected in the databases. However, seven articles were repeated on different bases. After reading the abstracts and articles in full, 15 that met the selection criteria were selected. For the evaluation of the articles' internal quality, five articles were excluded using the evaluation tools proposed by JBI.

According to the analysis of the selected articles — 10 in total — it was possible to verify their quantity according to year and their distribution: 2009 (n=1); 2011 (n=3); 2012 (n=1); 2013 (n=2); 2014 (n=1) and 2015 (n=2).

In relation to the production and its dissemination, eight articles produced and published in national journals and two in international journals were identified: Journal of Science, Care and Health (n=1); Journal of Nursing UFPE (n=1); *Revista de Administração em Saúde* (n=1); Journal of Nursing of the Federal University of Santa Maria (UFSM) (n=1); *Revista Gaúcha de Enfermagem* (n=1); *Revista Mineira de Enfermagem* (n=1); Anna Nery School Journal of Nursing (n=1); SOBECC Journal (n=1); Online Brazilian Journal of Nursing (n=1); and Journal Nursing Health (n=1).

Regarding the study design, the following were found: qualitative research (n=7); quantitative research (n=2), and mixed/qualitative and quantitative research (n=1). Thus, the studies were classified according to the LoE: three with LoE 5 and seven with LoE 6.

From the research performed, the articles were analyzed and grouped into two topics according to their focus: safe surgery and patient safety; and PNCS. Charts 2 and 3 present the synthesis of the articles selected in the integrative review.

DISCUSSION

The analysis allowed the grouping of the theme into two topics, according to the articles' approach. Chart 2 included the articles focusing on safe surgery and patient safety, which

addressed the importance of using the surgical checklist for quality of care.

WHO[7] has launched the Second Global Challenge, which includes Safe Surgeries Save Lives, which aims to improve care for surgical patients by using the surgical checklist as a way to help the team reduce the occurrence of patient harm. It seeks to improve care safety and the communication of the surgical team, using a checklist that guides verbal interaction, confirming healthcare standards, minimizing the most common and avoidable risks, as well as the improving the well-being of surgical patients[19-21,22].

One study[21] evaluated the checklist records in orthopedic surgeries, involving limbs and double laterality, in which the possibility of error is even greater, and the surgical site should be outlined to avoid adverse events. Thus, verification items and the correct and effective filling of this instrument are very important because they prevent errors and promote patient safety in the surgical procedure, and the results can contribute to the planning of corrective institutional actions based on the surgical checklist records.

In another study[19], the authors emphasized the importance of the institutions to provide training regarding the use of the surgical checklist, emphasizing its importance to be applied in daily practice as a feasible tool to guarantee safe surgeries and to contribute to an effective communication process in the surgical environment. Carrying out training with the team encourages the promotion of best practices. It should be emphasized that the checklist should be routine in the SC to improve patient safety, so the correct completion of this instrument should be a continuous work[22].

The checklist must be carried out at the three moments of the anesthetic-surgical procedure: before anesthetic induction, before the beginning of the procedure/before the skin incision, and at the end of the procedure/before the patient leaves the operating room. The implementation of this instrument generates some difficulties in the SC, because often there is not a good acceptance by the surgical team, which impairs their participation in its application. In this sense, the role of the nurse is very important, as it contributes to the application of the checklist and the orientation of the team in its use, emphasizing the benefits for professionals and patients[19].

Thus, studies have shown that the use of the checklist improves communication with the surgical team, as it promotes better interaction between patients and professionals, providing quality and safe care[19,20-22].

Chart 3 included articles that addressed PNCS, emphasizing the importance of its implementation in the SC, aiming at the quality of care provided.

SNC contributes to the organization of the nursing team's work, but is complex, as it is different in each sector, being executed in four phases of the NP: data collection, nursing diagnosis, nursing care planning, and implementation[27]. However, this study highlights the benefits and difficulties related to its implementation in the CC. The benefits emphasized were that, with the implantation, the nurse becomes better acquainted with the patient, performing a continuous nursing work, monitoring the surgical patient closely, improving the care provided, and establishing a routine. Regarding the difficulties, it was pointed out the lack of time and personnel to perform the SNC, the changes

Table 1. Synthesis of the search in the databases. Porto Alegre, 2017.

	BVS	PubMed	CAPES
Descriptor: (perioperative nursing AND systematization of assistance)			
Total articles found	37	00	04
Total articles selected	06	00	00
Descriptor: (surgical center AND systematization of assistance)			
Total articles found	27	00	22
Total articles selected	04	00	01
Descriptor: (perioperative care AND nursing process)			
Total articles found	69	00	03
Total articles selected	06	00	00
Descriptor: (perioperative care AND patient safety)			
Total articles found	198	00	06
Total articles selected	04	00	00
Descriptor: (perioperative nursing OR perioperative care) AND (systematization of assistance OR nursing process)			
Total articles found	37	00	10
Total articles selected	07	00	00
Descriptor: (perioperative nursing OR perioperative care) AND (patient safety OR nursing process)			
Total articles found	239	00	15
Total articles selected	02	00	0
Total after selection criteria	**09**	**00**	**01**

VHL: Virtual Health Library; PubMed: *National Library of Medicine*; CAPES: Coordination of Improvement of Higher Level Personnel.

in work practice, and the lack of knowledge to carry out the systematization[27].

