NURSING NOW: NOW IS THE TIME, THEN IT'LL BE PAST!

DOI: 10.5327/Z1414-4425201900020001

Writing an editorial about the *Nursing Now* campaign requires referral to the Burdett Trust for Nursing, an independent British charity created by Sir Henry Burdett KCB who founded the Royal National Pension Fund for Nurses (RNPFN) in 2002 in recognition of the importance of the work of nurses. At that time, the Burdett Trust for Nursing Program was implemented, aimed at valuing nursing, specifically funding nurse and midwifery training programs in the areas of management, leadership and research and supporting actions from leading local nurses.

Since that time, RNPFN has been implementing other nursing empowerment programs and, in partnership with the International Council of Nurses (ICN), has developed a program embraced by the World Health Organization (WHO) and the All-Party Parliamentary Group on Global Health of the United Kingdom, called Nursing Now. The Burdett Trust for Nursing gives and receives grants to support nurse-led projects, always focused on nursing empowerment and on improving patient, family, and community care[1].

The global three-year Nursing Now campaign, from 2018 to 2020, is based on the findings published in 2016 in the *Triple Impact* report. The document recommends the training of nurses to improve global health, promote gender equality, since the vast majority of the category is still composed of women, and generate economic growth[2].

The global launch of the campaign took place in London on February 27th, 2018, with the patroness of the Duchess of Cambridge, Kate Middleton, aiming to stimulate the training of nurses, in order to contribute to the improvement of global health, making these professionals more influential in addressing health challenges in the 21st century[3,4]. Its end will occur in 2020, when the bicentenary of Florence Nightingale's birth will be celebrated[4].

In a growing global movement, a number of countries have joined the campaign, with new regional groups, national groups and local supporters groups emerging every day, currently developing in more than 80 countries, including: Germany, Argentina, Australia, Brazil, Canada, China, Colombia, Korea, Egypt, Scotland, Spain, the United States, Philippines, France, Greece, England, Ireland, Israel, Italy, Japan, Lebanon, Mexico, Nigeria, Peru, Portugal, Russia, Sweden, Switzerland, Venezuela, Turkey and many others[5].

The Nursing Now campaign arrived in Brazil as a result of the agreement between the Federal Nursing Council (*Conselho Federal de Enfermagem* – COFEn), the Collaborating Center of the Pan American Health Organization (PAHO/WHO), for the development of nursing research, the *Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo* (EERP-USP) and the Burdett Trust for Nursing, responsible for the Nursing Now Campaign in the world, representing ICN and WHO. With the agreement, commitments and responsibilities that require local, regional and national actions led by the signatory institutions were made[6].

Brazil has 2,141,883 nursing professionals, including nurses, nursing technicians, nursing assistants and midwives, representing 60% of the health workforce[6].

The historical milestone of the launching of the campaign in our country occurred on April 24th, 2019, in Brasília (DF), in the auditorium of the Oswaldo Cruz Foundation (Fiocruz), being the central theme "The impact of nursing contributions to health systems". The opening table was attended by representatives of WHO, PAHO, PAHO Brazil and ICN, the COFEn president, the Coordinator of the Nursing Now Working Group in Brazil, the Minister of Health and representatives of the National Congress. University officials, representatives of the professional category and health managers participated in the ceremony.

The Nursing Now Brazil Campaign aims to value the contribution of nursing professionals in guaranteeing and expanding access to the population's health. To achieve this purpose, the following goals are established: "To invest in strengthening the education and development of nursing professionals with a focus on leadership; to invest in improving the working conditions of nursing professionals; to disseminate effective and innovative nursing practices based on scientific evidence at national and regional levels"[6]. Only with the integration of many actors, with social commitment and the articulation between local initiatives and regional representations will these goals be achieved.

The campaign, therefore, represents a strong initiative to empower nurses to play the central role in addressing health challenges in the 21st century, using their potential, competence and leadership.

Time flies! Now is the time for Brazilian nursing professionals to show what they are capable of! It is an unparalleled opportunity for recognition and appreciation of our professional category, for the health of people and for the effective functioning of health systems and services and, consequently, for Brazil's social development[6].

Rita Catalina Aquino Caregnato
Adjunct Professor of Nursing, Universidade Federal de Ciências da Saúde de Porto Alegre (UFCSPA), Porto Alegre, Brazil.

Maria Belén Salazar Posso
Retired professor at the Universidade de Taubaté (UNITAU), Taubaté, Brazil, and assistant professor and retired emeritus of the Faculdade de Medicina do ABC, Santo André, Brazil.

Rachel de Carvalho
Nurse, specialist in Cardiology and Surgical Center, Master and PhD in Nursing by the School of Nursing of the Universidade de São Paulo (USP). Full Professor of the Israeli Faculty of Health Sciences Albert Einstein, São Paulo, Brazil.

REFERENCES

1. Burdett Trust for Nursing. Learning disability nursing 2019: guidelines for applicants [Internet]. Burdett Trust for Nursing; 2019 [acessado em 23 maio 2019]. Disponível em: https://www.btfn.org.uk/wp-content/uploads/2019/03/BTFN_Grants_2019_Learning_Disability_Nursing_Guidelines.pdf

2. All-Party Parliamentary Group on Global Health. Triple impact: how developing nursing will improve health, promote gendere quality and support economic growth. Genebra: All-Party Parliamentary Group on Global Health [Internet]. 2016 [acessado em 23 maio 2019]. Disponível em: https://www.who.int/hrh/com-heeg/digital-APPG_triple-impact.pdf

3. Crisp N, Iro E. Nursing now campaign: raising the status of nurses. Lancet [Internet]. 2018 [acessado em 25 maio 2019];391(10124):920-1. Disponível em: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30494-X/fulltext. https://doi.org/10.1016/S0140-6736(18)30494-X

4. Cassiani SHB, Lira Neto JCG. Nursing perspectives and the "Nursing Now" Campaign. Rev Bras Enferm. 2018;71(5):2351-2. http://dx.doi.org/10.1590/0034-7167.2018710501

5. Nursing Now. Nursing Now Groups. National & local groups [Internet]. Nursing Now [acessado em 25 maio 2019]. Disponível em: https://www.nursingnow.org/list-of-groups/

6. Nursing Now Brasil. Carta de Brasília: valorização da enfermagem [Internet]. Nursing Now Brasil [acessado em 25 maio 2019]. Disponível em: http://nursingnowbrasil.com.br/arquivos/carta_de_brasilia.pdf

MONITORING OF HEALTH PRODUCTS CLEANING WITH ADENOSINE TRIPHOSPHATE TESTING

Monitoramento da limpeza de produtos para saúde com teste adenosina trifosfato

Monitoreo de la limpieza de productos para la salud con test adenosín trifosfato

André Luiz Alvim[1]*, Marcela Silva Ramos[2], Poliana Mara Silva Durão[2]

ABSTRACT: Purpose: Evaluating the cleaning quality of health products by using the surface adenosine triphosphate (ATP) test in a Central Sterile Services Department. **Method:** It is a descriptive, cross-sectional study with a quantitative approach, conducted in a private clinic in Belo Horizonte, Minas Gerais. Twenty-six survey forms with 102 ATP tests were evaluated between May 2017 and May 2018. **Results:** The numbers in ATP tests in the lumened instruments vary from 55 to 206 relative luminescence units (RLU), with a mean of 124±46. In surgical instruments, results alternated between 14 and 82 RLU, with a mean of 54±28. **Conclusion:** ATP tests are not specific, but they suggest absence of residues in all the instruments. The conclusion is that a proper physical structure, evidence-based cleaning protocols and human and material resource management contribute to ensure the cleaning process quality.
Keywords: Equipment and supplies. Housekeeping. Disinfection. Sterilization.

RESUMO: Objetivo: Avaliar a qualidade da limpeza dos produtos para saúde utilizando o teste de superfície adenosina trifosfato (ATP) em um Centro de Materiais e Esterilização. **Método:** Trata-se de um estudo transversal, descritivo, de natureza quantitativa, realizado em uma clínica particular de Belo Horizonte, Minas Gerais. Foram avaliados 26 formulários com 102 testes de ATP entre maio de 2017 e maio de 2018. **Resultados:** Os valores dos testes de ATP nos canulados variaram de 55 a 206 unidades relativas de luz (RLU), com média de 124±46. Para instrumentais, os resultados alternaram entre 14 e 82 RLU, com média de 54±28. **Conclusão:** Os testes de ATP não são específicos, mas sugerem ausência de resíduos em todos os instrumentais. Conclui-se que uma estrutura física adequada, protocolos de limpeza baseados em evidências e o gerenciamento de recursos materiais e humanos contribuem para a garantia da qualidade do processo de limpeza.
Palavras-chave: Equipamentos e provisões. Serviço de limpeza. Desinfecção. Esterilização.

RESUMEN: Objetivo: Evaluar la calidad de la limpieza de los productos para la salud utilizando el test de superficie adenosín trifosfato (ATP) en un Centro de Materiales y Esterilización. **Método:** Se trata de un estudio transversal, descriptivo, de naturaleza cuantitativa, realizado en una clínica particular de Belo Horizonte, Minas Gerais. Fueron evaluados 26 formularios con 102 test de ATP entre mayo de 2017 y mayo de 2018. **Resultados:** Los valores de los test de ATP en las cánulas variaron de 55 a 206 unidades relativas de luz (RLU), con promedio de 124±46. Para instrumentales, los resultados alternaron entre 14 y 82 RLU, con promedio de 54±28. **Conclusión:** Los test de ATP no son específicos, pero sugieren ausencia de residuos en todos los instrumentales. Se concluye que una estructura física adecuada, protocolos de limpieza basados en evidencias y la gestión de recursos materiales y humanos contribuyen para la garantía de la calidad del proceso de limpieza.
Palabras clave: Equipos y suministros. Servicio de limpieza. Desinfección. Esterilización.

[1]Nurse; specialist in hospital infection control; master's degree and PhD student in Nursing at Universidade Federal de Minas Gerais (UFMG); MBA in Auditing and Quality Management applied to Health Services – Belo Horizonte (MG), Brasil.
[2]Nurse; MBA in Health Care Management with Emphasis in Operating Room and Central Sterile Services Department at Faculdade Pitágoras de Belo Horizonte – Belo Horizonte (MG), Brasil.
*Corresponding author: andrevolts@hotmail.com
Received: 11/14/2018 – Approved: 03/24/2019
DOI: 10.5327/Z1414-4425201900020002

INTRODUCTION

The Central Sterile Services Department (CSSD) is defined as a functional unity intended for the processing of health products (HP). Its mission is to provide HP for surgical, care and diagnostic services, guaranteeing the quantity and the quality of resources for safe assistance[1].

The CSSD has a peculiar role in the health context, acting directly in the fight against infections related to health care (IRHC). Any failure occurring during the processing of HP implies the possible compromising of the sterility, enabling the occurrence of infectious events during hospitalization or after discharge[2].

In order to ensure the quality of all processing stages, it is essential that the CSSD has the appropriate infrastructure, in accordance with current legislation. Currently, the classifications of this support sector are defined as level I CSSD, being the site that performs the processing of non-critical, semi-critical and critical HP of non-complex conformation, subject to processing; and level II CSSD, defined as the site that performs the processing of non-critical, semi-critical and critical HP of complex and non-complex conformation, subject to processing[1].

In addition, it is necessary for the support sector to have quality in all internal processes, such as the receipt of contaminated HP, cleaning, preparation, sterilization, storage and distribution of HP. Accordingly, cleanliness is emphasized as the primary step for ensuring a safe disinfection or sterilization[1,2].

Among the various chemical tests available on the market for validation of the cleaning process, the adenosine triphosphate (ATP) test is highlighted, which is not replaceable by chemical, physical and biological indicators. The ATP test measures the cleaning of devices, endoscopes and environmental surfaces. Its reading is performed quantitatively, through bioluminescence, searching for the energy source present in living cells according to the degree of contamination. Light measurement requires the use of the luminometer, and the results are emitted in relative luminescence unit (RLU)[3].

Although ATP bioluminescence is used as a good practice in health services, it is possible to note a certain insecurity amongst professionals in what concerns to the need for intervention in the cleaning process, before releasing HP for the next stages. This fact can be attributed to the results of ATP, which present a great variation of values during the execution of the test[4-6]. In addition, the literature does not standardize rapid-reading chemical tests that ensure when a product is clean, a fundamental requirement for ensuring effective disinfection and/or sterilization[6]. For this reason, the following question emerges: "Does the monitoring by means of the ATP test contributes to an evaluation of the desired quality parameters for HP cleaning?".

In this sense, the analysis of the parameters found in the process of validation of cleaning in CSSD can contribute to the improvement of HP processing, aiming at patient and professionals safety. The survey of the available strategies for validation of the cleaning parameters may guarantee the safety of the processes involved, as well as reduce the risk of infection. Hopelessly this study will contribute to the subject, offering results that can assist in the elaboration of protocols and serve as benchmark for health services.

OBJECTIVE

Assess the quality of HP cleaning using the ATP surface test in a CSSD.

METHOD

This is a cross-sectional descriptive study with a quantitative approach, conducted at a private clinic in Belo Horizonte, Minas Gerais, Brazil. Because it is a study that did not involve research with human beings, an opinion from the Research Ethics Committee was not necessary. However, there was formal authorization from the institution's Technical Board.

The clinic performs, on average, 1,800 consultations per month, with an average of 450 surgeries. Notable among these are the cataract extraction with intraocular lens insertion and eyelid plastic surgeries. The CSSD of the study site is classified as level II. The sector provides the employees with all standard operating procedures (SOP) for full-time access, such as: proper handling of equipment, manual and automated cleaning methods, and load release process.

