

THE USE OF THERAPEUTIC PLAY AND HUMANIZATION OF SURGICAL CHILD ASSISTANCE

DOI: 10.5327/Z1414-4425201900030001

The need to undergo surgery is perceived by many people as worrying and capable of generating high levels of stress. In my professional career, experience in caring for adults and children pre- and postoperatively has shown that misinformation seems to be the major problem.

Health professionals are not always aware of the importance of welcoming patients at such a time when they feel so vulnerable. Fear of the unknown disorganizes the individual, who ends up feeling insecure. Being clear about the surgical procedure, using appropriate language and being receptive to their fears and anxieties, is essential at the moment.

If surgery is not easy for adults, it can become a traumatic event for children, with significant repercussions on their emotional development. They also need to be informed of what will happen before, during and after surgery, although this right is often denied.

Believing that the child has no ability to understand the situation and for fear that they will suffer even more when talking about the procedure, adults often choose not to tell the truth, omitting facts or telling fantasy stories, often far from reality¹. And when they wake up from anesthesia, they feel confused and angry for being betrayed by the people they trust. It does not cooperate with procedures, as might be expected, increasing the risk of accidental extubation as well as inadvertent removal of catheters and probes.

The child's ability to understand is often underestimated by adults; however, when appropriate communication strategies to their stage of development are used, they may surprise us.

One of such strategies is a toy, as important to the child as work to the adult. They have numerous functions, among which I highlight their ability to foster the establishment of a bond of trust with the caregiver. Its insertion in health institutions is indispensable and enables the accomplishment of atraumatic care, which consists in offering care clear of emotional trauma, recognized as one of the forms of humanization of pediatric care¹.

The therapeutic play (TP) is a playful modality widely used in the hospital context, either as a way to enable the child to relieve tension, by dramatizing an atypical situation

for them (dramatic), transforming a therapeutic activity into a playful one (function enabler), or as a powerful tool that helps adults to explain, simply and clearly, what will happen to them (instructional).

A study of 30 children between 3 and 5 years of age, who underwent minor surgery and previously prepared with TP, shows that most of them spontaneously entered the operating room (73.3%) and without resisting separation from their mother (80.0%), contributing to the anesthetic procedure (53.3%) and awakening from anesthesia quietly (87%)².

Puppets representing the surgical team, the child and their parents, as well as hospital supplies such as caps, mask, aprons, syringes and serum equipment, among others, were used in this study to dramatize the surgery. The reduced number of behaviors that show fear and stress among children, such as crying, fussing, struggling, or shouting, reinforces the beneficial effects of TP on children's readiness for surgery².

Although there are several publications on the effects of TP on reducing anxiety and stress in children undergoing hospital procedures, most of them do not provide consistent evidence to support this, as shown in a more recently published systematic review³.

However, a randomized clinical trial yields more robust results on the effectiveness of BT in reducing childhood anxiety in the face of invasive, painful and/or stressful procedures. It was performed with 208 children, between 3 and 12 years of age, who underwent removal of orthopedic plaster, of which 103 were randomly selected to receive previous preparation with TP and the others constituted the control group. Overall, children prepared with TP had fewer negative emotional manifestations during the procedure; however, the reduction in anxiety levels was more evident in children aged three and seven who played before the procedure⁴.

In spite of the vast literature regarding the use of TP at different levels of health care, especially by nursing professionals, it is noteworthy, however, that its use is still modest in clinical practice.

In this sense, the Legislation of Professional Practice in Nursing recognizes, as a competence of all nursing staff working in the pediatric area, the use of toys/TP in the care of hospitalized children and their families. Therefore, it is up to the nurse to prescribe and supervise this activity when performed by the nursing assistant or technician⁵.

Given all efforts to make TP widely used by health professionals in childcare, I hope that, in the near future it will be as routine as hand hygiene or fall prevention. Playing is also to take care!

Fabiane de Amorim Almeida 

Nurse, PhD in School Psychology and Human Development by Universidade de São Paulo (USP). Professor at Faculdade Israelita de Ciências da Saúde Albert Einstein (FICSAE) and leader of the Toy Study Group (Grupo de Estudos do Brinquedo – GEBRINq), associated to the National Council for Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq).

REFERENCES

1. Hockenberry MJ, Wilson D, Winkelstein ML, editores. Wong: Fundamentos de Enfermagem Pediátrica. 10ª ed. São Paulo: Elsevier; 2018.
2. Paladino CM, Carvalho R, Almeida FA. Brinquedo terapêutico no preparo para a cirurgia: comportamentos de pré-escolares no período transoperatório. *Rev Esc Enferm USP*. 2014;48(3):423-9. <http://doi.org/10.1590/S0080-623420140000300006>
3. Silva RD, Austregésilo SC, Ithamar L, Lima LS. Therapeutic play to prepare children for invasive procedures: a systematic review. *J Pediatr*. 2017;93(1):6-16. <http://doi.org/10.1016/j.jpmed.2016.06.005>
4. Wong CL, Ip WY, Kwok BMC, Choi KC, Ng BKW, Chan CWH. Effects of therapeutic play on children undergoing cast-removal procedures: a randomized controlled trial. *BMJ Open*. 2018;8:e021071. <http://doi.org/10.1136/bmjopen-2017-021071>
5. Conselho Federal de Enfermagem. Resolução COFEN nº 546/2017, de 9 de maio de 2017. Atualiza norma para utilização da técnica do brinquedo/brinquedo terapêutico pela equipe de enfermagem na assistência à criança hospitalizada [Internet]. Brasília: COFEN; 2017 [acessado em 31 jul. 2019]. Disponível em: http://www.cofen.gov.br/resolucao-cofen-no-05462017_52036.html

SANITARY APPLIANCE: COMPARATIVE STUDY OF AUTOMATED AND MANUAL CLEANING AND DISINFECTION PROCESSES

Utensílios sanitários: comparação entre processos de limpeza e desinfecção manual e automatizado

Utensílios sanitarios: comparación entre procesos de limpieza y desinfección manual y automatizado

Carmen Eulalia Pozzer^{1*} , Marcia Arsego² , Ivana Gottardo Rocha³ , Heloisa Helena Karnas Hoefel⁴ ,
Cinara Maisonette Duarte⁵ , Angelica Peres do Amaral⁶ , Rita Catalina Aquino Caregnato⁷ 

ABSTRACT: Objective: To compare the results of manual and automated cleaning and disinfection of Sanitary Appliance (US). **Method:** A descriptive experimental study, carried out by means of microbiological cultures of appliance used by patients bedridden in a hospitalization unit of a hospital located in the south of Brazil. Thirty three samples were collected after the cleaning and disinfection processes were carried out, eleven for each of the three methods available: automated, manual with and without supervision for microbiological evaluation. **Results:** In the automated process, pathogenic microorganisms of epidemiological relevance was now here to be found in the experiment. In the manual, in both processes performed, according to protocol established by the Institution with and without supervision, there was growth of pathogenic microorganisms. **Conclusion:** Therefore, in this study we conclude that the automated method for cleaning and disinfection has been shown to be safer for use in healthcare. The results obtained in the manual method do not confer safety. It is suggested that studies be carried out with references trains with controlled contamination.

Keywords: Patient safety. Bathroom equipment. Disinfection. Equipment and supplies, hospital.

RESUMO: Objetivo: Comparar os resultados dos processos de limpeza e desinfecção manual e automatizado de Utensílios Sanitários (US). **Método:** Estudo experimental, descritivo, realizado por meio de culturas microbiológicas de US usados por pacientes acamados em uma unidade de internação de um hospital localizado no sul do Brasil. As amostras microbiológicas foram coletadas após limpeza e desinfecção, sendo 11 amostras de cada um dos três processos testados: automatizado, manual sem supervisão e manual com supervisão. **Resultados:** No processo automatizado, não houve crescimento de microrganismos patogênicos de relevância epidemiológica. No manual, em ambos processamentos realizados, conforme protocolo estabelecido pela instituição com e sem supervisão, houve crescimento de microrganismos patogênicos. **Conclusão:** Com base nos resultados obtidos no estudo, o método automatizado demonstrou ser seguro para utilização dos US na assistência à saúde. Os resultados obtidos no método manual não conferem segurança. Sugere-se que sejam realizados estudos com conhecimento prévio do grau de contaminação controlada por meio de cepas de referência.

Palavras-chave: Segurança do paciente. Aparelho sanitário. Desinfecção. Equipamentos e provisões hospitalares.

RESUMEN: Objetivo: Comparar los procesos de limpieza y desinfección manual y por medio de un equipo automático de Utensílios Sanitarios (US). **Método:** Estudio experimental descriptivo de medio de cultivos microbiológicos de US de los que hicieron uso enfermos en piso de internación de un hospital del sur de Brasil. Las muestras microbiológicas fueron recolectadas después de la limpieza y desinfección, de las cuales 11 muestras de cada uno

¹Nurse; Master in Health Education. Coordinator of Health Products Sterilization of Santa Casa de Misericórdia de Porto Alegre – Porto Alegre (RS), Brazil.

²Nurse of Hospital Infection Control at Santa Casa de Misericórdia de Porto Alegre – Porto Alegre (RS), Brazil.

³Biologist in the Laboratory of Microbiology of Santa Casa de Misericórdia de Porto Alegre – Porto Alegre (RS), Brazil.

⁴Nurse; PhD in Nursing. Professor at the Nursing School of Universidade Federal do Rio Grande do Sul – Porto Alegre (RS), Brazil.

⁵Nurse. Hospital Manager of Hospital São Francisco da Santa Casa de Misericórdia de Porto Alegre – Porto Alegre (RS), Brazil.

⁶Nurse at Santa Casa de Misericórdia de Porto Alegre – Porto Alegre (RS), Brazil.

⁷PhD in Education. Professor at the Nursing Department of Universidade Federal de Ciências da Saúde de Porto Alegre – Porto Alegre (RS), Brazil.

*Corresponding author: pozzer@santacasa.org.br

Received: 09/15/2018 – Approved: 06/10/2019

DOI: 10.5327/Z1414-4425201900030002

de los tres procesos probados: automático, manual sin supervisión y manual con supervisión. **Resultados:** En el proceso con el equipo automático, no hubo crecimiento de microorganismos patógenos de relevancia epidemiológica. En los dos procesos manuales con y sin supervisión, conforme protocolo establecido por la institución, hubo crecimiento de microorganismos patógenos. **Conclusión:** Por los resultados obtenidos en el estudio, se concluye que el la limpieza e nel equipo automático ha demostrado seguridad para usar los US en cuidados a La salud. Se sugiere que se realicen estudios con conocimiento previo del grado de contaminación controlada por medio de cepas de referencia.

Palabras clave: Seguridad del paciente. Aparatos sanitarios. Desinfección. Equipos y suministros de hospitales.

INTRODUCTION

Good practices and proper processing of Health Products (HP) are essential for a safe nursing care. The traditional classification of appliances, according to their criticality levels, in critical, semi-critical and non-critical, as to the invasion of such appliances in the human body, is still used worldwide and is quoted in publications directed to the practices related to the control and prevention of Health Care-Associated Infections (HCAI)¹. Non-critical appliances, which are the objects of this study, have contact with a healthy skin, requiring at least a cleaning process¹.

Cleaning aims at removing organic matter, thus reducing the Colony-Forming Units (CFU). The requirement for processing of non-critical health products is smaller compared to the treatment to be applied for a safe use, because it only has contact with healthy skins^{2,3}.

The indiscriminate use of antimicrobials contributed to the development of multidrug-resistant bacteria through selective pressure. Thus, the concerns to adopt preventive measures increased, involving materials and environments that contribute to control the transmission of such microorganisms. Materials that come in contact only with healthy skins, but that are reused by different people, should be closely analysed after their use, when they were previously contaminated with organic matter that may contain a higher total of CFU.

Several HP used in patient care in the Health Care Facilities (HCF) are reused (after undergoing the cleaning and disinfection processes) by different patients. Thus, they may be vehicles of infectious agents if there are failures in the cleaning and disinfection processes. Sanitary appliances (SA), such as bedpans and portable urinals used by patients who are unable to use the toilet, can be an important source of cross-contamination⁴. Feces are comprised of organic matter with a large amount of microorganisms. Therefore, the containers

that receive them must be processed and comply with the good processing practices.

The pathogenic microorganisms include Enterobacteria (enteropathogenic *Escherichia coli*, *Salmonella*, *Shigella*, *Citrobacter*, *Klebsiella*, *Serratia*, *Enterobacter*, *Proteus*, and *Providencia*), which cause urinary tract, enteric and systemic infections, bacteraemia, pneumonia, and meningitis⁵.

In the manual cleaning of SA, mechanical friction is performed with specific objects, running water or under pressure and detergent solution, while automated cleaning is conducted with equipment that use water jets under pressure and detergent solution⁶. One of the disadvantages of SA manual cleaning is excreta handling by the worker, who is at risk of biological contamination. Although the contact with organic matter may also occur during automated cleaning, the risks are lower.

SA washing machines, also known as discharge washers, enable to remove excreta (feces, urine, secretions and blood) by cleaning and disinfecting non-critical materials, thus decreasing the risk of infections in patients, occupational risk of workers, and environmental impacts. They have been designed for use in the hospitalization units and should be installed in places where there are purification procedures and are connected to power, water, and sewage. The advantages are the possibility of cleaning more than one product simultaneously; of optimizing natural resources, such as water; of preventing occupational, biological and chemical hazards; and of performing the process in a standardized way³. To guarantee the performance of such equipment, the manufacturer states that it is essential to maintain the preventive intervention and its periodic qualification, which is defined by the HCF, in an annual basis⁶.

Based on this reflection, we established the research problem: What is the microbial difference in SA when performing the processes of automated and manual cleaning and disinfection?

OBJECTIVE

To compare the results of manual and automated cleaning and disinfection of SA.

METHOD

This is an experimental and descriptive study carried out in a HCF with 1,200 beds, located in the South of Brazil at a hospitalization unit with 16 beds.

The study was performed using SA microbiological cultures, after they were used for faecal and urinary eliminations of patients hospitalized in this unit. The sample consisted of 11 SA for each type of cleaning and disinfection process, from which microbiological cultures were collected after the manual or automated process. Samples were collected by the nurse that received guidance by a microbiologist and they were numbered independently of the process, from 1 to 33, and sent to the laboratory. Only the collector had the cleaning type identification before the final analysis result. All collections were immediately done after the processing conclusion. The mean number of samples was estimated based on a daily control worksheet during 90 days of SA use with feces and urine, used in the unit where the study was performed.

There were three types of processes for cleaning and disinfecting SA, as described below:

- Manual without the nurse's supervision, in which a licensed practical nurse reported that the process followed the Standard Operating Procedure (SOP): excreta were thrown in the purge of the purification step; then, they were washed with hospital neutral detergent and SA-specific cleaning brush in running cold water; they were dried with a clean compress and disinfected with a compress soaked in 70% alcoholic solution, through friction in the inner and outer surfaces. The procedure was repeated three times;
- Manual cleaning according to SOP: the same process described in the previous item was performed, but with the nurse's direct supervision;
- Automated cleaning: SA collected by the licensed practical nurse and introduced with excreta into a slot inside the washer, which initiated the automatic command; after the completion of the process, the

SA was removed from the equipment; a discharge washer was used with the following characteristics: standards for thermal disinfection of temperature between 85 and 90°C⁷, with short cycles; low consumption of water, energy, and detergent; washing with 12 jets, four with rotation function; standard cycle of five minutes, consumption of 13 liters of cold water and 13 liters of hot water in the standard cycle.

To prepare the samples, 100 mL of sterile peptone water was inoculated in the interior, passing through the entire internal surface of each SA after each process performed in the purification step. From this volume, 50 mL were recovered and placed in the original vial with a sterile syringe. The samples were identified, conditioned, and sent to the Laboratory of Microbiology.

In the Laboratory of Microbiology, the quantitative method was used to determine the microbial load (viable bacteria and fungi), a technique called Spread Plate in US⁸. The acceptable reference value is 1×10^2 CFU/mL. Tryptic Soy Agar (TSA) and Sabouraud Dextrose Agar with Chloramphenicol (SDA) were respectively used for bacterial and fungal cultures. The samples inoculated in TSA were incubated at the temperature (T) of $32.5^\circ\text{C} \pm 2.5^\circ\text{C}$, from 3 to 5 days; and SDA at the T of $22.5^\circ\text{C} \pm 2.5^\circ\text{C}$, from 5 to 7 days. The readings were performed every 24 hours; the results reported in the Worksheets (WS), and later typed into the system and released. For the expression of results, CFU per mL was used. In the qualitative method, microorganisms of epidemiological importance were isolated.

In the qualitative method, we used the inoculation of 1.0 mL of sample, containing peptone water in flasks with 100 mL of sterile Trypticase soy broth (TSB). Samples were incubated in an oven at a T of $32.5^\circ\text{C} \pm 2.5^\circ\text{C}$, from 3 to 5 days. The readings were performed daily; if apparent turbidity was observed in TSB, we isolated the possible microorganisms in solid selective culture media (for gram-negative and gram-positive bacteria), with incubation at $32.5^\circ\text{C} \pm 2.5^\circ\text{C}$, for 24 and 48 hours. If growth was observed in the period, the microorganism was identified and an antimicrobial susceptibility testing (AST) was conducted for the carbapenem class (imipenem, meropenem, and ertapenem). In case of full resistance to carbapenems, the AST would be repeated with the standardized antibiotic battery at the institution.

In the qualitative stage, the fungi were not identified because they were of saprophytic etiology, except if yeast elements grew, which did not occur.

The project was submitted to the Hospital Research Ethics Committee (REC) and approved according to CAAE No. 64628217.3.0000.5335.

RESULTS

Microbiological cultures performed in SA showed different results. Table 1, with automated cleaning results, shows <01 CFU in all analyzed samples.

In the automated cleaning, there was no growth of viable fungi and bacteria in any of the 11 analyzed samples.

The results of routine manual cleaning methods with and without supervision, shown in Table 2, presented non-detectable and detectable isolates. Of the 11 analyzed samples, seven were positive for bacteria of epidemiological relevance and 12 Gram-Negative Bacilli (GNB) were isolated of these, seven from the *Enterobacteriaceae* family and five from the non-fermenting GNB family.

Regarding the microbial load, we verified that of the 11 samples, six had a count in the interval from <01 CFU/mL to 630 CFU/mL (6.3×10^2), and GNB were isolated in samples one and two.

Table 1. Washing/cleaning methods, counting of bacteria and viable fungi (CFU/mL).

Sample	Automated Cleaning		Manual Cleaning (N/S)		Manual Cleaning (W/S)	
	Bacteria	Fungi	Bacteria	Fungi	Bacteria	Fungi
1	<01	<01	50	41	15,000	14,000
2	<01	<01	630	47,000	19	12
3	<01	<01	<01	40	44	39
4	<01	<01	1680	40	375	91
5	<01	<01	124,000	33,200	154	20
6	<01	<01	130	30	327	208
7	<01	<01	162	155,000	216,000	12,000
8	<01	<01	90	20	65,000	37,000
9	<01	<01	770,000	200,000	3,000,000	127,000
10	<01	<01	2,860,000	380,000	143,000	33,000
11	<01	<01	141,000	108,000	3,000,000	37,000

N/S: no supervision; W/S: with supervision.

Table 2. Methods of manual washing and isolated bacteria.

Sample	Manual Cleaning (N/S)			Manual Cleaning (W/S)		
	Isolate 1	Isolate 2	Isolate 3	Isolate 1	Isolate 2	Isolate 3
1	<i>P. aeruginosa</i>	ND	ND	<i>Pseudomonas sp.</i>	<i>K. pneumoniae</i>	ND
2	<i>E. cloacae</i>	ND	ND	<i>E. cloacae</i>	<i>S. marcescens</i>	ND
3	ND	ND	ND	<i>P. putida</i>	ND	ND
4	<i>E. cloacae</i>	ND	ND	<i>E. cloacae</i>	<i>Pseudomonas sp.</i>	ND
5	<i>E. cloacae</i>	<i>Pseudomonas sp.</i>	<i>P. putida</i>	<i>Pseudomonas sp.</i>	ND	ND
6	ND	ND	ND	<i>P. putida</i>	ND	ND
7	ND	ND	ND	<i>E. cloacae</i>	ND	ND
8	ND	ND	ND	<i>E. cloacae</i>	<i>Pseudomonas sp.</i>	ND
9	<i>E. cloacae</i>	<i>S. marcescens</i>	ND	<i>E. cloacae</i>	<i>Enterobacter sp.</i>	<i>Pseudomonas sp.</i>
10	<i>K. oxytoca</i>	<i>P. aeruginosa</i>	ND	<i>P. putida</i>	ND	ND
11	<i>K. oxytoca</i>	<i>P. aeruginosa</i>	ND	<i>K. oxytoca</i>	<i>P. aeruginosa</i>	ND

N/S: no supervision; W/S: with supervision; ND: non-detectable.

From the *Enterobacteriaceae* family, the species of epidemiological relevance were isolated, *Enterobacter cloacae*; four isolates were resistant to Meropenem, one isolate was resistant to Ertapenem and there was no resistance to Imipenem. There was no resistance to carbapenems for *Klebsiella oxytoca* (two isolates) and *Serratia marcescens* (one isolate). In the five remaining samples, with quantification between 1,680 (1.6×10^3) and 2,860,000 (2.9×10^6) CFU/mL, GNB were isolated with epidemiological relevance.

As to the method of manual cleaning with supervision, the results show in Table 2 that of the 11 analyzed samples, there was growth for 17 GNB, eight from the *Enterobacteriaceae* family and nine from non-fermenting GNB family.

Of the isolated species, an *Enterobacter sp.* and four *Enterobacter cloacae* samples, two isolates presented an intermediate sensitivity to Imipenem and Meropenem; a resistant isolate and an isolate with intermediate resistance to Ertapenem. There was no resistance to carbapenems for *Klebsiella pneumoniae* (one isolate), *Klebsiella oxytoca* (one isolate), and *Serratia marcescens* (one isolate).

From the group of non-fermenting GNB, five *Pseudomonas sp.*, three *Pseudomonas putida* and one *Pseudomonas aeruginosa* were isolated, and there was no resistance to carbapenems.

As to the microbial load of the 11 samples, five had a count in the range of 19 (1.9×10^1) to 375 (3.7×10^2) CFU/mL, and GNB were isolated in samples 2, 3, 4, 5, and 6.

In the six remaining samples (54.5%), with a quantification between 1,500 (1.5×10^3) and 3,000,000 (3.0×10^6) CFU/mL, GNB were isolated with epidemiological relevance.

DISCUSSION

This study suggests a benefit in the use of automated cleaning for SA applied in the eliminations of feces and urine of dependent patients. Lack of knowledge as to the level of contamination of AS prior to hygiene and decontamination processes are considered study limitations. However, considering that feces have the highest number of CFUs per gram and all the tested SA initially had feces, this limitation becomes less relevant, because, after the automated process, the microbial count (viable fungi and bacteria) was <01 CFU/mL in all samples. Microbial load reduction is a concern identified by other authors due to the positive

impact on HCAI after cleaning of materials that make contact with the patient^{9,10,11}.

The found microorganisms differ from a French study, in which most of the 25 automatic washing machines were gram-positive bacteria, *Staphylococcus sp.*, in addition to other GNB in a lower quantity⁴. In this study, they were not found in the automated cleaning, and GNB were found in manual washings.

Another aspect to be discussed is whether the process is supervised or not. The Hawthorne phenomenon was expected to occur during supervised cleaning and disinfection; however, it did not occur. Although the sample number was insufficient for statistical significance tests, it was clear, regardless of supervision or not, that the automated method was safer for handling SA by professionals. It allows a safe reuse among patients. Other authors also confirmed the impact of environmental cleaning on HCAI reduction¹⁰. This observation similarly suggests that SA cleaning would have an equal impact, considering it comes into direct contact with patients, as shown in the present study. Likewise, recommendations from experts on infected fomites have been the subject of recent discussions regarding the impact on the environment and on HCAI¹¹.

Excreta that contain modified microbiota of patients are eliminated and contaminate the environment, gradually modifying the hospital microbiota. Materials and surfaces contaminated with modified microorganisms come into contact with other patients, infecting or colonizing them, thus creating an endless infection chain¹². The detection of differences among the identified isolates proves that SA are contaminated by them, exposing users to both resistant and intermediate isolates, as well as antimicrobial susceptible ones. Other authors identified that the intervention in the hygiene of patient fomites reduces the dissemination of resistant microorganisms¹³.

CONCLUSION

Based on the study data, the automated method for cleaning and disinfection proved to be safer when using SA in health care. Results obtained in the manual method proved it was not safe. Further studies with previous knowledge as to the level of controlled contamination through reference strains are needed.