Studies[23-27] emphasize that nurses report the importance and necessity of performing PNCS in their practice, but they do not carry it out due to the various difficulties and the lack of understanding for their application. One study reports that SC nurses cannot provide direct assistance to the patient during the perioperative period, since they perform various managerial activities in their work, being overloaded with, which stresses the need for assistance planning, in which the tasks must be redistributed so that nurses can care for the patient and promote integrated care.

SNC allows a humanized and individualized care, which highlights the importance of the use of quality indicators of nursing care in the SC, identifying the nursing interventions according to the needs of each patient, allowing nurses to

Chart 2. Synthesis of articles focused on safe surgery and patient safety.

Authors, title and journal	Objectives	Design	Main results	Level of Evidence
Pancieri AP, Santos BP, Avila MAG, Braga EM[19] Safe surgery checklist: analysis of the safety and communication of the teams of a school hospital Rev Gaúcha Enferm. 2013.	Apply the WHO "safe surgery" checklist in the surgical specialties of a school hospital and verify the opinion of the teams on the influence of this application on the safety of the surgical process and the team's interpersonal communication.	Qualitative descriptive research	It is necessary that institutions make use of the tool and know its importance, ensuring safe surgeries and implementing communication processes between the teams. There is still difficulty in implementing the checklist regarding its acceptance by the surgical team. The subjects of the study did not notice changes in interpersonal communication by using the checklist, however, they indicated that its use provided more safety to the procedure, and some adaptations to the checklist were recommended.	LoE 6
Guzzo GM, Guimarães SM, Magalhães AMM[20] Effects and challenges of a surgical safety checklist implantation: an integrative review. J Nurs Health. 2014.	To identify the effects of the use of a surgical safety verification system, as well as the challenges of its implantation, as available in the literature.	Integrative review	The use of the surgical safety check system brings better care results to the surgical patient. Continuous monitoring of its implementation is necessary to guarantee its full operation and to improve SC practices with quality and safety to the patient.	LoE 6
Amaya MR, Maziero ECS, Grittem L, Cruz EDA[21] Analysis of the registration and content of surgical safety checklists. Esc Anna Nery. 2015.	To analyze and relate the record of the information and content on the checklist with the goals of the Safe Surgery Saves Lives Program.	Quantitative research	Planning actions so that the checklist is registered correctly and with high adherence as to its completion. It allowed to identify potential surgical risks, contributing to a professional practice focused on patient safety.	LoE 5
Elias ACGP, Schmidt DRC, Yonekura CSI, Dias AO, Ursi ES, Silva RPJ, Feijó VBER[22] Evaluation of the adherence to the safe surgery checklist at the public university hospital. Rev SOBECC. 2015.	To evaluate adherence to the checklist in surgeries performed at a public school hospital, as well as identify the patients' profiles from its use.	Descriptive, qualitative study	The checklist should be implemented into the SC routine and be carried out during daily practices, promoting better communication between teams, thus being improved, contributing to the reduction of adverse events in surgical patients.	LoE 6

WHO: World Health Organization; LoE: level of evidence; SC: surgical center.

Chart 3. Synthesis of articles focused on the systematization of perioperative nursing care.

Authors, title and journal	Objectives	Design	Main results	Level of Evidence
Grittem L, Meier MJ, Peres AM[23] Sistematization of perioperative care: a qualitative research. Online Braz J Nurs. 2009.	To develop a participatory process to structure perioperative nursing care in the Surgical Center Unit of a hospital in Curitiba.	Qualitative study	The arguments allowed reflection on the perioperative nursing care and the valuation of the activities performed by nurses as a way to collaborate to their professional recognition.	LoE 6
Gonçalves RMDA, Pereira MER, Pedrosa LAK, Silva QCG, Abreu RMD[24] The verbal nurse-patient communication in the perioperative period of cardiac surgery. Cienc Cuid Saúde. 2011.	To verify the importance of the verbal communication between nurse and patient in the perioperative period of cardiac surgery in a university hospital.	Descriptive-exploratory, quantitative and qualitative study (mixed)	It identified the importance of the nurse's effective communication, seeking optimal interaction with the patient and the team, identifying their needs and elaborating systematized actions that are essential for the quality of care and systematization of perioperative care.	LoE 5
Umann J, Guido LA, Linch GFC, Freitas EO[25] Perioperative nursing in heart surgery: integrative literature review. Rev Min Enferm. 2011.	To investigate scientific productions about the perioperative assistance of nurses to patients in heart surgery.	Integrative review	It is important that a care plan and intervention protocols are carried out, and that the NP be implemented. Research should be carried out to prove the effectiveness of the interventions, to assist in the profession's scientific advancement with the implementation of evidence-based practices.	LoE 6
Klein AGS, Bitencourt JVOV, Dal Pai D, Wegner W[26] Nursing records in the perioperative period. Rev Enferm UFPE Online. 2011.	To evaluate the nursing records in the perioperative period of a hospital in Porto Alegre, Rio Grande do Sul.	Descriptive quantitative study	There is a lack and a difficulty of nursing professionals to carry out records in the perioperative period, which compromises the NP. It is recommended that a single and systematized instrument is prepared for perioperative records, providing a flow of information about the anesthetic-surgical procedure. The whole team should be motivated and committed to develop and implement specific instruments that can benefit surgical patients.	LoE 5
Adamy EK, Tosatti M[27] Systematization of nursing care in the perioperative period: overview of the nursing team. Rev Enferm UFSM. 2012.	To evaluate the implementation of SNC in the perioperative period of a hospital in the west region of Santa Catarina, from the point of view of the nursing team.	Qualitative descriptive study	It highlights some difficulties regarding the implementation of SNC, such as a lack of collective commitment, rapid deployment, without adequate training for the nursing team, without having a computerized system to favor the work process, and lack of personnel. It emphasizes the importance of SNC implantation in relation to the safety of the surgical patient, the records became indispensable and facilitated the access to patient information, maintaining work organized and ensuring the continuity of the assistance. It is up to the institution to provide strategies that result in an effective and successful SNC.	LoE 6