The CSSD is supervised by a nurse and the operational activities are performed by two nursing assistants, who work exclusively at the sector and have between 5 and 7 years of experience in the same institution. Still on the workforce, there is an employee in charge of handling the contaminated HP and another one in charge of preparing the HP which come from the sluice room.

The sluice room has a 21-liter ultrasonic cleaner, with a connector to lumened instruments. The analysis of this specific equipment deionized water quality is performed every six months or whenever it is necessary.

In the CSSD of study, the manual and automated HP cleaning validation is carried out through visual inspection, by means of a tabletop 800% magnifying glass. It is then complemented by a Clean Trace™ Surface ATP 3M chemical test. The ATP reading is performed with the aid of the incubator (3M Clean Trace)[3].

The positive and negative control of the chemical test is performed only by the nurse in charge of the sector. The acceptance levels adopted are the following: up to 90 RLU (cut-off point) for instruments and up to 250 RLU (cut-off point) for lumened instruments. The entire process has been completely described and followed, according to SOP and the manufacturer's recommendation. When the results show values higher than the cut-off points, manual cleaning, followed by automated one, is performed again, before HP release.

Twenty-six forms have been analyzed, with a total of 102 records of ATP tests performed between May 2017 and May 2018. The values were recorded by the CSSD nurses in the "cleaning quality monitoring checklist", containing the following variables: date of cleaning, HP name, post cleaning RLU, observation fields (in case there were intercurrences) and the name of the person in charge.

Data collection was performed by the researchers themselves in July 2018, on alternate days, by means of a survey instrument that contained the same variables as the checklist. For the data processing, a descriptive statistical analysis was performed in order to present measures of central tendency (means) and absolute numbers generated by the program Epi Info 7®. The results were aggregated and presented through descriptive tables.

RESULTS

Table 1 shows the HP distribution evaluated with the ATP test during the study period. The number of instruments and lumened instruments ranged from 6 to 16 per month, with a mean of 7.8 ± 3.5. In Total, 102 (100%) ATP tests were performed between May 2017 and May 2018.

Table 2 shows ATP test results in RLU after manual cleaning, followed by the automated one. During the study period, the values of the ATP test for lumened instruments ranged from 55 to 206 RLU, with a mean of 124± 46. In what concerns the instruments, the results alternated between 14 e 82 RLU, with a mean of 54±28.

DISCUSSION

The CSSD aims at preventing infections, even indirectly, coordinating science, safety and quality, through the nursing team. When CSSD professionals are not aware of the importance

Table 1. Distribution of health products evaluated in the cleaning process with the adenosine triphosphate test.

Period	Lumened instruments* (n=51)	Instruments** (n=51)	Total (n=102)
May, 2017	03	03	06
June, 2017	03	03	06
July, 2017	03	03	06
August, 2017	05	05	10
September, 2017	02	02	04
October, 2017	08	08	16
November, 2017	03	03	06
December, 2017	05	05	10
January, 2018	03	03	06
February, 2018	03	03	06
March, 2018	03	03	06
April, 2018	03	03	06
May, 2018	07	07	14
Mean	-	-	7.8
Standard deviation	-	-	3.5
Median	-	-	06

*Dual lumen; **Tweezers, blepharostats and hooks.

of the cleaning process and perform it in a condescending or superficial manner, the dirt is not completely removed and can create barriers that protect microorganisms[6-10].

According to Article 65 of the Collegiate Board Resolution (RDC) No. 15, March 15th, 2012, the HP that can be processed, regardless of its risk rating, must be subjected to the cleaning process within the very CSSD of the health service. To this end, the cleaning of surgical instruments must be rigorously done to reduce the microbial load[1,10-13].

The cleansing process is known to be influenced by using appropriate equipment, enzymatic detergent action and the creation of evidence-based protocols. The science of processing HP, currently fairly consistent, values this process as an initial and fundamental step to guarantee the subsequent disinfection and/or sterilization phases. In addition, it states that cleaning reduces the initial microbial load by up to 99.9%, i.e., it reduces four logarithmic cycles of bioburden that are in the instruments[7,10-13].

A study conducted in a hospital in Minas Gerais, in order to validate the HP cleaning protocol, reinforced the importance of thoroughly execute this stage, by means of strongly recommended protocols. In Addition, it stressed the need for validation of safe methodologies to ensure the acceptable levels of protein and RLU for ATP testing after cleaning[9].

The Association for the Advancement of Medical Instrumentation (AAMI) recommends the use of a rapid method to determine the HP organic matter levels. In that case, the ATP provides evaluation of the parameters that surpass the visual cleaning, ensuring safety to the process[4].

The current national legislation on HP processing does not yet specify the best chemical test for cleaning validation. With that in mind, some investigations indicate that the evaluation of ATP bioluminescence can be considered an effective method for process validation, offering the opportunity to obtain rapid and objective results[1,6,9,12].

The results of this study were below 204 RLU, taking into consideration lumened instruments and other instruments. A study states that surfaces with ATP concentrations below 500 RLU can be considered clean surfaces[6]. Other authors present stricter values for cleaning validation, indicating concentrations lower than 200 RLU for less complex instruments. In the CSSD of study, the lumened instruments obtained cut-off point below 250 RLU, assigned to complex HP that have less than 5 mm of lumen or blind-end, which make them inaccessible to the cleaning process[1,5,6].

ATP is considered a strong control variable for manual and automated cleaning monitoring. When the results remain within the established parameters, it is inferred that the organic and inorganic dirt has been removed, reducing the microbial load present in the HP[5,6]. It is noteworthy that the ATP shows feasibility for proving the decontamination of instruments[5-7,12].

Table 2. Results of the adenosine triphosphate tests, in relative light units, after manual cleaning, followed by automated cleaning.

Period	Lumened Instruments*			Instruments**		
	Mean	Min	Max	Mean	Min	Max
May, 2017	98	45	205	82	10	74
June, 2017	94	50	195	09	15	85
July, 2017	116	57	189	19	07	86
August, 2017	138	45	198	06	15	85
September, 2017	134	64	209	64	12	84
October, 2017	96	54	197	75	14	82
November, 2017	128	50	204	17	18	79
December, 2017	203	48	207	72	15	79
January, 2018	48	57	220	82	15	85
February, 2018	182	63	215	75	18	88
March, 2018	71	60	205	67	15	77
April, 2018	98	64	217	53	14	85
May, 2018	204	59	214	77	12	78
Average	124	55	206	54	14	82
Standard deviation	46	-	-	28	-	-
Median	116	-	-	67	-	-

*Dual lumen; **Tweezers, blepharostats and hooks.

The proper and validated cleaning process through ATP is fundamental to a reduction of unexpected problems, such as, for instance, surgical site infections. A study[5] reinforced that the instruments must be properly processed, so that this material does not become a source of contamination and transmission of microorganisms. The CSSD plays a key role in combating IRHC, requiring adequate skilled labor to guarantee quality in the indirect care provided to the patient[5,7,9,12].

It is worth noting that cleaning and its validation stages must follow SOP elaborated with updated references and the highest level of evidence scientific studies. This document contributes to a systematization of a routine considered primordial for the HP processing science. The SOP should be available not only in the management system of a health service but must be widely disseminated to all nursing professionals working in the sector[1,13].

In light of that, the activities involved in the CSSD are essential for patient safety. The quality of internal processes, particularly cleaning, with consequent validation by ATP test is considered a good practice that must be valued, standardized and disseminated in health services.

CONCLUSION

This study made it possible to analyze HP monitoring through ATP testing and reinforced the importance of validation of the cleaning process as a safe practice in health services. All parameters remained within the desired values, evidencing absence of living cell residues in all instruments analyzed.

The validation of the cleaning process contributes to the patient's safety and consequent reduction of infectious events. The available strategies for validating this specific process parameters must be disseminated, valued and followed in their entirety, in order to improve the processes in CSSD.

REFERENCES

1. Brasil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. Resolução da Diretoria Colegiada RDC nº 15, de 15 de março de 2012. Dispõe sobre requisitos de boas práticas para o processamento de produtos para saúde e dá outras providências. Diário Oficial da República Federativa do Brasil [Internet]. 2012 [acessado em 27 jun. 2018]. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2012/rdc0015_15_03_2012.html

2. Madeira MA, Santos AMR, Batista OMA, Rodrigues FTC. Processamento de produtos para saúde em CME. Rev SOBECC. 2015;20(4):220-7. http://doi.org/10.5327/Z1414-4425201500040006

3. 3M. Linha para Monitoramento de Limpeza Clean TraceTM [Internet]. 2015 [acessado em 27 jun. 2018]. Disponível em: https://multimedia.3m.com/mws/media/1398454O/technical-datasheet-clean-trace.pdf

4. American National Standard, Advancing Safety in Healthcare Technology. Comprehensive guide to steam sterilization and sterility assurance in health care facilities. Arlington: American National Standard/Advancing Safety in Healthcare Technology; 2017 [acessado em 27 jun. 2018]. Disponível em: http://my.aami.org/store/detail.aspx?id=st79

5. Alfa MJ, Fatima I, Olson N. The adenosine triphosphate test is a rapid and reliable audit tool to assess manual cleaning adequacy of flexible endoscope channels. Am J Infect Control [Internet]. 2013 [acessado em 29 jun. 2018];41(3):249-53. Disponível em: http://dx.doi.org/10.1016/j.ajic.2012.03.015

6. Oliveira AC, Viana REH. Adenosina trifosfato bioluminescência para avaliação da limpeza de superfícies: uma revisão integrativa. Rev Bras Enferm. 2014;67(6):987-93. http://dx.doi.org/10.1590/0034-7167.2014670618

7. Centers for Diseases Control and Prevention. Options for evaluating environmental cleaning. Atlanta: Centers for Diseases Control and Prevention; 2010 [acessado em 29 jun. 2018]. Disponível em: https://www.cdc.gov/HAI/pdfs/toolkits/Environ-Cleaning-Eval-Toolkit12-2-2010.pdf

8. Frota OP, Ferreira AM, Guerra OG, Rigotti MA, Andrade D, Borges NMA, et al. Eficiência da limpeza e desinfecção de superfícies: correlação entre métodos de avaliação. Rev Bras Enferm. 2017;70(6):1176-83. http://dx.doi.org/10.1590/0034-7167-2016-0608

9. Oliveira AC, Faria COC, Santos RO, Manoel VCF, Mussel IC, Paula AO. Validação do protocolo de limpeza manual dos instrumentais videolaparoscópios em hospital universitário. Rev SOBECC. 2014;19(4):201-6. http://dx.doi.org/10.5327/Z1414-4425201400040005

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

11. Magalhães-Costa E. Reprocessamento de produtos: estado da arte à luz dos estudos de Kazuko Uchikawa Graziano. Rev SOBECC. 2018;23(3):142-54. https://doi.org/10.5327/Z1414-4425201800030006

12. Jagrosse D, Bommarito M, Stahl JB. Monitoring the cleaning of surgical instruments with an ATP detection system. Am J Infect Control [Internet]. 2012 [acessado em 19 jul. 2018];40(5):e90-1. Disponível em: https://doi.org/10.1016/j.ajic.2012.04.159

13. Rutala WA, Weber DJ. Disinfection and sterilization: an overview. Am J Infect Control [Internet]. 2013 [acessado em 19 jul. 2018];41(5 Supl.):S2-5. Disponível em: https://doi.org/10.1016/j.ajic.2012.11.005

CLINICAL AND EPIDEMIOLOGICAL PROFILE OF OBESE PATIENTS FROM A PRE-OPERATIVE OUTPATIENT EVALUATION CLINIC

Perfil clínico e epidemiológico de pacientes obesos de um serviço ambulatorial de avaliação perioperatória

Perfil clínico y epidemiológico de pacientes obesos de un servicio ambulatorio de evaluación perioperatoria

Ana Caroline de Mendonça Motta[1], Jacqueline Ramos de Andrade Antunes Gomes[2*], Glayson Carlos Miranda Verner[3], Thaís Lôbo Campos[4], Weslei da Silva Araújo[5], Leonília Brelaz de Abreu[6], Letícia Santos Ribeiro[7], Rafael Villela Silva Derré Torres[8], Anna Karoline Carvalho Sousa[9], Tâmela Beatriz Matinada da Silva[10], Janaina Ferreira Passos[11]

ABSTRACT: Objective: To describe the clinical and epidemiological profile of obese patients from a pre-operative outpatient evaluation clinic, performed by nurses and anesthesiologists based on cardiac risk assessment and stratification. **Method:** A descriptive, retrospective study, consisting of 292 patients consulted in the pre-operative outpatient evaluation clinic, in which 88 were identified as obese. Demographic, anthropometric (by body mass index - BMI), clinical and cardiac variables were analyzed using the χ^2 test. **Results:** 30% of the patients were obese, of which 91% were female. Regarding the presence of comorbidities, 50% had systemic arterial hypertension (SAH) and 22% had diabetes mellitus (DM). A prevalence of ASA P2 (74%) and high risk for venous thromboembolism (63%) was verified; in relation to cardiac risks according to the ACC (American College of Cardiology / American Heart Association - AHA, modified by Detsky), the majority (74%) was stratified/classified as intermediate risk. **Conclusion:** The significant incidence of comorbidities confirmed the need to use multiprofessional strategies in perioperative care, aimed at the obese population, with the possibility of identifying vulnerabilities and reduce the risks to the individual when undergoing surgical procedures.
Keywords: Perioperative care. Perioperative nursing. Obesity. Patient care team. Patient safety.