REFERENCES

1. Rutala WA, Weber DJ. Disinfection, sterilization, and antiseptics: an overview. *Am J Infect Control* [Internet]. 2016 [acessado em 10 abr. 2019];44(5 Supl.):e1-6. Disponível em: <https://doi.org/10.1016/j.ajic.2015.10.038>
2. Groa E, Wohl RL, Coepferthwaite L, Beaty K, Jones K, Ladny C. Association of periOperative Registered Nurses (AORN). Sterilization and disinfection. In: *Guidelines for Perioperative Practice*. Denver: AORN; 2018. p. 957-83.
3. Kulkarni K, Kaczorowski D, Bonkowski A, Kovach S, Basile R. Safe to handle? Comparing manually and machine-washed medical devices. *Biomed Instrum Technol* [Internet]. 2016 [acessado em 10 abr. 2019];50(s2):18-22. Disponível em: <https://doi.org/10.2345/0899-8205-50.s2.18>
4. Bros A, Deboscker S, Mielcarek M, Foeglé J, Hernandez C, Ménard C, et al. Bacteriological quality evaluation of bed pans in a university hospital. *Int J Infect Control* [Internet]. 2018 [acessado em 10 abr. 2019];14(1):1-6. Disponível em: <http://www.ijic.info/article/view/17934>
5. Jandhyala SM, Talukdar R, Subramanyam C, Vuyyuru H, Sasikala M, Reddy DN. Role of the normal gut microbiota. *World J Gastroenterol* [Internet]. 2015 [acessado em 10 abr. 2019];21(29):8787-803. Disponível em: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4528021/>
6. Sociedade 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.
7. International Organization for Standardization. ISO 15883: Washer disinfectors [Internet]. Genebra: ISO; 2006 [acessado em 10 abr. 2019]. Disponível em: <https://www.iso.org/standard/41076.html>
8. United States Pharmacopeia. 37ª ed. Rockville: United States Pharmacopeia l Convention; 2014.
9. Ramphal L, Suzuki S, McCracken IM, Addai A. Improving hospital staff compliance with environmental cleaning behavior. *Proc (Bayl Univ Med Cent)* [Internet]. 2014 [acessado em 10 abr. 2019];27(2):88-91. Disponível em: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3954653>
10. Everett BR, Sitton JT, Wilson M. Efficacy and cost-benefit analysis of a global environmental cleaning algorithm on hospital-acquired infection rates. *J Patient Saf.* [Internet]. 2017 [acessado em 10 abr. 2019];13(4):207-10. Disponível em: <https://doi.org/10.1097/PTS.0000000000000141>
11. Quinn MM, Henneberger PK, Braun B, Delclos GL, Fagan K, Huang V, et al. A. Cleaning and disinfecting environmental surfaces in healthcare: toward an integrated framework for infection and occupational illness prevention. *Am J Infect Control* [Internet]. 2015 [acessado em 10 abr. 2019];43(5):424-34. Disponível em: <https://www.ajicjournal.org/article/S0196-6553%2815%2900075-9/pdf>. <http://dx.doi.org/10.1016/j.ajic.2015.01.029>
12. Hoefel HH, Lautert L, Schmitt C, Soares T, Jordan S. Vancomycin administration: mistakes made by nursing staff. *Nurs Stand* [Internet]. 2008 [acessado em 10 abr. 2019];22(39):35-42. Disponível em: <https://doi.org/10.7748/ns2008.06.22.39.35.c6567>
13. Datta R, Platt R, Yokoe DS, Huang SS. Environmental cleaning intervention and risk of acquiring multidrug-resistant organisms from prior room occupants. *Arch Intern Med* [Internet]. 2011 [acessado em 10 abr. 2019];171(6):491-4. Disponível em: <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/226851>

EVALUATION OF THE FUNCTIONAL CAPACITY OF PATIENTS ATTENDED IN A PERIOPERATIVE OUTPATIENT CLINIC OF THE FEDERAL DISTRICT

Avaliação da capacidade funcional de pacientes atendidos em um ambulatório perioperatório do Distrito Federal

Evaluación de la capacidad funcional de pacientes atendidos en un ambulatorio perioperatorio del Distrito Federal

Jacqueline Ramos de Andrade Antunes Gomes^{1*} , Thaís Lôbo Campos² , Glayson Carlos Miranda Verner³ , Leonília Brelaz de Abreu⁴ , Ana Caroline de Mendonça Motta⁴ , Wesley da Silva Araújo⁵ , Letícia Santos Ribeiro⁶ , Rafael Villela Silva Derrê Torres⁷ , Anna Karoline Carvalho Sousa⁶ , Tâmelá Beatriz Matinada da Silva⁶ , Janaina Ferreira Passos⁶ 

ABSTRACT: Objective: To identify the functional capacity of patients attended at the perioperative evaluation outpatient clinic of the Regional Hospital of Gama (APA-HRG), Federal District, as well as establish relationship with the cardiac stratifications employed. **Method:** Observational, descriptive, retrospective study with data collection of records from preoperative consultations of 292 patients screened as high risk, performed by a team of medical anesthesiologists and nurses, performed in the APA-HRG in the period from June 2014 to June 2016. **Results:** The sample profile consisted, for the most part, of female subjects (78.77%), of over 60 years of age (48.35%), not obese (69.44%), referred mainly by the gynecological clinic (39.79%), diagnosed with systemic arterial hypertension (44.17%) and smokers (12.67%). Functional capacity was classified as excellent in 63.18% (>10 metabolic equivalents) of patients. There was a significant association between the metabolic equivalents and the stratification of the American Society of Anesthesiologists, the Revised Cardiac Risk Index and the Functional Classification of the New York Heart Association. **Conclusion:** Most of the charts analyzed were of patients with excellent functional capacity, presenting a significant association with the stratifications studied.

Key words: Aged. Exercise test. Perioperative care. Patient Care Team.

RESUMO: Objetivo: Identificar a capacidade funcional de pacientes atendidos no ambulatório de avaliação perioperatória do Hospital Regional do Gama (APA-HRG), no Distrito Federal, bem como estabelecer relação com as estratificações cardíacas utilizadas. **Método:** Estudo observacional, descritivo, retrospectivo, com coleta de dados dos registros nos prontuários das consultas pré-operatórias de 292 pacientes triados como alto risco, executadas por equipe de médicos anesthesiologistas e enfermeiros, realizadas no APA-HRG no período de junho de 2014 a junho de 2016. **Resultados:** O perfil da amostra constituiu-se, em sua maioria, por indivíduos do gênero feminino (78,77%), maiores de 60 anos (48,35%), não obesos (69,44%), encaminhados principalmente pela clínica ginecológica (39,79%), diagnosticados com hipertensão arterial sistêmica (44,17%) e tabagistas (12,67%). A capacidade funcional foi classificada como excelente em 63,18% (>10 equivalentes metabólicos) dos pacientes. Foi constatada associação significativa entre os equivalentes metabólicos e as estratificações da American Society of Anesthesiologists, do Índice de Risco Cardíaco Revisado e da Classificação Funcional da New York Heart Association. **Conclusão:** A maioria dos prontuários analisados era de pacientes com excelente capacidade funcional, apresentando associação significativa com as estratificações estudadas. **Palavras-chave:** Idoso. Teste de esforço. Assistência perioperatória. Equipe de assistência ao paciente.

¹Nurse; PhD in Health Sciences. Coordinator of the Residency of Nursing in Surgical Center in Network of the Escola Superior de Ciências da Saúde da Fundação de Ensino e Pesquisa em Ciências da Saúde (ESCS-FEPECS - School of Health Sciences of the Foundation of Education and Research in Health Sciences) Secretaria da Saúde do Distrito Federal (SES/DF - Secretary of Health of the Federal District) - Brasília (DF), Brazil.

²Nurse; specialist in Surgical Center by the ESCS-FEPECS of the SES/DF - Brasília (DF), Brazil.

³Medical anesthesiologist. Head of the Anesthesiology and Perioperative Medicine Unit of the Regional Hospital of Gama - Brasília (DF), Brazil.

⁴Nurse; specialist in Surgical Center by the ESCS-FEPECS of the SES/DF - Brasília (DF), Brazil.

⁵Nurse; specialist in Surgical Center by the ESCS-FEPECS of the SES/DF - Brasília (DF), Brazil.

⁶Nurse. Resident of Nursing in Surgical Center of the ESCS-FEPECS da SES/DF - Brasília (DF), Brazil.

⁷Major of the Official Fire Brigade Board. Medical anesthesiologist of the Corpo de Bombeiros Militar do Distrito Federal (CBMDF - Federal Fire Brigade of the Federal District) - Brasília (DF), Brazil.

*Corresponding author: jacquelinecchdbf@gmail.com

Received: 06/08/2018 - Approved: 03/09/2019

DOI: 10.5327/Z1414-4425201900030003

RESUMEN: **Objetivo:** Identificar la capacidad funcional de pacientes atendidos en el ambulatorio de evaluación perioperatoria del Hospital Regional do Gama (APA-HRG), en el Distrito Federal, así como establecer relación con las estratificaciones cardíacas utilizadas. **Método:** Estudio observacional, descriptivo, retrospectivo, con colecta de datos de los registros en los historiales médicos de las consultas preoperatorias de 292 pacientes seleccionados como alto riesgo, ejecutadas por equipo de médicos anestesistas y enfermeros, realizadas en el APA-HRG en el período de junio de 2014 a junio de 2016. **Resultados:** El perfil de la muestra se constituye, en su mayoría, por individuos del género femenino (78,77%), mayores de 60 años (48,35%), no obesos (69,44%), encaminados principalmente por la clínica ginecológica (39,79%), diagnosticados con hipertensión arterial sistémica (44,17%) y tabaquistas (12,67%). La capacidad funcional fue clasificada como excelente en un 63,18% (>10 equivalentes metabólicos) de los pacientes. Fue constatada asociación significativa entre los equivalentes metabólicos y las estratificaciones de la American Society of Anesthesiologists, del Índice de Riesgo Cardíaco Revisado y de la Clasificación Funcional de la New York Heart Association. **Conclusión:** La mayoría de los historiales médicos analizados era de pacientes con excelente capacidad funcional, presentando asociación significativa con las estratificaciones estudiadas.

Palabras-clave: Anciano. Prueba de esfuerzo. Atención perioperatoria. Grupo de atención al paciente.

INTRODUCTION

According to the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* – IBGE)¹, the segment of the Brazilian population that grows the most is the elderly, with a projection of 44.44% for the year 2060. By 2025, the country can be in sixth place in the world ranking in number of elderly people². As a result, the volume of non-cardiac surgeries in elderly patients, associated with comorbidities, has increased. This fact culminates in a higher risk of postoperative morbidity and mortality³.

Among the main risk factors related to death in non-cardiac surgeries are cardiovascular diseases, mainly coronary artery disease (CAD)⁴⁻⁶. This evidence points to the need to meet this growing demand for multi professionals who perform perioperative assessments in order to identify factors that increase surgical risk and to devise strategies that reduce it, aiming at a satisfactory surgical result^{7,8}. In this sense, the functional capacity of each patient, which is a reliable predictor of cardiac risk, is determined and helps establish the need for additional tests and specific pharmacological therapy before and during the planned surgery⁹.

Usually, good functional capacity is defined based on the levels of metabolic equivalence (MET). A MET unit is defined as 3.5 mL/kg/min and represents the basal oxygen consumption of an average man of 70 kg at rest¹⁰. For reference purposes, activities of daily living such as eating, dressing, using the bathroom and showering generally require 1 to 2 MET, while sports as intense as swimming, tennis and skiing require more than 10 MET¹¹.

In order to evaluate the functional capacity of the patient in the perioperative period, the ergometric test is an examination of low financial cost, easy execution and high reproducibility,

compatible with the reality of several regions and municipalities in Brazil. It is evident how the gradient of severity in the test is greatly related to the perioperative evolution. When at low loading, the onset of ischemic response is related to the increase in perioperative cardiac events^{5,12}. The performance of this test is not indicated for the group of very low risk patients, since it does not add benefit, not even for high-risk patients due to the need for invasive stratification⁵.

Anamnesis is another way used to determine tolerance to a patient's exercise. Patients are asked to describe the nature and frequency of their physical activities. As an alternative to the formal test, this is another information to evaluate the patient's ability to safely undergo surgery¹³.

Simple questions allow a reasonable estimate of the patient's functional capacity. For example, one may ask whether the patient is able to walk four blocks without stopping because of limiting symptoms and climbing two floors of stairs without stopping because of limiting symptoms. Affirmative responses confirm adequate functional capacity, since such activities test the patient's tolerance to effort at a level of 4 to 5 MET, the equivalent of surgical stress¹⁰.

On the other hand, negative responses to both questions are generally associated with older patients, who are prone to diabetes, obstructive pulmonary disease, congestive heart failure, hypertension, and higher values for the physical status classification of the American Society of Anesthesiologists (ASA). In addition, they predict a greater probability of poor postoperative evolution¹³.

Considering the specific characteristics of the surgical patient and the importance of the physical exercises to obtain the improvement of the quality of care provided to the patient, the perioperative evaluation outpatient clinic of a general hospital is a service focused on perioperative evaluation. A multi professional team (anesthesiologists and nursing

staff), trained in evidence-based practices, provides individualized perioperative care to the patient, seeking better results.

At the perioperative evaluation visit, performed at the perioperative evaluation outpatient clinic of the Regional Hospital of Gama (APA-HRG), the nurse and the anesthesiologist apply the risk stratification of obstructive sleep apnea syndrome (score STOP-BANG), functional capacity (MET) and risk of venous thrombosis (safety zone). The anesthesiologist also uses the ASA physical status classification and cardiac risk by the functional classification of the New York Heart Association (NYHA), Lee's Individual Reserve Capacity Requirement (IRCR) and cardiac risk for non-cardiac procedures^{14,15}.

OBJECTIVE

To identify the functional capacity of patients treated in APA-HRG, Federal District, as well as establish relationship with the cardiac stratifications employed.

METHOD

This is an observational, descriptive, retrospective study, with data collection from the visits conducted from June 2014 to June 2016 at APA-HRG, a regional hospital located in Brasília, Federal District.

The population consisted of the medical records of candidates for elective surgery referred by the surgical specialties to APA-HRG. The sample consisted of 292 medical records of patients screened as high risk. According to the service protocol, high-risk patients were considered those who were older than 65 years, or less than 65 years with a morbid history (allergies, systemic diseases, use of medications on a continuous basis) and/or physical and/or cognitive limitation and/or previous history of complication in surgical-anesthetic procedure.

The study included medical and physical records of patients over 18 years of age, with elective treatment surgical diseases referred to general surgery clinics and subspecialties, gynecology and orthopedics, evaluated by APA-HRG. The exclusion criteria were the medical records of patients whose surgery was not performed until June 2017.

Of the total sample, 50 medical records of patients seen in the second half of 2014 were included, 125 in 2015 and 117 in the first half of 2016.

For the data collection, a form recorded in the physical or electronic medical records of the patients, gathering the main information contained in the standard questionnaire of the service of preoperative visits, was used. In addition to the sociodemographic and anthropometric variables (gender, age, body mass index, comorbidities and smoking habits), the physical status classification by ASA and functional classification by MET (Chart 1) were collected, as well as cardiac risk assessments: Lee, NYHA and cardiac risk for non-cardiac procedures.

The instrument used to assess functional capacity was taken from the current Guidelines of the American College of Cardiology/American Heart Association (ACC/AHA), adapted from the Duke Activity Status Index¹⁶.

Data analysis was performed through descriptive statistics of socioeconomic and demographic data, as well as the comparison of clinical and cardiac stratifications with functional capacity (inferential analysis).

The categorical variables were described by means of absolute (n) and relative (%) frequencies and the associations were tested using the χ^2 test with a significance level of 5% ($p < 0.05$). The variables were analyzed using the statistical software R (R Development Core Team 2008 version 3.3 for Windows®).

Regarding the critical analysis of the risks, because the research used only physical or electronic medical records, the risks related to work were minimal. The study assured the patients' anonymity, as it focused on the data in general and not on the individual patients.

The project was approved by the Research Ethics Committee of the Foundation of Education and Research in Health Sciences (*Fundação de Ensino e Pesquisa em Ciências da Saúde – FEPECS*), CAAE 60740916.8.0000.5553, in accordance

Chart 1. Classification of functional capacity in levels of metabolic equivalence (MET) used by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama.

Metabolic equivalent (MET)	Type of activity
Excellent (>7 MET)	Practice soccer, swimming, tennis, running for short distances
Moderate (4 to 7 MET)	Walk with speed of 6,4 km/h
Poor (<4 MET)	Little activity, short hikes (two blocks), with maximum speed of 4.8 km/h

MET: The oxygen consumption (V02) of a 40-year-old man with 70 kg at rest is 3.5 mL/kg, or the corresponding 1 MET Source: Fleisher et al.⁹.

with the requirements of Resolution 466 of December 12, 2012, of the National Health Council (*Conselho Nacional de Saúde – CNS*).

RESULTS

The profile of the studied sample consisted, for the most part, of female subjects (78.77%), of over 60 years of age (48.35%), not obese (69.44%), referred mainly by the gynecological clinic (39.79%), diagnosed with systemic arterial

Table 1. Demographic and anthropometric variables of the researched population served by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama. Federal District, 2016.

Variables	n	%
Gender		
Female	230	78.77
Male	62	21.23
Age (years)		
<20	01	0.41
20 to 40	41	16.94
41 to 60	83	34.3
> 60	117	48.35
BMI (Kg/m ²)		
<30	200	69.44
>30	88	30.56
Field of expertise		
General	68	23.53
Gynecology	115	39.79
Mastology	05	1.73
Trauma and orthopedics	85	29.41
Vascular	06	2.08
Others	10	3.46
Related diseases		
SAH	125	44.17
DM	12	4.24
SAH+DM	35	12.37
No	111	39.22
Smoking		
Yes	37	12.67
No	200	68.49
Former smoker	55	18.84

BMI: Body mass index; SAH: systemic arterial hypertension; DM: diabetes mellitus.

hypertension (SAH) (44.17%) and smokers (12.67%), as shown in Table 1.

Regarding functional capacity, 277 medical charts were evaluated, and of these, 11 (3.97%) had poor functional capacity (1 to 4 MET), in contrast to 175 (63.18%) ones classified as excellent (>10 MET), as shown in Table 2.

In the relation between MET, the classification system of the physical condition of the patient (ASA) and the cardiac risk stratification (Lee and NYHA), p-values were found to be a significant association in all cases. That is, depending on the MET classification, the classification of the stratification is also changed (Table 3).

In Table 4, when analyzing the relationship between MET and cardiac risk by the non-cardiac procedure, 44.76% of the patients obtained excellent MET and were submitted to non-cardiac procedures considered as intermediate risk, as well as the 26.35% that obtained moderate MET. This group

Table 2. Evaluation of the metabolic equivalent in the population served by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama. Federal District, 2016.

MET	n	%
Excellent	175	63.18
Moderate	91	32.85
Poor	11	3.97

MET: levels of metabolic equivalence.

Table 3. Test of χ^2 between the metabolic equivalent (MET) and the stratifications performed by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama. Federal District, 2016.

	χ^2 *	Degrees of freedom	p
ASA	37.638	4	0.000
LEE	31.284	6	0.000
NYHA	22.661	4	0.000

ASA: American Association of Anaesthesia; LEE: revised cardiac risk index; NYHA: New York Heart Association; *program SPSS version 25.0.0.0.

Table 4. Relationship between the metabolic equivalent and cardiac risk by the non-cardiac procedure performed by the perioperative evaluation outpatient clinic of the Regional Hospital of Gama. Federal District, 2016.

MET	Cardiac risk by the non-cardiac procedure performed (%)		
	Low	Intermediate	High
Excellent	15.89	44.76	2.52
Moderate	5.41	26.35	1.09
Poor	0.72	2.89	0.36

MET: metabolic equivalent.

of patients represents the majority of the sample and they were safely released to surgery without further testing following the ACC/AHA guidelines.

DISCUSSION

In the current study, the majority of the sample belonged to the female gender (78.77%) and was over 60 years old (48.35%). Population-ageing in Brazil has occurred throughout the country, with greater survival of the female population, which reached a life expectancy of 72.6 years, in 2000, almost 8 years longer than men. For this reason, gynecology was the specialty most attended (39.7%) in this study¹⁷.

The study also showed higher incidence of patients diagnosed with SAH (44.17%) in relation to the associated pathologies. Similarly, in another study, 71.3% of the patients evaluated in the preoperative period had related diseases¹⁸. Concomitant to the ageing population, the increase in the prevalence of chronic non-communicable diseases demands the need for continuous treatments and the increase of variable degrees of dysfunctions and dependencies brings direct implications to the care of surgical patients¹⁸.

This study found an expressive number of obese patients (30.56% with $>30 \text{ kg/m}^2$ body mass index), which exacerbates the national picture, in which the prevalence is 19.6% among women and 18.1% among men in Brazil¹⁹. This data is relevant for the design of the surgical risk, since obesity is a conditioning factor for cardiovascular disease²⁰.

Regarding smoking, the majority of the sample (68.49%) was non-smoker, an expected figure, according to the Brazilian reality. According to data from the Vigilance of Risk Factors and Protection for Chronic Diseases by Telephone Inquiry (*Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico – VIGITEL*) in 2016, the percentage of smokers over 18 years old in Brazil is 10.2%, 12.7% among men and 8% among women¹⁹.

Functional capacity was classified as excellent in 63.18% ($>10 \text{ MET}$) of the patients. This result was expected, since according to the VIGITEL 2016 collection in the Federal District, the practice of free time physical activity increased by approximately 7.3% between 2009 and 2016, although physical activity is still reduced with aging¹⁹.

According to data from the VIGITEL, in 2016 the frequency of physically inactive individuals was 10.3%

in the Federal District, the lowest of all Brazilian capitals¹⁹. In the region under administration of the Gama, of the total number of residents analyzed by the District Household Sample Survey (*Pesquisa Distrital por Amostra de Domicílios – PDAD/DF*), 64.50% have a Community Meeting Point (*Ponto de Encontro Comunitário – PEC*), 48.85% with bike path and 29.64% have tree-lined streets near their homes²¹, and this possibly contributes to the active lifestyle of the population.

Only 3.9% of the sample were classified as having poor functional capacity ($<4 \text{ MET}$). The risk of operative cardiac complications is higher for these patients. However, it is a well-known fact that poor physical condition is a modifiable risk factor and improvements in fitness over time have been demonstrated to improve prognosis. One study concluded that each increment of 1 MET in exercise capacity is associated with approximately 12% mortality reduction, regardless of the form of measurement, a powerful predictor of cardiovascular risk²².

Most patients with established cardiovascular disease report decreased functional capacity²³. Also to objectively discriminate the surgical risk for each specific condition of coronary artery disease (CAD) is fundamental for prevention and for a lower morbidity of perioperative events⁵. This study demonstrated, then, a significant association between MET and some of the cardiac stratification announced by the Brazilian Society of Cardiology: ASA, Lee and NYHA.

A study of 1,049 patients found that 30-day and long-term postoperative survival was significantly better regardless of the type of surgery in ASA P3 with functional independence than in those ASA P3 with limited functional capacity²⁴.

In patients with heart failure, as evidenced in the NYHA classification, loss of functional capacity is related to lower ejection fraction and lower cardiac output. In patients with ischemic heart disease, as evidenced by the IRCR, exercise is also limited by the eventual onset of myocardial ischemia²³.

According to the ACC/AHA protocol, after determining the patient's physical status and cardiac risk (step 1) and estimating their functional capacity (step 2), cardiac risk related to the different types of surgical procedures should be considered (step 3)²⁵.

This study revealed that the majority (74%) of the surgical procedures were at intermediate risk. The intrinsic risk of the surgical procedure corresponds to the probability of occurrence of perioperative cardiovascular events⁵. Extensive surgical procedures, particularly those in the abdomen or chest,

and those associated with large changes in blood volume and/or loss have increased risks²⁵. 22.02% of them were classified as low risk. These small outpatient procedures are associated with a very low rate of morbidity and mortality²⁶.

The surgery can be performed when the patient presents lower predictors of cardiac risk, with moderate or excellent functional capacity, and if the procedure is of intermediate or low risk⁸. Thus, 44.76% of the patients who obtained excellent MET and would be submitted to non-cardiac procedures considered as intermediate risk, as well as the 26.35% who obtained moderate MET, were released for surgery safely, without requiring other tests, following the guidelines of the ACC/AHA²⁵.

The incorporation of the functional capacity evaluation in the perioperative nursing visit brings to the nurse and other professionals of the multi professional team a more complete risk investigation, since MET is an important predictor of mortality.

In this study we evaluated the MET through the questionnaire, since it is a more practical and accessible tool. Therefore, other works, including the ergometric test for MET verification, should be encouraged.

CONCLUSION

This study demonstrated that APA-HRG follows the current perioperative assessment guidelines announced by ACC/AHA.

The study showed a predominance of female patients, over 60 years of age, non-obese, smokers, diagnosed with SAH, referred in greater incidence by the gynecological clinic.

Most of the population of this study had functional capacity classified as excellent and would be at lower cardiovascular risk. It also verified a significant association between the functional capacity assessment (MET) and the ASA, Lee and NYHA stratifications. Thus, by conducting a perioperative evaluation based on the best scientific evidence, the MET provides nurses and anesthesiologists with important information to perform non-cardiac surgeries safely.

The need for other studies on the evaluation of functional capacity in preoperative patients is also verified, considering that there are few studies on this subject in the Brazilian literature.