Continue...

Chart 3. Continuation.

Authors, title and journal	Objectives	Design	Main results	Level of Evidence
Santos MC, Rennó CSN[28] Quality indicators of nursing care in the surgical center: integrative literature review. Rev Adm Saúde. 2013.	To identify the quality indicators of nursing care in the SC.	Integrative review	SC nurses should monitor and analyze the indicators and promote communication among the teams, as well as the planning of activities, promoting effectiveness in nursing processes. PNCS allows nurses to qualify the assistance provided in the SC.	LoE 6

LoE: level of evidence; SC: surgical center; SNC: systematization of nursing care; NP: nursing process; PNCS: perioperative nursing care systematization.

plan their activities[28]. The importance to have a computerized system in the institution is highlighted for conducting organized work, keeping records properly, optimizing time, and facilitating access to patient information[27]. Nursing records should be performed in the perioperative period in a systematized instrument, seeking to confirm the practice and the care given to the patients, in order to allow the flow of information in the anesthetic-surgical procedure[26].

PNCS allows SC nurses to qualify the care to be dispensed to patients in the perioperative period, planning the assistance, promoting better communication among the teams, monitoring and analyzing the indicators to provide the effectiveness of the nursing processes[28].

Studies highlight the importance of communication between the teams in order to contribute to the improvement of perioperative care, developing actions that aim to guide and evaluate the needs of each surgical patient, resulting in quality care planning throughout the surgical process.

FINAL CONSIDERATIONS

This article sought to know the approach of the scientific articles, considering the few publications on PNCS related to surgical patient safety. The selected articles have low LoE and the approach is directed towards patient safety, being restricted to the use of the checklist and PNCS implementation.

The results of this study show the importance of using the checklist in the SC in order to provide greater patient safety in the anesthetic-surgical procedure, developing better interaction between the patient and the team, thus improving communication in the perioperative care. The results showed that the implementation of PNCS allows nurses to interact in the perioperative process, planning the care according to the needs of each patient, aiming at the quality of care provided, focused on a scientific process, based on all the practices adopted. It is suggested that further research be conducted on this subject to qualify the nursing care to the patient in the perioperative period.

REFERENCES

1. Viana VO, Pires PS. Validação de instrumento de sistematização da assistência de enfermagem. Rev Enferm Atenção Saúde. 2014;3(2):64-75. https://doi.org/10.18554/
2. Lourenção DCA, Tronchin DMR. Segurança do paciente no ambiente cirúrgico: tradução e adaptação cultural de instrumento validado. Acta Paul Enferm. 2016;29(1):1-8. http://dx.doi.org/10.1590/1982-0194201600002
3. Ferrari D, Costa AEK, Pissaia LF, Moreschi C. A visão da equipe de enfermagem sobre a Sistematização da Assistência de Enfermagem em um hospital de médio porte. Cad Pedagógico. 2016;13(3):109-16. http://dx.doi.org/10.22410/issn.1983-0882.v13i2a2016.1160
4. Conselho Federal de Enfermagem. Resolução nº 358, de 15 de outubro de 2009. Dispõe sobre a Sistematização da Assistência de Enfermagem e a implementação do Processo de Enfermagem em ambientes, públicos ou privados, em que ocorre o cuidado profissional de enfermagem, e dá outras providências. Brasília: COFEN; 2009.
5. Carvalho R, Bianchi ERF, eds. Enfermagem em centro cirúrgico e recuperação. 2ª ed. Barueri: Manole; 2016.
6. Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização. Diretrizes de práticas em enfermagem cirúrgica e processamento de produtos para a saúde. 7ª ed. São Paulo: SOBECC/Barueri: Manole; 2017.