RESUMO: Objetivo: Descrever o perfil clínico e epidemiológico de pacientes obesos de um serviço ambulatorial de avaliação perioperatória, realizado por enfermeiros e anestesiologistas, baseado em estratificações e avaliações do risco cardíaco. **Método:** Estudo descritivo, retrospectivo, composto por dados de 292 pacientes consultados pelo serviço ambulatorial de avaliação perioperatória, em que 88 foram identificados com obesidade. Foram analisadas variáveis demográficas, antropométricas (por índice de massa corporal — IMC), clínicas e cardíacas pelo teste do χ^2. **Resultados:** Entre os pacientes, 30% eram obesos, dos quais 91% eram do sexo feminino. Em relação à presença de comorbidades, 50% eram portadores de hipertensão arterial sistêmica (HAS) e 22% a tinham associada ao diabetes mellitus (DM). Foi verificada prevalência de ASA P2 (74%) e alto risco para tromboembolismo venoso (63%); em relação aos riscos cardíacos pelo ACP (American College of Cardiology / American Heart Association — ACP, modificado por Detsky), a maioria (74%) foi estratificada como risco intermediário. **Conclusão:** A significativa incidência de comorbidades constatada acusa a necessidade de utilizar estratégias multiprofissionais na assistência perioperatória, voltadas para a população obesa, sendo possível identificar vulnerabilidades e diminuir riscos aos quais o indivíduo está sujeito, ao submeter-se a procedimentos cirúrgicos.
Palavras-chave: Assistência perioperatória. Enfermagem perioperatória. Obesidade. Equipe multiprofissional. Segurança do paciente.

[1]Nurse; University of Brasília (UnB); (SES / DF) - Brasília (DF), Brazil. Surgical Center Nursing Resident of the Nursing Center at the School of Health Sciences of the Health Sciences Teaching and Research Foundation (ESCS-FEPECS)
[2]Nurse; PhD in Health Sciences awarded by UnB. Coordinator of Nursing Residency in Network Surgical Center of ESCS-FEPECS of SES/DF – Brasília (DF), Brazil.
[3]Anesthesiologist of SES/DF; head of the Anesthesiology and Perioperative Medicine Unit of Hospital Regional de Gama – Brasília (DF), Brazil.
[4]Nurse; Surgical center specialist awarded by ESCS-FEPECS of SES / DF - Brasília (DF), Brazil.
[5]Nurse; Catholic University of Brasilia (UCB); Surgical center specialist awarded by ESCS-FEPECS of SES / DF - Brasília (DF), Brazil.
[6]Nurse; Surgical center specialist awarded by ESCS-FEPECS of SES / DF - Brasília (DF), Brazil.
[7]Nurse; Surgical Center Nursing Resident at ESCS-FEPECS of SES / DF - Brasília (DF), Brazil.
[8]Major of the Military Fire Brigade (QOBM); anesthesiologist of the Military Fire Brigade of the Federal District (CBMDF) - Brasília (DF), Brazil.
[9]Nurse; ESCS-FEPECS; Surgical Center Nursing Resident at ESCS-FEPECS of SES / DF - Brasília (DF), Brazil.
[10]Nurse; Surgical Center Nursing Resident at ESCS-FEPECS of SES / DF - Brasília (DF), Brazil.
[11]Nurse; Federal University of Mato Grosso (UFMT);Surgical Center Nursing Resident at ESCS-FEPECS of SES / DF - Brasília (DF), Brazil.
*Corresponding author: jacquelinecchbdf@gmail.com
Received: 06/08/2018 – Approved: 03/09/2019
DOI: 10.5327/Z1414-4425201900020003

RESUMEN: Objetivo: Describir o perfil clínico e epidemiológico de pacientes obesos de un servicio ambulatorio de evaluación perioperatoria, realizado por enfermeros y anestesistas, basado en estratificaciones y evaluaciones del riesgo cardíaco. **Método:** Estudio descriptivo, retrospectivo, compuesto por datos de 292 pacientes consultados por el servicio ambulatorio de evaluación perioperatoria, en que 88 fueron identificados com obesidad. Fueron analizadas variables demográficas, antropométricas (por índice de masa corporal — IMC), clínicas y cardíacas por el test de χ^2. **Resultados:** Entre los pacientes, un 30% era obeso, del cual un 91% era del sexo femenino. Con relación a la presencia de comorbilidades, un 50% era portador de hipertensión arterial sistémica (HAS) y un 22% la tenía asociada a la diabetes mellitus (DM). Fue verificada prevalencia de ASA P2 (74%) y alto riesgo para tromboembolismo venoso (63%); con relación a los riesgos cardíacos por el ACP (American College of Cardiology / American Heart Association — ACP, modificado por Detsky), la mayoría (74%) fue estratificada como riesgo intermediario. **Conclusión:** La significativa incidencia de comorbilidades constatada acusa la necesidad de utilizar estrategias multiprofesionales en la asistencia perioperatoria, volcadas para la población obesa, siendo posible identificar vulnerabilidades y disminuir riesgos a los cuales el individuo está sujeto, a someterse a procedimientos quirúrgicos.

Palabras clave: Atención perioperativa. Enfermería perioperatoria. Obesidad. Grupo de atención al paciente. Seguridad del paciente.

INTRODUCTION

According to information from the World Health Organization (WHO), more than 200 million surgeries were performed in 2008. It is also estimated that there were around seven million complications and about two million deaths, with half being preventable deaths. Thus, safe actions are necessary to protect the patient during surgical procedures under anesthesia, since these can result in permanent damage[1,2].

An increase in the number of non-cardiac surgical procedures is expected in the coming years due to the progressive aging of the population. Such evidence highlights the need to absorb a growing demand for perioperative assessments for procedures, sometimes associated with significant morbidity and mortality[3].

The Brazilian population is mostly overweight (52%). Regarding the surgical population, it is estimated that 30% will present some degree of obesity[4].

Once the surgical intervention is indicated, it is important to estimate the surgical risk, which is related to specific patient and surgery characteristics, with the aim to establish specific modifications relevant to the patient's clinical condition[5].

Obese patients are more prone to risks asssociated with preventable adverse events; are at increased risk for hypoxemia, pulmonary atelectasis, hypoventilation, increased dependence on mechanical ventilation, obstructive sleep apnea syndrome (OSAS), aspiration of gastric contents; cardiovascular events due to comorbidities; hypertension, diabetes mellitus (DM), dyslipidemia and atherosclerosis. The risk of perioperative thromboembolic events is also more prevalent in obese patients than in non-obese patients[4].

According to the WHO, it is possible to classify the severity of obesity in patients in three grades: Grade I (overweight), which corresponds to the body mass index (BMI) value between 30 and 34.9 kg / m2; Grade II (obese), when the BMI value is between 35 and 39.9 kg / m2; and Grade III (morbidly obese), if the BMI exceeds 40 kg / m2[6].

The pre-operative evaluation in the outpatient setting, which includes pre-anesthetic consultation, promotes the identification of risks associated with the anesthetic-surgical act, increases the chance of a satisfactory surgical result, and is effective in reducing pre-operative anxiety[7].

The Pre-operative Outpatient Clinic of the Regional Hospital de Gama (APA-HRG) is a service aimed at the pre-operative evaluation of patients of a general hospital. The patients are cared for by a multiprofessional group, composed of anesthesiologists and a nursing team, which, based on evidence-based practices, provides individualized pre-operative care to the patients, seeks better surgical results and reduces the average length of hospitalization prior to elective surgery and the number of suspended surgeries[8].

During the pre-operative outpatient consultation, the nurse identifies obese patients by calculating BMI and performing anthropometry measurements[8]. The physical examination also includes the verification of vital signs, cardiopulmonary auscultation and identification of a difficult airway (DA) predictors. The medical team evaluates the risk stratification for OSAS using the STOP-BANG score, as well as the functional capacity questionnaire (MET) and the risk flow chart for venous thrombosis (VTE) by means of the Safety-Zone algorithm.

The anesthesiologist and the nursing team identify the cardiac risks using stratifications that measure the

risk of developing cardiac complications in the perioperative period, which allows the team to make decisions and seek the best prevention and treatment strategies, including adjustments in the management of the underlying disease[3]. Thus, the stratifications by the American Society of Anesthesiologists (ASA) and the Lee (Cardiac Risk Index Revised Lee - IRCR), ACC (American College of Cardiology / American Heart Association - AHA) by Detsky), New York Heart Association (NYHA) are applied by the anesthesiologist as well as the Cardiac Risk for Non-Cardiac Procedures[3,9].

The initial evaluation allows the pre-operative nurse to identifiy the risks for the surgical patient during the preoperative period and faciliates the nursing diagnoses process, and makes the implementation of the Perioperative Nursing Care Systematization (PNCS) possible.

OBJECTIVE

To describe the clinical and epidemiological profile of obese patients at a pre-operative outpatient evaluation clinic in the Federal District.

METHOD

A descriptive, retrospective study, in which data collection from consultations was carried out between June 2014 and June 2016, at the APA-HRG of a general hospital in the Federal District.

According to the protocol of the service, high risk patients are those who are 65 years of age or under 65 years of age with a history of morbidity (allergies, systemic diseases, use of medications on an ongoing basis), and / or physical limitation, and / or cognitive limitation, and / or previous history of problems while under anesthesia during a surgical procedure.

Physical and electronic medical records of obese patients, over 18 years of age, requiring elective surgical treatment, referred to general surgery clinics and subspecialties, gynecology and orthopedics, were included in the study. Patient medical records for patients over 18 years of age and with a BMI <30 kg / m2 were excluded from the study. For the data collection, a form was used that gathered the main information contained in the questionnaire of the preoperative consultations of the service. Sociodemographic and anthropometric variables were studied in order to create the database including: sex, age, BMI, surgical specialty, associated diseases, DA predictor, smoking and alcoholism; clinical stratifications: ASA physical status classification, MET functional classification, OSAS risk classification, and VTE risk classification; and cardiac risk assessments: Lee, ACP, NYHA and Cardiac Risk Classification for Non-Cardiac Procedures[3,9].

Safety Zone is an algorithm that uses clinical data from past and present history to stratify the risk of developing VTE in clinical and surgical patients[11].

According to the III Guideline of The Perioperative Evaluation of the Brazilian Cardiology Sociey, the ACP algorithm, ACC / AHA, American College of Cardiology / American Heart Association, and IRCR are the most indicated for the identification of perioperative cardiac risks[4].

These variables were analyzed using the 2008 Development Core Team statistical software, version 3.3 for Windows®, and were presented in a descriptive way in absolute and percentage frequencies.

The research work was approved by the Research Ethics Committee of the Foundation for Teaching and Research in Health Sciences (FEPECS) under CAAE nº 60740916.8.0000.5553, and was carried out in accordance with the requirements of Resolution 466, of December 12, 2012, of the National Health Council.

RESULTS

It was verified that, between July 1, 2014 and June 30, 2016, 292 consultations were carried out in the APA-HRG. Among these, 88 were with obese patients who would undergo some surgical procedure requiring anesthesia.

The largest amount of medical records of obese patients (71/91%) belonged to the female gender. In relation to age, the majority were older than 60 years (34/43.5%). In relation to the lifestyle habits, a great part confirmed being non-smokers (63/71,5%). The patients were mainly referred by the Gynecological Clinic (38/43.6%). The findings are presented in detail in Table 1.

Upon studying the mentioned clinical variables, most of the participants were classified as ASA P2, according to the clinical state proposed by ASA. Regarding the Duke index (MET), around 5.9% had poor functional capacity (1-4 METS), while 41.6% had moderate MET (4-10 METS). Regarding the risk of VTE, most of them presented a high risk for a

thromboembolic event; and 47.8% presented a high risk for OSAS (Table 2).

In relation to comorbidities, a higher prevalence of medical records for patients with systemic arterial hypertension (SAH) was obtained and a reduced number of records for patients with DM, as detailed in Table 2.

Regarding the results of the cardiac risk stratification presented in Table 3, the sample was mostly (52.3%) classified as Lee I. The NYHA obtained functional class I (82.2%) as the prevalent stratification, as described in Table 3.

DISCUSSION

From the population selected, a sample of 30% obese patients was obtained, consistent with estimates of the Brazilian Cardiology Society for surgical patients nationwide[4].

Table 1. Socio-demographic data and profile of the obese population treated at the Pre-operative Outpatient Evaluation Clinic of the Regional Hospital de Gama (APA-HRG). Brasília (DF), 2016.

Variables	n	%
Age group (years)		
<20	00	0.0
20–40	12	15.3
41–60	32	41.0
>60	34	43.5
Sex		
Female	71	91.0
Male	07	8.9
Clinic		
Gynecology	38	43.6
Orthopedic	28	32.1
General	17	19.5
Mastology	02	2.2
Vascular	01	1.1
Others	01	1.1
Smoker		
Yes	09	10.2
No	63	71.5
Ex-smoker	16	18.8
Difficult airwaypredictor		
Yes	36	46.1
No	42	53.8

Table 2. Clinical data of obese patients treated at the Pre-operative OutpatientEvaluation Clinic of the Regional Hospital of Range (APA-HRG). Brasília (DF), 2016.

Variables	n	%
ASA		
P1	09	10.3
P2	65	74.7
P3	13	14.9
MET		
Excelent	44	52,3
Moderate	35	41,6
Poor	05	5,9
OSAS		
Yes	33	47.8
No	36	52.1
VTE		
High	55	63.9
Moderate	18	20.9
Low	13	15.1
SAH	44	50.5
SAJ+DM	20	22.9
DM	03	3.4
No SAH or DM	20	22.9

ASA: American Society of Anesthesiologists; MET: Functional Classification; OSAS:obstructive sleep apnea syndrome; VTE: venous thromboembolism; SAH: systemicarterial hypertension; DM: diabetes mellitus.

Table 3. Cardiac stratification performed in obese patients by the PerioperativeOutpatient Evaluation Clinic of the Hospital Regional de Gama (APA-HRG). Brasília (DF), 2016.

Variables	n	%
LEE		
I	45	52.3
II	35	40.6
III	05	5.8
IV	01	1.1
ACC		
High	02	0.9
Low	18	7.6
Intermediate	57	24.5
NYHA		
I	51	82.2
II	08	12.9
III	02	3.2

LEE: Lee's Revised Cardiac Index; ACC: American College of Cardiology / American Heart Association - AHA, modified by Detsky; NYHA: New York Heart Association.