REFERENCES

1. Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics). Coordenação de População do IBGE (IBGE Population Coordination). Population Change in Brazil in the Beginning of the 21st Century: Subsidies on population projections for Brazil and Federation Units [Internet]. Brasil: Instituto Brasileiro de Geografia e Estatística; 2017 [accessed on June 09, 2017]. Available in: <https://agenciadenoticias.ibge.gov.br/agencia-noticias/2013-agencia-de-noticias/releases/9831-ibge-lanca-estudo-metodologico-sobre-mudanca-demografica-e-projecoes-de-populacao.html>
2. Machado WD, Gomes DF, Freitas CASL, Brito MCC, Moreira ACA. Elderly with not transmitted chronic diseases: a group association study. Reon Facema [Internet]. 2017 [accessed on June 09, 2017];3(2):444-51. Available in: <http://www.facema.edu.br/ojs/index.php/ReOnFacema/article/view/194/106>
3. Reis PV, Souza GS, Lopes AM, Costa AV, Santos A, Abelha FJ. Severity of disease scoring systems and mortality after non-cardiac surgery. Braz J Anesthesiol. 2018;68(3):244-53. <https://doi.org/10.1016/j.bjan.2017.12.001>
4. Ramos GC. Aspectos relevantes da doença arterial coronariana em candidatos à cirurgia não cardíaca. Rev Bras Anesthesiol. 2010;60(6):662-5. <http://dx.doi.org/10.1590/S0034-70942010000600013>
5. Gualandro DM, Yu PC, Caramelli B, Marques AC, Calderaro D, Fornari LS, et al. 3ª Diretriz de Avaliação Cardiovascular Perioperatória da Sociedade Brasileira de Cardiologia. Arq Bras Cardiol. 2017;109(3 Supl. 1):1-104.
6. Cesar LA, Ferreira JF, Armaganijan D, Gowdak LH, Mansur AP, Bodanese LC, et al. Diretriz de Doença Coronária Estável. Arq Bras Cardiol. 2014;103(2 Supl. 2):1-59.
7. Pontes SRS, Salazar RM, Torres OJM, TCBC-MA. Avaliação perioperatória de pacientes em unidade de terapia intensiva. Rev Col Bras Cir. 2013;40(2). <http://dx.doi.org/10.1590/S0100-69912013000200002>
8. Fernandes EO, Guerra EE, Pitrez FAB, Fernandes FM, Rosito GBA, Gonzáles HE, et al. Avaliação pré-operatória e cuidados em cirurgia eletiva: recomendações baseadas em evidências. Rev AMRIGS. 2010;54(2):240-58.
9. Fleisher LA, Beckman JA, Brown KA, Calkins H, Chaikof E, Fleischmann KE, et al. ACC/AHA 2007 Guidelines on perioperative cardiovascular evaluation and care for non-cardiac surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Non-cardiac Surgery): developed in collaboration with the American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, and Society for Vascular Surgery. Circulation. 2007;116(17):e418-99. <https://doi.org/10.1161/CIRCULATIONAHA.107.185699>

10. Sabiston DC. Tratado de cirurgia. 19ª ed. Rio de Janeiro: Elsevier; 2014.
11. Prefeitura do Rio de Janeiro. Secretaria Municipal de Saúde. Avaliação pré-operatória. Coleção Guia de Referência Rápida SMS - RJ/SUBPAV/SAP. Rio de Janeiro: Prefeitura do Rio de Janeiro; 2016.
12. Feitosa ACR, Marques AC, Caramelli B, Ayub B, Polanczyk CA, Jardim C, et al. II Diretriz de Avaliação Perioperatória da Sociedade Brasileira de Cardiologia. *Arq Bras Cardiol.* 2011;96(3 Supl. 1):1-68.
13. Reilly DF, McNeely MJ, Doerner D, Greenberg DL, Staiger TO, Geist MJ, et al. Self-reported exercise tolerance and the risk of serious perioperative complications. *Arch Intern Med.* 1999;159(18):2185-92.
14. Loureiro BMC, Feitosa-Filho GS. Escores de risco perioperatório para cirurgias não-cardíacas: descrições e comparações. *Rev Soc Bras Clin Med.* 2014;12(4):314-20.
15. Santos IS, Bittencourt MS. Heart failure. *Rev Med [Internet].* 2008 [accessed on Nov. 10, 2017];87(4):224-31. Available in: <https://www.revistas.usp.br/revistadc/article/download/59083/62069>
16. Hlatky MA, Boineau RE, Higginbotham MB, Lee KL, Mark DB, Califf RM, et al. A brief self-administered questionnaire to determine functional capacity (the Duke Activity Status Index). *Am J Cardiol.* 1989;64(10):651-4.
17. Leão EM, Marinho LFB. Saúde das mulheres no Brasil: subsídios para as políticas públicas de saúde. *Rev Promoção Saúde.* 2002;6:31-6.
18. Santos ML, Novaes CO, Iglesias AC. Epidemiological profile of patients seen in the pre-anesthetic assessment clinic of a university hospital. *Braz J Anesthesiol.* 2017;67(5):457-67. <https://doi.org/10.1016/j.bjan.2016.06.002>
19. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância de Doenças e Agravos não Transmissíveis e Promoção da Saúde. *Vigitel Brasil 2016: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico: estimativas sobre frequência e distribuição sociodemográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2016.* Brasília: Ministério da Saúde; 2017.
20. Vargas BD, Sangiovo A, Pereira F, Vincensi C, Lissarassa YPS, Zimmermann CA, et al. Obesidade, diabetes, hipertensão associados ao desenvolvimento de dano renal e redução na qualidade de vida. *Rev Saúde Integrada.* 2016;9(18).
21. Distrito Federal. Governo do Distrito Federal. Secretaria de Estado de Planejamento, Orçamento e Gestão. Companhia de Planejamento do Distrito Federal. Pesquisa Distrital por Amostra de Domicílios (GAMA). PDAD 2015. Brasília: Companhia de Planejamento do Distrito Federal; 2015.
22. Myers J, Prakash M, Froelicher VD, Do D, Partington S, Atwood J. Exercise capacity and mortality among men referred for exercise testing. *N Engl J Med.* 2002;346(11):793-80. <https://doi.org/10.1056/NEJMoa011858>
23. Moraes RS, Nóbrega ACL, Castro RRT, Negrão CE, Stein R, Serra SM, et al. Diretriz de Reabilitação Cardíaca. *Arq Bras Cardiol.* 2005;84(5):431-40. <http://dx.doi.org/10.1590/S0066-782X2005000500015>
24. Visnjevac O, Lee J, Pourafkari L, Dosluoglu HH, Nader ND, Kritchevsky S. Functional capacity as a significant independent predictor of postoperative mortality for octogenarian ASA-III patients. *J Gerontol A Biol Sci Med Sci.* 2014;69(10):1229-35. <https://doi.org/10.1093/gerona/glu062>
25. Mukherjee D, Eagle KA. Perioperative cardiac assessment for non-cardiac surgery. *Circulation.* 2003;107(22):2771-4. <https://doi.org/10.1161/01.CIR.0000072248.24921.D6>
26. Novaes MV. Avaliação e preparo pré-operatório: classificação do estado físico. *Medicina Perioperatória.* Rio de Janeiro: SAERJ; 2006.

PATIENT SAFETY CULTURE IN SURGICENTERS: PERCEPTION OF NURSING TEAM

Cultura de segurança do paciente em centro cirúrgico: percepção da equipe de enfermagem

La cultura de seguridad del paciente en centro quirúrgico: la percepción del equipo de enfermería

Elena Bohomol^{1*} , Eliana Ferreira de Melo² 

ABSTRACT: Objective: To analyze the perception of nursing professionals from a surgicenter at a private hospital of patient's safety culture dimensions. **Method:** This is a descriptive and exploratory study with a quantitative approach, conducted in a private and accredited hospital institution, including 37 nursing professionals from surgicenters. It used the Hospital Survey on Patient Safety Culture instrument for data collection. **Results:** The dimension "Organizational learning and continuous improvement" was identified as a strong area (77.4%) in the institution. We found four weak areas regarding the dimensions: "Teamwork within units" (47.4%); "Communication opening" (45.8%); "Nonpunitive response to errors" (29.2%); and "Team Adequacy" (42%). **Conclusion:** Implementing changes that require efforts from the entire hospital institution at the strategic, administrative, and operational levels are required, mainly to encourage professionals' attention when conducting actions that strengthen a nonpunitive culture, and to study their dimensioning regarding patient's care during the perioperative period.

Keywords: Perioperative nursing. Patient safety. Organizational culture.

RESUMO: Objetivo: Analisar a percepção de profissionais de enfermagem de um centro cirúrgico em um hospital privado acerca das dimensões da cultura de segurança do paciente. **Método:** Estudo descritivo e exploratório, com abordagem quantitativa, realizado em uma instituição hospitalar privada e acreditada, com 37 profissionais de enfermagem do centro cirúrgico, utilizando o instrumento *Hospital Survey on Patient Safety Culture* para coleta de dados. **Resultados:** Identificou-se a dimensão "Aprendizado organizacional e melhoria contínua" (77,4%) como área forte na instituição. Encontraram-se quatro áreas frágeis, referentes às dimensões: "Trabalho em equipe dentro das unidades" (47,4%), "Abertura da comunicação" (45,8%), "Resposta não punitiva aos erros" (29,2%) e "Adequação de pessoal" (42%). **Conclusão:** Há a necessidade de se implementar mudanças que requeiram esforços de toda a organização hospitalar nos níveis estratégico, administrativo e operacional, principalmente para incentivar a atenção dos profissionais na condução das ações que fortaleçam a cultura não punitiva, e estudar o dimensionamento de profissionais para o atendimento do paciente no perioperatório.

Palavras-chave: Enfermagem perioperatória. Segurança do paciente. Cultura organizacional.

RESUMEN: Objetivo: Analizar la percepción de los profesionales de enfermería de un centro quirúrgico en un hospital privado sobre las dimensiones de la cultura de seguridad del paciente. **Método:** Estudio descriptivo y exploratorio con enfoque cuantitativo, realizado en una institución hospitalaria privada y acreditada, incluyendo 37 profesionales de enfermería del centro quirúrgico, utilizándose el instrumento *Hospital Survey on Patient Safety Culture* para la recolección de datos. **Resultados:** La dimensión "Aprendizaje organizacional y mejora continua" se identificó como un área fuerte (77,4%) en la institución. Se encontraron cuatro áreas frágiles con respecto a las dimensiones: "Trabajo en equipo dentro de las unidades" (47,4%); "Comunicación abierta" (45,8%); "Respuesta no punitiva a errores" (29,2%) y "Adecuación del equipo" (42%). **Conclusión:** Es necesario implementar cambios que requieran esfuerzos de toda la organización hospitalaria a los niveles estratégico, administrativo y operativo, especialmente para alentar la atención de los profesionales en la realización de acciones que fortalezcan la cultura no punitiva y para estudiar el dimensionamiento de los profesionales a la atención al paciente en el perioperatorio.

Palabras clave: Enfermería perioperatoria. Seguridad del paciente. Cultura organizacional.

¹Nurse. Associate Professor at Universidade Federal de São Paulo (Unifesp) – São Paulo (SP), Brazil.

²Nurse. Nursing Coordinator at Hospital São Camilo – São Paulo (SP), Brazil.

*Corresponding author: ebohomol@unifesp.br

Received: 10/23/2018 – Approved: 06/10/2019

DOI: 10.5327/Z1414-4425201900030004

INTRODUCTION

Patient safety is defined by the World Health Organization (WHO) as “the reduction of risk of unnecessary harm associated with health care to an acceptable minimum”. An acceptable minimum refers to what is feasible within current knowledge, available resources, and context in which care was delivered¹.

Errors and adverse events occur in all care settings, including surgicenters (SC), which are considered complex and high-risk sectors². Occupational processes in this sector involve a range of professionals, complex practices, specific environmental conditions, availability of material and technological resources, and readiness for safe care. However, incidents occur and may cause harm to patients, as well as suffering and stress to professionals who work in this context³.

Healthcare organizations have implemented initiatives that address safe surgery protocols to ensure that established standards are observed during procedures, adverse events presented in the SC and post-anesthetic recovery are effectively recorded, adequate attention is given to patients in the perioperative period, and communication between professionals is effective^{4,5}. Nonetheless, these actions must be based on managerial maturity, leadership involvement, team integration, and strategies to eliminate punishment culture⁶.

Studies show that the SC environment presents numerous conflicts and point to the frequency of inappropriate and arrogant behaviors among teams or inappropriate occupational conditions, which can negatively affect or potentially compromise patient care^{5,6}.

Hence, knowing patient safety culture in this context is an essential aspect to make improvements^{2,3}. Safety culture represents values, attitudes, skills, and behaviors that determine commitment to health and safety management, replacing guilt and punishment with the opportunity to learn from failures and improve health care⁷.

The greater the understanding of the care team concerning values and rules governing the institution and the more processes and systems are adequate, the safer the care⁸. To reinforce such understanding, one of the premises for implementing the Brazilian National Patient Safety Program (NPSP) addresses the importance of promoting safety culture focused on organizational improvement, involving professionals and patients, promoting safe systems and changes in individual accountability processes⁹.

The nursing team is fully involved in perioperative care, participates in the surgical team care and is responsible for promoting a quality and safe environment. Therefore, it is important to know the perception of safety culture among nursing professionals working in SC.

OBJECTIVE

To analyze the perception of nursing professionals from a SC at a private hospital of patient safety culture dimensions.

METHOD

This is a descriptive and exploratory study with a quantitative approach that was conducted at a private non-profit hospital accredited by Brazilian (National Accreditation Organization) and international (Health Standards Organization and Joint Commission International) accreditation programs. The SC was structured for high complexity procedures, including bariatric, orthopedic, oncological and cardiac surgeries, as well as minimally invasive and high precision procedures, such as videolaparoscopy, neuronavigation, and other video-assisted techniques.

All SC nursing professionals were invited to participate in the research. Those who performed care activities with direct patient contact were included, whereas nurses on vacation, who took time off or leave were excluded, as well as head nurses. The study population consisted of 51 collaborators, including eight nurses, 39 nursing technicians, and four nursing assistants.

Hospital Survey on Patient Safety Culture (HSOPSC) from the Agency for Healthcare Research & Quality (AHRQ) was the instrument used for data collection. The AHRQ is a North-American entity focused on the development of studies in the area, especially to implement safety culture in health institutions. It is a worldwide instrument that has been used both in hospitals and in other types of health institutions, designed by researchers Sorra and Nieva¹⁰ and validated for the Brazilian reality by Reis et al.¹¹. It has nine sections, 42 items in total, regarding patient safety culture, that measure 12 dimensions, divided into three levels:

- Hospital Level:
 1. Hospital management support for patient safety;
 2. Teamwork among units;
 3. Change of duty/shift and internal transfers;

- Unit Level:
 4. Expectations of the supervisor/head and safety-promoting actions;
 5. Organizational learning and continuous improvement;
 6. Teamwork within units;
 7. Communication opening;
 8. Information return and error communication;
 9. Nonpunitive reply to errors;
 10. Team adequacy;

- Results Level:
 11. General perception of patient safety;
 12. Frequency of reported events.

The instrument for data collection consisted of two parts: the first included items related to sociodemographic information (professional category, educational level, work shift, occupational time in institution and sector, and graduation period); and the second included items that comprehend the 12 dimensions of safety culture.

The instrument was made available online, using Interact® software, from July 12 to 24 of 2015, when the Free Informed Consent (ICF) Form was delivered and the purpose of the study was explained.

Data analysis was performed using descriptive statistics for categorical variables, presented by absolute and relative frequencies. The domain means and characterization variables were compared using the analysis of variance (ANOVA) to assess three or more factors. The analyzes were interpreted considering a 5% significance level ($p=0.05$) with the aid of R 3.2.3 software.

To calculate dimension scores, values from 1 to 5 points were used for each response level in the presented order: strongly disagree, disagree, neither agree nor disagree, agree and totally agree; and also never, rarely, sometimes, almost always and always. Considering the questionnaire follows the Likert scale technique, the items negatively written were inverted for analysis and scored in the order from 5 to 1. To develop the percentage of positive responses for the 12 dimensions, the formula recommended by AHRQ was used, which calculates the number of positive responses of the dimension items divided by the total number of valid responses (positive, neutral, and negative). Positive responses represent an assertive reaction regarding patient safety culture. They are classified into strong

areas (scores above 75%), neutral (between 50 and 75%), and weak (scores under 50%) of safety culture. Data were described and analyzed by dimension¹⁰.

The internal consistency of HSOPSC dimensions was assessed by Cronbach's alpha coefficient.

This study followed the principles of Resolution No. 466/2012 from the Brazilian National Health Council and was approved by the Research Ethics Committee (REC) of Universidade Federal de São Paulo and the participating institution, according to protocol No. 655.946.

RESULTS

A total of 37 professionals participated in the study, corresponding to 72.5% of the population, including seven (18.9%) nurses, and 30 (81.1%) licensed practical nurses. 65.9% of them have a high school degree; 48.6% work in the afternoons; 48.6% have been working at the institutions from 1 to 5 years; 54.1% have been working in the sector between 1 and 5 years, and 35.1% have taken an educational degree from 6 to 10 years (Table 1).

Cronbach's alpha coefficient of HSOPSC ranged from 0.45 to 0.91, and this coefficient was 0.64 for the instrument, which grants the questionnaire satisfactory reliability.

Table 2 presents the frequency of positive, neutral, and negative responses as to the level and dimensions of patient safety culture. Regarding positive answers, the "Organizational learning and continuous improvement" dimension is the strong area (77.4%) in the institution.

The Hospital management support for patient safety" (70.5%), "Teamwork among units" (50.8%), and "Change of duty/shift and internal transfers" (50.7%) Hospital Level dimensions are neutral regarding patient safety. Moreover, the Unit Level dimensions "Expectations of the supervisor/head and safety-promoting actions" (56.1%), and "Information return and error communication" (50.1%); and the Results Level dimensions "General perception of patient safety" (60.0%) and "Frequency of reported events" (73.2%) are also neutral.

Four dimensions of the Unit Level were found as weak areas: "Teamwork within units" (47.4%), "Communication opening" (45.8%), "Nonpunitive response to errors" (29.2%), and "Team Adequacy" (42.0%).

Table 1. Sociodemographic variables of surgicenter professionals.

Variables		n	%
Position/ function	Attending nurse	7	18.9
	Licensed practical nurse	30	81.1
Education	High School	24	64.9
	Undergraduation Degree	8	21.6
	Specialization	5	13.5
Shift	Morning	15	40.5
	Afternoon	18	48.6
	Night	4	10.8
Institution period	Less than 1 year	2	5.4
	From 1 to 5 years	18	48.6
	From 6 to 10 years	12	32.4
	From 11 to 15 years	2	5.4
	From 16 to 20 years	3	8.1
Sector Period	Less than 1 year	2	5.4
	From 1 to 5 years	20	54.1
	From 6 to 10 years	10	27
	From 11 to 15 years	2	5.4
	From 16 to 20 years	3	8.1
Training time	From 1 to 5 years	9	24.3
	From 6 to 10 years	13	35.1
	From 11 to 15 years	7	18.9
	From 16 to 20 years	5	13.5
	21 years or more	3	8.1

DISCUSSION

The study findings allowed us to know characteristics of nursing professionals working at SC and relevant aspects of patient safety culture that must be improved.

Regarding the characterization of professionals, there was a significant number of licensed practical nurses working in the sector, some with higher education training. This aspect corroborated the research findings on the profile of Brazilian Nursing, which showed that mid-level workers had an educational level above the required to perform their duties, with 11.7% of them holding an undergraduation degree¹².

Most professionals had 5 years at most of experience in the institution, which is similar to national and international studies including a nursing team from a SC^{8,13}.

The shorter time of experience may become a facilitating aspect to shape professionals in the organizational culture once they are admitted and presented to the institution guiding principles¹⁴. The studied institution applies the methodology of different accreditation programs, which involves intensive change processes. A study found that professionals working in accredited services felt more prepared to meet users' needs as they were able to work with more qualified material, technical and human resources, process and procedure standardization, and more organization. In addition, the organizational environment was favored by the accreditation process¹⁵.

Table 2. Positive, neutral, and negative responses regarding patient safety culture level and dimensions.

Level	Dimension	Negative %	Neutral %	Positive %
Hospital	Hospital management support for patient safety	10.5	19.0	70.5
	Teamwork among units	24.4	24.8	50.8
	Change of duty/shift and transfers	25.3	24.0	50.7
Unit	Expectations of the supervisor/head and safety-promoting actions	23.0	20.9	56.1
	Organizational learning and continuous improvement	9.9	12.7	77.4
	Teamwork within units	25.6	27	47.4
	Communication opening	20.1	34.1	45.8
	Information return and error communication	19.9	30.0	50.1
	Nonpunitive response to errors	50.5	20.3	29.2
	Team adequacy	37.7	20.3	42.0
Results	General perception of patient safety	25.7	14.3	60.0
	Frequency of reported events	12.6	14.2	73.2

Cronbach's alpha index measures the correlation between questionnaire responses and is based on the average correlation between questions. Therefore, variations between the perceptions of individuals are expected, because they are social subjects and have different experiences. The findings corroborate national (variability from 0.52 to 0.91)¹¹ and international studies (variability from 0.61 to 0.86)¹⁶.

The study presented one strong, seven neutral, and four fragile safety dimensions. Thus, many areas should be improved. In addition, some dimensions in the neutral range are close to 50% of positive responses, such as "Teamwork among units", "Change of duty/shift and internal transfers", "Expectations of the supervisor/head and safety-promoting actions", and "Information return and error communication".

Compared to a North-American study that assessed the perception of professionals working in SC, distribution of dimensions has some similarity, that is, there is only one strong area, which is "Teamwork within units" (75.9%). Three dimensions were identified as weak areas: "Teamwork among units" (48.7%), "Change of duty/shift and internal transfers" (37.2%), and "Nonpunitive response to errors" (37.3%), the latter also found in this study¹⁷.

Considering it is an accredited hospital, the dimensions were initially expected to have more positive responses, because quality assessments impose continuous improvement processes and presenting results is required, encouraging professionals to be involved in quality programs. However, after analyzing a study conducted in the nursing service of an accredited hospital in Turkey, culture dimensions did not necessarily reflect the quality process and its strong dimensions were: "Teamwork among units" (76%) and "General perception of patient safety" (75%); and two weak dimensions were also found in this study: "Nonpunitive response to errors" (33%), and "Team adequacy" (22%)⁶.

However, managing an institution, either globally or in sectors, must be focused on improving processes based on a positive patient safety culture, regardless of the assessment instrument to be used⁸. The findings point to the need of looking more closely at four dimensions, considering it is such an important and complex sector.

The dimension "Teamwork within units" shows that, in this sector, there should be a friendly working

climate with harmonious interpersonal and multi-professional relations, regarding different opinions and without intimidating behaviors, so that professionals can work in peace and promote actions that ensure patient safety⁷. Differently from data found in this study, another study conducted at a SC with all professionals who work in this context indicated that "Teamwork dynamics" had the highest score, pointing to the role of nurses as facilitating agents, with skills and potential to promote such values⁸.

The dimension "Communication opening" enlightens the idea of professionals being free to speak up and point out aspects that may put patient safety at risk. Literature reveals difficulties that nursing professionals have to position themselves when they notice something wrong, often conditioned by the attitude of doctors who understand such observations as criticisms to their work⁵. Therefore, actions that promote confidence of professionals to act proactively when something may not be working should be encouraged to protect patients in the care context⁴.

The dimension "Nonpunitive response to errors" is also weak, and studies on SC safety culture suggest this is one of the dimensions with the fewest positive responses, indicating concerns for this context within institutions^{6,17}. Studies highlight that health professionals refuse to report errors for fear of being penalized and that the punishment culture is still common in hospitals around the world and in Brazil¹⁶. Sub-notification of adverse events is an issue that needs to be addressed in hospitals and sectors, such as SC, to promote patient safety in nonpunitive environments by encouraging professionals to report incidents. These discrepancies may be explained by differences in organizational behavior among cultural contexts or by the lack of policies and procedures related to reporting errors⁶.

Finally, the findings regarding "Team adequacy" converge with those of studies that systematically identify this dimension as weak, either in the institution as a whole or in specific sectors, as examined in this research^{6,16,18}.

Team scaling is a critical issue both for health managers, due to human resources expenditures, and for those who work in direct patient care, with deficient scale and higher risk of adverse events. Studies confirm such information, indicating that staff scaling is still not enough to meet care demands in many health institutions, including critical areas¹⁹.

This study limitation was being conducted only with the nursing team. Therefore, results may not reflect the patient safety culture of other health professionals working in the service. Furthermore, the interventions for improvements and impacts on assistance that might have been caused from research are unknown.

CONCLUSION

Results of nursing professionals' safety culture perception at a SC revealed weaknesses in four dimensions: "Teamwork within units", "Communication opening", "Nonpunitive response to errors", and "Team adequacy", in which results were lower than 50% in positive responses. In addition,

four other dimensions, such as "Teamwork among units", "Change of duty / shift and internal transfers", "Expectations of the supervisor / head and safety-promoting actions", and "Information return and error communication" presented results that are within the neutral range, but closer to 50%. The dimension "Organizational learning and continuous improvement" was characterized as the institution strong area (77.4%).

Thus, implementing changes that require efforts from all the hospital organization at the strategic, administrative, and operational levels are required, mainly to encourage the attention of professionals when conducting actions that strengthen a nonpunitive culture and to study their dimensioning regarding care provided during the perioperative period.