7. Organização Mundial da Saúde. Segundo desafio global para a segurança do paciente: manual - cirurgias seguras salvam vidas (orientações para cirurgia segura da OMS). Rio de Janeiro: Organização Pan-Americana da Saúde, Ministério da Saúde, Agência Nacional de Vigilância Sanitária; 2009.

8. Joint Commission International. Manual de padrões de acreditação da Joint Commission International para hospitais. Estados Unidos: Joint Commission International; 2011.

9. Brasil. Ministério da Saúde. Portaria nº 529, de 1º de abril de 2013. Institui o Programa Nacional de Segurança do Paciente (PNSP). Brasília: Ministério da Saúde; 2013.

10. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. Resolução da Diretoria Colegiada – RDC nº 36, de 25 de julho de 2013. Institui ações para a segurança do paciente em serviços de saúde e dá outras providências. Brasília: ANVISA; 2013.

11. Organização Nacional de Acreditação. O que é acreditação [Internet]. 2017 [acessado em 1º out. 2017]. Disponível em: http://www.ona.org.br/

12. Henriques AHB, Costa SS, Lacerda LS. Assistência de enfermagem na segurança do paciente cirúrgico: revisão integrativa. Cogitare Enferm. 2016;21(4):1-9.

13. Martins FZ, Dall'Agnol CM. Centro cirúrgico: desafios e estratégias do enfermeiro nas atividades gerenciais. Rev Gaúcha Enferm. 2016;37(4):e56945. http://dx.doi.org/10.1590/1983-1447.2016.04.56945

14. Miranda AL, Carvalho AKO, Lopes AAS, Oliveira VRC, Carvalho PMG, Carvalho HEF. Contribuição da enfermagem à segurança do paciente: revisão integrativa. Rev Sonare. 2017;16(1):109-17.

15. Negri EC, Mazzo A, Martins JCA, Pereira Jr. GA, Almeida RGS, Pedersoli CE. Simulação clínica com dramatização: ganhos percebidos por estudantes e profissionais de saúde. Rev Latino-am Enferm. 2017;25:e2916. http://dx.doi.org/10.1590/1518-8345.1807.2916

16. Cunha PLP, ed. Manual revisão bibliográfica sistemática integrativa: a pesquisa baseada em evidências. Belo Horizonte: Grupo Ânima; 2014.

17. Vernaya M, McAdam J. The effectiveness of probiotics in reducing the incidence of Clostridium difficile associated diarrhea in elderly patients: a systematic review protocol. JBI Database System Rev Implement Rep. 2015;13(8):79-91. https://doi.org/10.11124/jbisrir-2015-2197

18. Melnyk BM, Fineout-Overholt E. Evidence-based practice in nursing & healthcare: a guide to best practice. 2ª ed. Filadélfia: Lippincott Williams & Wilkins; 2011.

19. Pancieri AP, Santos BP, Avila MAG, Braga EM. Checklist de cirurgia segura: análise da segurança e comunicação das equipes de um hospital escola. Rev Gaúcha Enferm. 2013;34(1):71-8. http://dx.doi.org/10.1590/S1983-14472013000100009

20. Guzzo GM, Guimarães SM, Magalhães AMM. Efeitos e desafios da implantação de um sistema de verificação de segurança cirúrgica: revisão integrativa. J Nurs Health. 2014;4(2):155-64. http://dx.doi.org/10.15210/jonah.v4i2.3393

21. Amaya MR, Maziero ECS, Grittem L, Cruz EDA. Análise do registro e conteúdo de checklists para cirurgia segura. Esc Anna Nery. 2015;19(2):246-51. http://dx.doi.org/10.5935/1414-8145.20150032

22. Elias ACGP, Schmidt DRC, Yonekura CSI, Dias AO, Ursi ES, Silva RPJ, et al. Avaliação da adesão ao checklist de cirurgia segura em hospital universitário público. Rev SOBECC. 2015;20(3):128-33. http://dx.doi.org/10.5327/Z1414-4425201500030002

23. Grittem L, Meier MJ, Peres AM. Sistematização da assistência perioperatória: uma pesquisa qualitativa. Online Braz J Nurs. 2009;8(3):65.

24. Gonçalves RMDA, Pereira MER, Pedrosa LAK, Silva QCG, Abreu RMD. A comunicação verbal enfermeiro-paciente no perioperatório de cirurgia cardíaca. Cienc Cuid Saúde. 2011;10(1):27-34. http://dx.doi.org/10.4025/cienccuidsaude.v10i1.8681

25. Umann J, Guido LA, Linch GFC, Freitas EO. Enfermagem perioperatória em cirurgia cardíaca: revisão integrativa da literatura. Rev Min Enferm. 2011;15(2):275-81. http://www.dx.doi.org/S1415-27622011000200017

26. Klein AGS, Bitencourt JVOV, Dal Pai D, Wegner W. Registros de enfermagem no período perioperatório. Rev Enferm UFPE Online. 2011;5(5):1096-104. http://dx.doi.org/10.5205/reuol.1302-9310-2-LE.0505201103

27. Adamy EK, Tosatti M. Sistematização da assistência de enfermagem no período perioperatório: visão da equipe de enfermagem. Rev Enferm UFSM. 2012;2(2):300-10. http://dx.doi.org/10.5902/217976925054

28. Santos MC, Rennó CSN. Indicadores de qualidade da assistência de enfermagem em centro cirúrgico: revisão integrativa da literatura. Rev Adm Saúde. 2013;15(58):27-36.