The results related to sex highlighted a greater number of obese women in the sample, which contrasts with the data from the Surveillance of Risk and Protective Factors for Chronic Diseases (VIGITEL), which shows that obesity is mostly found in the male Brazilian population[12]. The contrast is justified by the greater number of referrals that the clinic obtained from the Gynecological Clinic for preoperative consultation[13].

Nevertheless, the most prevalent age group for obesity was over 60 years, which corroborates the data found by VIGITEL, in which the proportion of obese women, in relation to men, increases after 64 years[12].

Another study presented a similar result when it identified 28.9% of obese patients in its epidemiological profile of a preoperative outpatient clinic. Of these, the prevalence was also found in women, and the frequency of obesity was increased in the age group from 45 to 54 years for men and from 55 to 64 years for women[14].

The risk of morbidity and mortality in the obese individual is directly related to weight gain, since body enlargement is associated with non-transmissible diseases, such as SAH, DM left ventricular hypertrophy (LVH), cardiorespiratory capacity dysfunction, arrhythmias, myocardial ischemia, acute myocardial infarction(MI),asthma,OSAS, pulmonary thromboembolism (PTE) and pulmonary hypertension[15,16].

Obese patients are 2.9 times more likely to develop DM and SAH than patients with BMI within normal parameters. As a result, more than half of the sample has a SAH diagnosis, but few individuals have developed both comorbidities[17].

Regarding clinical stratification, the ASA classification had a higher frequency of ASA P2, which is characterized by moderate systemic disease, without functional limitation and is justified by the prevalence of SAH and DM among patients. A meta-analysis showed that a gain of 1 kg of body mass is associated with an increase of 1.2 to 1.6 mmHg in systolic pressure and from 1.0 to 1.3 mmHg in diastolic pressure[17].The DA predictor, which is one of the parameters used to predict difficulties in laryngoscopy during anesthesia induction, may occur due to increased circumference of the neck in the obese patient and due to the increase in Mallampati classification which is the classification of the difficulty in visualizing the oropharynx[18].

Regarding these indicators, a relevant number is found in the sample of individuals with complicated airway predictors. The direct association between obesity and difficult laryngoscopy is still contradictory in the literature. In one study, 100 patients with BMI> 30 kg / m2, who presented cervical width increase and a Mallampati score ≥3, did not obtain direct laryngoscopy except one; i.e., only 1% of those obese had difficult intubation[18].

The application of the MET scale to evaluate functional capacity in individuals with high BMI showed that more than half obtained excellent functional capacity, performing activities and daily tasks without complaints. It is evidenced that 41.6% have moderate functional capacity due to reporting complaints or limitations regarding the performance these activities[19].

BMI is associated with OSAS, which can lead to hypoxia, impairing the postoperative period. The pathophysiology of OSAS is defined by respiratory pauses with micro arousals, which characterize the apnea event. The prevalence of OSAS in obese individuals reaches 40% in overweight individuals (BMI> 25 kg / m2) and can reach 90% in patients with BMI> 40 kg / m2[20].

In the study in question, by means of the STOP-BANG score, there were stratified patients with a high risk for OSAS. Sleep apnea may present complications to the patient's clinical status, for example, increased partial pressure of carbon dioxide in arterial blood, causing oxyhemoglobin desaturation due to lack of alveolar ventilation[20].

OSAS may be an aggravating factor among other adverse respiratory events in the obese patient. The increase in BMI leads to the narrowing of the pharynx, causing upper airway structure impairment and decreased lung volume, due to the low expansion of the thoracic cavity. This condition is worsened since the adipose tissue secretes adipokines, which are related to the decrease of the neuromuscular control[21].

In addition to OSAS, the risk of atelectasis and hypoventilation syndrome are present, often due to decreased vital and functional residual capacity, as well as forced expiratory volume[20].

Hypoventilation syndrome in the obese patient is defined by hypercapnia in wakefulness (carbon dioxide arterial pressure ≥45 mmHg), accompanied by hypoxia. The prevalence of hypoventilation syndrome in patients already diagnosed with OSAS is 11% and 8% among individuals undergoing bariatric surgery. Patients with hypoventilation syndrome have an expected increase in HCO2 levels, which can also be used as a tool to form a possible nursing diagnoses[22].

The postoperative complications that have more composite outcomes due to death in the obese are VTE and PE, which have higher risks in these patients and are recurrent in postoperative bariatric surgeries, but can be minimized[4].

One of the more complete prospective method studies and longitudinal evaluation with obese patients submitted to bariatric surgery verified a mortality rate of 0.3% in 30 days, the outcome being death, deep vein thrombosis (DVT) and PE[23]. In the sample of this study, most of the individuals were stratified by the Safety Zone as high risk patients for the development of PE / VTE and 20.9% were stratified as having moderate risk.

The risk of developing a thromboembolic event can be minimized. The application of the algorithm, in addition to performing the subject's risk classification, suggests adequate thromboprophylaxis treatment according to the patient's stratification. The risk and prophylaxis of PE / VTE have been underutilized by surgical clinics, decreasing perioperative safety and putting obese patient at risk, who has a greater chance of thromboembolic events[4].

Meanwhile, the risk of an adverse perioperative cardiac event is related to the degree of obesity, associated comorbidities and type of surgery performed. The ACC uses clinical evaluation, electrocardiographic, presence of MI or previous acute pulmonary edema as part of its classification process. The Lee algorithm proposes four classes of risk for patients according to variables related to high-risk surgeries: MI, congestive heart failure (CHF), history of cerebrovascular disease, serum creatinine> 2.0 mg / dL, and diabetes insulin-dependent diabetes. Thus, the intermediate ACC, followed by low ACC, was classified in the majority of the obese patients entered in the Lee I classification, in which none of the variables were presented; "However, in the second highest classification-Lee II-, patients presented one of the variables described[9].

The NYHA stratification is a widely used scale, indicated by the Brazilian Cardiology Society to identify subjects with CHF and coronary insufficiency, the stages and follow their progression. The scale can also be used for pre-operative evaluation, minimizing the risks of the disease and impairment in the intra and postoperative periods. The majority of the patients studied did not present a symptom of the disease, being classified as NYHA I, and only 12% were categorized as NYHA II, suggesting some symptom of the diseases[4].

The identification of the clinical risks for the obese patient guides the care of the nurse. Therefore, the Nursing Process is based on individualized care, evaluating all phases of the perioperative period during the nursing consultation[24,25].

As PNCS is indispensable in surgical patient care, the preoperative visit or preoperative outpatient care become protagonists in the beginning of care planning. In order to follow the nursing planning, it is necessary to state the previously identified risks and diagnoses. In view of this, it is important that the perioperative risks of the obese patient, identified in this study are taken into consideration when choosing the nursing diagnosis[10].

A significant limitation of the study was the difficulty in accessing physical records, due to the transition from physical to electronic records that occurred at the institution during the data collection period.

CONCLUSION

Among the population studied, it was observed that 30% had BMI> 30 kg / m2. Among these, 91% were women, more than 50% had SAH and 22% had SAH associated with DM. Significant numbers were obtained from the clinical stratifications, such as the increase in ASA P2, which showed that most individuals have some diagnosed comorbidity, even if already treated. A high risk for VTE in most patients was found, which allows the team to suggest more adequate prophylaxis. It was possible to predict postoperative apnea events in 40% of subjects, considering that they presented a high risk for OSAS.

The multidisciplinary work in the pre-operative context facilitates the identification of vulnerabilities in obese patients and the risks to which the disease predisposes them, making the reduction of these risks possible through prophylactic behaviors that can be taken, providing safer intra and post operations periods.

Emphasis is placed on the importance of nurses in pre-operative outpatient planning, as they perform an essential role with the team and the patient, as well as the convenience of knowing the patient outside the Surgical Center, which facilites PNCS implementation, care planning, and clarifies doubts as well as carrying out the necessary guidelines for the patient and their family.

REFERENCES

1. Monteiro E, Melo C, Amaral T, Prado P. Safe surgery: elaboration of an instrument for perioperative nursing care. Rev SOBECC. 2014;19(2):99-109. http://dx.doi.org/10.4322/sobecc.2014.016

2. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat AHS, Dellinger EP, et al. A surgical safety checklist to reduce morbidity and mortality in a global population. N Engl J Med. 2009;360(5):491-9. https://doi.org/10.1056/NEJMsa0810119

3. Santos IS, Bittencourt MS. Heart failure. Rev Med [Internet]. 2008 [acessado em 10 nov. 2017];87(4):224-31. Disponível em: https://www.revistas.usp.br/revistadc/article/download/59083/62069

4. Gualandro DM, Yu PC, Caramelli B, Marques AC, Calderaro D, Fornari LS, et al. III Diretriz de Avaliação Perioperatória da Sociedade Brasileira de Cardiologia. Arq Bras Cardiol. 2017;109(3 supl. 1):75-7. https://doi.org/10.5935/abc.20170140

5. Carvalho RWFD, Pereira CU, Laureano Filho JR, Vasconcelos BCDE. The surgical patient: part I. Rev Cir Traumatol Buco-maxilo-fac [Internet]. 2010 [acessado em 1º out. 2017];10(4):85-92. Disponível em: http://www.revistacirurgiabmf.com/2010/V10n4/12.pdf

6. World Health Organization. Obesity: preventing and managing the global epidemic. Geneva: World Health Organization; 2000. (WHO Technical Report Series, 894).

7. Schwartzman UP, Batista KT, Duarte LDT, Saraiva RA, Fernandes MCBC, Costa VV, et al. Complicação anestésica em hospital de reabilitação: a incidência tem relação com a consulta pré-anestésica? Braz J Anesthesiol [Internet]. 2014 [acessado em 1º out. 2017];64(5):357-64. Disponível em: https://doi.org/10.1016/j.bjan.2013.03.024

8. Sena AC, Nascimento ERP, Maia ARCR. Prática do enfermeiro no cuidado ao paciente no pré-operatório imediato de cirurgia eletiva. Rev Gaúcha Enferm. 2013;34(3):132-7. https://doi.org/10.1590/S1983-14472013000300017

9. 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.

10. Ribeiro E, Ferraz KM, Duran EC. Atitudes dos enfermeiros de centro cirúrgico diante da sistematização da assistência de enfermagem perioperatória. Rev SOBECC. 2017;22(4):201-7. https://doi.org/10.5327/Z1414-4425201700040005

11. Chung F, Abdullah HR, Liao P. STOP-Bang Questionnaire: a practical approach to screen for obstructive apnea. Chest [Internet]. 2016 [acessado em 8 nov. 2017];149(3):631-8. Disponível em: https://www.ncbi.nlm.nih.gov/pubmed/26378880. https://doi.org/10.1378/chest.15-0903

12. 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. Brasília: Ministério da Saúde; 2017.

13. Druszcz RMB, Botogoski SR, Pires TMS. Semiologia ginecológica: o atendimento da mulher na atenção primária à saúde. Arq Med Hosp Fac Cienc Med Santa Casa São Paulo. 2014;59(3):144-51.

14. Santos ML, Novaes CO, Iglesias AC. Perfil epidemiológico de pacientes atendidos no ambulatório de avaliação pré-anestésica de um hospital universitário. Braz J Anesthesiol. 2017;67(5):457-67. https://doi.org/10.1016/j.bjan.2016.06.002

15. Pereira RB. Acometimento cardíaco e pulmonar no pré e no pós-operatório tardio de gastroplastia [dissertação]. Maceió: Universidade Federal de Alagoas; 2014.

16. Souza GES, Prudenciatto MR, Tanaka RS, Martelli A, Delbim LR. Exercícios físicos como ferramenta de enfrentamento às comorbidades associadas à obesidade: revisão de literatura. Arch Health Invest [Internet]. 2016 [acessado em 12 nov. 2017];5(2):112-9. Disponível em: http://www.archhealthinvestigation.com.br/ArcHI/article/view/1307/pdf. http://dx.doi.org/10.21270/archi.v5i2.1307

17. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Cadernos de Atenção Básica, n. 12 Série A. Normas e Manuais Técnicos. Brasília: Ministério da Saúde; 2006.

18. Brodsky JB, Lemmens HJ, Brock-Utne JG, Vierra M, Saidman LJ. Morbid obesity and tracheal intubation. Anesth Analg. 2002;94(3):732-6.

19. 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):793-801. http://dx.doi.org/10.1056/NEJMoa011858

20. Silva GA, Sander HS, Eckeli AL, Fernandes RMF, Coelho EB, Nobre F. Conceitos básicos sobre síndrome da apneia obstrutiva do sono. Rev Bras Hipertens. 2009;16(3):150-7.

21. Daltro CHC, Fontes FHO, Santos-Jesus R, Gregório PB, Araújo LMB. Síndrome da apnéia e hipopnéia obstrutiva do sono: associação com obesidade, gênero e idade. Arq Bras Endocrinol Metab. 2006;50(1):74-81. http://dx.doi.org/10.1590/S0004-27302006000100011

22. Abdulla H, Chung F. Perioperative management for the obese outpatient. Curr Opin Anaesthesiol. 2014;27(6):576-82. https://doi.org/10.1097/ACO.0000000000000129

23. Longitudinal Assessment of Bariatric Surgery (LABS) Consortium, Flum DR, Belle SH, King WC, Wahed AS, Berk P, et al. Perioperative safety in the longitudinal assessment of bariatric surgery. N Engl J Med. 2009;361(5):445-54. https://doi.org/10.1056/NEJMoa0901836

24. 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. Barueri: Manole; São Paulo: SOBECC; 2017.