REFERENCES

1. Organização Mundial da Saúde. Divisão de Segurança do Doente, Departamento da Qualidade na Saúde. Estrutura conceitual da classificação internacional sobre segurança do doente. Relatório Técnico Final. Portugal: Organização Mundial da Saúde; 2011 [acessado em 10 out. 2018]. Disponível em: <https://proqualis.net/sites/proqualis.net/files/Estrutura%20Conceitual%20da%20Classifica%C3%A7%C3%A3o%20Int%20Seguran%C3%A7a%20do%20Paciente.pdf>
2. Lourenção DCA, Tronchin DM. Patient safety in the surgical environment: translation and cross-cultural adaptation of validated instrument. *Acta Paul Enferm.* 2016;29(1):1-8. <http://dx.doi.org/10.1590/1982-0194201600002>
3. Carvalho PA, Göttems LBD, Pires MRGM, Oliveira MLCl. Safety culture in the operating room of a public hospital in the perception of health care professionals. *Rev Latino-Am Enferm.* 2015;23(6):1041-8. <http://dx.doi.org/10.1590/0104-1169.0669.2647>
4. World Health Organization. WHO Guidelines for safe surgery 2009: safe surgery saves lives: the second global patient safety challenge [Internet]. Geneva: WRO; 2009 [acessado em 20 out. 2018]. Disponível em: http://apps.who.int/iris/bitstream/handle/10665/44185/9789241598552_eng.pdf;jsessionid=72CC6373244DEA74629F67F2933B9D72?sequence=1
5. Halverson AL, Neumayer L, Dagi TF. Leadership skills in the OR: Part II: Recognizing disruptive behavior. *Bull Am Coll Surg.* 2012;97(6):17-23.
6. Gözlü K, Kaya S. Patient safety culture asp by nurses in a Joint Commission International Accredited Hospital in Turkey and its comparison with Agency for Healthcare Research and Quality Data. *Patient Saf Qual Improv* [Internet]. 2016 [acessado em 20 out. 2018];4(4):441-9. Disponível em: http://psj.mums.ac.ir/article_7640.html. <http://dx.doi.org/10.22038/PSJ.2016.7640>
7. Halligan M, Zecevic A. Safety culture in healthcare: a review of concepts, dimensions, measures and progress. *BMJ Qual Safety.* 2011;20(4):338-43. <http://dx.doi.org/10.1136/bmjqs.2010.040964>
8. Correggio TC, Amante LN, Barbosa SFF. Avaliação da cultura de segurança do paciente em centro cirúrgico. *Rev SOBECC.* 2014;19(2):67-73. <http://dx.doi.org/10.4322/sobecc.2014.012>
9. Brasil. Portaria n. 529, de 1º de abril de 2013. Institui o Programa Nacional de Segurança do Paciente (PNSP) [Internet]. Brasília: Ministério da Saúde; 2013 [acessado em 22 out. 2018]. Disponível em: <http://www.saude.mt.gov.br/upload/controle-infeccoes/pasta2/portaria-msgm-n-529-de-01-04-2013.pdf>
10. Sorra JS, Nieva VF. Hospital survey on patient safety culture (Prepared by Westat, under Contract No. 290-96-0004). AHRQ Publication No. 04-0041. Rockville; 2004.
11. Reis CT, Laguardia J, Vasconcelos AGG, Martins M. Reliability and validity of the Brazilian version of the Hospital Survey on Patient Safety Culture (HSOPSC): a pilot study. *Cad Saúde Pública.* 2016;32(11):e00115614. <http://dx.doi.org/10.1590/0102-311x00115614>
12. Fiocruz. Pesquisa inédita traça perfil da enfermagem no Brasil. Agência Fiocruz de Notícias [Internet]. 2015 [acessado em 22 out. 2018] Disponível em: <https://portal.fiocruz.br/pt-br/content/pesquisa-inedita-traca-perfil-da-enfermagem-no-brasil>
13. Günes ÜY, Gürlek Ö, Sönmez M. A survey of the patient safety culture of hospital nurses in Turkey. *Collegian.* 2016;23(2):225-32. <http://dx.doi.org/10.1016/j.colegn.2015.02.005>

14. Paula P, Stefano SR, Andrade SM, Zampier MA. Clima e cultura organizacional em uma organização. *Gestão Regionalidade* [Internet]. 2011 [acessado em 20 out. 2018];27(81). Disponível em: <https://doi.org/10.13037/gr.vol27n81.1279>
15. Manzo BF, Ribeiro HCTC, Brito MJM, Alves M. A enfermagem no processo de acreditação hospitalar: atuação e implicações no cotidiano de trabalho. *Rev Latino-Am Enferm*. 2012;20(1):151-8. <http://dx.doi.org/10.1590/S0104-11692012000100020>
16. Najjar S, Baillien E, Vanhaecht K, Hamdan M, Euwema M, Vleugels A, et al. Similarities and differences in the associations between patient safety culture dimensions and self-reported outcomes in two different cultural settings: a national cross-sectional study in Palestinian and Belgian hospitals. *BMJ Open* [Internet]. 2018 [acessado em 22 out. 2018];8:e021504. Disponível em: <https://bmjopen.bmj.com/content/8/7/e021504>. <http://dx.doi.org/10.1136/bmjopen-2018-021504>
17. Adams-Pizarro I, Walker Z, Robinson J, Kelly S, Toth M. Using the AHRQ Hospital Survey on Patient Safety Culture as an intervention tool for regional clinical improvement collaboratives [Internet]. Rockville: Agency for Healthcare Research and Quality (US); 2008 [acessado em 22 out. 2018]. v. 2. Disponível em: <https://www.ncbi.nlm.nih.gov/books/NBK43728/>
18. Silva-Batalha EMS, Melleiro MM. Cultura de segurança do paciente em um hospital de ensino: diferenças de percepção existentes nos diferentes cenários dessa instituição. *Texto Contexto Enferm*. 2015;24(2):432-41. <http://dx.doi.org/10.1590/0104-07072015000192014>
19. Gonçalves LA, Andolhe R, Oliveira EM, Barbosa RL, Faro ACM, Gallotti RMD, et al. Nursing allocation and adverse events/incidents in intensive care units. *Rev Esc Enferm USP*. 2012;46(Núm. Spe.):71-7. <http://dx.doi.org/10.1590/S0080-62342012000700011>

CLINICAL-SURGICAL PROFILE OF PATIENTS WITH POST-CARDIAC MEDIASTINITIS: RETROSPECTIVE CROSS-SECTIONAL STUDY

Perfil clínico-cirúrgico de pacientes com mediastinite pós-cirurgia cardíaca: estudo transversal retrospectivo

Perfil clínico-quirúrgico de pacientes con mediastinitis post-cirugía cardíaca: estudio transversal retrospectivo

Priscilla Sayuri Kanasiro^{1*} , Ruth Natalia Teresa Turrini² , Vanessa de Brito Poveda³ 

ABSTRACT: Objectives: Describe the profile of patients who developed mediastinitis in the postoperative period of cardiac surgery in a hospital of high complexity, analyzing the outcome, related to the time of hospitalization, the need for reinternation, instituted antibiotic therapy and death. **Method:** Cross-sectional study, with retrospective data collection, through consultation with 86 medical records of patients who developed mediastinitis in the year 2015. Data were collected from the preoperative period up to 90 days after hospital discharge, the diagnosis of Mediastinitis or death. **Results:** The diagnosis of mediastinitis occurred in 45.3% of the cases during hospitalization and 54.7% after hospital discharge, of which 14.9% were treated ambulatory and 85.1% required reinternation. The mean hospitalization time was 31.8 days. The mean time for the diagnosis of Mediastinitis was 21.2 days (Standard deviation — SD \pm 11,48). Treatment was mainly based on Quinolones (43%) and Glycopeptides (39.5%). **Conclusion:** Considering the frequency of identification of cases after hospital discharge, postoperative surveillance of surgical site infections among patients submitted to cardiac surgeries should be an objective shared by the multiprofessional team.

Keywords: Surgical wound infection. Mediastinitis. Cardiovascular surgical procedures. Perioperative nursing.

RESUMO: Objetivo: Descrever o perfil dos pacientes que desenvolveram mediastinite no pós-operatório de cirurgia cardíaca em um hospital de alta complexidade, analisando o desfecho, relacionado ao tempo de internação, à necessidade de reinternação, à antibioticoterapia instituída e a óbito. **Método:** Estudo transversal, com coleta de dados retrospectiva, por meio de consulta a 86 prontuários de pacientes que desenvolveram mediastinite no ano de 2015. Os dados foram coletados desde o pré-operatório até 90 dias após a alta hospitalar, o diagnóstico de mediastinite ou o óbito. **Resultados:** O diagnóstico de mediastinite ocorreu em 45,3% dos casos durante a internação e 54,7% após a alta hospitalar, dos quais 14,9% foram tratados ambulatorialmente e 85,1% necessitaram de reinternação. O tempo médio de internação foi de 31,8 dias. O tempo médio para o diagnóstico de mediastinite foi de 21,2 dias (desvio padrão — DP \pm 11,48). O tratamento foi baseado principalmente em quinolonas (43%) e glicopeptídeos (39,5%). **Conclusão:** Considerando a frequência de identificação de casos após a alta hospitalar, a vigilância pós-alta de infecções do sítio cirúrgico entre pacientes submetidos a cirurgias cardíacas deve ser um objetivo compartilhado pela equipe multiprofissional.

Palavras-chave: Infecção da ferida cirúrgica. Mediastinite. Procedimentos cirúrgicos cardiovasculares. Enfermagem perioperatória.

RESUMEN: Objetivos: Describir el perfil de los pacientes que desarrollaron mediastinitis en el postoperatorio de cirugía cardíaca en un hospital de alta complejidad, analizando el resultado, relacionado con el tiempo de internación, la necesidad de reinternación, antibioticoterapia instituida y la muerte. **Método:** Estudio transversal, con recolección de datos retrospectiva, por medio de consulta a 86 historiales de pacientes que desarrollaron mediastinitis en el año 2015. Los datos fueron recogidos desde el preoperatorio, hasta 90 días después del alta hospitalaria, el diagnóstico de mediastinitis o el óbito.

¹Nurse; specialist in High Complexity Cardiopneumology Nursing from Instituto do Coração. Attending nurse at Instituto do Coração, Hospital das Clínicas of the School of Medicine of Universidade de São Paulo (USP) – São Paulo (SP), Brazil.

²Ph.D. in Public Health from the School of Public Health of Universidade de São Paulo. Adjunct professor at the Department of Medical-Surgical Nursing, USP School of Nursing – São Paulo (SP), Brazil.

³Ph.D. Postdoctoral degree in Health Sciences from the School of Nursing of Ribeirão Preto, Universidade de São Paulo. Adjunct professor at the Department of Medical-Surgical Nursing, USP School of Nursing – São Paulo (SP), Brazil.

*Corresponding author: psayuri27@gmail.com

Received: 11/21/2018 – Approved: 04/25/2019

DOI: 10.5327/Z1414-4425201900030005

Resultados: El diagnóstico de mediastinitis ocurrió en 45,3% de los casos durante la internación y 54,7% después de alta hospitalaria, de los cuales, 14,9% fueron tratados ambulatorialmente y 85,1% necesitaron reinternación. El tiempo medio de internación fue de 31,8 días. El tiempo medio para el diagnóstico de mediastinitis fue de 21,2 días (desviación estándar — DP 11,48). El tratamiento se basó principalmente en quinolonas (43%) y glicopéptidos (39,5%). **Conclusión:** Considerando la frecuencia de identificación de casos tras el alta hospitalaria, la vigilancia postalta de infecciones del sitio quirúrgico entre pacientes sometidos a cirugías cardíacas debe ser un objetivo compartido por el equipo multiprofesional.

Palabras clave: Infección de la herida quirúrgica. Mediastinitis. Procedimientos quirúrgicos cardiovasculares. Enfermería perioperatoria.

INTRODUCTION

Despite the recent technical and scientific advances in cardiac surgeries, mediastinitis affects between 0.3 and 3.4% of patients undergoing this type of surgery, resulting in an increase in morbidity and mortality, which can impact up to 19% of cases¹.

Mediastinitis is classified as an organ/space surgical site infection (OS-SSI), since it involves any part of the anatomy open or manipulated during a surgery, and can be diagnosed by positive mediastinal tissue or fluid culture, evidence on anatomical or histopathological examination, fever ($>38^{\circ}\text{C}$), chest pain, sternal instability, purulent drainage from the mediastinal area, or mediastinal enlargement during imaging examination².

Mediastinitis has multiple causes, including pre-surgical, surgical, and post-surgical risk factors³. The main pre-operative risk factors are diabetes mellitus (DM), smoking, obesity, advanced age (over 60 years old), malnutrition, male gender, chronic renal failure and/or creatinine >1.5 mg/dL, and left ventricular ejection fraction $<40\%$ ³. Surgical risk factors include: coronary artery bypass grafting (CABG) using both thoracic (mammary) arteries, emergency surgeries, surgical time, prolonged cardiopulmonary bypass (CPB), multiple blood transfusions, and excessive use of electrocautery^{3,4}. Post-surgical risk factors comprise prolonged hospitalization in inpatient units and intensive care units (ICU); respiratory, renal, and gastrointestinal complications; reoperation for bleeding; dehiscence; and sternal instability^{3,4}.

In addition to the negative effects on patient recovery, mediastinitis results in social and economic impacts, with higher hospital costs, length of stay, and need for surgical reintervention, as well as important social repercussions in the life of patients who survive this complication⁵.

OBJECTIVES

- To describe the profile of patients who developed mediastinitis in the postoperative period of a cardiac surgery in a high complexity hospital;
- To analyze the outcome related to the length of stay, readmission, antibiotic therapy, and death of patients who developed mediastinitis in the postoperative period of cardiac surgery.

METHOD

This is a cross-sectional study, with retrospective data collection, based on 86 medical records of patients who developed mediastinitis from January to December 2015. It was conducted in a high complexity public university hospital specialized in cardiac and thoracic surgeries, which has 535 beds available, distributed among seven inpatient units, and 157 ICU beds. The surgical center has 14 operating rooms and performs an average of 20 surgeries/day⁶.

The Human Research Ethics Committee (REC) approved this investigation, under report number 1.664.466 (Certificate of Presentation for Ethical Consideration — CAAE 56229716.83001.0068), complying with the ethical principles established in Resolution No. 466, from 2012⁷.

We used a convenience sample, selected from the data sheet of the local medical-hospital information unit. Patients undergoing cardiac surgeries who had developed mediastinitis from January to December 2015 were included. Those who were under 18 at the date of surgery, underwent prior surgical procedure within up to 90 days, had a diagnosis of osteomyelitis, and cases that did not meet the criteria of mediastinitis proposed by the Centers for Disease Control and Prevention (CDC) were excluded². Thus, among the 142 potentially eligible records, 86 met the inclusion and exclusion criteria and composed the study sample.

Data were collected by analyzing the available records in the medical files of the hospital, from the preoperative period until 90 days after hospital discharge, the diagnosis of mediastinitis, or death. We used an instrument of data collection adapted from the study by Oliveira⁸, which presented the following details:

- Patient-related factors: record number, birth date, biological gender, age, education level, date of hospitalization, date of surgery, date of discharge, date of death, medical history, status on the scale of the American Society of Anesthesiologists (ASA), smoking, use of steroids, and pre-existing infection;
- Factors related to the anesthetic-surgical procedure: time of onset and end of anesthesia, surgery performed, type of surgery, need for and duration of CPB, CABG (use of the internal mammary artery, saphenous vein, or radial artery), and need for blood transfusion;
- Factors associated with the postoperative period: date of admission in and discharge from the ICU, types of antibiotics used in the postoperative period, date of admission in and discharge from the inpatient unit;
- Regarding the SSI diagnosis: made during hospitalization or in the outpatient follow-up, with microbial culture of an isolated microorganism, evidence of mediastinitis in the anatomical or histopathological examination, purulent drainage from the mediastinal area, sternal pain, mediastinal enlargement during imaging examination, fever above 38°C and sternal instability, antibiotic use, type of antibiotic, and postoperative complications (cardiac and vascular, respiratory, and renal);
- Readmission: date of hospitalization, discharge and death, antibiotics administered, wound culture, type of bandage used to treat mediastinitis.

A pilot test with five patient records (not included in this study) of individuals who developed mediastinitis was carried out to verify the adequacy of the data collection instrument to the objectives proposed in research.

We analyzed the data with the software Statistical Package for the Social Sciences (SPSS), version 20.0, and presented the results in a descriptive and mathematical-statistical manner, using absolute frequency and percentage. We adopted the Kruskal-Wallis test, the Pearson correlation coefficient, and the Wilcoxon Mann-Whitney test to correlate the variables. We considered an $\alpha \leq 0.05$ significant.

RESULTS

The sample consisted of 86 patients, of whom 50 (58.1%) were women aged from 24 to 88 years old, mean of 57.66 years (standard deviation — $SD \pm 13.37$). With respect to medical history, diabetes mellitus (34; 39.5%) was the most prominent condition. As to smoking, 13 (15.1%) patients reported being smokers and 26 (30.2%), former smokers.

The mean body mass index (BMI) was 28.33 kg/m^2 ($SD \pm 5.03$), and most individuals were in the overweight range (34; 40%), followed by obesity (28; 32.5%), normal weight (21; 24.7%), and underweight (2; 2.4%).

Table 1 shows the other clinical and surgical data of the patients who composed the sample.

Among the patients who underwent CABG, the most used grafts were the internal mammary artery (48; 92.3%), followed by the saphenous vein (47; 90.4%), and the radial artery (2; 3.8%). The mean amount of internal mammary artery graft was 1.10 ($SD \pm 0.309$).

Postoperative complications occurred, i.e., before the diagnosis of mediastinitis, in 48 patients (55.8%). One patient might have developed one or more complications, and the most prevalent ones were cardiac and vascular (29; 33.7%), respiratory (22; 25.6%), and renal (13; 15.1%) complications.

Nine patients died (10.5%), of whom seven (70%) presented various causes, such as unspecified sepsis and shock, acute myocardial infarction, and liver failure. Three deaths (30%) were associated with the development of mediastinitis.

Mediastinitis was identified during hospitalization in 39 cases (45.3%), and 47 (54.7%) patients were diagnosed after hospital discharge. Among the cases diagnosed after discharge, seven (14.9%) were treated on an outpatient basis, and 40 (85.1%) required readmission. The time of onset of mediastinitis, between the date of surgery and the onset of symptoms, varied from four to 64 days, with an average of 21.2 days ($SD \pm 11.48$).

Surgical wound culture was performed in 78 patients (90.7%). In 68 (79.1%) of them, the culture was positive. Tables 2 and 3 describe the isolated microorganisms and the agents used in the treatment.

Adopting the criteria proposed by CDC², the signs and symptoms of mediastinitis found in the patients' charts at the time of diagnosis (during hospitalization, outpatient treatment, or readmission) were: positive culture of mediastinal fluid or tissue (68; 79.1%); purulent drainage from the mediastinal area (68; 79.1%); evidence of mediastinitis in the anatomical

or histopathological examination (39; 45.3%); sternal pain (37; 43%); mediastinal enlargement during imaging examination (25; 29.1%); fever above 38°C (24; 27.9%); and sternal instability (5; 5.8%). The mean of signs and symptoms characteristic of mediastinitis associated with each other was 3.09 (SD±1.11), with a minimum of one and a maximum of six symptoms.

DISCUSSION

In this study, the profile of patients who developed mediastinitis consisted of women with DM history, overweight, mean age of 57 years, prolonged length of stay, often diagnosed after hospital discharge – approximately 21.2 days after the procedure –, mediastinitis treatment based on quinolones and penicillins, and mortality of 30% associated with mediastinitis.

Such result differs from other studies, because male patients are more susceptible to the development of mediastinitis, as they have more hair follicles in the sternotomy region, favoring microbial growth and infections^{3,4}. However, we highlight that the sample of this study comprised a small number of patients.

The main diagnostic signs and symptoms identified were the positive culture of secretion and purulent drainage from deep tissues (79.1%). *Staphylococcus aureus* was the most prevalent microorganism found (30.9%) in the culture of mediastinal secretion. Such data are consistent with a study in which *Staphylococcus aureus* was the most prevalent microorganism (30.7%) among gram-positive bacteria³. In Brazil, this microorganism is the main etiological agent in mediastinitis³.

The aspects observed in the present analysis agree with those of a multicenter study evaluating 41 individuals who developed mediastinitis in a sample of 5,158 patients. Infection occurred

Table 1. Description of surgical and hospitalization data of patients undergoing cardiac surgeries who developed mediastinitis.

Variables	N (%)	Mean±SD	Minimum– Maximum
CABG	48 (55.8)	-	-
Heart valve surgeries	21 (24.4)	-	-
Other	6 (7)	-	-
Aortic aneurysm repair	4 (4.6)	-	-
Heart valve surgery + CABG	4 (4.6)	-	-
ASD/VSD closure	3 (3.5)	-	-
Cardiac surgery			
With CPB	79 (91.9)	-	-
Without CPB	7 (8.1)	-	-
Blood components in the intraoperative period			
Yes	23 (26.7)	-	-
No	63 (73.3)	-	-
ASA			
II	1 (1.2)	-	-
III	50 (58.1)	-	-
IV	35 (40.7)	-	-
Length of stay (days)	-	31.8±24.1	7-127
Preoperative hospitalization (days)	-	5.42±6.13	0-34
ICU hospitalization (days)	-	11.1±14.5	3-87
Postoperative hospitalization (days)	-	25.37±21.65	5-102
Time until diagnosis of mediastinitis (days)	-	21.2±11.48	4-64
Duration of anesthesia (min)	-	436.9±95.9	305-860
Duration of CPB (min)	-	91.4±51.9	0-336

CABG: coronary artery bypass grafting; SD: standard deviation; ASD: atrial septal defect; VSD: ventricular septal defect; CPB: cardiopulmonary bypass; ASA: American Society of Anesthesiologists; ICU: intensive care unit.

approximately 20 days after the surgical procedure and manifested after hospital discharge, being associated, among other aspects, with high BMI, leading to an increase in the length of stay over 11 days and risk of readmission five times higher when compared to patients who did not develop the complication⁹.

We emphasize that several aspects increase the risk of developing mediastinitis and relate to the patient's comorbidities, such as DM, obesity, smoking, and kidney failure, as well as surgical and technical factors^{1,10}. As to diabetes, elevated glucose levels may be associated with an increase in the inflammatory process, thus predisposing the patient to a significantly higher risk of infection³. Obesity hinders preoperative skin preparation¹¹, leading to a difficult wound healing process because of the risk of sternal dehiscence by rupture of the surgical suture, facilitating the entry of pathogens³. In addition, obesity makes it difficult to adjust doses of antibiotic to the body mass, resulting in low antibiotic tissue concentration, decreasing its effectiveness^{3,12}. Tobacco users, especially those with chronic obstructive pulmonary disease (COPD), are more susceptible to SSI, since they are less able to maintain satisfactory levels of oxygenation in their tissues⁴. Smoking deteriorates lung cells, leading to delayed healing, necrosis, and SSI¹³.

Moreover, prolonged cardiac surgeries – 4 to 5 hours – increase the risk of developing mediastinitis⁴. The type of surgical procedure performed can also be related to a greater risk of SSI. In CABG, using the mammary artery compromises sternal irrigation, causing local hypoxia and facilitating the proliferation of infectious microorganisms⁴. The use of two mammary arteries increases the risk of infection because it decreases the blood supply to sternal muscles⁴.

Other important aspects concerning the surgical procedures analyzed are the use and duration of CPB. Prolonged CPB increases the risk of infection⁴. Also, it causes physiological changes in the immune system due to the use of hypothermia and hemodilution³. Regarding surgeries, blood transfusion results in an immunosuppressive effect, favoring the occurrence of infection and increasing the probability of developing mediastinitis⁴.

The preoperative length of stay is also fundamental. A study showed that each week of preoperative hospitalization increased by 15% the risk of mediastinitis, associated with prolonged preoperative fasting, which compromises the adequate nutrition and postoperative recovery of patients¹⁴.

Table 3. Distribution of antibiotics and antifungal agents used in the postoperative of cardiac surgeries.

Agents	N	%
Quinolones	37	43.0
Glycopeptides	34	39.5
Penicillins	20	23.2
Cephalosporins	15	17.5
Antifungal agents	11	12.8
Polymyxins	9	10.5
Aminoglycosides	6	7.0
Oxazolidinone	5	5.8
Cyclic lipopeptides	4	4.3
Nitroimidazole	3	3.5
Carbapenems	3	3.5
Other	5	5.8

Table 2. Distribution of microorganisms isolated from patients with mediastinitis, according to the length of stay in the postoperative period.

Microorganism	N	%	Mean length of stay±SD (days)	Minimum–Maximum	Median
<i>Staphylococcus aureus</i>	21	30.9	16.05±12.26	8-60	11
<i>Klebsiella pneumoniae</i>	14	20.6	48.14±32.43	10-127	51
Coagulase-negative <i>staphylococcus</i>	09	13.2	41±21.24	14-87	39
<i>Candida sp.</i>	05	7.3	68.2±28.2	19-87	74
<i>Enterobacter sp.</i>	05	7.3	25.8±22.1	9-60	15
<i>Escherichia coli</i>	04	5.9	31.75±18.9	20-60	23.5
<i>Enterococcus sp.</i>	04	5.9	38±18.88	11-54	43.5
<i>Proteus mirabilis</i>	03	4.4	21.67±7.50	14-29	22 ^o
<i>Corynebacterium sp.</i>	01	1.5	76±0	76-76	76
<i>Serratia marcescens</i>	01	1.5	36±0	36-36	36
<i>Acinetobacter johnsonii</i>	01	1.5	09±0	9-9	09

SD: standard deviation.

Additionally, it raises the risk of developing infectious complications, including SSI, ICU admission, and the use of invasive devices (central venous catheter, indwelling urinary catheter, and mechanical ventilation), which make the patient susceptible to health care-related infections¹⁵.

Therefore, postoperative infections in patients who underwent cardiac surgeries, such as mediastinitis, drastically affect patients' survival and increase the need for readmissions¹⁶.

In this sense, research analyzing readmissions among 5,509 patients submitted to cardiac surgeries identified a readmission rate of 18.7%, with infections between the two main causes. The authors pointed out that, on average, these patients are readmitted up to 22 postoperative days and generate new hospitalizations, with a median of five days, and the more complex the procedure, the greater the chances of readmission¹⁷.

Considering these aspects, mediastinitis strongly impacts patients both physically and emotionally, requiring differentiated care from the health team to prevent it, or to recognize early signs, speeding up treatment and avoiding major harm in the long-term.

To that end, the multidisciplinary team needs to implement measures that affect the entire perioperative period, seeking to minimize the contamination by potentially pathogenic microorganisms present in the patient's airways and skin, i.e., screening for carriers of multiresistant *Staphylococcus aureus*, antibiotic prophylaxis, glycemic control, adequate skin preparation, and an efficient surgical technique¹⁰.

As most cases of mediastinitis are developed in the period after discharge, post-discharge surveillance measures must be

adopted, preferably ensuring the involvement of the entire multidisciplinary team, as well as extensive patient guidance¹⁸.

Thus, this study underlines the importance of an adequate preparation of the multidisciplinary team, with physicians and nurses attentive to the main signs and symptoms of this complication. The team must also be prepared to properly guide patients and follow their cases, since most of the diagnosed cases occur after hospital discharge and lead to new admissions to treat this complication.

CONCLUSION

We concluded that the profile of patients who developed mediastinitis after cardiac surgeries consisted, mainly, of women with diabetes history, overweight, mean age of 57 years, who underwent CABG, with CPB, and prolonged length of stay. Diagnosis and treatment of mediastinitis were performed after hospital discharge.

The most common symptoms during the diagnosis of mediastinitis were positive culture and purulent drainage from surgical wounds. The most frequently identified microorganisms were *Staphylococcus aureus*, *Klebsiella pneumoniae*, and coagulase-negative *staphylococcus*, and the postoperative antibiotic therapy administered was based on quinolones, glycopeptides, and penicillins.

These results point to the strict need to control risk factors prior to the surgical procedure, through measures to prevent and control health care-related infections. Thus, training the multidisciplinary team and reinforcing preventive measures are essential to reduce this complication.