COMMUNICATION, DESTRUCTIVE BEHAVIORS AND PATIENT SAFETY

Comunicação, comportamentos destrutivos e segurança do paciente

Comunicación, comportamientos destructivos y seguridad del paciente

Alexsandro Tartaglia[1]*, Mary Gomes Silva[2], Sandra Dutra Cabral Portela[2], Roberta Macêdo dos Santos[3], Abgail Cunha Mendes[4], Emanuela de Carvalho Lourenço Andrade[3]

ABSTRACT: Objective: To reflect on the communication and interaction processes of the perioperative health team in the context of patient safety. **Method:** Reflective theoretical study, based on a column published in the Association of perioperative Registered Nurses Journal (AORN Journal), in March 2014. **Results:** The communication process, in multiprofessional work in health, interferes in the patient's safety, becoming an essential tool to avoid the occurrence of adverse events during health care. **Final considerations:** Many barriers and challenges need to be addressed regarding the effective communication process and interrelation between the multiprofessional health team, with the objective of promoting safe care for the patient in the surgical process.
Keywords: Communication. Communication barriers. Behavior. Patient safety. Perioperative nursing.

RESUMO: Objetivo: Refletir sobre o processo de comunicação e interação da equipe de saúde perioperatória no contexto da segurança do paciente. **Método:** Estudo teórico reflexivo, baseado em coluna publicada na revista da *Association of periOperative Registered Nurses* (AORN *Journal*), em março de 2014. **Resultados:** O processo de comunicação, no trabalho multiprofissional em saúde, interfere na segurança do paciente, tornando-se ferramenta essencial para evitar a ocorrência de eventos adversos durante a assistência à saúde. **Considerações finais:** Muitas barreiras e desafios precisam ser enfrentados no que diz respeito ao processo de comunicação eficaz e à inter-relação entre a equipe multiprofissional de saúde, com o objetivo de promover um cuidado seguro ao paciente em processo cirúrgico.
Palavras-chave: Comunicação. Barreiras de comunicação. Comportamento. Segurança do paciente. Enfermagem perioperatória.

RESUMEN: Objetivo: Reflexionar sobre el proceso de comunicación e interacción del equipo de salud perioperatoria en el contexto de la seguridad del paciente. **Método:** Estudio teórico reflexivo, basado en una columna publicada en la revista de la *Association of periOperative Registered Nurses* (AORN Journal), en marzo de 2014. **Resultados:** El proceso de comunicación, em el trabajo multiprofesional en salud, interfiere en la seguridad del paciente, convirtiéndose en una herramienta esencial para evitar la ocurrencia de eventos adversos durante la asistencia a la salud. **Consideraciones finales:** Muchas barreras y desafíos necesitan ser enfrentados en lo que se refiere al proceso de comunicación eficaz y a la interrelación entre el equipo multiprofesional de salud, con el objetivo de promover un cuidado seguro al paciente en proceso quirúrgico.
Palabras clave: Comunicación. Barreras de comunicación. Comportamiento. Seguridad del paciente. Enfermería perioperatoria.

[1]Nurse; professor at Escola Bahiana de Medicina e Saúde Pública (BAHIANA); federal employee at Secretaria da Saúde do Estado da Bahia (Sesab), Hospital Geral Roberto Santos – Salvador (BA), Brazil.
[2]Nurse; professor at BAHIANA and at Universidade do Estado da Bahia (UNEB) – Salvador (BA), Brazil.
[3]Nurse; federal employee at Sesab – Hospital Geral Roberto Santos – Salvador (BA), Brazil.
[4]Nurse at Hospital Santa Izabel – Salvador (BA), Brazil.
*Corresponding author: alextartaglia@bahiana.edu.br
Received: 01/07/2018 – Approved: 05/20/2018
DOI: 10.5327/Z1414-4425201800040007

INTRODUCTION

"I heard a phrase a patient said that has frightened and saddened me a lot. When he was hospitalized, he told his doctor: 'Don't leave me. I'm afraid they'll kill me here'"[1].

The occurrence of adverse events (AEs) due to health care has been discussed in studies focusing on patient safety; and the recognition of the problem's magnitude has mobilized researchers and practitioners in relation to unsafe health care practices. A study states that the World Health Organization (WHO) estimates that AEs affect about 3 to 16% of all hospitalized patients[2]. Thus, with a minimum 3% AE perioperative rate and a worldwide mortality rate of 0.5%, almost 7 million surgical patients may suffer some damage during perioperative care and, from these, one million would die during or immediately after surgery[2].