25. Conselho Federal de Enfermagem. Resolução COFEN nº 358/2009, de 15 de outubro de 2009. Dispõe sobre a Sistematização da Assistência de Enfermagem e a implementação do Processo de Enfermagem em ambientes, públicos ou privados, em que ocorre o cuidado profissional de Enfermagem, e dá outras providências [Internet]. Brasília: Conselho Federal de Enfermagem; 2009 [acessado em 23 jan. 2019]. Disponível em: http://www.cofen.gov.br/resoluo-cofen-3582009_4384.html

SURGERIES PERFORMED ON ELDERLY PATIENTS IN A PUBLIC HOSPITAL IN THE STATE OF SÃO PAULO

Cirurgias realizadas em idosos em um hospital público do interior de São Paulo

Cirugías realizadas en idosos en un hospital público del interior de São Paulo

Patrícia Santos Moreira[1], Léia Regina de Souza Alcântara[2]*, Jamille Duran Matilde[3], Letícia Costa Rinaldi[4], Marla Andréia Garcia de Avila[5]

ABSTRACT: Objective: To identify the prevalence of surgical procedures performed in the elderly in a surgical center of a public hospital in the state of São Paulo and to characterize such procedures. **Method:** Cross-sectional, retrospective, quantitative study. The sample consisted of 7,483 surgical procedures performed in the elderly, between 2013 and 2015. Data were collected from the surgical information system of the institution under study. **Results:** The age range was between 60 and 70 years of age; the highest average anesthesia recovery time was between 71 and 80 years. The specialties that performed the most procedures were: orthopedics, urology and ophthalmology. The most commonly used anesthesias were: general inhalation, intravenous, local with sedation and spinal; 37,3% used anesthesia, however the type was not described in the patient medical records. There were 1,140 deaths resulting from the procedures or complications; three of them occurred in the surgical center, while the others occured in the intensive care unit or ward. **Conclusion:** The data presented here reinforce the need for new models of care, with improvements in geriatric multidisciplinary care, in perioperative care for the elderly.
Keywords: Surgery. Elderly population. Population dynamics.

RESUMO: Objetivo: Identificar a prevalência dos procedimentos cirúrgicos realizados em idosos em um centro cirúrgico de um hospital público do interior do estado de São Paulo e caracterizar tais procedimentos. **Método:** Estudo transversal, retrospectivo, quantitativo. A amostra constou de 7.483 procedimentos cirúrgicos em idosos, realizados entre 2013 e 2015. Os dados foram coletados a partir do sistema de cirurgia da instituição sede do estudo. **Resultados:** A faixa etária na qual prevaleceram os procedimentos foi entre 60 e 70 anos de idade; a maior média de tempo para recuperação da anestesia foi entre 71 e 80 anos. As especialidades que mais realizaram procedimentos foram: ortopedia, urologia e oftalmologia. As anestesias mais empregadas foram: geral inalatória, endovenosa, local com sedação e raquideana; 37,3% usaram o serviço de anestesia, porém não estava descrito em prontuário qual foi o tipo de anestesia realizada. Os óbitos decorrentes dos procedimentos ou complicações das cirurgias foram 1.140; três deles ocorreram no centro cirúrgico e os demais, em enfermarias ou unidades de cuidados intensivos. **Conclusão:** Os dados aqui apresentados reforçam a necessidade de novos modelos de assistência, com melhorias da assistência multidisciplinar geriátrica, no atendimento perioperatório aos pacientes idosos.
Palavras-chave: Cirurgia. População idosa. Dinâmica populacional.

RESUMEN: Objetivo: Identificar la prevalencia de los procedimientos quirúrgicos realizados en ancianos en un centro quirúrgico de un hospital público del interior del estado de São Paulo y caracterizar tales procedimientos. **Método:** Estudio transversal, retrospectivo, cuantitativo. La muestra constató de 7.483 procedimientos quirúrgicos en ancianos, realizados entre 2013 y 2015. Los datos fueron recolectados a partir del sistema de cirugía de la institución sede del estudio. **Resultados:** El grupo de edad en el que prevalecieron los procedimientos fue entre 60 y 70 años de edad; la mayor media de tiempo para la recuperación de la anestesia fue entre 71 y 80 años. Las especialidades que más realizaron procedimientos fueron: ortopedia, urología y oftalmología. Las anestesias más empleadas fueron: general inhalatoria, endovenosa, local con sedación y raquídea; 37,3% usaron el servicio de anestesia, pero no estaba descrito en prontuario cuál fue el tipo de anestesia realizada. Las muertes derivadas de los procedimientos o complicaciones de las cirugías fueron 1.140; Y tres de ellos ocurrieron en el centro quirúrgico y los demás, en enfermerías o unidades de cuidados intensivos. **Conclusión:** Los datos aquí presentados refuerzan la necesidad de nuevos modelos de asistencia, con mejoras de la asistencia multidisciplinaria geriátrica, en la atención perioperatoria a los pacientes ancianos.
Palabras clave: Cirugía. Población anciana. Dinámica poblacional.

[1]Nurse. Resident in Adult and Elderly Health at the "Júlio de Mesquita Filho" State University (Unesp) - Botucatu (SP), Brazil.
[2]Nurse, specialist in Surgical Center Nursing, Post-Anesthetic Recovery and Central Sterile Services Department ; Master of Health Sciences. Lecturer in the Perioperative Nursing course of the Nursing course of the Northern State University of Paraná (UENP) - Bandeirantes (PR), Brazil.
[3]Nurse. Resident of the Multiprofessional Residency Program in Adult and Elderly Health at the Hospital das Clínicas of Botucatu Medical School, UNESP - Botucatu (SP), Brazil.
[4]Undergraduate nursing student at Unesp - Botucatu (SP), Brazil.
[5]Nurse; Master in Medical Biotechnology; PhD in Collective Health. Graduate Nursing Program Advisor at UNESP - Botucatu (SP), Brazil
*Corresponding author: alcantara@uenp.edu.br
Received: 07/29/2018 – Approved: 05/01/2019
DOI: 10.5327/Z1414-4425201900020004

INTRODUCTION

The demographic transition is a worldwide phenomenon, whereby, the number of young people progressively decreases and there is a considerable increase in the over 60 population. Brazil has also experienced an increase in the population of this age group. According to the Brazilian Institute of Geography and Statistics (IBGE), the aging index rose from 31.7% in 2001 to 51.8% in 2011. This shows that there is, on average, a person aged 60 or over for every two people under the age of 15. It is estimated that by 2050 there will be 2 billion elderly people in the world, and that in Brazil there will be about 28 million elderly people[2].

The increase in life expectancy is due to the reduction in infant mortality, which has progressively reached all age groups, including the death rates of the elderly population, which has experienced a large decline. It is also due to advances in health technologies and the development of public policies for the elderly[3].

Aging is an irreversible, natural and individual biological process. The term aging is marked by changes in shape and function throughout life that occur in organisms after sexual maturation and that progressively compromise functionality, mobility and independence, influencing the elderly's ability to respond to environmental stress and the maintenance of homeostasis, as well as the high prevalence of chronic-degenerative diseases, which will cause this population to require qualified assistance from the health services at all levels of attention[4].

As a consequence of a longer life expectancy, treatments and surgeries tend to be more routine. The World Health Organization (WHO) predicts that more than 60 million people will undergo surgeries for traumatic reasons and more than 30 million to treat malignancies each year[5]. Surgical complications are more common in the elderly population because of the slower organism, impaired physical mobility, the greater probability of infections and the difficulties arising from the underlying diseases themselves, making it necessary to prepare professionals to care for geriatric patients[5].

Few studies consider the profile of surgeries performed in the elderly, or the characteristics of this population. In general, studies that evaluate surgical procedures in the elderly focus on surgeries performed in single areas [6-8]. Hospital management appears to focus on the costs of surgeries, specifically oncological surgeries, analyzing actions to reduce costs and the transfer of these costs from health insurance companies[9].

Considering the increase in life expectancy in the population, the scarcity of studies related to the theme and the importance of health care for the elderly in all areas, we propose to carry out this study with the objective of providing support for the improvement of care to the elderly person in the surgical center (SC) and the management of the SC unit.

OBJECTIVE

To identify the surgical procedures performed in elderly patients in a SC of a public hospital in the the state of São Paulo and to characterize such procedures.

METHODS

A cross-sectional, retrospective study with a quantitative, non-probabilistic approach.

The present study was conducted at Hospital das Clínicas (HC) in the city of Botucatu, in the state of São Paulo. It is estimated that the hospital caters for 1.5 million users, who come from 68 municipalities of the Bauru Regional Health Department (DRS VI). The HC has 385 beds, 52 being intensive care beds (30 adults, 15 neonates and 7 pediatric), 198 doctor consultation rooms and 31 specialized rooms. The institution conducts an average of 2 million exams, 650 thousand consultations and 25 thousand hospitalizations per year.

It is considered the largest public health unit in the Botucatu region, linked to the Unified Health System (SUS). The Hospital das Clínicas of the Botucatu Medical School (HCFMB) has 170 nurses and more than 800 nursing technicians.

The SC of the institution has 13 operating rooms, which hosts surgeries I, II, III and IV, of various specialties, according to the weekly schedule established for each team. Approximately 13 surgical teams, anesthesiologists and nursing staff, among other professionals, work in the SC. In 2014, the service performed 8,967 surgeries.

Data were collected from the surgical information system. The procedures that took place in SC of the HCFMB, between 2013 and 2015, in users 60 and older were included. Procedures with incomplete data in

the patient medical record were excluded. The variables analyzed were: sex (male and female), age (in years), surgery performed (classified according to the Management System for Procedures, Medications and Orthoses and Prostheses and Special Materials of SUS - SIGTAP) anesthesia, length of hospital stay (in days), medical specialty, surgical time (in minutes) and death during surgery.

The results were presented using descriptive statistics, with absolute and percentage frequencies for the categorized variables,average and median. The data were entered and tabulated in a Microsoft Excel worksheet which is presented in table form.

The project was submitted to the Research Ethics Committee (CEP) of the Faculty of Medicine of Botucatu, under Opinion No. 1,526,015, dated May 3rd, 2016.

The waiver of the Informed Consent Form was requested and authorized, due to the use of secondary data.

RESULTS

The study sample consisted of data from 7,483 surgical procedures performed on elderly patients, older than 60 years, between 2013 and 2015, 51% were performed in males. The age group in which the most procedures occurred was between 60 and 70 years of age, in both sexes. The mean surgical time was higher in this age group, and lower in the other groups.

The highest average time for anesthesia recovery appeared in the 71 to 80 age group, followed by the 60 to 70 age group. The mean hospitalization rate predominated in the 60 to 70 age group (Table 1).

Upon analyzing the variable surgical specialties, it was verified that the orthopedic procedures were the most predominate, followed by urology, ophthalmology, vascular surgery, gastrointestinal surgery, neurosurgery, cardiac surgery, otorhinolaryngology, general surgery and thoracic surgery. Table 2 shows the procedures divided by age group.

Table 3 shows the main surgical procedures performed in patients, in the age group studied.

Table 4 shows the predominance of anesthesia performed in surgical procedures. It can be verified that general inhalation anesthesia and the intravenous anesthesia were the most used, followed by local anesthesia with sedation and spinal anesthesia. It is worth mentioning, that 37% of the surgeons used anesthesia but they did not record it in the patient's chart.

The analysis of deaths due to the procedures or surgical complications revealed a total of 1,140 deaths in elderly patients, three of them occurred in the SC and the other in the intensive care units or ward. Table 5 shows the characteristics of patients who died.

Table 1. Distribution of surgeries according to gender, time of surgery, time of anesthesia recovery and days of hospitalization.

Variables	60 - 70 years n (%)	71 - 80 years n (%)	81 - 90 years n (%)	91 years or older n (%)	Total
Sex					
Female	1.930 (47)	1.081 (49)	575 (56)	94 (60)	3.680
Male	2.180 (53)	1.117 (51)	444 (44)	62 (40)	3.803
Total	4.110 (100)	2.198 (100)	1.019 (100)	156 (100)	7.483
Surgical indicators					
Surgery length(minutes)					
Average	128	114	101	83	106.5
Median	107	99.5	97	50	98.2
Anesthesia recovery time (minutes)					
Average	80.5	88.5	84	88.5	85.3
Median	94.5	284	61	66	172.5
Length of hospital stay (days)					
Avergae	12.5	12	12	9	11.3
Median	16	14	13.5	9	13.7

Table 2. Distribution of surgeries according to specialty and age group.

Variables Speciality	60 - 70 years n (%)	71 - 80 years n (%)	81 - 90 years n (%)	91 years or older n (%)	Total n (%)
Orthopedics	674 (16)	370 (17)	278 (27)	63 (40)	1.385 (18.5)
Urology	578 (14)	227 (10)	54 (5)	10 (6)	869 (11.6)
Ofthalmological	382 (9)	332 (15)	142 (14)	8 (5)	864 (11.5)
Vascular	405 (10)	302 (14)	121 (12)	22 (14)	850 (11.4)
Gastro-surgery	458 (11)	234 (11)	107 (10)	10 (6)	809 (10.8)
Neurology	368 (9)	152 (7)	57 (6)	9 (8)	586 (7.8)
Cardiac surgery	221 (5)	140 (6)	80 (8)	12 (8)	453 (6.2)
Otorhinolaryngology	215 (5)	104 (5)	41 (4)	4 (3)	364 (4.9)
General surgery	171 (4)	75 (3)	39 (4)	11 (7)	286 (3.8)
Thoracic	126 (3)	52 (2)	12 (1)	1 (0.64)	191(2.6)
Other specialities	-	-	-	-	816 (10.9)

Table 3. Distribution of the main surgical procedures performed in the elderly.