REFERENCES

1. Goh SSC. Post-sternotomy mediastinitis in the modern era. *J Card Surg.* 2017;32(9):556-66. <https://doi.org/10.1111/jocs.13189>
2. Centers for Disease Control and Prevention. Surgical Site Infection (SSI) Event. Procedure-associated Module SSI. Estados Unidos: Centers for Disease Control and Prevention; 2016. 31 p.
3. Pinto DCG, Bahia Neto AFC, Gonçalves FL, Gomes IC, Sternick EB, Almeida AM, et al. Fatores associados à mediastinite pós-esternotomia: caso-controle. *Int J Cardiovascul Sci.* 2018;31(2):163-72. <https://doi.org/10.5935/2359-4802.20180004>
4. Pinto CGS, Silva LDC, Correa RGCF, Lages JS. Análise dos aspectos clínicos e epidemiológicos e pacientes com mediastinite. *Rev Baiana Saúde Pública.* 2016;40(4):1014-28. <https://doi.org/10.22278/2318-2660.2016.v40.n4.a2320>
5. Rehman SM, Elzain O, Mitchell J, Shine B, Bowler IC, Sayeed R, et al. Risk factors for mediastinitis following cardiac surgery: the importance of managing obesity. *J Hosp Infect.* 2014;88(2):96-102. <https://doi.org/10.1016/j.jhin.2014.06.011>
6. Cerci JJ, Trindade E, Cerci RJ, Preto D, Lemos PA, Cesar LA, et al. Investigation route of the coronary patient in the public health system in Curitiba, São Paulo and in InCor-IMPACT study. *Arq Bras Cardiol.* 2014;103(3):192-200. <http://dx.doi.org/10.5935/abc.20140107>
7. Brasil. Conselho Nacional de Saúde. Resolução nº 466, de 12 de dezembro de 2012. Aprova normas regulamentadoras de pesquisas envolvendo seres humanos. Brasília: Diário Oficial da União; 2013.

8. Oliveira RA. Fatores de risco para infecção do sítio cirúrgico em transplante de fígado: coorte histórica [dissertação]. São Paulo: Universidade de São Paulo; 2016.
9. Perrault LP, Kirkwood KA, Chang HL, Mullen JC, Gulack BC, Argenziano M, et al. A prospective multi-institutional cohort study of mediastinal infections after cardiac operations. *Ann Thorac Surg.* 2018;105(2):461-8. <https://doi.org/10.1016/j.athoracsur.2017.06.078>
10. Abu-Omar Y, Kocher GJ, Bosco P, Barbero C, Waller D, Gudbjartsson T, et al. European Association for Cardio-Thoracic Surgery expert consensus statement on the prevention and management of mediastinitis. *Eur J Cardiothorac Surg.* 2017;51(1):10-29. <https://doi.org/10.1093/ejcts/ezw326>
11. Oliveira FS, Freitas LDO, Silva ERR, Costa LM, Kalil RAK, Moraes MAP. Preditores de risco de mediastinite após cirurgia de revascularização do miocárdio: aplicabilidade de score em 1.322 casos. *Arq Bras Cardiol.* 2017;109(3):207-12. <http://dx.doi.org/10.5935/abc.20170119>
12. Silva QCG, Canini SRMS, Silveira RCCP, Dessotte CAM, Campos FR. Fatores de risco para mediastinite após revascularização do miocárdio: revisão integrativa. *Rev Min Enferm.* 2015;19(4):1015-22. <http://www.dx.doi.org/10.5935/1415-2762.20150076>
13. Barreiros BRN, Bianchi ERF, Turrini RNT, Poveda VB. Causas de readmissão hospitalar após cirurgia cardíaca. *Rev Eletron de Enferm.* 2016;18:1-8. <https://doi.org/10.5216/ree.v18.39529>
14. Sang SLW, Chaturvedi R, Alam A, Samoukovic G, Varennes B, Lachapelle K. Preoperative hospital length of stay as a modifiable risk factor for mediastinitis after cardiac surgery. *J Cardiothorac Surg.* 2013;8:45-52. <https://doi.org/10.1186/1749-8090-8-45>
15. Conterno LO, Toni SMD, Konkiewitz RG, Guedes ES, Barros RT, Tiveron MG. Impact of hospital infections on patients outcomes undergoing cardiac surgery at Santa Casa de Misericórdia de Marília. *Rev Bras Cir Cardiovasc.* 2014;29(2):167-76. <https://doi.org/10.5935/1678-9741.20140037>
16. Gelijns AC, Moskowitz AJ, Acker MA, Argenziano M, Geller NL, Puskas JD, et al. Management practices and major infections after cardiac surgery. *J Am Coll Cardiol.* 2014;64(4):372-81. <https://doi.org/10.1016/j.jacc.2014.04.052>
17. Iribarne A, Chang H, Alexander JH, Gillinov AM, Moquete E, Puskas JD, et al. Readmissions after cardiac surgery: experience of the National Institutes of Health/Canadian Institutes of Health research cardiothoracic surgical trials network. *Ann Thorac Surg.* 2014;98(4):1274-80. <https://doi.org/10.1016/j.athoracsur.2014.06.059>
18. Noman F, Mahmood SF, Asif S, Rahim N, Khan G, Hanif B. A novel method of surgical site infection surveillance after cardiac surgery by active participation of stake holders. *Am J Infect Control.* 2012;40(5):479-80. <https://doi.org/10.1016/j.ajic.2011.06.006>

PATIENT SAFETY IN THE CONTEXT OF POST-STATISTICAL RECOVERY: A CONVERGENT ASSISTANCE STUDY

Segurança do paciente no contexto da recuperação pós-anestésica: um estudo convergente assistencial

*La seguridad del paciente en el contexto de la recuperación post-estadística:
un estudio de asistencia convergente*

Suellen Klein^{1*} , Denise Consuelo Moser Aguiar² , Gelson Aguiar da Silva Moser³ ,
Marceli Cleunice Hanauer⁴ , Suellen Rodrigues de Oliveira⁵ 

ABSTRACT: Objective: To verify the knowledge of nursing professionals about patient safety in the Post-Anesthesia Recovery Room (PARR) after the implementation of a care protocol in the sector. **Method:** This is a descriptive, exploratory, convergent-care study with qualitative approach, involving seven professionals of the nursing team from the PARR of a hospital in Western Santa Catarina. **Results:** Based on the findings, two categories emerged: “Patient safety in post-anesthesia recovery room” and “Care Protocols”, which provided effectiveness of such protocols in the systematization of the care process, considering both the patient’s and the professional’s safety. **Conclusion:** Applying the protocol through a checklist, besides guiding the actions of the team, allowed them to act systematically and quickly, taking into account the service complexity in the PARR.

Keywords: Patient safety. Clinical protocols. Anesthesia recovery period. Perioperative nursing.

RESUMO: Objetivo: Verificar o conhecimento dos profissionais de enfermagem no que concerne à segurança do paciente na Sala de Recuperação Pós-Anestésica (SRPA), após a implantação de um protocolo assistencial no referido setor. **Método:** Trata-se de um estudo descritivo, exploratório, com abordagem qualitativa, do tipo convergente assistencial, envolvendo sete profissionais da equipe de enfermagem, atuantes na SRPA de um hospital do oeste catarinense. **Resultados:** Com base nos achados, surgiram duas categorias: “Segurança do paciente na sala de recuperação pós-anestésica” e “Protocolos Assistenciais” (PA), que proporcionaram efetividade de tais protocolos na sistematização do processo de cuidar, considerando, tanto a segurança do paciente, quanto a do profissional. **Conclusão:** A aplicação do protocolo, por meio de *checklist*, além de nortear as ações da equipe, possibilitou que estas ocorressem de forma sistemática e rápida, levando-se em conta a complexidade do atendimento na SRPA.

Palavras-chave: Segurança do paciente. Protocolos clínicos. Período de recuperação da anestesia. Enfermagem perioperatória.

RESUMEN: Objetivo: Verificar el conocimiento de los profesionales de enfermería en lo que concierne a la seguridad del paciente en la Sala de Recuperación Pos-Anestésica (SRPA), tras la implantación de un protocolo asistencial en el referido sector. **Método:** Se trata de un estudio descriptivo, exploratorio, con abordaje cualitativo, del tipo convergente asistencial, involucrando siete profesionales del equipo de enfermería, actuantes en la SRPA de un hospital del oeste catarinense. **Resultados:** Con base en los hallazgos, surgieron dos categorías: “Seguridad del paciente en la sala de recuperación pos-anestésica” y “Protocolos Asistenciales” (PA), que proporcionaron efectividad de tales protocolos en la sistematización del proceso de cuidar, considerando, tanto la seguridad del paciente, cuanto a del profesional. **Conclusión:** La aplicación del protocolo, por medio de *checklist*, además de guiar las acciones del equipo, posibilitó que estas ocurriesen de forma sistemática y rápida, tomándose en cuenta la complejidad de la atención en la SRPA.

Palabras clave: Seguridad del paciente. Protocolos clínicos. Periodo de recuperación de la anestesia. Enfermería perioperatoria.

¹Nurse from Universidade Federal da Fronteira Sul (UFFS), Nurse at Hospital Unimed – Chapecó (SC), Brazil.

²Nurse, PhD in Education, Professor at UFFS – Chapecó (SC), Brazil.

³Nurse, PhD in Education, Professor at UFFS – Chapecó (SC), Brazil.

⁴Nurse from UFFS – Chapecó (SC), Brazil.

⁵Nurse, MD in Nursing, Professor at Universidade Federal do Mato Grosso (UFMT) – Rondonópolis (MT), Brazil.

*Corresponding author: tilihanauer@hotmail.com

Received: 07/03/2018 – Approved: 05/26/2019

DOI: 10.5327/Z1414-4425201900030006

INTRODUCTION

Patient safety has gained ground in the context of health services with the creation of the World Alliance for Patient Safety, in 2004, through the challenge “Safe Surgeries Saves Lives”, launched by the World Health Organization (WHO) in 2013, and in Brazil through the National Program of Patient Safety, also instituted in 2013. Discussions have drawn attention in the scientific community and actions have been implemented around the subject of patient safety both in the academic and in the care settings, aiming to promote care free from adverse events^{1,2}.

In the perioperative context, safety guidelines came through safe multidisciplinary practices and the adoption of specific standards to prevent errors and adverse events, which are the result of this vulnerable moment to both the patient and the surgical team¹. Considered by some authors as a passing territory, the Surgical Center (SC) and the Post Anesthesia Recovery Room (PARR) are places where different bodies, patients, nurses, physicians, and other professionals coexist. The provision of specialized nursing care in this environment aims to ensure the rehabilitation of patients with safety and effectiveness, detecting and acting early on complications possibly to be experienced with different types of anesthesia and surgery³.

Considering that the work of the team needs to be fast, individualized, human and holistic, it also requires a theoretical basis that aims to systematize, organize and render assistance that is safer and safer. Nursing care in the SC, particularly in the PARR, focuses on patient safety, trained human resources and oriented material, procedures and interventions, all backed by practical and scientific knowledge on the basis of safe behaviors, attitudes and habits, avoiding adverse events and, consequently, complications, which mostly result from the high complexity inherent to the anesthetic-surgical process⁴.

However, each day, many obstacles hamper the care provided by the nursing team in the PARR. For example, lack of workflow organization, lack of standard procedures or care protocols, insufficient number of professionals, inadequate structure and lack of multiprofessional work. In addition, a non-attentive look at safety-oriented care also poses a number of risks to patients and professionals involved.

Adapting the WHO Checklist to the postoperative period provides professionals with a view to strengthening the quality of care and patient safety to minimize risks and adverse events in the PARR. In addition to checklists, care protocols are of great applicability to Nursing, as they allow the revision of professional practice, defining therapeutic objectives and evidence-based behaviors. It contributes, therefore, to an effective and efficient decision-making⁵.

The quality of care is related to the high complexity of the care in a PARR⁶. Therefore, strategies that connect quality and patient safety must be considered by the Nursing staff, care protocols included⁷.

The nurse, in this context, needs to keep up to date and apply, in practice, the knowledge acquired in line with the duties of the function. According to Law 7,498, dating June 25, 1986, it is up to the nurse to prevent and control any harm that may be caused to the patient during nursing care provision⁸. From this perspective, we ask: What are the nursing professionals' conceptions about patient safety within the PARR at a mid-size hospital in the southern region of Brazil?

In order to answer such questioning, we sought to verify the knowledge of Nursing professionals about patient safety in the PARR after the implementation of a care protocol.

OBJECTIVE

To verify the knowledge of Nursing professionals about patient safety in the PARR, after the implementation of a care protocol in the sector.

METHOD

This is a descriptive, exploratory, convergent-care study with a qualitative approach aiming to characterize the articulation of theory and professional practice, allowing the researcher to assist in the proposition of actions that qualify assistance rendered⁹.

The present study is in line with the guidelines for the conduct of research involving human beings, pointed out in Resolution 466 of December 12, 2012, by the National Health Council¹⁰, ethical opinion 952184 and CAAE 33713614.1.0000.5564, issued by the Research Ethics Committee of *Universidade Federal da Fronteira Sul*.

The description of steps adopted begins with the conception phase, based on the experiences of the researchers related to the perioperative context. Then, the instrumentation phase, where we opted for the PARR of a medium-sized private hospital in the city of Chapecó, western Santa Catarina state, as the study scenario. Seven professionals were selected to the research, considering the team that only works in daytime period, with at least six months of activity in the sector, minimum age of 18 years and who accepted to participate in the research, by signing the Informed Consent Form. Participants were assigned pseudonyms (names of surgical tweezers) to ensure information anonymity and no distinction of professional class. However, they were all part of the nursing team of the unit.

Data collection had different stages. First, there was observation (immersion), which was made individually, naturally and systematically by participants. After that, the planning of the items to be observed was made through previous elaboration of a data collection instrument, which was called "Field Diary", aimed at guiding researchers as for the organizational aspects of nursing care to patients in the immediate postoperative period in PARR⁹. The semi-structured questionnaire was also used as an instrument for data collection, with open and closed questions. This was applied in two moments to understand and implement the practice, ensuring patient safety.

After the initial survey, participants were proposed to create a study group composed of nursing professionals working in the PARR of the institution. The meetings took place for three months, mediated by researchers, through open talks with defined dates and times, according to availability of the sector. This methodology allowed the collective building of the knowledge underlying the implementation of the care through a protocol and a checklist.

It should be noted that no difficulties were faced in data collection, as it took place in a closed and specific sector, where the researcher had access to professionals and had the team participating as a unit.

In the phase of data analysis and interpretation, participants were organized and categorized, in a process to acquire a simplified representation of them. This strategy aims to facilitate the recognition of information such as most common words, phrases and themes across the participants' reports. Following the rigorous analysis of data collected, interpretation was based on a synthesis that is characterized by the moment in which associations and variations

of information are examined until one can synthesize and memorize the whole work process; then the theorizing phase, which consists in analyzing information; and reflexes to theory, to extract meanings that could help form assumptions and questionings⁹.

The analysis of speeches during the meetings of the group complied with the precepts of Bardin. The steps of pre-analysis, material exploration, interpretation and data transfer were used to create analytical categories¹¹.

RESULTS

The participatory observation technique by means of a Field Diary allowed us to understand how the PARR is structured for the work processes, which reflected in the care from the perspective of patient safety. The PARR in this unit has 30 beds divided into two areas, with two nursing stations, where different actions of the staff were observed: bed preparation and patient admission, stay and discharge. Nursing care was restricted to checking vital signs, administering medications, writing down catheter and/or drainage debit, evaluating bleeding by surgical incision, and the use of scales (Aldrete and Kroulik, and Kendall). The PARR's discharge criteria depended on the type of surgery, anesthesia and destination within the hospital¹².

After data collection and analysis, we identified which were the scientific-based topics of patient care and which needed improvement. From then on, the care protocol and the checklist started being assembled in cooperation with the nursing team at the meetings proposed by the researchers, which consisted in the convergence group¹³, composed of the study participants and aimed at organizing the nursing care offered in the sector.

At the meetings, the care protocol and the checklist were elaborated in accordance with the precepts of surgery safety, with emphasis on patient safety, as the WHO advocates. The checklist was designed to take into account the patient's personal data and perioperative data such as surgical procedure, anesthesia, surgeon and anesthetist. Therefore, aspects inherent to admission and stay in the PARR were considered as primary evaluation, focused on airway permeability, respiratory pattern and circulation, as well as the initial evaluation of body systems. Aspects of prevention (risk of fall, phlebitis, skin lesions, dermatitis, allergies, infections) were highlighted, as well as the procedures performed during the patient's stay in the sector.

Regarding discharge, aspects of patient evolution such as respiratory pattern, vital signs, reflexes, blood volume, and evaluation by specific scales, justified and passed on to the sector receiving the patient after discharge from the PARR, were contemplated^{1,2}.

After the elaboration and implementation of the care protocol in the meetings, all professionals were individually approached to fill in a questionnaire aimed at collecting information about the effectiveness of instruments and the systematization of the work process focusing on patient safety. From then on, the meaningful units and statements about changes in care practice were highlighted, after the implementation of the care protocol/checklist. From the qualitative analysis, two categories emerged: "Patient Safety in PARR" and "Care Protocols". From each category, three units were extracted, as one can see in Charts 1 and 2.

DISCUSSION

Over the last decades, the nurses' role in the surgical environment has gained a different character, focusing on quality and safety through the provision of qualified, specialized and humane care.

Safety is a basic criterion for the quality of patient care to occur and errors and adverse events to be reduced in health facilities. Errors can be prevented with the implementation of simple and safe measures that need to be adopted and disclosed¹⁴. During the research, the participants' statements expressed safety aspects that they consider to be part of safe care in the PARR, when there are mechanisms that standardize safe practices:

"Observation and consultation necessary for an immediate postoperative period free of possible errors" (Mayo)

"Safety in the recovery room depends directly on the elaboration and application of care protocols" (Backaus)

The speeches show the connection of a safety-oriented care with care protocols. These professionals acknowledge the importance of establishing guidelines for the team's performance and prevention of possible errors. Sometimes, several patients are admitted simultaneously

and this requires a fast acting and decision making by the nursing team. Care protocols allow systematized care based on scientific evidence¹⁵.

Participants' statements also reflect the relation between safe care and the human resources dimension:

"Enough employees to guarantee safety. Trainings, adaptations, enthusiasm to develop such activity" (Mayo).

"Through implementation of care protocols for each type of surgery, constant training and a sufficient number of employees for the sector's demand" (Adson)

The PARR is a critical care unit and, for this reason, the nurse is required⁸. According to recommendations of the Brazilian Society of Surgical Center Nurses, Anesthetic Recovery and Sterilization Material Center (SOBECC), the proportion of nurses for patients who depend on mechanical ventilators is one for every three or four patients and a nursing technician for each three patients. For those who do not rely on respiratory support, the recommended minimum number is one nurse per eight beds, the number of nursing technicians being the same as mentioned previously⁸.

In a study carried out to examine the number of nurses associated with the risk of mortality among surgical patients with complications, the high proportion of these professionals was found to be related to low mortality and complication rates¹⁶.

Therefore, full-time nurses in the PARR is emphasized as an essential element to promote patient safety. An important function of this professional is to manage nursing care, organizing the admission of patients according to complexity, in line with current legislation.

Another important aspect, perceived as a means to ensure patient safety, is the use of a Surgical Safety Checklist, adopted by the institution of this study during the perioperative period. The lines of participants reaffirm this:

"Confirming relevant postoperative care with the checklist" (Kelly).

"Checking the checklist" (Maryland).

"Because we are aware of the primary care we must provide the patient with" (Mixer)

It is vital to create a link between the phases of nursing care in the perioperative period, that is why instruments/ documents that guarantee the continuity of the care provided to surgical patients, such as checklist and nursing notes, are so important¹⁷.

Paperwork facilitates communication between members of the healthcare team and can favor the continuity of care, ensure follow-up, and serve as a legal record of the care provided^{17,18}. Personal data, hospitalization diagnosis, pathological antecedents, drug allergies, types of surgery and anesthesia, problems and complications during surgery, among others, are strictly necessary for the postoperative nursing care to be established⁸.

Data recording promotes continuity of care and allows for critical thinking. Since the surgical environment requires professionals' agility whilst they need to take note of the care provided, the elaboration of instruments based on a theoretical framework and easy to apply simplifies the process¹⁸. The creation of a checklist for safe management of a patient in the PARR sought to contemplate all issues

previously discussed, associating relevant data with care by standardizing care.

Based on analyses of participants statements and the answers obtained in the questionnaires, professionals were found to be aware of the existence and importance of protocols, but, in daily routine, they end up not applying them effectively, either because of work demand or lack of habit.

Therefore, when designing a Patient Safe Handling Protocol in the PARR in the form of a checklist, the professionals could think of an instrument that privileges PARR patients, compared to the various protocols already available in the institution, thus guaranteeing effectiveness and consequent promotion of patient and team safety.

Also regarding patient safety, the participants uphold the importance of professional training:

“Through care protocols with systematized and standardized practice, with training (continuing education) of the team” (Backaus)

Chart 1. Category: Patient Safety in Post-Anesthesia Recovery Room.

Meaningful units	Participants' comments
Protocols	<p>“Through implementation of care protocols for each type of surgery, constant training and a sufficient number of employees for the sector’s demand” (Adson).</p> <p>“Through care protocols with systematized and standardized practice, with training (continuing education) of the team” (Backaus).</p>
Error prevention	<p>“Safety in the recovery room depends directly on the elaboration and application of care protocols” (Backaus).</p> <p>“Observation and consultation necessary for the immediate postoperative period free of possible errors” (Mayo).</p> <p>“Enough employees to guarantee safety. Trainings, adaptations, enthusiasm to develop such activity” (Mayo).</p>
Checklist	<p>“Confirming relevant postoperative care with the checklist” (Kelly).</p> <p>“Checking the checklist” (Maryland).</p> <p>“Because we are aware of the primary care we must provide the patient with” (Mixer).</p>

Chart 2. Category: care protocols.

Meaningful units	Participants' comments
Safety	<p>“Care protocols reduce problems and constantly stimulate the improvement of healthcare units’ processes, assuring the quality of care” (Backaus).</p>
Knowledge	<p>“By following institutional protocols correctly and always being sure of what you are doing, after all, we work with lives” (Maryland).</p> <p>“Through care protocols we have been able to ensure more safety to patients” (Kelly).</p>
Error reduction	<p>“It is necessary for there to be fewer errors upon care and to ensure a posture to follow in isolated cases, as well as routines, so that one knows the correct decision to make” (Mayo).</p> <p>“Protocols give us confidence to follow appropriate routines with patients” (Faure).</p> <p>“Through protocols that ensure safety to our work and especially to patients” (Maryland).</p>

Research points to knowledge as one of the main tools that health professionals have to guarantee safe and high-quality care to patients¹⁹⁻²². Trainings, through continuing education programs, contribute to the qualification of care, since it fills knowledge gaps identified in professional practice that are reflected in patient care.

The nursing team is vulnerable to multiple interruptions and distractions that can affect their memory and attention capacity during critical periods, causing lack of focus and failure to follow protocols²⁰. Therefore, health services need to ensure a safe environment for both professionals and patients. The preparation of a care protocol contributes to a qualified assistance, but if these are difficult to apply, if the number of professionals is insufficient for the demand for activities, and if they work unmotivated, errors are likely to occur.

Therefore, actions, attitudes, and values need to be applied to health services, so that the political and professional awareness of patient safety proposed by the Global Patient Safety Alliance¹ becomes effective.

The creation of a care protocol for the safe management of a patient in the PARR allows the actions to be carried out in an empirical way and to be scientifically based, systematized and safe, through reliable and easy-to-apply instruments. As shown, most answers obtained refer to care safety based on care protocols:

“Care protocols reduce problems and constantly stimulate the improvement of healthcare units’ processes, assuring the quality of care” (Backaus)

“By following institutional protocols correctly and always being sure of what you are doing, after all, we work with lives” (Maryland).

“Through care protocols we have been able to ensure more safety to patients” (Kelly).

“It is necessary for there to be fewer errors upon care and to ensure a posture to follow in isolated cases, as well as routines, so that one knows the correct decision to make” (Mayo).

Statements show the relationship between care protocols and the prevention of errors and events. Adverse events and events that compromise patient safety is a major challenge for the improvement of quality in the health sector²¹, since

the non-adherence of professionals to norms, protocols or clinical guidelines favors their occurrence²².

Patient care in the PARR requires preparation of the professionals to act in the prevention and treatment of complications arising from the anesthetic-surgical process and, thus, the establishment of guidelines can help in rapid and safe decision making, preventing the patients’ exposure to risks, possible errors and avoidable events^{21,22}.

According to the National Program of Patient Safety, barriers that prevent risks include up-to-date professionals, use of clinical protocols and safety checklists²³. The perception that care protocols ensure patient safety goes beyond in some reports, where respondents recognize the importance to their own professional safety.

“Protocols give us confidence to follow appropriate routines with patients” (Faure).

“Through protocols that ensure safety to our work and especially to patients” (Maryland).

In this sense, care protocols aim at a systematic, organized and scientific-based assistance, reflected in reduction of errors and a legally supported care. These aspects are recognized to establish safe routes to be followed and that keep the record of the care provided, which favors the qualification of assistance and, thus, brings safety to the team.

Therefore, care protocols lead to a nursing staff seeking to increase knowledge and establish its craft as a science, using the best practices that make patient and professional safety feasible, providing learning and ensuring effective, excellence assistance.

FINAL REMARKS

Applying the protocol through a checklist guides the actions of the team, besides enabling these to occur in a systematic and fast way, given the complexity of the service provided in a PARR. However, it should be noted that this research demonstrates that, in addition to care protocols, other factors contribute to patient safety in the PARR, including recommended number of professionals, qualification, continuing education and availability of resources. In addition, a safe environment is possible if the professionals who work in it recognize the importance and are aware of actions such as the use of care protocols.

Although the PARR is considered a passing territory, its purpose is not only to wait for the “effects of anesthesia to pass”, so it should be acknowledged as a critical and complex environment, where multiprofessional care, not only nursing, must be intensive to guarantee the continuity and success of the anesthetic-surgical procedure. Preventive measures also need to be employed, including prevention of skin lesions, prevention of infections, and not only in hospitalization units.

Although the Surgery Safety Checklist recommended by the WHO is widely applied by health services, it is still little used in the PARR, since only one item contemplates relevant post-operative care. However, it contains valuable and essential information for nursing care this environment, such

as identification data, patient history, intraoperative complications, besides allowing a communication between professionals. Therefore, the socialization of strategies created by the nursing team to promote patient safety and value the PARR is emphasized.