Given these data, it is undeniable that this is a public health problem, with significant repercussions on the world's population, involving social and economic costs, with damages to patients and their families. It is considered that between 50 and 60% of the AEs resulting from health care can be prevented[3].

In 2004, the Joint Commission issued a sentinel event alert regarding 47 cases of perinatal death or disability in the United States, where 40 cases resulted in infant death and 7 in permanent disability. In all of those cases, communication and teamwork problems were at the top of the list of identified causes (72%)[4].

The scenery is scary! The lack of effective communication among health professionals can lead to unpleasant and often irreparable outcomes for patients.

OBJECTIVE

To reflect on the communication and interaction processes of the perioperative health team in the context of patient safety.

METHOD

This is a reflexive study motivated by the column Back to Basics: Speak Up[5], published in the Association of Perioperative Registered Nurses Journal (AORN Journal) in March 2014, by nurse Lisa Spruce; and the authors' experience in what corresponds to the communication process and the health team's relationships in the hospital context.

RESULTS

Nuance of everyday life in a surgical center

Imagine the scene: on the one hand, a highly reputed surgeon, strict with the team and impatient with someone new in an operating room (OR) and on the other, a student nurse in training, advised by her preceptor to avoid the aforementioned surgeon at all costs. This surgeon suddenly reaches out to adjust the surgical lamp's central focus and contaminates his glove.

Pause ... What to do now? Be paralyzed with fear and not notify the surgeon about the occurrence or warn him, thus preserving the patient?

Figure 1 illustrates that students often feel the impact of (A) disrespectful and intimidating behavior that may (B) make professionals afraid to speak or (C) lead other professionals to seek work elsewhere.

This scenario among members of health team is not uncommon, and, in Brazil, we are also experiencing similar situations. Lisa Spruce, in her column, mentions that bullying and destructive behaviors in health facilities, which prevent nurses and other professionals from manifesting themselves, can lead to errors and AEs for patients, as well as increase the cost of care. In addition, the problems resulting from these relationships act as an important obstacle to excellence in health services' production[6].

The American Medical Association (AMA) defines as destructive behavior any abusive conduct (including sexual harassment and/or other forms of harassment), or other verbal or nonverbal conduct, which harms or intimidates others, as the quality of care or patient safety may be compromised[7]. Thus, outbursts of anger, retaliation against a coworker, humiliation, retention of information to harm one another, and comments that weaken the self-confidence of a health professional are examples of destructive behaviors in the health work environment[8].

Figure 1 clearly depicts the intimidation process generated by the surgeon in the OR, inhibiting any other health professional from manifesting, thus leaving the patient exposed to more risks during care.

DISCUSSION

Addressing these behaviors can be difficult, and health professionals often avoid taking attitude. The Back to Basics: Speak Up[5] column presents worrying situations on the topic. A research carried out in 2005 in the United States, by the American Association of Critical-Care Nurses (AACN), namely Silence Kills[9] has identified that a small percentage of health professionals talk when they see errors, incompetence, disrespect, or poor teamwork. The research conducted in 2005 in the United States by the American Association of Critical-Care Nurses (AACN). The advantage of manifesting your thoughts while being respectful is obvious: protecting the patient from harm. It is known that the health work process involves intense social interaction, which incorporates a complex structure of needs that includes health professionals, managers and patients. Currently, there is a fragility in the values, attitudes, competencies and behaviors that determine the safety culture in health organizations[8].

An article published in Brazil cites a study on interaction and conflict between professional categories in public hospital organizations and points out that intra-group conflict and power are closely related when considering work relations among health professionals in hospital environment[10]. In addition, there are indications that these two factors have negative consequences for interpersonal relationships and for performance at work.