Surgical Procedures	n	(%)
Surgical treatment of proximal femoral fracture	270	17.6
Exploratory laparotomy	259	16.8
Tracheostomy	182	11.8
Intraocular lens implant facectomy	157	10.2
Amputation / disarticulation of finger	128	8.3
Deviation of ulcer / devitalized tissue	125	8.1
Endoscopic resection of prostate	119	7.7
Arterial embolectomy	114	7.4
Cholecystectomy	97	6.3
Vaginal hysterectomy	87	5.7

Table 4. Distribution of surgeries according to anesthesia performed in elderly patients.

Types of anesthesia	n	(%)
General inhalation and intravenous	2.012	26.9
Local/sedation	1.221	16.3
Spinal	1.172	15.7
Blocks	237	3.2
Epidural	51	0.7
Uninformed	2.790	37.3
Total	7.483	100.0

Table 5. Characteristics of deaths in elderly patients.

Death	Intraoperative n	Post-operative n	Total
Period	3	1.137	1.140
Sex			
Female	0	472	472
Male	3	665	668
Average hospital stay (days)	10	13	-
Anesthesia recovery time (minutes)	-	92	-
Predominate anesthesia	General	General	-
Predominate speciality	Cardiac/vascular	Vascular/gastrointestinal surgery/neurosurgery	-
Surgery time (minutes)	376	135	-
Age(years)	79	72	-

DISCUSSION

The sample of this study was composed of data from 7,843 elderly patients submitted to surgical procedures between 2013 and 2015.

The increase in the elderly population in Brazil and in the world shows a greater demand for hospitals and, consequently, entrance into the SC[10]. When the total number of surgical procedures was analyzed, there was no significant prevalence of males or females; however, when the age groups between 60 and 80 years were analyzed, there was a prevalence of males. Such an occurrence leads us to believe that self-care may be more deficient among men, leading to higher hospitalization rates and surgeries.

The avarage and median time of the surgical procedures did not show great variations between the age groups, however it should be emphasized that the surgical time is directly related to several complications, such as surgical site infections, which is increased in 13, 17 and 37% for every 15, 30 and 60 minutes of surgery, respectively[11].

The length of hospital stay also did not show significant variations between the age groups. The common comorbidities in the studied age groups can prolong hospitalization time, making the individual vulnerable to adverse events that worsen the prognosis and cause burdens to hospitals[12].

Aging as a biological process leads to the decline of organic functions and the occurrence of chronic degenerative diseases as a consequence of morphological, biochemical and functional changes. These may cause the individual to experience a surgical situation at some moment of senility.Thus, it can be verified (Tables 2 and 3) that the surgical specialties, as well as the procedures performed, involve all the organic systems. However, lifestyle and habits can dictate the quality of the aging process; therefore, it is of great importance that senility is considered from the earliest phases of life.

The high prevalence of orthopedic surgical procedures (Table 2), with the majority being for femur fracture (Table 3) should be highlighted. A study conducted in countries belonging to the European Union showed that 610,000 hip / femoral fractures occurred in elderly people over 70 years of age[14] in 2010, and in Brazil between 2008 and 2012, there were 38,755 femoral fractures, evidencing that this occurrence has been increasing in recent decades.

Fractures are the result of falls and bone fragility and result in loss of independence and high morbidity and mortality rates, increasing costs for the health system[15]. In view of this reality, the importance of implementing the preventive measures recommended by the WHO is emphazied[16].

General inhalation anesthesia and intravenous anesthesia were the most used in the elderly patients. This study questions whether general anesthesia can be detrimental to the elderly brain, since, not infrequently, elderly patients present deterioration of cognitive function postoperatively, which may lead to increased morbidity and mortality[17.] Spinal anesthesia, as well as other anesthetic modalities, has advantages over general anesthesia, such as: stable hemodynamic variables, less blood loss, less postoperative pain, faster recovery time and less postoperative confusion; howevere,the sympathetic block can cause hypotension, bradycardia and cardiac arrest[18].

The high number of surgical teams that used anesthesia in elderly patients, but who did not make any records in the Electronic Patient Record (PEP) was alarming. Although the quality of patient medical record keeping was not an objective of this study, it is important to emphasize the importance of this finding, since the PEP aims to contribute to the efficiency and quality of care, to integrate health organizations and to facilitate their management and research[19].The fact that there is no record in the patient medical records regarding the type of anesthesia used in certain surgical procedures is significant information due to the importance of this information for the planning and the implementation of perioperative care.

A death rate of 14.53% was found. A study evaluating mortality in elderly patients with hip fractures revealed a rate of 11.9% of deaths during hospitalization, related to comorbidities, infections during hospitalization and time between hospitalization and surgery for more than 7 days[20]. Surgery time and age were also higher in deaths that occurred in the intraoperative period, i.e., within the SC, reaffirming the risk of long surgeries, especially in older patients. Long procedures may serve as markers for complex cases.

Vascular surgeries had the highest amount of postoperative deaths, both in the hospitalization units and in the intensive care units followed by gastrointestinal surgery and neurosurgery, which are both complex surgical specialties.

Due to the increase of cardiovascular diseases in the study population, due to genetics and lifestlye habits incompatible with their underlying diseases, intraoperative and postoperative complications increase and, as a result mortality is also high[9].

CONCLUSION

The present study identified the main causes that lead elderly patients to need surgical procedures and that, in order to improve the service, it is important to understand the pattern of surgical care changes for this group of patients. The data presented here reinforce the need for new models of care, with a view to improving the multidisciplinary geriatric care in the preoperative care provided to the elderly. Improving the quality of the electronic medical record completion is also fundamental for new research. Specific electronic documents for anesthesia and immediate recovery can provide greater safety for the professional and for the patient, besides contributing to academic and research activities.

This study is limited due to the collection of retrospective data, the non-probabilistic sample and due to being performed in only onecontext. In addition, the results found here can not be generalized, and more studies on this theme should be performed with other methodological designs and other samples of elderly patients.

REFERENCES

1. Brasil. Ministério do Planejamento Orçamento e Gestão. Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional por Amostra de Domicílios. Rio de Janeiro: Ministério do Planejamento Orçamento e Gestão / Instituto Brasileiro de Geografia e Estatística; 2012.

2. Soares DS, de Mello LM, da Silva AS, Martinez EZ, Nunes AA. Fraturas de fêmur em idosos no Brasil: análise espaço-temporal de 2008 a 2012. Cad Saúde Pública. 2014;30(12):2669-78. http://dx.doi.org/10.1590/0102-311x00218113

3. Rohde G, Haugeberg G, Mengshoel AM, Moum T, Wahl AK. Two-year changes in quality of life in elderly patients with low-energy hip fractures: a case-control study. BMC Musculoskelet Disord [Internet]. 2010 [acessado em 26 mar. 2018];11:226. Disponível em: http://bmcmusculoskeletdisord.biomedcentral.com/articles/10.1186/1471-2474-11-226. https://doi.org/10.1186/1471-2474-11-226

4. Strobl R, Müller M, Emeny R, Peters A, Grill E. Distribution and determinants of functioning and disability in aged adults: results from the German KORA-Age study. BMC Public Health [Internet]. 2013 [acessado em 26 mar. 2018];13:137. Disponível em: http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-13-137. https://doi.org/10.1186/1471-2458-13-137

5. Santana RF, do Amaral DM, Pereira SK, Delphino TM, Cassiano KM. The occurrence of the delayed surgical recovery nursing diagnosis among adults and the elderly. Acta Paul Enferm. 2014;27(1):35-9. http://dx.doi.org/10.1590/1982-0194201400008

6. Sierink JC, de Castro SMM, Russell NS, Geenen MM, Steller EP, Vrouenraets BC. Treatment strategies in elderly breast cancer patients: Is there a need for surgery? Breast [Internet]. 2014 [acessado em 26 mar. 2018];23(6):793-8. Disponível em: http://www.ncbi.nlm.nih.gov/pubmed/25212636. https://doi.org/10.1016/j.breast.2014.08.006

7. Moug SJ, McCarthy K, Coode-Bate J, Stechman MJ, Hewitt J. Laparoscopic versus open surgery for colorectal cancer in the older person: a systematic review. Ann Med Surg [Internet]. 2015 [acessado em 26 mar. 2018];4(3):311-8. Disponível em: http://linkinghub.elsevier.com/retrieve/pii/S2049080115000795. https://doi.org/10.1016/j.amsu.2015.08.002

8. O'Lynnger TM, Zuckerman SL, Morone PJ, Dewan MC, Vasquez-Castellanos RA, Cheng JS. Trends for spine surgery for the elderly: implications for access to healthcare in North America. Neurosurgery [Internet]. 2015 [acessado em 26 mar. 2018];77(Supl. 1):S136-41. Disponível em: https://academic.oup.com/neurosurgery/article-lookup/doi/10.1227/NEU.0000000000000945. https://doi.org/10.1227/NEU.0000000000000945

9. Nathan H, Atoria CL, Bach PB, Elkin EB. Hospital volume, complications, and cost of cancer surgery in the elderly. J Clin Oncol [Internet]. 2015 [acessado em 26 mar. 2018];33(1):107-14. Disponível em: http://ascopubs.org/doi/10.1200/JCO.2014.57.7155. https://doi.org/10.1200/JCO.2014.57.7155

10. Mendoza IYQ, Grazziano ES. Promoção de práticas seguras no cuidado perioperatório do idoso. In: Grazziano SDE, Viana LD, Harada SCJDM, Pedreira GLDM, editores. Enfermagem perioperatória e cirurgia segura. São Caetano do Sul: Yendis; 2015. p. 219-235.

11. Cheng H, Chen BP-H, Soleas IM, Ferko NC, Cameron CG, Hinoul P. Prolonged operative duration increases risk of surgical site infections: a systematic review. Surg Infect (Larchmt) [Internet]. 2017 [acessado em 26 mar. 2018];18(6):722-35. Disponível em: http://www.ncbi.nlm.nih.gov/pubmed/28832271. https://doi.org/10.1089/sur.2017.089

12. de Freitas FAZ, Santos ES de S, Pereira LSM, Lustosa LP. Vulnerabilidade física de idosos na alta hospitalar. Fisioter e Pesqui [Internet]. 2017 [acessado em 28 mar. 2018];24(3):253-8. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1809-29502017000300253&lng=pt&tlng=pt. https://doi.org/10.1590/1809-2950/16205224032017

13. Barbon FJ, Wiethölter P, Flores RA. Alterações celulares no envelhecimento humano. J Oral Investig [Internet]. 2016 [acessado em 28 mar. 2018];5(1):61-5. Disponível em: http://www.bibliotekevirtual.org/index.php/2013-02-07-03-02-35/2013-02-07-03-03-11/2010-joi/v05n01/20634-alteracoes-celulares-no-envelhecimento-humano.html. http://dx.doi.org/10.18256/2238-510X/j.oralinvestigations.v5n1p61-65

14. Hernlund E, Svedbom A, Ivergård M, Compston J, Cooper C, Stenmark J, et al. Osteoporosis in the European Union: medical management, epidemiology and economic burden: a report prepared in collaboration with the International Osteoporosis Foundation (IOF) and the European Federation of Pharmaceutical Industry Associations (EFPIA). Arch Osteoporos. 2013;8:136. https://doi.org/10.1007/s11657-013-0136-1

15. Loures FB, Chaoubah A, de Oliveira VM, Almeida AM, Campos EM de S, de Paiva EP. Economic analysis of surgical treatment of hip fracture in older adults. Rev Saúde Pública. 2015;49:12. https://dx.doi.org/10.1590%2FS0034-8910.2015049005172

16. de Avila MAG, Pereira GJC, Bocchi SCM. Cuidadores informais de idosos em pós-operatório de cirurgia de fêmur proximal: prevenção de novas quedas. Ciên Saúde Colet [Internet]. 2015 [acessado em 30 mar. 2018];20(6):1901-7. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-81232015000601901&lng=pt&tlng=pt. http://dx.doi.org/10.1590/1413-81232015206.17202014

17. Purdon PL, Pavone KJ, Akeju O, Smith AC, Sampson AL, Lee J, et al. The ageing brain: age-dependent changes in the electroencephalogram during propofol and sevoflurane general anaesthesia. Br J Anaesth [Internet]. 2015 [acessado em 31 mar. 2018];115(Supl. 1):i46-57. Disponível em: http://www.ncbi.nlm.nih.gov/pubmed/26174300. https://doi.org/10.1093/bja/aev213

18. Mung'ayi V, Mbaya K, Sharif T, Kamya D. A randomized controlled trial comparing haemodynamic stability in elderly patients undergoing spinal anaesthesia at L5, S1 versus spinal anaesthesia at L3, 4 at a tertiary African hospital. Afr Health Sci [Internet]. 2015 [acessado em 31 mar. 2018];15(2):466-79. Disponível em: http://www.ncbi.nlm.nih.gov/pubmed/26124793. https://doi.org/10.4314/ahs.v15i2.21

19. Pinto MLR, Jorge MJ. A qualidade da informação do prontuário eletrônico do paciente: um estudo de caso sobre avaliação da inovação. Vita et Sanitas. 2014;(8):58-80.