Therefore, this study represents the importance of using safe care in all phases of the perioperative period, considering that care protocols contribute to the implementation of the Global Alliance on Patient Safety, “Safe Surgery Saves Lives” challenge, and the National Patient Safety Program. Finally, we hope that further research is conducted to promote patient safety and improve the profession, and that the awareness of the importance of this topic be extended to all health services and educational institutions.

REFERENCES

1. Organização Mundial da Saúde. Segundo Desafio Global para a Segurança do Paciente: Cirurgias Seguras Salvam Vidas. Rio de Janeiro: Organização Pan-Americana da Saúde (OPAS); Ministério da Saúde (MS); Agência Nacional de Vigilância Sanitária (ANVISA); 2009.
2. Brasil. Ministério da Saúde. Portaria nº 529, de 1º de abril de 2013. Institui o Programa Nacional de Segurança do Paciente [Internet]. Brasil; 2013 [acessado em 19 maio 2019]. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2013/prt0529_01_04_2013.html
3. Bonfim IM, Malagutti W. Recuperação pós-anestésica: assistência especializada no centro cirúrgico. São Paulo: Martinari; 2010.
4. Sociedade Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material de Esterilização. Diretrizes de práticas em enfermagem cirúrgica e processamento de produtos para a saúde. 7ª ed. São Paulo: SOBECC/Barueri: Manole; 2017.
5. Amaya MR, Paixão DPSS, Sarquis LMM, Cruz EDA. Construção e validação de conteúdo de checklist para a segurança do paciente em emergência. Rev Gaúcha Enferm. 2016;37(n. esp.):e68778. <http://dx.doi.org/10.1590/1983-1447.2016.esp.68778>
6. Wachter RM. Compreendendo a segurança do paciente. 2ª ed. Porto Alegre: AMGH; 2013.
7. Fassarella CS, Ferreira SS, Camerini FG, Henrique DM, Luna AA, Almeida LF. Profissionais mediadores da qualidade e segurança do paciente como estratégia para o cuidado seguro. Rev Min Enferm. 2017;21:e-1068. <http://www.dx.doi.org/10.5935/1415-2762.20170078>
8. Conselho Federal de Enfermagem. Lei nº 7.498, de 25 de junho de 1986. Dispõe sobre a regulamentação do exercício da enfermagem e dá outras providências [Internet]. Brasil; 1986 [acessado em 19 maio 2019]. Disponível em: <http://www.jusbrasil.com.br/legislacao/128195/lei-7498-86>
9. Trentini M, Paim L, Silva DMG. Pesquisa convergente assistencial: delineamento provocador de mudanças nas práticas de saúde. 3ª ed. Porto Alegre: Moriá; 2014.
10. Brasil. Ministério da Saúde. Resolução nº 466, de 12 de dezembro de 2012. Diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos [Internet]. Brasil; 2012 [acessado em 19 maio 2019]. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/cns/2013/res0466_12_12_2012.html
11. Bardin L. Análise de conteúdo. Lisboa: Edições 70; 2011.
12. Rothrock JC. Alexander: Cuidados de enfermagem ao paciente cirúrgico. 13ª ed. Rio de Janeiro: Elsevier; 2007.
13. Loro MM, Bittencourt VLL, Zeitoune RCG. Pesquisa convergente assistencial: equipe de enfermagem compartilhando saberes sobre riscos ocupacionais e propondo intervenções. REME-Rev Min Enferm. 2017;21:e-1044. <http://www.dx.doi.org/10.5935/1415-2762.20170054>
14. Vendramini RCR, Silva EA, Ferreira KASL, Possari JF, Bais WRM. Segurança do paciente em cirurgia oncológica: experiência do Instituto do Câncer do Estado de São Paulo. Rev Esc Enferm USP. 2010;44(3):827-32. <http://dx.doi.org/10.1590/S0080-62342010000300039>

15. Werneck MAF, Faria HP, Campos KFC. Protocolos de cuidado e de organização do serviço. 2ª ed. Belo Horizonte: Nescon/UFMG; 2013.
16. Aiken LH, Clarke SP, Cheung RB, Sloane DM, Silber JH. Educational levels of hospital nurses and surgical patient mortality. *JAMA*. 2003;290(12):1617-23.
17. Cunha ALSM, Peniche ACG. Validação de um instrumento de registro para sala de recuperação pós-anestésica. *Acta Paul Enferm*. 2007;20(2):151-60. <http://dx.doi.org/10.1590/S0103-21002007000200007>
18. Tannure MC. Sistematização da Assistência de Enfermagem: guia prático. Rio de Janeiro: Guanabara Koogan; 2008.
19. Reis AM, Marques TC, Opitz SP, Silva AE, Gimenes FR, Teixeira TC, et al. Errors in medicine administration profile of medicines: knowing and preventing. *Acta Paul Enferm*. 2010;23(2):181-6. <http://dx.doi.org/10.1590/S0103-21002010000200005>
20. Paixão DPSS, Batista J, Maziero ECS, Alpendre FT, Amaya MR, Cruz EDA. Adhesion to patient safety protocols in emergency care units. *Rev Bras Enferm*. 2018;71(Supl. 1):577-84. <http://dx.doi.org/10.1590/0034-7167-2017-0504>
21. Paiva MCMS, Paiva SAR, Berti HW. Eventos adversos: análise de um instrumento de notificação utilizado no gerenciamento de enfermagem. *Rev Esc Enferm USP*. 2010;44(2):287-94. <http://dx.doi.org/10.1590/S0080-62342010000200007>
22. Carlesi KC, Padilha KG, Toffoletto MC, Henriquez-Roldán C, Juan MAC. Patient safety incidents and nursing workload. *Rev Latino-Am Enferm*. 2017;25:e2841. <http://dx.doi.org/10.1590/1518-8345.1280.2841>
23. Brasil. Ministério da Saúde. Documento de Referência para o Programa Nacional de Segurança do Paciente. Fundação Oswaldo Cruz; Agência Nacional de Vigilância Sanitária (ANVISA). Brasília: Ministério da Saúde; 2014.

THE NURSE IN THE ANTIMICROBIAL STEWARDSHIP: AN INTEGRATIVE REVIEW

O enfermeiro no programa de gerenciamento do uso de antimicrobianos: uma revisão integrativa

El enfermero en el programa de gestión del uso de antimicrobianos: una revisión integrativa

André Luiz Silva Alvim^{1*} 

ABSTRACT: Objective: To analyze how scientific literature describes the nurse, as well as his/her role in the Antimicrobial Stewardship (AMS). **Method:** Integrative literature review, carried out by consulting the Scientific Electronic Library Online (SciELO), Latin American & Caribbean Health Sciences Literature (LILACS), and MEDical Literature Analysis and Retrieval System Online (MEDLINE) databases. **Results:** We included six articles that met the previously established inclusion criteria. They were published in English and disclosed in the MEDLINE electronic database. Half of the articles were published in scientific journals that had an impact factor evaluated above 2.0. The journals *Clinical Infectious Diseases* (8.216), *BMC Medical Informatics and Decision Making* (2.288), and *American Journal of Infection Control* (2.209) were highlights. Regarding the addressed themes, all the articles recognized the nurse as a key element in the AMS. **Conclusion:** Even though the studies in the literature are limited, we concluded that the participation of nurses promotes therapeutic optimization and rational use of antibiotics, contributing to the reduction of antimicrobial resistance. **Keywords:** Nursing, team. Antimicrobial stewardship. Cross infection.

RESUMO: Objetivo: Analisar como a literatura científica descreve o enfermeiro, bem como seu papel no Programa de Gerenciamento do Uso de Antimicrobianos (PGUA). **Método:** Revisão integrativa da literatura, realizada mediante consulta às bases de dados Scientific Electronic Library Online (SciELO), Literatura Latinoamericana e do Caribe em Ciências da Saúde (LILACS) e Medical Literature Analysis and Retrieval System Online (MEDLINE). **Resultados:** Foram incluídos seis artigos que atenderam os critérios de inclusão previamente estabelecidos. Todos foram publicados na língua inglesa e divulgados na base de dados eletrônica MEDLINE. A metade dos artigos foi publicada em revistas científicas que tiveram fator de impacto avaliado acima de 2,0, destacando os periódicos *Clinical Infectious Diseases* (8,216), *BMC Medical Informatics and Decision Making* (2,288) e *American Journal of Infection Control* (2,209). Quanto aos temas abordados, todos os artigos reconheceram o enfermeiro como peça fundamental no PGUA. **Conclusão:** Embora os estudos na literatura sejam limitados, foi possível concluir que a participação do enfermeiro promove otimização terapêutica e uso racional dos antibióticos, contribuindo para redução da resistência antimicrobiana. **Palavras-chave:** Equipe de enfermagem. Gestão de antimicrobianos. Infecção hospitalar.

RESUMEN: Objetivo: Analizar cómo la literatura científica describe el enfermero, así como su papel en el Programa de Gestión del Uso de Antimicrobianos (PGUA). **Método:** Revisión integrativa de la literatura, realizada mediante consulta a las bases de datos *Scientific Electronic Library Online* (SciELO), Literatura Latinoamericana y del Caribe en Ciencias de la Salud (LILACS) y *Medical Literature Analysis and Retrieval System Online* (MEDLINE). **Resultados:** Fueron incluidos seis artículos que atendieron a los criterios de inclusión previamente establecidos. Todos fueron publicados en el idioma inglés y divulgados en la base de datos electrónica MEDLINE. Mitad de los artículos fue publicada en revistas científicas que tuvieron factor de impacto evaluado arriba de 2,0, destacando los periódicos *Clinical Infectious Diseases* (8,216), *BMC Medical Informatics and Decision Making* (2,288) y *American Journal of Infection Control* (2,209). Con relación a los temas abordados, todos los artículos reconocieron al enfermero como pieza fundamental en el PGUA. **Conclusión:** Aunque los estudios en la literatura sean limitados, fue posible concluir que la participación del enfermero promueve optimización terapéutica y uso racional de los antibióticos, contribuyendo para la reducción de la resistencia antimicrobiana. **Palabras clave:** Grupo de enfermería. Programas de optimización del uso de los antimicrobianos. Infección hospitalaria.

¹Nurse; Master's Degree in Nursing from Universidade Federal de Minas Gerais (UFMG); Specialist in Hospital Infection Control; MBA in Audit and Quality Management applied to Health Services. PhD student in Nursing at UFMG – Belo Horizonte (MG), Brazil.

*Corresponding author: andrealvim1@hotmail.com

Received: 11/14/2018 – Approved: 06/12/2019

DOI: 10.5327/Z1414-4425201900030007

INTRODUCTION

Antimicrobial Resistance (AR) refers to the ability of the microorganism to withstand the action effects of previously prescribed antibiotics. This phenomenon is considered a public health problem, which compromises the effectiveness of current anti-infective treatments. Several factors contributing to the emergence of this phenomenon are highlighted, especially the use of antimicrobials without proper indication¹.

In the United States, 2 million Healthcare-Associated Infections (HAI) by antimicrobial-resistant microorganisms are estimated to occur every year, and at least 23,000 deaths occur as a result of these infections¹. In Europe, around 25,000 patients die from infections caused by multiresistant microorganisms, which generate additional costs for public coffers of approximately € 1.5 billion per year². In Brazil, resistance to antibiotics has been reported by several health services in the recent decades³.

In the national context, Ordinance No. 2,616, from May 12, 1998, established guidelines and standards for the creation of the Hospital Infection Control Program (PCIH, acronym in Portuguese) and included a mandatory policy for the use of antimicrobials, germicides, and hospital-medical materials⁴. At the same time, not only in Brazil, but also worldwide, through the World Health Organization (WHO)⁵ and the United States Center for Disease Control and Prevention, the issue of antimicrobial stewardship has gained wide discussion and highlight among the themes related to public health⁶.

The Antimicrobial Stewardship (AMS) establishes guidelines and strategies based on scientific evidence and laboratory data to create systematic actions that may prevent and control the spread of multiresistant microorganisms. Effectively implanted AMS favors better clinical outcomes, reducing the length of hospital stay, morbimortality, and unexpected care costs resulting from inadequate anti-infective treatments⁶⁻⁸.

Among the various professionals who make up the team responsible for the AMS, the nurses stand out. They are responsible for ensuring that bacteriological cultures are carried out before the start of antibiotics, because these promote discussions on the possible adverse effects caused by antimicrobials and review medical prescriptions daily, according to the indicated treatment and its duration.

Hence, this study is justified in elucidating the nurse's role as to the AMS, considering some literatures still do not recognize it as a key element for the program success. This research is important to provide data that draw the attention of health managers on the importance of nursing in the fight against AR. In addition, new reflections on the proposed theme are expected.

OBJECTIVE

To analyze how scientific literature describes the nurse, as well as its role in the AMS.

METHOD

This is a bibliographical study, an integrative literature review type. This method allows unifying the results based on a defined theme and incorporates the evidence in clinical practice, contributing to deepen the knowledge of the investigated subject⁹.

For the study preparation, the following steps were taken:

- establishment of research hypothesis or question;
- sampling or search in the literature;
- categorization of studies;
- evaluation of studies included in the review;
- interpretation of results;
- synthesis of knowledge or presentation of review⁹.

In the first stage, the theme and the research objectives were defined. As a guiding question, the following question was asked: What is the nurse's role in the AMS?

For the selection of studies, a bibliographic survey was carried out in the Scientific Electronic Library Online (SciELO), Latin American & Caribbean Health Sciences Literature (LILACS) and Medical Literature Analysis and Retrieval System Online (MEDLINE) databases through the Virtual Health Library (<http://bvsalud.org/>). For the retrieval strategy of scientific information, Boolean operators were used. The keywords defined for literary search were "Nurse" AND "Antimicrobial Stewardship" AND "hospital". The latter was used as a free descriptor, without the use of quotation marks. All keywords are part of the Health Sciences Descriptors (DeCS).

The following inclusion criteria were used: articles published in Spanish, English and Portuguese, from 2013 to 2017. The articles in the form of handouts were excluded from the research because they did not meet the necessary criteria, which reinforce the importance of searching for scientific evidence on the subject.

For data collection, a form was prepared by the author himself, including the title of the articles, the researchers' names, information of the journals (volume, number, pages, year and published journal), and the main highlights. Subsequently, data were transmitted to a synoptic table with the same information for the synthesis of studies.

After reading the scientific articles included in the integrative review, a descriptive analysis was performed, using percentage calculation and absolute values presentations in tables. Later, data were analyzed through the synthesis of authors' dialogues and discussed based on relevant literature.

The studies were grouped by content similarity and showed a single category: The nurse in the AMS.

Figure 1 shows the steps taken to select the articles that were part of the study sample.

RESULTS

Six articles that met the previously established inclusion criteria were included in this study. All of them were published in English and disclosed in the MEDLINE database. Table 1 presents the synthesis of the six articles that formed the sample.

From the total of articles on such subject, we verified that half (50.0%) was published in scientific journals that had an impact factor evaluated above 2.0, and the following journals stood out: Clinical Infectious Diseases (8.216), BMC Medical Informatics and Decision Making (2.288),

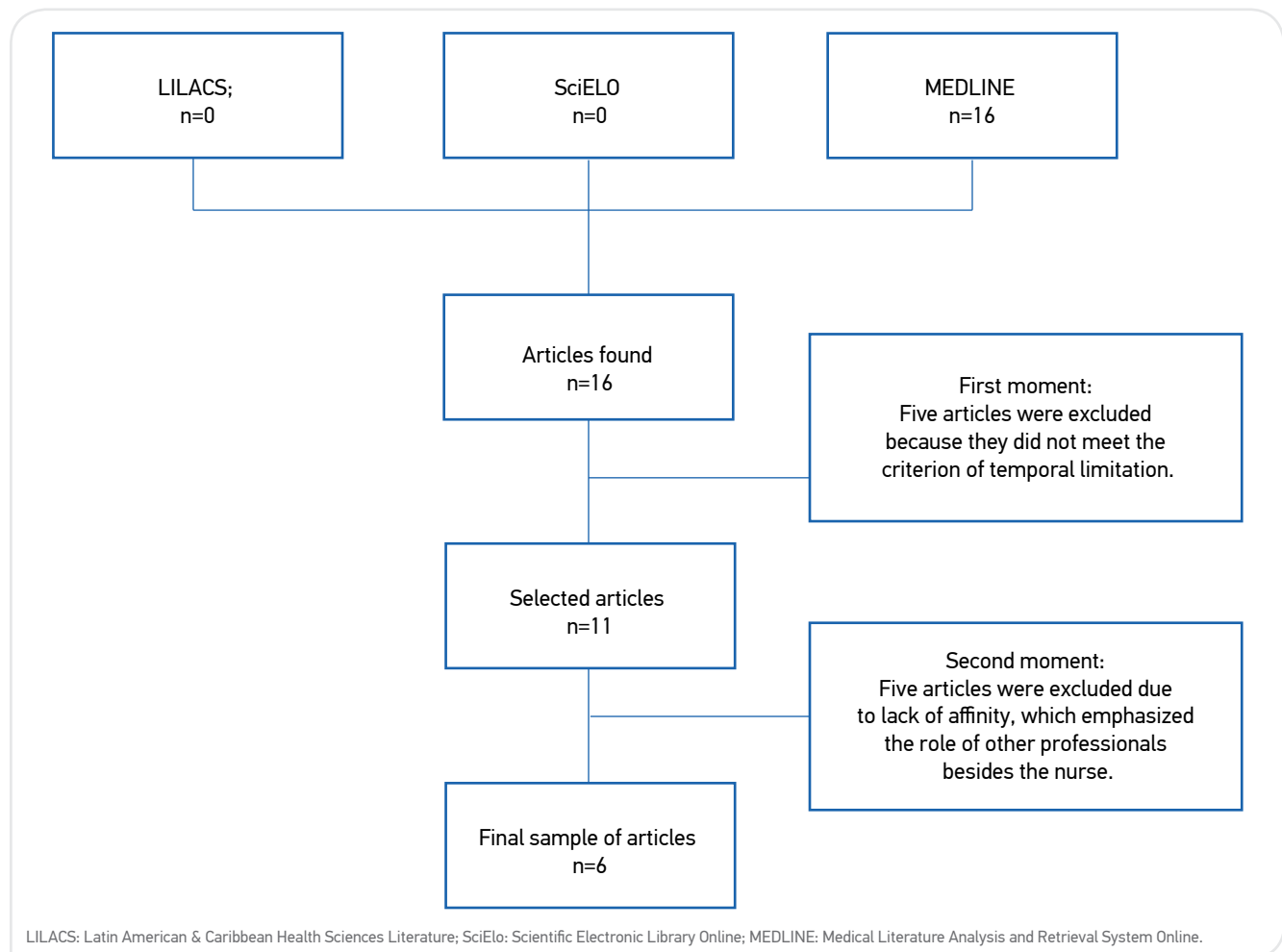


Figure 1. Literary search of scientific articles.

and American Journal of Infection Control (2.209), as seen in Table 2.

Regarding temporal delimitation, we observed in this integrative review that two (33.3%) of the selected articles are from 2013; two (33.3%) from 2014; one (16.67%) from 2015, and one (16.67%) from 2016 (Table 1). In addition, the absence of Brazilian studies published in the selected databases was notorious, with a predominance of international studies.

Regarding the addressed themes, all the articles recognized the nurse as a key element in the AMS. The studies highlighted the activities performed by this professional as essential for the reduction of AR, as well as for therapeutic optimization of infectious treatments. Key activities performed by nurses, such as daily review of medical prescriptions and administration of antimicrobials with adequate indication, dose and duration, stood out.

Chart 2. Impact factor of scientific journals evaluated for the study.

Journal	Impact factor
Clinical Infectious Diseases	8.216
BMC Medical Informatics and Decision Making	2.288
American Journal of Infection Control	2.209
Journal of the American Association of Nurse Practitioners	0.931
Journal of Continuing Education in Nursing	0.880
Nursing Standard	0.080

Table 1. Distribution of studies according to the year of publication.

Year of publication	Number	Percentage
2013	2	33.3
2014	2	33.3
2015	1	16.7
2016	1	16.7
2017	-	-

Chart 1. Synoptic table with synthesis of selected articles for the study.

Article title	Authors	Journal, year, volume, number and pages	Main Highlights
The critical role of the staff nurse in antimicrobial stewardship: unrecognized, but already there ¹⁰	Olans RN, Olans RD, DeMaria A Jr.	Clin Infect Dis. 2016;62(1):84-9	The nurse is a professional who has always performed several essential functions for the success of antimicrobial stewardship, such as continuous status monitoring of the patient and the assessors of antimicrobial therapeutic response.
Defining a role for nursing education in staff nurse participation in antimicrobial stewardship ¹¹	Olans RD, Nicholas PK, Hanley D, DeMaria A Jr.	J Contin Educ Nurs. 2015;46(7):318-21	The role of nurses in the AMS has not been clearly defined, requiring educational interventions to improve awareness of program components.
The urgent need for nurse practitioners to lead antimicrobial stewardship in ambulatory health care ¹²	Manning ML	J Am Assoc Nurse Pract. 2014;26(8):411-3.	In the AMS, nursing professionals should lead in addressing the therapeutic implications for patients and their care practice.
Participatory eHealth development to support nurses in antimicrobial stewardship ¹³	Wentzel J, Van Velsen L, Van Limburg M, de Jong N, Karreman J, Hendrix R, et al.	BMC Med Inform Decis Mak. 2014;14:45.	To perform complex antimicrobial-related activities, nurses need to consult various sources of information on a myriad of occasions, mainly because the information is not structured to match the professional's duties.
Antimicrobial stewardship: the role of the nurse ¹⁴	Ladenheim D, Rosembert D, Hallam C, Micallef C	Nurs Stand. 2013; 28(6):46-9.	The nurse's role is essential to ensure the correct use of antimicrobials through correct drug administration, contributing to the reduction of antimicrobial resistance.
Improving antibiotic stewardship by involving nurses ¹⁵	Gillespie E, Rodrigues A, Wright L, Williams N, Stuart RL	Am J Infect Control. 2013;41(4):365-7.	Nurses are essential to administer medications prescribed by the medical staff. The AMS should involve these professionals in order to improve the antimicrobial administration in the hospital environment.

AMS: Antimicrobial Stewardship.

DISCUSSION

The nurse in the antimicrobial stewardship

Medical prescriptions classified as inadequate or unnecessary may vary between 20 and 50% and justify the adoption of AMS as a strategy to guarantee efficient medical and therapeutic effect and to control the consumption of antibiotics in health services¹⁶. As a result, the indiscriminate use of these substances could be reduced as much as possible, and could have an impact on the decline in AR that threatens global public health.

AMS involves a multifaceted approach to policies, guidelines, educational strategies, and other strategies that ensure the best clinical outcomes. The strict control and monitoring of antimicrobials aims to reduce or eliminate potential risks, which affect the anti-infective treatment of patients³.

The proper management of antimicrobials in health services can considerably reduce the HAIs caused by multiresistant microorganisms¹⁶. The formation of an interdisciplinary team responsible for the execution of improvement actions related to AMS is essential, which would train health managers and disseminate feedback to those involved^{3,5-8}.

The national guideline for the elaboration of AMS in Health Services, launched by the Brazilian Health Regulatory Agency (ANVISA) in 2017, suggests the nursing team as one of the representatives for the formation of a management team. This team should coordinate administrative and general actions, thus establishing systematic evaluations and control for compliance with the plan in different units of a hospital. This document also cites the operational team, which is responsible for the elaboration, execution and monitoring of the AMS actions. The team must be comprised, at a minimum, by the following components of the management team: infectologist or physician with expertise in infectious diseases; clinical pharmacist, preferably with expertise in infectious diseases and antimicrobial use; nurse of the Hospital Infection Control Commission (CCIH, acronym in Portuguese), and clinical microbiologist³.

The nurse has a peculiar role in the patient's direct care. He/she develops several complex care activities, including the administration of medications. One study showed the importance of this professional as one of the leaders as

to the AMS, addressing the several implications related to the administration of antimicrobials for the nurse's practice of care¹².

Hence, the importance of nursing in the rationalization of antibiotic therapy through drug administration should be more explored in health services^{10,14,15}. It is noteworthy that nurses need to see themselves within the AMS, valuing their knowledge as educators and their informant support of the practices associated with AMS.

Even though the nurse's role has not been formally recognized as to the AMS or defined in the medical literature, it is important to elucidate that the professional has always played a number of essential functions for the program success. They are considered central communicators of the patient's status and evaluate the effects and/or possible side events related to antibiotic therapy¹⁰ for 24 hours.

One study evaluated 900 scientific articles on hospital AMS, and the authors identified that only 11 had been published in nursing journals¹¹. In this case, most of them were available in medical, pharmacy, microbiology and other journals, emphasizing the lack of studies elaborated by nurses on the subject.

A study carried out with 180 nurses showed that the professionals have great prominence, mainly in the identification of adverse reactions and acquisition of bacteriological cultures before the start of antimicrobials and active participation in health education related to the subject. However, the authors of this study have highlighted opportunities for improvement in some aspects, such as the review of microbiology results to determine the adequacy of the antibiotic and failures in the insertion of nurses in discussion rounds of the multidisciplinary team¹⁷.

Another relevant aspect is the education of health professionals, patients, companions and caregivers for the success of AMS, which is an essential factor that favors awareness and positively stimulates the operational team. The educational process for general involvement promotes the correct use of antimicrobials and favors the effective therapeutic management of patients with infection, and may favor outcomes with fewer adverse events³.

However, nurses still need to improve their knowledge of the components of AMS¹¹. A study showed that 98% of 210 nurses still report lack of specific antimicrobial-related training. It is inferred that education on the subject should not be limited to graduation, thus it should be expanded to places that involve care practice to patients¹⁸.

In addition to the need of improving nurses' knowledge regarding AMS, authors¹³ consider that professionals still need to consult several sources of information on a multitude of occasions, mainly because the specific data of the program are not structured to match the professional's tasks. Thus, the need to create technologies that favor the incorporation of medical protocols into the nurses' work routines was observed, reducing rework and optimizing the good practices of antimicrobial use.

Based on the careful reading of the selected articles, we noticed the importance of the nurses' participation in the rationalization of antimicrobial use. It is noteworthy that its specific attributions contribute to the effectiveness of actions in the AMS, in which its concerns regarding antibiotic selection, administration routes, dosage and duration of treatments favor the best clinical outcomes with minimal potential risk.