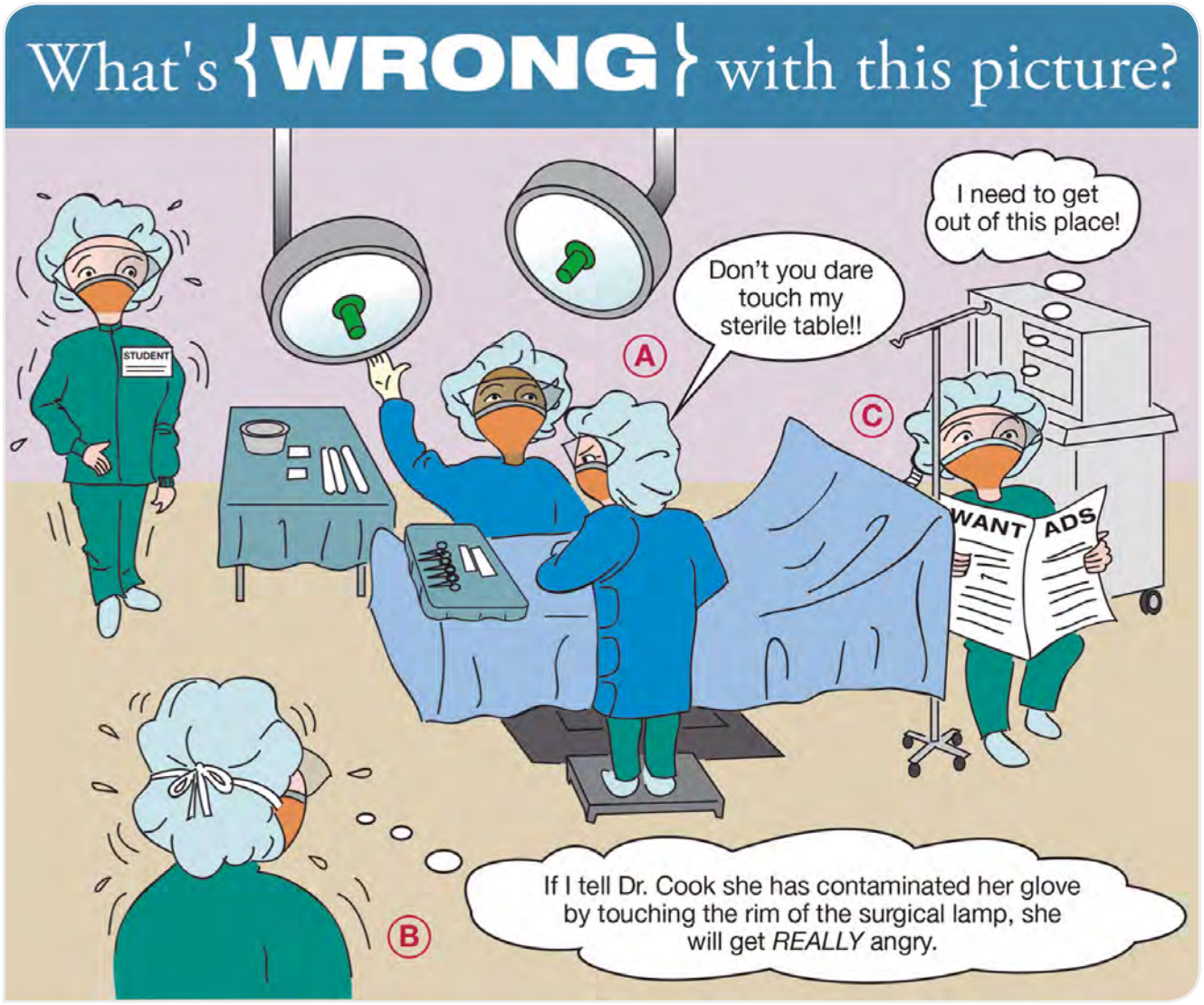


Figure 1. Illustration of destrutive behavior. Reproduction in Brazilian Portuguese authorized by Elsevier. License No. 3780310727171, dated 01/01/2016.

Often, in health care, we are unable to put together a supportive group. And without teamwork, patient safety can hardly be guaranteed. The lack of a cohesive team makes the difficulties greater, and the tools to improve communication become less effective. Teamwork was less important in the past, but given the increasing complexity of health care, there is evidence of its importance[11].

Thus, we argue that the health staff should work as a team to provide patient care safely and to create a pleasant environment. Without mutual respect and trust among all members, the foundations for the development of safe care may suffer negative interference. It is known that the work of teams in critical units often generates mismatches between each professional's peculiarities, difficulty in working in an interdisciplinary way and complexity of care in these environments[12]. Scholars on the matter claim that destructive events are easier to occur in stressful areas or specialties of care, such as surgical centers, emergency units and intensive care units[8].

It is imperative to improve relationship among health professionals, since one of the important aspects of safety culture is the human factor involved in the occurrence of AEs. Encouraging the active role of workers in the workplace, allowing them to identify problems, propose changes and become aware of the harm resulting from a destructive relationship are key principles for improving the quality of patients' health and safety. Noise in communication and lack of its effectiveness are significant contributors to harm and error regarding patients. One must be aware of all team's role in promoting a safety culture, developing healthy behaviors, and communicating effectively in the perioperative environment. The patient admitted to a health institution cannot be a victim of these inappropriate and reprehensible behaviors among the professionals who are there to provide care[13].

Lisa Spruce[5] also mentions some tactics for the treatment of silence among health professionals, such as: sharing examples of near miss and how speech has helped to avoid harm to the patient; the development of practical skills, through training on how to speak and deal with emotions, among others. It was also verified that such situations can be worked out in laboratories, in the form of realistic simulations, where all team will reflect on the possible damages that can occur to the patient, due to omission of a given member.

Hospitals need to develop policies where all workers can talk without fear of retaliation or punishment, favoring horizontal communication, establishing links and enhancing a healthy work environment[8].

FINAL CONSDIERATIONS

To ensure quality and promote a culture of safety, organizations must address the issues of attitudes and behaviors that threaten the performance of the health care staff. It is not about demonstrating power between teams. It's about care! It's about preserving the patient!