20. Edelmuth SVCL, Sorio GN, Sprovieri FAA, Gali JC, Peron SF. Comorbidades, intercorrências clínicas e fatores associados à mortalidade em pacientes idosos internados por fratura de quadril. Rev Bras Ortop [Internet]. 2018 [acessado em 31 mar. 2018];53(5):543-51. Disponível em: https://www.sciencedirect.com/science/article/pii/S0102361617303958. https://doi.org/10.1016/j.rbo.2017.07.009

FACTORS ASSOCIATED WITH SKIN LESIONS RESULTING DURING THE INTRAOPERATIVE PERIOD

Fatores associados a lesões de pele decorrentes do período intraoperatório

Factores asociados a lesiones de piel resultantes del período intraoperatorio

Mayara Beatriz Gonçalo Bezerra[1], Mayana Camila Barbosa Galvão[2], José Cristovam Martins Vieira[3], Marcella Gomes dos Santos Lopes[4], Aracele Tenório de Almeida e Cavalcanti[5], Eduardo Tavares Gomes[6]

ABSTRACT: Objective: To evaluate the occurrence of skin lesions in the intraoperative period due to surgical procedures performed at a large university hospital. **Method:** A cross-sectional, descriptive study with a quantitative approach, performed at a university hospital in Recife, Pernambuco, Brazil. The sample consisted of 154 patients undergoing elective surgeries between January and April 2018. They were evaluated in the pre and postoperative periods, through the application of the Risk Assessment Scale for the Development of Injuries due to Surgical Positioning (ELPO), during the intraoperative period. Data were collected at the preoperative visit and on the first postoperative day. **Results:** Of the 154 patients evaluated, seven presented 11 skin lesions, such as stage I, stage II and abrasion lesions, predominantly in the gluteus and thorax. The variables length of the surgical procedure, type of anesthesia and comorbidities were the main factors associated with the occurrence of lesions. **Conclusion:** Among patients who presented skin lesions due to surgical positioning, most were classified by the ELPO as high risk, which suggests that this is a suitable scale for assessing the risk of skin lesions in surgical patients.
Keywords: Perioperative nursing. Skin. Pressure ulcer. Operative surgical procedures.

RESUMO: Objetivo: Avaliar a ocorrência de lesões de pele no período intraoperatório decorrentes de procedimentos cirúrgicos realizados em um hospital universitário de grande porte. **Método:** Estudo transversal, descritivo, com abordagem quantitativa, realizado em um hospital universitário do Recife, Pernambuco, Brasil. A amostra foi constituída de 154 pacientes submetidos a cirurgias eletivas entre os meses de janeiro e abril de 2018, avaliados nos períodos pré e pós-operatório, por meio da aplicação da Escala de Avaliação de Risco para o Desenvolvimento de Lesões Decorrentes do Posicionamento Cirúrgico (ELPO), no intraoperatório. A coleta de dados ocorreu na visita pré-operatória e no primeiro dia de pós-operatório. **Resultados:** Dos 154 pacientes avaliados, sete apresentaram 11 lesões de pele, como lesões por pressão estágio I, estágio II e abrasão, predominantemente no glúteo e no tórax. As variáveis tempo do procedimento cirúrgico, tipo de anestesia e comorbidades foram os principais fatores de associados à ocorrência das lesões. **Conclusão:** Entre os pacientes que apresentaram lesões de pele devido ao posicionamento cirúrgico, a maioria foi classificada pela ELPO como alto risco, o que leva a crer que se trata de uma escala adequada para avaliação de risco de lesões de pele em pacientes cirúrgicos.
Palavras-chave: Enfermagem perioperatória. Pele. Lesão por pressão. Procedimentos cirúrgicos operatórios.

RESUMEN: Objetivo: Evaluar la ocurrencia de lesiones de piel en el período intraoperatorio resultantes de procedimientos quirúrgicos realizados en un hospital universitario de gran porte. **Método:** Estudio transversal, descriptivo, con abordaje cuantitativo, realizado en un hospital universitario de Recife, Pernambuco, Brasil. La muestra fue constituida de 154 pacientes sometidos a cirugías electivas entre los meses de enero y abril de 2018, valuados en los períodos pre y postoperatorio, por medio de la aplicación de la Escala de Evaluación de Riesgo para el Desarrollo de Lesiones Debidas al Posicionamiento Quirúrgico (ELPO), en el intraoperatorio. La recolección de datos ocurrió en la visita preoperatoria y en el primer día de postoperatorio. **Resultados:** De los 154 pacientes evaluados, siete presentaron 11 lesiones de piel, como lesiones por presión estadio I, II y abrasión, predominantemente en el glúteo y en el tórax. Las variables tiempo del procedimiento quirúrgico, tipo de anestesia y comorbilidades fueron los principales factores de asociados a la ocurrencia de las lesiones. **Conclusión:** Entre los pacientes que representaron lesiones de piel debido al posicionamiento quirúrgico, la mayoría fue clasificada por ELPO como alto riesgo, lo que lleva a creer que se trata de una escala adecuada para la evaluación del riesgo de lesiones de piel en pacientes quirúrgicos.
Palablas clave: Enfermería perioperatoria. Piel. Úlcera por presión. Procedimientos quirúrgicos operativos.

[1]Nurse; Specialist in surgical nursing from the nursing residency program of the Hospital das Clínicas da Universidade Federal de Pernambuco (HC/UFPE) – Recife (PE), Brazil.
[2]Nurse; Master's in Nursing from the UFRN. Director of the Nursing residency program at HC/UFPE – Recife (PE), Brazil.
[3]Stoma therapy nurse undergraduate degree from the Universidade de São Paulo (USP); Master's in Nursing from the Universidade Federal de Santa Catarina (UFSC). Professor in the Nursing Department of UFPE – Recife (PE), Brazil.
[4]Nurse; Master's in Hebiatria from the Universidade de Pernambuco (UPE); specialist in surgical nursing. Director of the Nursing residency program at HC/UFPE – Recife (PE), Brazil.
[5]Nurse; Master's and doctoral candidate in Health Sciences from UPE. Director of the Nursing residency program at HC/UFPE – Recife (PE), Brazil.
[6]Doctoral candidate in Sciences through the graduate program in adult health nursing at the School of Nursing of USP. Director of the Nursing residency program at HC/UFPE – Recife (PE), Brazil.
*Corresponding author: edutgs@hotmail.com
Received: 07/18/2018 – Approved: 05/04/2019
DOI: 10.5327/Z1414-4425201900020005

INTRODUCTION

The surgical environment is considered to be a place of risk for iatrogenic diseases, due to the characteristics of care provided, the diversity of surgical procedures and diagnoses, as well as the intense circulation of health professionals, making it one of the units of the hospital where adverse events (AE) are most frequent, and are preventable in up to 43% of cases[1,2].

AEs are injuries or lesions originating from care that results in temporary or permanent disability or dysfunction, and even in death among patients[3].

Among the AE that happen in the perioperative period, complications that occur due to surgical positioning include: musculoskeletal pain, joint displacement, peripheral nerve damage, skin lesions (SL), cardiovascular and pulmonary involvement, and compartment syndrome[4]. Intraoperative SL can range from an erythema, which compromises skin integrity, to extensive lesions such as burns caused by an electric scalpel and accessories, or even friction or shear legions, as a result of surgical exposure without proper prevention care in positioning. Regardless of the position of the patient, bony prominences and high-pressure areas should be protected[5].

Recent studies have highlighted several risk factors associated with SL in surgical patients, and such factors are divided into two groups: intrinsic, such as age, body weight, nutritional status and chronic diseases like diabetes mellitus, vasculopathies, neuropathies, hypertension and anemia; and extrinsic, for example, type and length of surgery, anesthesia, surgical position and positioning. The intensity of these factors and the duration of the anesthetic-surgical procedure show a greater or lesser risk of developing SL, which can be observed after the procedure is completed and can be strengthened rapidly. The most common sites for the development of SL through surgical positioning are: the sacral region, the calcaneus, the mandibular region and the trochanters[5,6].

In order to adequately and safely position the surgical patient on the operating table, it is imperative that the nurse at the surgical center (SC) be aware of the anatomical and physiological changes resulting from the surgical positioning on the body, as well as the equipment and devices available to assist in the execution of the procedure. In this way, he or she will reduce the rate of SL in patients undergoing anesthetic-surgical procedures[7,8].

Thus, it is essential that all members of the surgical team understand the risk factors related to the occurrence of SL in the perioperative period and that they effectively apply SL prevention protocols in the SC, thus responding to the real needs of the surgical patient during perioperative care[9-11].

Faced with the multifactorial etiology of surgical lesions, all patients who undergo some surgical intervention should be systematically evaluated during the perioperative period in order to identify risks and to prepare an individualized care plan that guarantees quality perioperative care[4-6].

OBJECTIVE

To evaluate the occurrence of SL in the intraoperative period due to surgical procedures performed at a large university hospital.

METHOD

This is a cross-sectional, descriptive study with a quantitative approach, developed in the SC unit and in the surgical wards of a large university hospital in the Northeast of Brazil. The SC is composed of ten operating rooms, and the surgical procedures occur according to the distribution map, which shows the rooms for each specialty. Between 350 and 400 elective surgeries per month are performed, which includes 14 surgical specialties and highly complex surgeries such as cardiac, thoracic, neurological, oncological and transplantation surgeries.

The population consisted of patients undergoing surgery during the collection period, including those who were older than 18 years old and who were not being included in emergency surgeries or reoperations. The exclusion criteria were patients with a cognitive deficit, a hospital discharge less than 24 hours after the end of surgery, and a referral to the intensive care unit after their anesthesia-surgical procedure.

The sample was obtained for convenience. To estimate the sample size, a calculation was used to estimate means, considering the quantitative variable risk score as the main outcome, as measured by the Risk Assessment Scale for the Development of Injuries due to Surgical Positioning (ELPO), the principal outcome of the study. A standard deviation (SD) of 3.84 was considered; extracted from the ELPO scale-study

study[7], a maximum error was estimated at 0.5 points and a significance level for the statistical tests was 5%. Thus, for the monthly average of 370 surgeries/month in the previous year and the collection period of three months, the calculated sample was 189 patients. In total, 227 patients were approached, of which 154 fulfilled the inclusion criteria. There was a loss of 73 patients, of whom 43 were discharged before 24 hours, 12 had surgeries that were canceled/suspended, 7 patients were unable to perform verbal communication due to orotracheal intubation, 6 had some type of cognitive limitation or were using sedatives, and 5 did not agree to participate in the study.

The data collection was performed in two moments. In the immediate preoperative period, the patients were identified at the preoperative visit, invited to participate in the study and informed about the study protocol. After the patient agreed to participate in the research, an Informed Consent Form was given to them with all of the information and specifics about the study. The sociodemographic and clinical data and an assessment of the hospitalized patient's skin conditions were collected in the surgical infirmary of the patient's origin, using a specific instrument to record the observations.

On the first postoperative day, the second evaluations were performed in a new visit to the patient in the surgical infirmary of origin, from 24 to 48 hours after the anesthetic-surgical procedure. This was done by inspecting the skin's condition in order to verify if the development of SL had occurred, and thus filling out the collection instrument. The surgical data (procedure performed, surgical positioning, surgical time, type of anesthesia, classification by the American Society of Anesthesiologists - ASA, location of the scalpel plate, complications, use of blood products, skin preparation, use of adhesive tapes on the skin and trichotomy) were obtained from the patient's chart, the intraoperative record (completed by the anesthesiologist), the description of the surgical procedure (filled out by the surgeon) and the perioperative nursing record (completed by the nursing team). The postoperative data were not collected in the post-anesthetic recovery room due to the patients' difficulties with communication and mobilization.

The ELPO was used to evaluate the risk score and to evaluate the factors associated with the lesion. The ELPO was created and validated in Brazil in 2013, in order to evaluate the risk for the development of tegumentary lesions (pressure lesions), neurological lesions (nerve lesions) and pain unrelated to surgical incision[7].

The scale contains seven items: type of surgical positioning, length of surgery, type of anesthesia, support surface, limb position, comorbidities and age of the patient. A score of 20 was the cut-off point to differentiate the patients classified by the ELPO, that is, a patient with a score of up to 19 points was classified with a lower risk for the development of lesions resulting from the surgical positioning, and a patient with a score of 20 or more was classified with a greater risk. This classification established which patients were at greater risk and, consequently, which perioperative team should be more cautious during the execution of the positioning, in order to prevent complications associated with the surgical procedure[7].

In order to evaluate the SL identified in the postoperative period, the National Pressure Ulcer Advisory Panel (NPUAP) was adopted and culturally adapted for Brazil for SL, but other injuries were included, such as abrasion[12].

The data were tabulated in Microsoft Excel and analyzed using the free software, Statistical Package for the Social Sciences (SPSS). Descriptive statistics (absolute and relative frequencies, averages, and DP) were used. Student's *t* test was used for data analysis in order to compare independent sample means. Data regarding ELPO variables, according to the presence or absence of SL in the intraoperative period, were analyzed by Student's *t* test.

The research was elaborated based on the ethical precepts of Resolution 466/2012 of the National Health Council, which was initiated after approval by the Research Ethics Committee of the hospital, under report No. 2,045,355.

RESULTS

Of the patients who participated in the study (n=154), the majority (n=102/66.2%) were of the feminine sex; had an average of age of 51.8±15.4 years, 37% (n=57) were elderly; 21.4% (n=33) were retired. Of the 154 patients, 23.3% (n=36) were from the capital city, 37% (n=57) lived in the metropolitan region, 33.7% (n=52) lived in the countryside and 5.8% (n=9) were from another northeastern state. Most had already previously undergone a surgery (n=108/70.1%).

Of the patients evaluated, 53.9% (n = 83) had systemic arterial hypertension as a comorbity, followed by diabetes mellitus (n = 26 / 16.8%), alcoholism (n = 28/18.2%) and smoking n = (27/17.5%). With regard to body mass index (BMI), the mean was 26.7 kg/m^2, and ranged from 16.7 to

51 kg/ m², and 21.1% (n = 31) of the patients presented patterns of obesity.

In relation to physical limitations, 14 (9%) patients needed ambulatory help, 8 (5.1%) reported having some type of movement limitation due to being overweight, 8 (5.1%) patients were bedridden and 1 (0.6%) had paraplegia.

The evaluation of skin conditions in the preoperative period revealed that 147 (95.5%) patients had no cutaneous lesions in this period, however, 7 (4.5%) were admitted to the SC with some type of SL, including: a diabetic foot/vascular lesion on the foot/leg (37.5%), abrasions (12.5%), a psoriasis dermatological disease (12.5%), a keloid (25%) and a soft tissue infection(12.5%).