FINAL CONSIDERATIONS

The AMS optimizes drug therapy and decreases the resistance of microorganisms to antibiotics. For the program to

be implemented successfully, infection prevention and control guidelines should be adopted together to reduce the transmission of pathogens to patients in a care unit.

For the implementation of policies and regulations related to the AMS, an interdisciplinary team composed of several professionals should be formed. Even though the nurses have not been recognized by some studies as members of AMS, their participation promotes therapeutic optimization as well as rational use of antimicrobials.

The main objective of the study was achieved, and it was possible to know the nurses' role and their importance to AMS through this integrative review. It is noteworthy that the other professionals who make up the management team, such as infectologist, pharmacist, CCIH nurse and clinical microbiologist, contribute, in a mutual way, to therapeutic management with favorable outcomes and fewer adverse events to the patient. However, more researches with other methodologies and new approaches are fundamental to a better understanding of the studied subject.

REFERENCES

- Centers for Disease Control and Prevention (CDC). Antibiotic resistance threats in the United States, 2013 [Internet]. Atlanta: Centers for Disease Control and Prevention; 2013 [acessado em 8 jun. 2018]. Disponível em: <https://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf>
- European Centre for Disease Prevention and Control. Factsheet for experts: antimicrobial resistance [Internet]. European Centre for Disease Prevention and Control; 2008 [acessado em 8 jun. 2018]. Disponível em: <https://ecdc.europa.eu/en/antimicrobial-resistance/facts/factsheets/experts>
- Brasil. Agência Nacional de Vigilância Sanitária (ANVISA). Diretriz Nacional para Elaboração de Programa de Gerenciamento do Uso de Antimicrobianos em Serviços de Saúde. Brasília [Internet]. Brasil: Agência Nacional de Vigilância Sanitária; 2017 [acessado em 9 jun. 2018]. Disponível em: <https://www20.anvisa.gov.br/segurancadopaciente/index.php/publicacoes/item/diretriz-nacional-para-elaboracao-de-programa-de-gerenciamento-do-uso-de-antimicrobianos-em-servicos-de-saude>
- Brasil. Ministério da Saúde (MS). Portaria nº 2.616, de 12 de maio de 1998. Dispõe sobre diretrizes e normas para prevenção e o controle das infecções hospitalares [Internet]. Brasília: Ministério da Saúde; 1998 [acessado em 9 jun. 2018]. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/gm/1998/prt2616_12_05_1998.html
- World Health Organization. Global strategy for containment of antimicrobial resistance [Internet]. Geneva: World Health Organization; 2001 [acessado em 10 jun. 2018]. Disponível em: http://www.who.int/drugresistance/WHO_Global_Strategy_English.pdf
- Pollack LA, Srinivasan A. Core elements of hospital antibiotic stewardship programs from the centers for disease control and prevention. Clin Infect Dis [Internet]. 2014 [acessado em 10 jun. 2018];59(Supl. 3):s97-s100. Disponível em: <http://dx.doi.org/10.1093/cid/ciu542>
- Perez KK, Olsen RJ, Musick WL, Cernoch PL, Davis JR, Peterson LE, et al. Integrating rapid diagnostics and antimicrobial stewardship improves outcomes in patients with antibiotic-resistant Gram-negative bacteremia. J Infect [Internet]. 2014 [acessado em 10 jun. 2018];69(3):216-25. Disponível em: <http://dx.doi.org/10.1016/j.jinf.2014.05.005>
- Centers for Disease Control and Prevention (CDC). Core Elements of Hospital Antibiotic Stewardship Programs [Internet]. Atlanta: US Department of Health and Human Services, CDC; 2014 [acessado em 10 jun. 2018]. Disponível em: <http://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html>
- Mendes KS, Silveira RCCP, Galvão CM. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem. Texto Context Enferm [Internet]. 2008 [acessado em 10 jun. 2018];17(4):758-64. Disponível em: <http://dx.doi.org/10.1590/S0104-07072008000400018>

10. Olans RN, Olans RD, de Maria Jr. A. The critical role of the staff nurse in antimicrobial stewardship: unrecognized, but already there. *Clin Infect Dis* [Internet]. 2016 [acessado em 10 jun. 2018];62(1):84-9. Disponível em: <http://dx.doi.org/10.1093/cid/civ697>
11. Olans RD, Nicholas PK, Hanley D, DeMaria A Jr. Defining a role for nursing education in staff nurse participation in antimicrobial stewardship. *J Contin Educ Nurs* [Internet]. 2015 [acessado em 9 jun. 2018];46(7):318-21. Disponível em: <http://dx.doi.org/10.3928/00220124-20150619-03>
12. Manning ML. The urgent need for nurse practitioners to lead antimicrobial stewardship in ambulatory health care. *J Am Assoc Nurse Pract* [Internet]. 2014 [acessado em 10 jun. 2018];26(8):411-3. Disponível em: <http://dx.doi.org/10.1002/2327-6924.12150>
13. Wentzel J, Van Velsen L, Van Limburg M, de Jong N, Karreman J, Hendrix R, et al. Participatory eHealth development to support nurses in antimicrobial stewardship. *BMC Med Inform Decis Mak* [Internet]. 2014 [acessado em 9 jun. 2018];14(45). Disponível em: <https://doi.org/10.1186/1472-6947-14-45>
14. Ladenheim D, Rosembert D, Hallam C, Micallef C. Antimicrobial stewardship: the role of the nurse. *Nurs Stand*. 2013;28(6):46-9. <http://dx.doi.org/10.7748/ns2013.10.28.6.46.e7802>
15. Gillespie E, Rodrigues A, Wright L, Williams N, Stuart RL. Improving antibiotic stewardship by involving nurses. *Am J Infect Control*. 2013;41(4):365-7. <https://doi.org/10.1016/j.ajic.2012.04.336>
16. Fridkin S, Baggs J, Fagan R, Magill S, Pollack LA, Malpiedi P, et al. Vital signs: improving antibiotic use among hospitalized patients. *MMWR Morb Mortal Wkly Rep* [Internet]. 2014 [acessado em 12 jun. 2018];63(9):194-200. Disponível em: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6309a4.htm>
17. Monsees E, Popejoy L, Jackson MA, Lee B, Goldman J. Integrating staff nurses in antibiotic stewardship: Opportunities and barriers. *Am J Infect Control* [Internet]. 2018 [acessado em 9 jun. 2018];46(7):737-42. Disponível em: <https://doi.org/10.1016/j.ajic.2018.03.028>
18. Abera B, Kibret M, Wondemagegn M. Knowledge and beliefs on antimicrobial resistance among physicians and nurses in hospitals in Amhara Region, Ethiopia. *BMC Pharmacol Toxicol* [Internet]. 2014 [acessado em 11 jun. 2018];15:26. Disponível em: <http://dx.doi.org/10.1186/2050-6511-15-26>

LESIONS ARISING OUT OF SURGICAL PROCEDURE: RELATED FACTORS

Lesões provenientes de procedimento cirúrgico: fatores relacionados

Lesiones provenientes de procedimiento quirúrgico: factores relacionados

Sílvia Márcia dos Santos Sandes^{1*} , Mikael Ferreira Costa² , Graycielle Vieira dos Santos³ , Lucas Pereira de Freitas⁴ ,
Alessa Caroline Pedroza de Vasconcelos⁵ , Luciana de Santana Lôbo Silva⁶ 

ABSTRACT: Objectives: To analyze scientific publications regarding skin lesions resulting from surgical procedures and to identify the risk factors associated with their occurrence. **Method:** Integrative literature review study, with publications from 2012 to 2018, using PubMed Library and Virtual Health Library databases. **Results:** Of the eight studies that contemplated the subject, 87.5% were researches developed in hospital institutions and 12.5% in medical centers; 25.0% of the studies used case-control method, 25.0% were retrospective analysis studies, 12.5% were sample selection studies, 12.5% were cross-sectional studies, 12.5% were case reports and 12.5% were cohort studies. In total, 50.0% had been published in medical journals, 12.5% in nursing journals and 37.5% in journals of other health areas. **Final considerations:** The lesions that occur due to surgical procedures are mostly related to skin, both intraoperatively and in the immediate postoperative period. In addition to pressure ulcers, the presence of intraoperative burns and the appearance of skin lesions in the postoperative period were noted.

Keywords: Pressure ulcer. Wounds and injuries. Burns. Operating rooms. Patient positioning.

RESUMO: Objetivos: Analisar as publicações científicas referentes a lesões de pele decorrentes de procedimento cirúrgico e identificar os fatores de risco associados à ocorrência das lesões. **Método:** Estudo de revisão integrativa de literatura, com publicações do período de 2012 a 2018, utilizando as bases das bibliotecas PubMed e Biblioteca Virtual de Saúde. **Resultados:** Dos oito estudos que contemplaram o objetivo, 87,5% foram pesquisas desenvolvidas em instituições hospitalares e 12,5% em centro médico; e 25,0% dos estudos utilizaram o método de caso controle, 25,0% eram estudos de análise retrospectiva, 12,5% eram estudo de seleção de amostra, 12,5% estudo transversal, 12,5% relato de caso e 12,5% estudo de coorte. Das publicações, 50,0% foram em revistas médicas, 12,5% em revistas de enfermagem e 37,5% em revistas de outras áreas da saúde. **Considerações finais:** As lesões que acontecem por conta de procedimento cirúrgico, em sua maioria, são relacionadas à pele, tanto no intraoperatório quanto no pós-operatório imediato. Além das lesões por pressão, destacaram-se a presença de queimaduras no intraoperatório e o aparecimento de lesões de pele no período pós-operatório. **Palavras-chave:** Lesão por pressão. Ferimentos e lesões. Queimaduras. Salas cirúrgicas. Posicionamento do paciente.

RESUMEN: Objetivos: Analizar las publicaciones científicas referentes a lesiones de piel decurrentes de procedimiento quirúrgico e identificar los factores de riesgo asociados a la ocurrencia de las lesiones. **Método:** Estudio de revisión integrativa de literatura, con publicaciones del período de 2012 a 2018, utilizando las bases de las bibliotecas PubMed y Biblioteca Virtual de Salud. **Resultados:** De los ocho estudios que contemplaron el objetivo, un 87,5% fue investigación desarrollada en instituciones hospitalarias y un 12,5% en centro médico; y un 25,0% de los estudios utilizaron el método de caso control, un 25,0% era estudio de análisis retrospectivo, un 12,5% era estudio de selección de muestra, un 12,5% estudio transversal, un 12,5% relato de caso y un 12,5% estudio de cohorte. De las publicaciones, un 50,0% fue en revistas médicas, un 12,5% en revistas de enfermería y un 37,5% en revistas de

¹Nurse; MD in Physiological Science at Universidade Federal de Sergipe (UFS). Professor of Nursing at Faculdade Estácio de Sergipe – Aracaju (SE), Brazil.

²Nurse; MD student at Post-graduate Program in Parasite Biology at UFS – Aracaju (SE), Brazil.

³Nursing student at Faculdade Estácio de Sergipe – Aracaju (SE), Brazil.

⁴Nursing student at Faculdade Estácio de Sergipe – Aracaju (SE), Brazil.

⁵Pharmacist; PhD in Biotechnology at Rede Nordeste de Biotecnologia; MD in Health and Environment at Universidade Tiradentes; Professor of Nursing at Faculdade Estácio de Sergipe – Aracaju (SE), Brazil.

⁶Nurse; MD in Nursing at UFS; Professor of Nursing at Faculdade Estácio de Sergipe – Aracaju (SE), Brazil.

*Corresponding author: sil.sandes@hotmail.com

Received: 08/23/2018 - Approved: 06/01/19

DOI: 10.5327/Z1414-4425201900030008

otras áreas de la salud. **Consideraciones finales:** Las lesiones que ocurren por cuenta de procedimiento quirúrgico, en su mayoría, son relacionadas a la piel, tanto en el intraoperatorio como en el posoperatorio inmediato. Además de las lesiones por presión, se destacaron la presencia de quemaduras en el intraoperatorio y la aparición de lesiones de piel en el período posoperatorio.

Palabras clave: Úlcera por presión. Heridas y traumatismos. Quemaduras. Quirófanos. Posicionamiento del paciente.

INTRODUCTION

In the last decade, patient safety has become prominent in discussions of caring for people and the processes surrounding it. Several studies have sought best practices to obtain safety, and institutions have been constantly aiming to improve their processes with accreditation certificates. The Surgical Center (SC), due to its complexity, deserves a different look at patient care, with the performance of different professionals and the integration of several units; its specificity demands attention in the processes surrounding the patient¹.

The SC in a hospital is where most adverse health events occur to patients. There, therapeutic and diagnostic procedures of small, medium and high complexity are performed, requiring a complex and interdisciplinary work process, since surgical interventions integrate health care, contributing to the prevention of physical damage and loss of lives. Often, SCs are associated with risks of complications and death².

In this context, surgical positioning is an essential and often underestimated step. However, it must be considered that it can lead to serious but preventable injuries³. The patient is totally dependent on the care implementation team to prevent or minimize positioning problems. On the other hand, the team should protect the neuromuscular and cutaneous integrity, maintaining body alignment and respiratory and circulatory functions, especially⁴.

All members of the surgical team (nurse, float nurse, anesthesiologist, surgeon and assistants) are responsible for positioning the patient to the surgery. Therefore, they should be involved in identifying risks, maintaining patient safety and, thus, protecting possible adverse events during surgery⁵.

Prolonged permanence in the same position may lead to potential risk for anatomical and physiological changes, joint damage, stretching, muscular effort, nerve damage or dislocations⁶, resulting in musculoskeletal pain, skin and peripheral nerves lesions and compartment syndrome⁴.

Thus, the interest of this research emerged in the discipline of Clinical Teaching in Surgery, on the field on quality

indicators, posing to researchers the following guiding question: What are the injuries related to surgical procedure described in the literature?

OBJECTIVES

- To analyze scientific publications regarding skin lesions resulting from surgical procedure;
- To identify the following risk factors associated with the occurrence of lesions: type of anesthesia, procedure performed and length of surgery.

METHOD

This is a retrospective study, an integrative literature review encompassing a time span of six years. The following steps were taken to prepare the review: definition of guiding question and objectives, search for evidence in literature, establishment of inclusion and exclusion criteria of articles, analysis, inspection, discussion and presentation of results⁷.

The guiding question of this research was elaborated based on the PICO strategy (Patient, Intervention, Comparison, Outcomes). Thus, the question delimited was: What are the injuries related to surgical procedures described in the literature? The databases used were the US National Library of Medicine (PubMed) and the Virtual Health Library (VHL).

Inclusion criteria were: original articles published in Portuguese and English available electronically in full, with level of evidence for randomized controlled clinical trials; and observational studies and case reports addressing injuries related to surgical procedures, interventions and/or prevention care, published from 2012 to 2018. We aimed at more updated articles, since science is in constant renewal. Review studies and meta-analyzes, dissertations, theses and editorials were excluded.

During search, the mode was adapted according to the particularity of each database, using the following health descriptors:

- Pressure ulcer;
- Wounds and injuries;
- Burns;
- Operating rooms;
- Patient positioning (Chart 1).

In order to select the articles, a strategy of analysis was elaborated according to the guiding question and inclusion and exclusion criteria. Such analysis was done through the reading of titles, abstracts and full texts and resulted in six articles. After this step, duplicates were excluded (Figure 1).

For the analysis and subsequent discussion of the articles, a synoptic table was created by the researchers, which included the following aspects considered relevant: name of study authors, lesions described, characterization of sample and conclusions. Data was processed through Microsoft Office Excel 2010, followed by descriptive statistics, shown in the form of figures and tables.

RESULTS

Twenty articles were found on the proposed theme; however, only eight were analyzed, as these included the established inclusion criteria. Of these, seven (87.5%) had been found on PubMed and one (12.5%) on VHL.

Of the articles selected, seven (87.5%) were research carried out in hospital institutions and one (12.5%) in a medical center.

The research method comprised two (25.0%) case-control studies, two (25.0%) retrospective analysis studies, one (12.5%) sample selection study, one (12, 5%) cross-sectional study, one (12.5%) case report and one (12.5%) cohort study.

Regarding the type of journal in which articles were published, four (50.0%) appeared in medical journals, one (12.5%) in a nursing journal and three (37.5%) in journals of other areas of health.

Regarding the years of publication and the number of publications selected in studies, the time span was from 2012 to 2018. There was a higher percentage of publications between 2013 and 2015, with two articles (25.0%) in each year (Figure 2).

The types of surgical specialties involved in studies are subdivided into general, cardiac, orthopedic, thoracic, neurological and plastic surgery. They are all studies of patients submitted to surgical procedures, with samples varying from 143 to 32,963 individuals. Chart 2 summarizes the results of this integrative review.

DISCUSSION

Regarding the objective of this review, we observed, in the eight articles selected, some variants that were directly associated with lesions arising from surgical procedures, such as procedure performed, duration of surgery and type of anesthesia.

The research for injuries suffered by the surgical patient is of paramount importance to draw attention to the fact that the surgical team must establish care to preserve the physical integrity of the patients.

In a study on perioperative lesions, burns and pressure ulcers (PUs) were highlighted. The authors report that 10.7% of 2,69 patients had PUs after surgical procedure¹².

Other investigations report skin lesions after surgical procedure related to the type of surgery; however, the authors do not point out the type of surgery with a higher incidence of lesions. Cardiovascular, thoracic, orthopedic, neurological, plastic, urologic, bariatric, general, hepatobiliary, oncologic, trauma, transplantation and vascular specialties are among the surgeries

Chart 1. Distribution of search strategies, according to database and number of articles found.

Databases	Search	Retrieved articles	Articles
PubMed	Pressure Ulcer AND Patient positioning; Wounds and Injuries AND Patient positioning; Burns and Patient Positioning; Pressure Ulcer AND Operating rooms; Wounds and injuries AND Operating rooms; Burns AND Operating rooms	14	7
VHL	Pressure ulcer AND Operating rooms; Wounds and injuries AND Operating rooms; Burns AND Operating rooms; Pressure ulcer AND Patient positioning; Wounds and injuries AND Patient positioning; Burns AND Patient Positioning	6	1

VHL: Virtual Health Library.

highlighted by the authors. Lesions range from impaired skin and tissue integrity, considered as PU stage I to stage IV^{9,11-13}.

Besides PUs reported by the authors, other researchers consider that these are directly related to burns occurred during surgical procedures. The highest burn rate is connected to the electrocautery device, which, in most cases, is the starting point for burns^{10,17}. One study identified that 90% of burns were caused by electrocautery¹⁷.

Another important feature is related to the presence of the components essential for the onset of fire, which are found abundantly in the SC. The three basic items are the oxidizer, the source of ignition and the fuel. The oxidant reported by the authors was oxygen because, due to complex surgical procedures and high levels of sedation, high concentrations of oxygen were offered^{10,17}. The authors believe that, for the most part, SC burns could be avoided by taking adequate and effective precautionary measures.

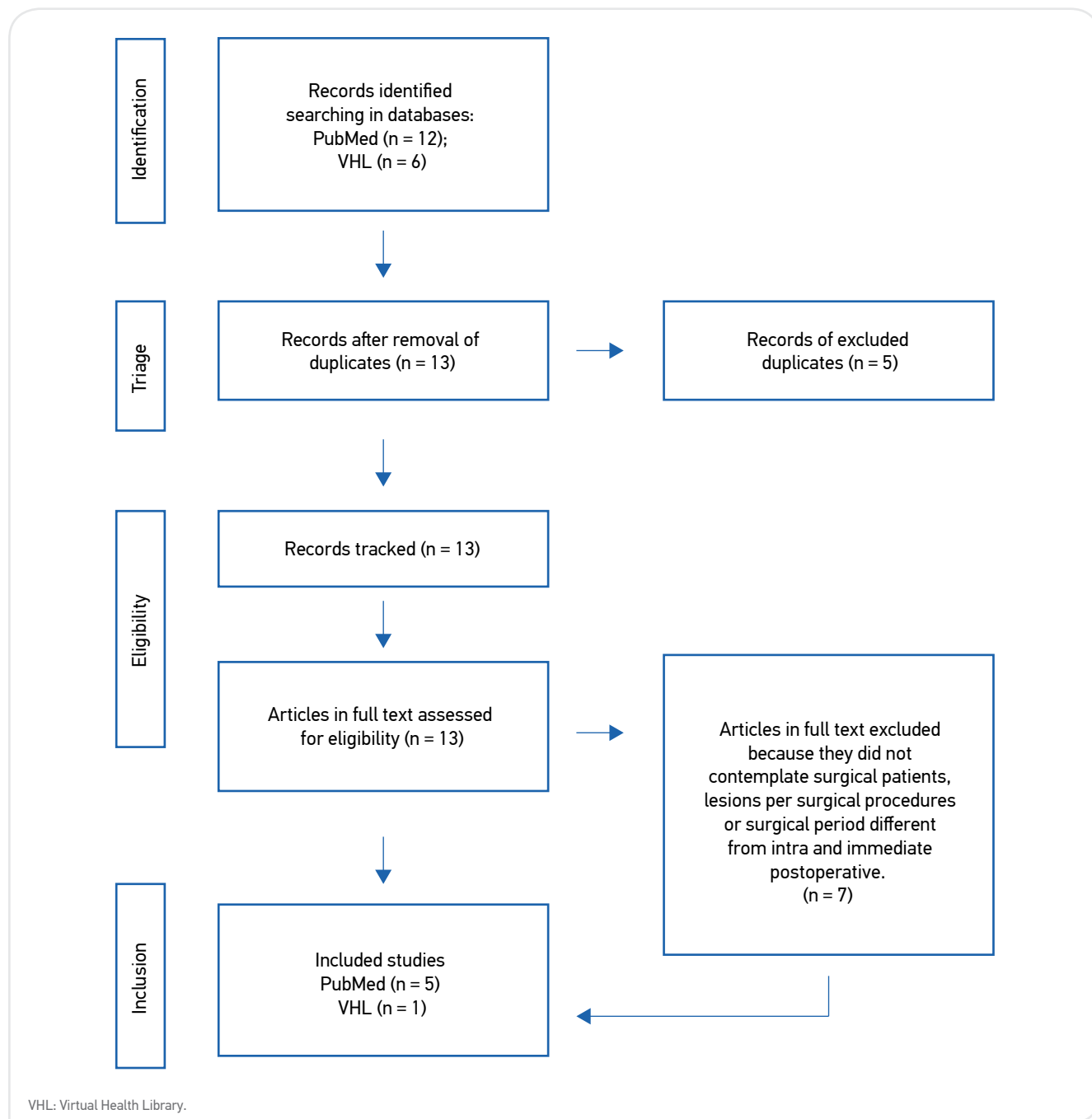


Figure 1. Flowchart for selection of articles included in the review.

Regarding the length of procedures, it was verified that, soon after the surgery, it is already possible to identify PU and this is due to the prolonged time of immobility and pressure exerted in certain areas of the patient's body. A high index of patients with lesions after longer procedures was reported. Of the 297 patients followed up, 44 presented PU, with a rate of 9.8% of lesions found in the first 30 minutes after surgery, and 5.1% of patients with lesions after the first 30 minutes after surgery^{11,13}.

There was a higher incidence of lesions in patients with prolonged surgery time (period equal to or greater than 4 hours), with a mean of 4.5% lesions found in patients in the first 24 hours after surgery¹¹.

The greater the surgery, the greater the risk of the individual acquiring injury, since more complex surgeries require a longer surgical time. In addition, under general anesthesia, in which the patient is immobile for a long period, anesthetics that are more potent are administered^{11,13}. More attention is recommended in the postoperative period because the incidence of PUs is remarkable in this period¹².

Regarding the type of anesthesia, the general one is most associated with skin lesions. Patients submitted to general anesthesia had a variation 4.8 times greater when compared to patients who underwent local anesthesia¹³.

Patients under general anesthesia are more exposed to burns because the sedation rate is higher in relation to other

anesthetic drugs, which consequently requires a higher rate of oxygen, a potential component for fires¹⁷.

Authors of a study reported difficulties in approaching this data, since the research was directed at critical patients, which directly influenced the use of general anesthetics in prolonged surgeries, linked to the patients' clinical situation¹². The other authors do not point out an association between the anesthetic agent and the occurrence of lesions.

FINAL CONSIDERATIONS

In view of this study, the literature analyzed showed the incidence of lesions resulting from surgical procedures. The most common are PUs, with more evidence of postoperative appearance, and burns, which have more visibility in the intraoperative period.

The type and the length of surgery are highly relevant factors to generate trauma; however, the surgical team should promote care during the operative act, from the proper positioning to the use of accessories to distribute pressure and protect the bony prominences. As for burns, attention is focused on the use of electrocautery and components that could lead to the onset of fire in the operating room.