Thus, it is necessary, in Brazil, to constantly discuss issues involving communication and destructive behaviors in the workplace.

It is necessary to break paradigms; to work the incoherence of professional training in health, based on the fragmentation of work and the individualism of the professional relations between the actors involved in the caring process. It is necessary to recognize the problem, discuss it and, in this way, promote the awareness of professionals regarding the negative effects on health organizations and, especially, the patient and their family.

Finally, the AORN Journal product is an invitation to reflect on the communication process in hospitals and patients' safety. We cannot tolerate destructive behaviors in this environment. Emphasis is placed on the need to encourage a safety culture between the health team and the performance of the work itself in the multiprofessional configuration, including, in this way, improvements in communication, sharing of knowledge, and favoring safe healthcare practices .

Thus, there is a need of change on the part of leaders, workers and users of health services, in order to raise the awareness of professionals about destructive behaviors, thus guaranteeing an open, noise-free and effective communication between the various teams and establishing a teamwork environment with the collaboration and co-responsibility of all.

REFERENCES

1. Barbosa JAG. Loss of human lives caused by administering food by the venous route: a reflection on the safety of nursing care. Rev Min Enferm [Internet]. 2014[citado 20 set. 2015];18(3):531-2. Disponível em: http://www.reme.org.br/artigo/detalhes/943 http://www.dx.doi.org/10.5935/1415-2762.20140038

2. Santana HT, Siqueira HN, Costa MMM, Oliveira DCAN, Gomes SM, Sousa FC, et al. Surgical patient safety from the perspective of health surveillance - a theoretical reflection. Vigil Sanit Debate [Internet]. 2014[citado 23 set. 2015];2(2):34-42. Disponível em: https://visaemdebate.incqs.fiocruz.br/index.php/visaemdebate/article/view/124/122 http://www.dx.doi.org/10.3395/vd.v2i2.124

3. Gallotti RMD. Eventos adversos: o que são? Rev Assoc Méd Bras [Internet]. 2004[citado 23 set. 2015];50(2):114. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&ptid=S0104-42302004000200008 http://dx.doi.org/10.1590/S0104-42302004000200008

4. The Joint Commission. Preventing infant death and injury during delivery. Sentinel Events Alert [Internet]. 2004[citado 10 out. 2015]:30. Disponível em: http://www.jointcommission.org/assets/1/18/SEA_30.PDF

5. Spruce L. Back to basics: speak up. AORN J [Internet]. 2014[citado 12 out. 2015];99(3):407-15. Disponível em: http://www.aornjournal.org/article/S0001-2092%2813%2901300-8/pdf https://doi.org/10.1016/j.aorn.2013.10.020

6. Oliveira AM, Lemes AM, Machado CR, Silva FL, Miranda FS. Professional relationship between nurses and doctors at the hospital of medical school: the view of doctors. Rev Bras Saúde Matern Infant [Internet]. 2010[citado 12 out. 2015];10(Supl. 2):433-9. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1519-38292010000600023 http://dx.doi.org/10.1590/S1519-38292010000600023

7. American Medical Association. AMA Code of Medical Ethics. Opinion 9.045 - Physicians with disruptive behavior [Internet]. 2013 [citado 6 maio 2018]. Disponível em: http://www.coachingforphysicians.com/services/background-to-coaching/articles-about-coaching/ama-opinion-9045---physicia.pdf

8. Oliveira RM, Silva LMS, Guedes MVC, Oliveira, ACS, Sánchez RG, Torres RAM. Analyzing the concept of disruptive behavior in healthcare work: an integrative review. Rev Esc Enferm USP. 2016;50(4):690-9. http://dx.doi.org/10.1590/S0080-623420160000500021

9. Maxfield D, Grenny J, McMillan R, Patterson K, Switzler A. Silence kills: the seven crucial conversations in healthcare [Internet]. 2005 [citado 25 out. 2015]. Disponível em: http://www.aacn.org/wd/practice/docs/publicpolicy/silencekillsexecsum.pdf

10. Costa DT, Martins MCF. Stress among nursing professionals: effects of the conflict on the group and on the physician's power. Rev Esc Enferm USP. 2011:45(5):1191-8. http://dx.doi.org/10.1590/S0080-62342011000500023

11. Barcellos GB. Comunicação entre os profissionais de saúde e a segurança do paciente. In: Sousa P, Mendes W, eds. Segurança do paciente: criando organizações de saúde seguras. Rio de Janeiro: Fiocruz; 2014. p.139-58.

12. Caregnato RCA, Lautert L. The stress of the multiprofessional team in the Operating Room. Rev Bras Enferm [Internet]. 2005[citado 27 out. 2015];58(5):545-50. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-71672005000500009 http://dx.doi.org/10.1590/S0034-71672005000500009

13. Stumm EMF, Maçalai RT, Kirchner RM. Difficulties faced by nurses that work in surgery. Texto Contexto Enferm [Internet]. 2006[citado 28 out. 2015];15(3):464-71. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-07072006000300011 http://dx.doi.org/10.1590/S0104-07072006000300011