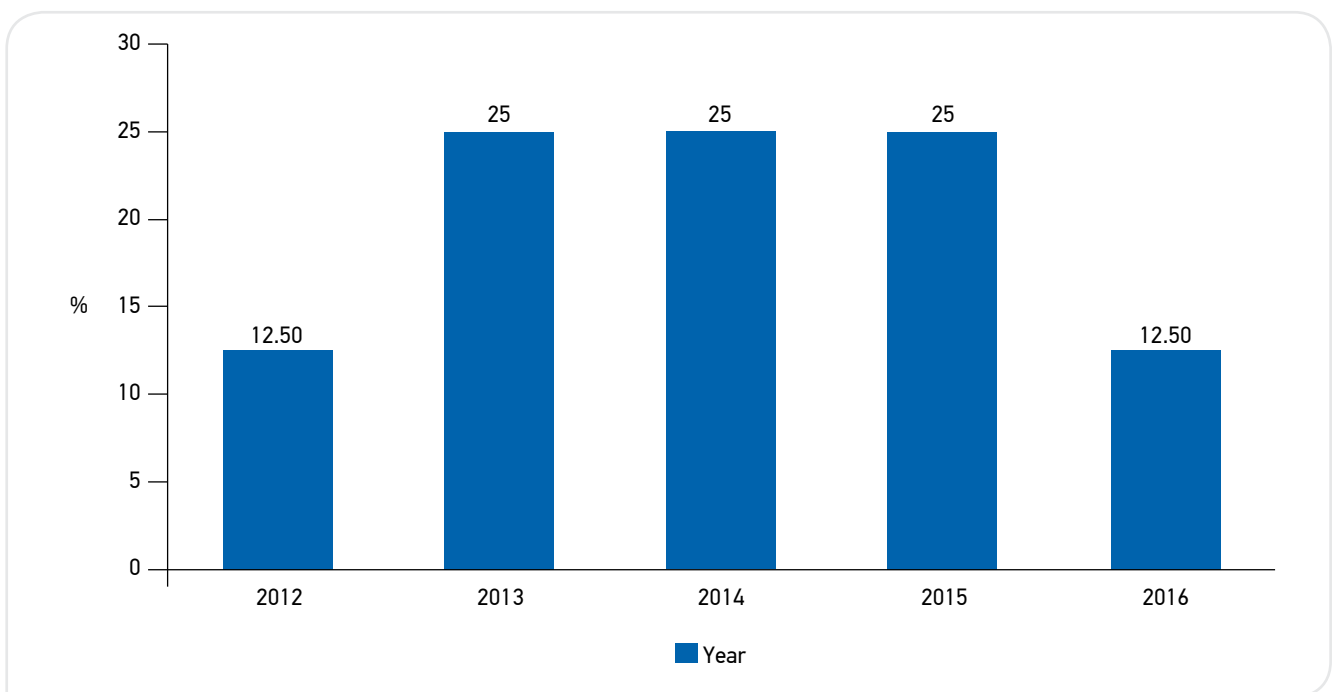


Figure 2. Quantitative view of publications per year, with time span from 2012 to 2018.

Chart 2. Summary of researches included in integrative review.

Authors, country and year	Described lesions	Sample characterization	Conclusions
Steyer et al. (Brazil, 2016) ⁹	Impaired tissue integrity of skin	Of the 143 patients undergoing bariatric surgery, 133 had impaired tissue integrity.	The scarcity of nursing studies on bariatric surgery has limited the discussion of data, corroborating the need to expand investigations on the subject.
Jalali et al. (Iran, 2015) ¹⁰	Thermal lesion	300 patients submitted to cardiac surgery, divided into two groups, were selected: 150 before the engineering modifications and 150 after the modifications. 110 patients with burns were identified: 75 before and 35 after the modifications.	Surveillance and repair of defects by specialized professionals have had significant effects in reducing the incidence of burns.
Hayes et al. (United States, 2015) ¹¹	Pressure ulcer	A study with 32,963 patients who had no lesions at admission, submitted to cardiac, general, hepatobiliary, neurological, oncological, plastic, thoracic, transplantation, trauma, urological and vascular surgeries. 931 PUs were documented.	The immediate postoperative period and prevention efforts should focus on postoperative care when most PUs develop.
O'Brien et al. (United States, 2014) ¹²	Stage II, III and IV pressure ulcers, deep and / or unstable tissue injury	2,695 patients were selected, of whom 288 presented lesions: 261 with PU type II, 22 PU type III, 10 PU type IV, 23 deep tissue PU and 88 unstable tissue PU.	Postoperative PUs were present in 10.7% of the critically ill patients.
Shaw et al. (Taiwan, 2014) ¹³	Stage I pressure ulcer	Of the 297 patients who underwent surgical procedures with more than 30 minutes under spinal or general anesthesia, 29 acquired stage I PU immediately after surgery and 15 stage I PU after 30 minutes of surgery.	Type of anesthesia, patients with old age, type of surgery and surgery position are associated with the development of PU.
Eteuati et al. (Australia, 2013) ¹⁴	Brachial plexus lesion	Between 2005 and 2010, 548 laparoscopic colorectal resections were performed, with five cases of brachial plexopathy due to the long stay in the Trendelenburg position.	To prevent brachial plexopathy, precautions are recommended: changes in patient positioning, especially with lower BMI, placing in position with both arms held to the side of the trunk and use of cushions with gel or foam pads and pillows.
Jellish et al. (United States, 2013) ¹⁵	Brachial lesion	Somatosensitive monitoring of potential risks (PESS, acronym in Portuguese) was used to detect brachial plexus lesions related to the positioning during cranial base surgery. Sixty-five patients, aged 15-77 years, were studied. The sensitivity of PESS for lesion detection was 57%, and the specificity was 94.7%.	If there is adjustment in the position with improvement in SSEP, nerve injury can be avoided. Thus, the monitor can be used for routine evaluation of brachial plexus in surgical procedures or, at least, in obese patients.
Mehta (United States, 2013) ¹⁶	Chemical burn and thermal injury to skin, nose, mouth, lips, trachea, pharynx and thorax	5,194 complaints collected about surgical failures, of which 103 were caused by fires, and 90% of the fires were caused by electrocautery. Of the lesions caused by electrocautery, 86% occurred in the skin and 10% in the mouth.	Recognition of the fire triad is crucial to prevent fires. Further education and communication between SC staff and fire prevention protocols in high-risk procedures can reduce the occurrence.

PU: Pressure Ulcer; BMI: body mass index; CC: surgical center.

Regarding the initial objective of the research, there were gaps reported in the studies to address the lesions that may occur after the surgical procedure. Even inserting descriptors that involved different types of lesions, only articles describing pressure ulcers or burns were found, which met the inclusion criteria.

Understanding which factors have generated these gaps is beyond the reach of researchers, but it is notable that there are other lesions that can be generated by surgical procedures, either by positioning or chemical or electrical items. Therefore, the research must be deepened, with the purpose of intensifying evidence regarding the topic addressed.

REFERENCES

1. Lima AM, Sousa CS, Cunha ALSM. Patient safety and preparation of the operating room: reflection stud. *J Nurs UFPE* [Internet]. 2013 [acessado em 6 maio 2018];7(1):289-94. Disponível em: <https://doi.org/10.5205/1981-8963-v7i1a10232p289-294-2013>
2. Henriques AHB, Costa SS, Lacerda JS. Nursing care in surgical patient safety: an integrative review. *Cogitare Enferm* [Internet]. 2016 [acessado em 6 maio 2018];21(4):1-9. Disponível em: <http://dx.doi.org/10.5380/ce.v21i4.45622>
3. Menezes S, Rodrigues R, Tranquada R, Müller S, Gama K, Manso T. Lesões decorrentes do posicionamento para cirurgia: incidência e fatores de risco. *Acta Med Port* [Internet]. 2013 [acessado em 6 maio 2018];26(1):12-6. Disponível em: <https://www.actamedicaportuguesa.com/revista/index.php/amp/article/viewFile/4006/3204>
4. 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.
5. Barbosa MH, Oliva AMB, Sousa Neto AL. Ocorrência de lesões perioperatórias por posicionamento cirúrgico. *Rev Cubana Enferm* [Internet]. 2011 [acessado em 6 maio 2018];27(1):31-41. Disponível em: <http://www.medigraphic.com/pdfs/revcubenf/cnf-2011/cnf111e.pdf>
6. Lopes CMM, Haas VJ, Dantas RAS, Oliveira CG, Galvão CM. Escala de avaliação de risco para lesões decorrentes do posicionamento cirúrgico. *Rev Latino-Am Enferm*. 2016;24:e2704. <http://doi.org/10.1590/1518-8345.0644.2704>
7. Domingos CMH, Iida LIS, Poveda VB. Glycemic control strategies and the occurrence of surgical site infection: a systematic review. *Rev Esc Enferm USP*. 2016;50(5):868-74. <http://doi.org/10.1590/s0080-623420160000600022>
8. Santos CMC, Pimenta CAM, Nobre MRC. A estratégia PICO para a construção da pergunta de pesquisa e busca de evidências. *Rev Latino-Am Enferm*. 2007;15(3):508-11. <http://dx.doi.org/10.1590/S0104-11692007000300023>
9. Steyer NH, Oliveira MC, Gouvêa MRF, Echer IC, Lucena AF. Clinical profile, nursing diagnoses and nursing care for postoperative bariatric surgery patients. *Rev Gaúcha Enferm*. 2016;37(1):e50170. <http://dx.doi.org/10.1590/1983-1447.2016.01.50170>
10. Jalali SM, Moradi M, Khalaj A, Pazouki A, Tamannaie Z, Ghanbari S. Assessment of electrosurgery burns in cardiac surgery. *Trauma Mon*. 2015;20(4):e18996. <https://dx.doi.org/10.5812%2Ftraumamon.18996>
11. Hayes RM, Spear ME, Lee SI, Krauser Lupear BE, Benoit RA, Valerio R, et al. Relationship between time in the operating room and incident pressure ulcers: a matched case-control study. *Am J Med Qual* [Internet]. 2015 [acessado em 5 maio 2018];30(6):591-7. <http://doi.org/10.1177/1062860614545125>
12. O'Brien DD, Shanks AM, Talsma A, Brenner PS, Ramachandran SK. Intraoperative risk factors associated with postoperative pressure ulcers in critically ill patients: a retrospective observational study. *Crit Care Med* [Internet]. 2014 [acessado em 5 maio 2018];42(1):40-7. <http://doi.org/10.1097/CCM.0b013e318298a849>
13. Shaw LF, Chang PC, Lee JF, Kung HY, Tung TH. Incidence and predicted risk factors of pressure ulcers in surgical patients: experience at a Medical Center in Taipei, Taiwan. *Biomed Res Int* [Internet]. 2014 [acessado em 5 maio 2018];2014:416896. <http://doi.org/10.1155/2014/416896>
14. Eteuati J, Hiscock R, Hastie I, Hayes I, Jones I. Brachial plexopathy in laparoscopic-assisted rectal surgery: a case series. *Tech Coloproctol*. 2013;17(3):293-7. <http://doi.org/10.1007/s10151-012-0920-8>
15. Jellish WS, Sherazee G, Patel J, Cunanan R, Steele J, Garibashvili K, et al. Somatosensory evoked potentials help prevent positioning-related brachial plexus injury during skull base surgery. *Otolaryngol Head Neck Surg*. 2013;149(1):168-73. <http://doi.org/10.1177/0194599813482878>
16. Mehta SP, Bhananker SM, Posner KL, Domino KB. Operating room fires: a closed claims analysis. *Anesthesiology*. 2013;118(5):1133-9. <http://doi.org/10.1097/ALN.0b013e31828afa7b>
17. Hart SR, Yajnik A, Ashford J, Springer R, Harvey S. Operating room fire safety. *Ochsner J* [Internet]. 2011 [acessado em 5 maio 2018];11(1):37-42. Disponível em: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3096161>

NURSING TRAINING IN THE PROCESSING OF PRODUCTS FOR EXPEDITIONS IN THE BRAZILIAN AMAZON

Capacitação da enfermagem no processamento de produtos para atuação em expedições na amazônia brasileira

Capacitación de la enfermería en el procesamiento de productos para actuación en expediciones en la amazonia brasileña

Cintia Rachel Gomes Sales^{1*} , Mona Luisa Sabongi² , Maria Inês Monteiro³ 

ABSTRACT: Introduction: In Brazil, universal and equitable access to health care services for indigenous peoples remains a challenge, considering the difficulty in establishing primary health and multidisciplinary teams in indigenous lands. The Brazilian Health Expeditions – a civil society organization of public interest – carry out expeditions in the north of the country to promote the health of indigenous peoples. **Objective:** The present article described the training experience that enabled the nursing team to work in the Material and Sterilization Center during expeditions. **Method:** This is descriptive research, designed as an experience report, on the stages of training for nurses to work in the material center of a field hospital, during expeditions in the Amazon. **Results:** The proposed training was satisfactory, and the participants developed the desired skills through theoretical input and practical activities. **Conclusion:** The involvement of nurses in voluntary activities arouses interest in permanent training, as well as enhances their technical-scientific knowledge.

Keywords: Nurses. Sterilization. Health human resource training. Staff development.

RESUMO: Introdução: No Brasil, o acesso universal e equânime aos serviços de assistência à saúde dos povos indígenas ainda é um desafio, considerando, a dificuldade de inserção da saúde básica e das equipes multiprofissionais em terras indígenas. A organização da sociedade civil de interesse público Expedicionários da Saúde realiza expedições no Norte do país para promover a saúde dos povos indígenas. **Objetivo:** O presente artigo descreveu a experiência de capacitação que habilitou a equipe de enfermagem para atuar no Centro de Material Esterilização durante expedições. **Método:** Pesquisa descritiva, do tipo relato de experiência, que descreve as etapas de capacitação para enfermeiros atuarem no centro de material, em hospital de campanha, durante expedições na Amazônia. **Resultados:** A capacitação proposta foi satisfatória e os participantes desenvolveram as competências almejadas, por meio do aporte teórico e das atividades práticas. **Conclusão:** Observou-se que envolver enfermeiros em atividades voluntárias desperta o interesse na formação permanente, bem como aprimora seu conhecimento técnico-científico.

Palavras-chave: Enfermeiras e enfermeiros. Esterilização. Capacitação de recursos humanos em saúde. Desenvolvimento de pessoal.

RESUMEN: Introducción: En Brasil, el acceso universal y equânime a los servicios de asistencia a la salud de los pueblos indígenas aún es un desafío, considerando, la dificultad de inserción de la salud básica y de los equipos multiprofesionales en tierras indígenas. La organización de la sociedad civil de interés público Expedicionarios de la Salud realiza expediciones en el Norte del país para promover la salud de los pueblos indígenas. **Objetivo:** El presente artículo describió la experiencia de capacitación que habilitó el equipo de enfermería para actuar en el Centro de Material Esterilización durante expediciones. **Método:** Estudio descriptivo, del tipo relato de experiencia, que describe las etapas de capacitación para que enfermeros actúen en el centro de

¹Nurse; Master's degree in Psychology from Universidade Católica Dom Bosco (UCDB); Ph.D. in Health Sciences from Universidade Estadual de Campinas (UNICAMP); specialist in Nursing Care in Surgical Center, Anesthesia Recovery, and Material and Sterilization Center from Faculdade Israelita de Ciências da Saúde Albert Einstein. Professor at the School of Nursing of Universidade do Sul de Santa Catarina (UNISUL) – Palhoça (SC), Brazil.

²Nurse; specialist in Surgical Center, Anesthesia Recovery, and Material and Sterilization Center from Centro Universitário Hermínio Ometto (UNIARARAS). Nursing Coordinator at the Associação dos Expedicionários da Saúde (EDS) – Campinas (SP), Brazil.

³Nurse; Master's degree in Education from UNICAMP; Ph.D. in Nursing from Universidade de São Paulo (USP); postdoctoral degree in specialty from the Finnish Institute of Occupational Health (FIOH), Työterveyslaitos, Finland. Associate Professor at the School of Nursing at UNICAMP – Campinas (SP), Brazil.

*Corresponding author: prof.cintia.rachel@gmail.com

Received: 07/18/2018 – Approved: 06/01/2019

DOI: 10.5327/Z1414-4425201900030009

material, en hospital de campaña, durante expediciones en la Amazonia. **Resultados:** La capacitación propuesta fue satisfactoria y los participantes desarrollaron las competencias anheladas, por medio del aporte teórico y de las actividades prácticas. **Conclusión:** Se observó que involucrar enfermeros en actividades voluntarias despertó el interés en la formación permanente, así como perfecciona su conocimiento técnico-científico.

Palabras clave: Enfermeras y enfermeros. Esterilización. Capacitación de recursos humanos en salud. Desarrollo de personal.

INTRODUCTION

In Brazil, universal and equitable access to health care services for indigenous peoples is still a challenge. However, the Federal Constitution of 1988, through articles 231 and 232, outlined political bases that effected relations between indigenous peoples and the Brazilian State, based on their valorization, social organization, customs, languages, beliefs, and traditions¹. In this context, the Brazilian Health Expeditions (EDS – *Expedicionários da Saúde*), a Civil Society Organization of Public Interest (OSCIP – *Organização da Sociedade Civil de Interesse Público*), have carried out expeditions in the Legal Amazon for 14 years, promoting health to indigenous peoples in remote and difficult to reach areas.

Through articulation and technical cooperation between public institutions, such as ministries and the National Indian Foundation (FUNAI – *Fundação Nacional do Índio*), and private ones, clinical, surgical, and dental care were established with a field hospital on indigenous lands in the north of Brazil². The EDS hospital consists of humanitarian aid field hospitals and has a modular mobile structure, with equipment that guarantees logistic autonomy in health, such as generators, lighting, thermal insulation, water purification, air-conditioned units, fuel, among others. Such characteristics allow the provision of health care and small and intermediate surgical procedures, such as hernia repair and cataract removal, typical in the indigenous population².

However, the recruitment of volunteer nurses to work in the Surgical Center (SC) and the Material and Sterilization Center (CME – *Centro de Material e Esterilização*) of this hospital is a challenge and, at the same time, an opportunity to develop human and technical-scientific skills and abilities³. The possibility of offering training for nurses involved in CME activities allows the field hospital to provide the same type of competence to the practice of these professionals, when compared to conventional hospitals, reducing risks and promoting positive outcomes for nursing care and the population treated in the expeditions.

Essential precautions to inhibit surgical site contamination require measures to prevent infection not only in locals

but also in the surgical team. In this scenario, CME takes great responsibility in managing risk factors that could lead to adverse events related to community surgical care⁴.

However, if CME volunteers do not have the necessary skills to handle equipment, in addition to attention in processing materials – cleaning, preparation, and sterilization of surgical instruments in specific areas –, they might create risks to the care provided to the indigenous community and their own health.

In this sense, theoretical and practical training has become an important tool for the education of new volunteer nurses, as a viable alternative for safe practice in the CME. Authors report that training encourages active learning, recycles current information, and stimulates critical and reflective thinking, increasing the expertise of these professionals for competent and highly qualified professional practice⁵. This experience report provides knowledge based on the training of nurses to work in the CME of a field hospital.

OBJECTIVE

To report the stages of the training process that enabled the volunteer nursing team to work at the CME of a field hospital in the Brazilian Amazon.

METHOD

This is descriptive research, designed as an experience report, that can be defined as a methodology of systematic observation of reality, seeking to establish correlations between findings of this reality and relevant theoretical principles⁶.

The study scenario was the EDS field hospital, which has a mobile structure for SC and CME, composed of six surgical tents, with the purpose of providing care in different specialties, such as ophthalmology, gynecology, pediatrics, and dentistry.

The hospital complex was set up in the community of Assunção do Içana, in the city of São Gabriel da Cachoeira, state of Amazonas, Brazil. The location chosen for the SC and CME was a shed previously built by the indigenous

community. The CME structure was divided into a dirty and a clean area to maintain the independence between them and guarantee the unidirectional flow, as recommended by the Resolution of the Collegiate Board of Directors (RDC – *Resolução da Diretoria Colegiada*) no. 15/2012⁷.

With regard to human resources, the training stages started after the registration of the nurse in the EDS website, followed by a curriculum evaluation, which required at least one year of experience in care, and personal interview. Participating in nursing meetings and theoretical-practical training in the EDS Distribution Center (DC) is a prerequisite.

The training program began after the selection of the nurse who would coordinate the CME, aiming at recycling the technical-scientific knowledge and care practices. The coordinator was in charge of training the support team from the local Special Indigenous Health District (DSEI – *Distrito Sanitário Especial de Saúde Indígena*). The training was offered to the DSEI team during the finalization of the CME. Next, there was a demonstration and supervision of the functions delegated to each member of the team.

The training process was followed by a tutor, nurse, and EDS volunteer; specialist in SC, Anesthesia Recovery (AR), and CME; with professional experience in the CME field; and responsible for preparing the CME/EDS guideline. The training began with the suggestion to read the article on the logistics of setting up the SC and the CME/EDS, authored by EDS volunteer nurses², followed by the CME/EDS guideline, and equipment manuals located in the CME/EDS.

The theory allowed reviewing concepts related to the processing of surgical materials, as well as aspects associated with cleaning, disinfection, and sterilization of health products. At the laboratory stage, the nurse volunteer learned how to assemble surgical boxes, prepare supplies, ventilation support kits, operate equipment (ultrasonic washing machine, water distiller, and incubator), and, finally, perform the test in loaded autoclaves and the biological test. The volunteer needed to participate in the 10 meetings during the load assembly, totaling 50 hours.

The practical activity was crucial to demonstrate the logistics of preparing supplies, the assembly of materials and equipment, and the nurse's role in the CME. This role consists of being able to fill indicators in the shift report, predict the need for and provide materials, equipment, and supplies – according to the daily surgical schedule –, verify the proper working of the equipment, and request the support of clinical engineering, when necessary, in addition to instructing and supervising the DSEI team during the expedition.

The validation of autoclaves and other equipment had a satisfactory result (before the expedition period) and started

the documentary records of quality and quantity indicators. We emphasize that indicators are important tools in improving processes, including logistic ones.

RESULTS

The experience report refers to the Surgery in the Amazon Program, which, in its 36th expedition, met the surgical demands of the indigenous population, estimated at 12 thousand inhabitants, in the community of Assunção do Içana, from November 18 to 26, 2016. Initially, registered volunteer professionals are digitally notified about the expeditions. Next, they attend bi-weekly meetings at the EDS headquarters.

When the team is complete, the professionals are distributed in the following sectors: screening, reception, preoperative, postoperative, offices, SC, and CME. Although five nurses volunteered to work in the EDS, only one was trained during the three-month period in 2016.

At the end of the theoretical-practical training, it was possible for the tutor nurse to assign the volunteer nurse to work in the CME, due to her attendance and technical performance during the simulation of assembling and operating the CME, in the DC of the EDS. With respect to the DSEI team, their training was carried out *in loco*, in the expedition, during the assembly of the CME, and they were actively evaluated according to their resourcefulness and technical ability. The EDS volunteer nurse trained the DSEI team, consisting of a nurse, three nursing technicians, and an Indigenous Health Agent (AIS – *Agente Indígena de Saúde*), to support the CME, and assigned them as follows: nurse and a technician to the clean area, two technicians to the dirty area, and an AIS to transportation.

The demand for surgical instruments used in the expedition comprised: 20 cataract surgical boxes, seven pterygium surgical boxes, nine general surgical boxes (medium size), five small surgical boxes, and two orthopedic boxes. For seven days, the CME team worked 105 hours and operated 312 indigenous patients, of whom 185 underwent general surgeries; 125, ophthalmic surgeries; and two, gynecological surgeries. The training of the EDS nurse and the DSEI team was fundamental for the proper operation of the sector and process optimization.

DISCUSSION

According to the Association of periOperative Registered Nurses (AORN)⁸, nurses who work in the perioperative

period should keep up to date in nursing care practice to follow the nursing trends in the perioperative setting. This perspective is reiterated by the Brazilian Association of Surgical Center, Anesthesia Recovery, and Material and Sterilization Center Nurses (SOBECC – *Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização*)⁹, which recommends that nurses working at the CME keep abreast of the technical and scientific trends related to hospital infection control and the use of advanced technologies.

Increasingly, the labor market has required professionals qualified to diagnose and solve problems. Therefore, innovating training models for nursing professionals is necessary, so as to improve teaching-learning processes and make them more attractive. Newly graduated nurses, at first, have no initiative in seeking the knowledge to work in the CME, despite being aware of the importance of the sector and the maintenance of care in health units¹⁰.

In this regard, this experience report shows the desire and willingness of a nurse, specialist in another area, to migrate to an unusual type of care, through voluntary work in indigenous health, and thereby acquire up-to-date knowledge, backed

by CME experts. Health education dynamically transforms the collective knowledge of the actors involved in the health work process. Thus, nursing education assumes the responsibility of training the whole team in the improvement of techniques and new technologies¹¹.

CONCLUSION

The result of the experiment was considered effective for the training of the volunteer nurse who coordinated the CME of the field hospital. The deadlines were sufficient, and the necessary skills, achieved by the EDS volunteer nurse and the DSEI team, who were trained and supported the activities developed in the expedition.

Training volunteer nursing professionals who work in a field hospital on EDS expeditions in the northern Brazilian Amazon has become a differentiated strategy in the teaching-learning context and perioperative care. We expect that this report will awaken not only the motivation for voluntary work in indigenous health but also the responsibility of adopting good practices in nursing care, especially in the CME.

REFERENCES

1. Brasil. Ministério da Saúde. Fundação Nacional de Saúde. Política Nacional de Atenção à Saúde dos Povos Indígenas [Internet]. Brasília: Fundação Nacional de Saúde; 2002 [acessado em 6 jul. 2018]. Disponível em: http://bvsms.saude.gov.br/bvs/publicacoes/politica_saude_indigena.pdf
2. Sales CRG, Sabongi ML, Reis VN, Pivatti ASA, Camisão AR, Kanashiro-Filho G. Logística de implementação de bloco cirúrgico na floresta: atuação do enfermeiro. *Rev. SOBECC*. 2016;21(3):162-9. <https://doi.org/10.5327/Z1414-4425201600030007>
3. Smith CE. Developing simulation scenarios for perioperative nursing core competencies and patient safety. *Perioper Nur Clin*. 2009;4(2):157-65. Disponível em: http://docs.bvsalud.org/biblioref/2017/02/831533/sobecc-v21n4_in_198-202.pdf
4. Reis UOP. Controle da infecção hospitalar no centro cirúrgico: revisão integrativa. *Rev Baiana Enferm*. 2014;28(3):303-10. <http://dx.doi.org/10.18471/rbe.v28i3.9085>
5. Neil JA. Simulation in nursing education. *Perioper Nurs Clin*. 2009;4(2):97-112. Disponível em: <https://kundoc.com/pdf-simulation-in-nursing-education-.html>
6. Dyniewicz AM. Metodologia da pesquisa em saúde para iniciantes. 2ª ed. São Caetano do Sul: Difusão; 2009.
7. Agência Nacional da Vigilância Sanitária. Resolução RDC n. 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 [Internet]. Brasília; 2012 [acessado em 20 maio 2018]. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2012/rdc0015_15_03_2012.html
8. Association of periOperative Registered Nurses. Perioperative standards and recommended practices. 13ª ed. Denver: Association of periOperative Registered Nurses; 2012.
9. Sociedade 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.
10. Lucon SMR, Braccialli LAD, Pirollo 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>
11. Ribeiro MB. A educação permanente no treinamento do enfermeiro de centro cirúrgico: revisão integrativa. *Rev SOBECC*. 2017;22(2):98-105. <https://doi.org/10.5327/Z1414-4425201700020007>