The most frequent surgical specialty was general surgery (n = 47/30.5%), followed by gynecology (n=44/28.5%) and urology (n=34/22%). The most performed surgeries were exploratory laparotomy and enlarged total hysterectomy, both with 19 patients (12.3%) each, followed by videolaparoscopic cholecystectomy (n=11/7.14%).

It was verified, according to the ELPO, that 72 (46.7%) anesthetic-surgical procedures performed lasted between 2 to 4 hours, and 7 (4.6%) procedures lasted more than 6 hours (Table 1).

It was observed that 39.7% (n = 61) of the procedures used regional anesthesia and 68.2% (n=105) adopted the surgical position of dorsal decubitus; and in all procedures (n = 154/100%) the standard operating table (MOP) with foam mattress and cotton-field cushions were used as support surfaces for patients (Table 1). Regarding the position of the limbs (upper and lower), it was found that in 110 (71.4%) evaluated procedures, the opening of the upper limbs was less than 90° (Table 1).

From the surgical procedures, it was observed that 88.3% (n=136) used electrocautery (an electric scalpel), and the plate was placed mainly in the calf (n=65/42.2%), in the vastus lateralis of the thigh (n=51/33.1%) and in the posterior thorax (n=15/9.7%).

With regard to intraoperative complications, only 8 (5.1%) cases were identified: hypotension, hypertension, severe bleeding, hypoxemia, hypoglycemia, hyperglycemia and oliguria.

In more than half of the patients (n=92/59.7%) no trichotomy was performed; 43 (27.9%) reported having performed the trichotomy more than 2 hours before the anesthetic-surgical procedure and 19 (12.4%) performed the trichotomy within 2 hours of the surgery.

The results of the ELPO score in the intraoperative period showed a mean score of 18.33 ± 3.02, a median of 19 points, a minimum score of 11 and a maximum score of 27 points. The majority of patients evaluated (n=103/66.9%) had a low risk of developing SL in the intraoperative period, according to ELPO (≤20 points). Only 7 (4.5%) patients had SL at the end of the anesthetic-surgical procedure, and 4(57.1%) presented more than one lesion, thus totaling 11 recorded lesions. Table 2 presents the recorded cases of intraoperative SL.

The main specialty to have SL was orthopedic surgery (n=4/57.1%). The most adopted position for SL patients was dorsal decubitus (n=3/42.8%), followed by the left lateral

Table 1. Distribution of patients undergoing elective surgeries (n = 154), according to variables present in the Risk Assessment Scale for the Development of Injuries due to Surgical Positioning.

Variables	n	%
Length of surgery (hours)		
Up to 2	59	38.3
Between 2 and 4	72	46.7
Between 4 and 6	16	10.4
Above 4	7	4.6
Type of Anesthesia		
Local	1	0.6
Sedation	1	0.6
Regional	61	39.7
General	60	39.0
General + regional	31	20.1
Type of surgical position		
Supine	105	68.2
Lateral	13	8.4
Trendelenburg	0	0.0
Prone	3	2.0
Lithotomic	33	21.4
Type of support		
Foam mattress + cushions with cotton pads	154	100.0
Surgical positioning of the limbs		
Anatomical position	1	0.65
Opening of the upper limbs <90°	110	71.4
Elevation of the knees <90° and opening of the lower limbs <90° or neck without chin-sternal alignment	40	26.0
Elevation of the knees >90° or opening of the lower limbs >90°	3	2.0

decubitus position and the ventral decubitus position, both with 2 (28.6%) patients each. The most prevalent type of anesthetic procedure was general anesthesia and the combined form (general + regional), each had 3 patients (42.8%), and only 1 (14.3%) patient underwent regional anesthesia. With regard to the ASA classification, 4 (57.1%) were classified as ASA II, 2 (28.6%) ASA III and 1 (14.3%) ASA I. Table 3 lists the characterizations of SL and their frequencies, found in this study sample.

On the first postoperative day, of the 7 patients presenting SL, 5 (71.4%) had pain that was not related to the surgical procedure, but rather, due to SL caused during the intraoperative period. The pain intensity at the lesion site was evaluated according to the patient's report score and ranged from 1 to 8, with a higher frequency of score 1, reported by 2 patients, followed by scores of 3 to 8, reported by 1 patient.

Regarding the ELPO score, it ranged from 17 to 26 points, showing a mean score of 21.71 ± 2.69 in the patients presenting SL in the intraoperative period. It should be noted that the majority of patients assessed who presented SL (n = 6/85.71%) were classified by the ELPO as high risk (Table 3).

Patients who presented SL in the intraoperative period had a mean of 21.7 ± 2.7 on the ELPO scale. On the other hand, patients who did not present SL had an average of 18.21 ± 3.0.

Table 4 shows that patients with lesions presented worse results (higher scores) in the domains of length of surgery, type of anesthesia, and comorbidities, and the difference was not significant for age, position of the limbs, and type

Table 2. Characterization of patients with skin lesions resulting from the intraoperative period.

Case	Sex	Age	BMI	Comorbidities	Physical limitations
1	Female	57	44	DM/SAH/CA/obesity	None
2	Male	37	17.9	CA/malnutrition	None
3	Female	67	24.5	SAH	Walking with help
4	Female	60	20.8	No comorbidities	None
5	Male	43	22.2	No comorbidities	Bedridden
6	Male	52	25.4	No comorbidities	None
7	Male	50	31	DM/SAH/VD/obesity	None

BMI: Body mass Index; DM: diabetes mellitus; SAH: Systemic arterial hypertension; CA: cancer; VD: Vascular disease.

Table 3. Clinical characterization. type and location of the lesions. scoring and classification of the Risk Assessment Scale for the Development of Injuries due to Surgical Positioning that presented skin lesions in the intra-operative period (n = 7).

Case	Surgery Performed	Scalpel Plate Site	Type of Position	Length (in hours)	Type of anesthesia	ASA	Type of skin lesion	Skin lesion site	Pain*	ELPO
1	Colectomy	Thigh	Dorsal	4	Combined	II	Supra Pubic region/ Perichannel	Abrasion/PL II	04	21
2	Cholecystectomy	Calf	Dorsal	9	Combined	II	Gluteus L/RLL	PL II/abrasion	05	22
3	Knee arthroplasty	Back	Dorsal	3	Spinal	II	Sacrum Coccigea	PL I	01	18
4	Nephrectomy	Thigh	Lateral	4.3	Combined	II	Gluteus D	PL I	01	21
5	Hip arthrodesis	Gluteus	Lateral	8	General	II I	Dorsal/thorax	Abrasion/ Abrasion	03	21
6	Lumbar decompression	Thigh	Ventral	5.5	General	I	Zygomatic Region	PL I	07	22
7	Review of Cervical Arthrodesis	Thigh	Ventral	8	General	II I	Bilateral thorax	PL I/PLII	08	27

ASA: Clinical condition and anesthetic risk of the patient according to the American Society of Anesthesiology Classification; *Pain scale at the site of the skin lesion; ELPO: Risk Assessment Scale for the Development of Injuries due to Surgical Positioning; Combined Anesthesia: General + regional; L: Left; RLL: Right lower limb; PL: Pressure lesion.

of surgical position. The surgical surface was the same in both groups, since in the hospital there is only one type of mattress for the operating tables and there are no gel pads, or viscoelastic pads. Sheets with cushions for positioning were used.

DISCUSSION

Nursing care that is dedicated to patients during the intraoperative period will reflect in the postoperative period, since many SL begin in the operating room and intensify in the postoperative phase. Surgical patients are the first candidates for tissue ischemia due to decreased capillary flow, prolonged immobility and pressure in the surgical procedure, giving the patient greater pressure intolerance. Therefore, it is essential to maintain the cutaneous integrity of each patient, requiring the nurse to become familiar with the proper technical and scientific knowledge[9-13].

Studies describe that there is an association between the development of LP due to surgical positioning and the various risk factors related to the occurrence of these lesions, especially the intrinsic factors such as age, body weight, nutritional status, chronic diseases (diabetes mellitus, neuropathies, arterial hypertension and anemia), and extrinsic factors such as type and length of surgery, type of anesthesia, surgical positions adopted and resources and measures used for protection[6-14].

The prevalence of women (66.2%) undergoing elective surgeries remained equivalent, when compared to other studies[7-15]. As for age group, most patients were adults (63%). Elderly people have a higher risk of perioperative complications, and an even greater risk of developing SL in the intraoperative period, when compared to adults, because they have lower skin thickness, decreased muscle mass and subcutaneous fat on their bone prominences, leaving them more susceptible to pressure and, consequently, to the occurrence of tissue damage[14-16].

In addition to age, the presence of comorbidities such as diabetes mellitus, vasculopathies, neuropathies and arterial hypertension is a risk factor for the occurrence of perioperative lesions because of positioning, since such pathologies compromise tissue perfusion[6-8,14-17]. Hypertension and diabetes, both entities found in a significant proportion of the sample, are the comorbidities responsible for increasing the risk of SL[8-18].

Regarding nutritional status, being underweight and overweight, which is indicated by BMI, are also risk factors associated with the appearance of lesions[17]. Patients who are overweight and obese present little vascularity of the fatty tissue, leading to more time-consuming surgical procedures, a greater likelihood of trauma on the operated tissue, and difficulty performing adequate hemostasis. On the other hand, being underweight results in a marked exposure of bone prominences, leaving patients more susceptible to the occurrence of SL due to surgical positioning[4-14].

The devices used to decrease the pressure interfaces during the anesthetic-surgical procedure can be classified as static and dynamic. Static devices include foam and gel mattresses, dry viscoelastic gel and polymer mattress covers, air or fluid mattresses, and foam and gel pads. The dynamic devices include micropulsing air mattresses[19]. The service

Table 4. Data referring to the variables of the Risk Assessment Scale for the Development of Injuries due to Surgical Positioning, according to the presence or absence of skin lesions during the intraoperative period.

ELPO	No skin lesion (n=147) average±SD	Skin lesion (n=7) average±SD	p*
ELPO Variable			
Type of surgical position	2.02±1.66	1.63 ±1.41	0.465
Length of surgery	2.69±0.86	4.75±1.17	0.001
Type of anesthesia	3.73±0.78	4.63±0.52	0.002
Support surface	4±0.00	4±0.00	**
Position of limbs	2.29±0.51	2.25±0.46	0.52
Comorbidities	2.25±1.35	3.37±1.06	0.02
Age	2.25±1.31	2.12±0.83	0.649
ELPO Score	18.21±3.05	21.75±2.69	0.06

ELPO: Risk Assessment Scale for the Development of Injuries due to Surgical Positioning; SD: standard deviation; *Student's *t* test; **they all used the same surface.

does not yet have these features, taking only the traditional mattress and improvising cushions with cotton fabric pads.

An important finding that deserves to be highlighted is related to the lack of lesions (burns) from electric scalpel plates (electrocautery) in the patients evaluated. It is known that the risk for burns is mainly associated with an improper placement of the electrocautery plate and inadequate electrical installation[9]. However, only disposable adhesive plates are used and the scalpels have a safety system, which prevents their use if the plate has not been connected or if it is out of use[19].

The length of surgery evidenced in this research, lasting more than 2 hours, is also cited as one of the risk factors for injury, since long periods of immobilization and exposure to pressure cause anoxia, tissue necrosis, and consequently SL[6-9].

Prolonged immobility of the patient on the surgical table decreases the volume of pulmonary capillary blood flow, thereby limiting lung expansion because of the position pressure on the ribs and the ability of the diaphragm to force abdominal contents down.[17]

Another intraoperative risk factor is the type of anesthesia, which influences the degree of depression of the nervous system, in which peripheral vasodilation occurs, resulting in hypotension and decreased venous return, pain receptor depression. This causes the defense mechanisms of the patient to offer less protection against pressure, leaving them susceptible to perioperative lesions due to positioning[17-20].

The supine position was the most common surgical position (68.2%), which corroborates Lopes' study, in which, of the 115 surgical procedures, 83 (72.2%) were performed in the supine or prone position[16]. In another study, performed with surgical patients in a hospital in Triângulo Mineiro, Minas Gerais, the supine position was adopted in 50% of patients[9].

In another national study, in 251 (90.3%) anesthetic-surgical procedures, the foam surgical table mattress (conventional) and improvised cushions with cotton pads were used. Another study showed that the surgical foam mattress and the cushions made from cotton pads were used in 69 (60%) surgeries[16].

Support surfaces are specialized devices, overlays, mattresses or integrated systems fabricated for pressure redistribution, shear control or frictional forces on the fabric, maintenance of the microclimate or other therapeutic functions and shall be chosen according to the particular needs of the patient and type of surgery. They aim to avoid friction, preventing SL, compression or neuromuscular stretching, contact with metal from the table, which can cause burns (due to the use of an electric scalpel) and other injuries[21,22]. However, these areas of support are little used in surgical patients, since the political, economic and social issues faced by health in the country do not allow for many public services to have these types of technological resources, interfering directly in the prevention of injuries[9-20].

The surgeries were performed in the same type of standard operating table, with the same improvised cushions with cotton pads. The electric scalpel apparatuses (electrocautery) were always of the same make and model, with the same type of disposable plate. Therefore, there were no differences between the material used in the surgeries. There were also no differences in the preparation of the skin, as all of the surgeries followed the same institutional protocol.

Other studies presented a disagreement, since the incidence of SL was quite high, as pointed out in studies carried out in the state of São Paulo, which showed incidences of perioperative lesions because of positioning of 20.6 and 20.9%, respectively[6,18]. In the state of Minas Gerais, research identified incidence rates in which 21.7 and 74% of the patients presented SL at the end of the surgical procedure[7,9]. As noted, the incidence of perioperative lesions resulting from positioning remains high because of the absence of preventive measures to avoid such lesions. The lack of compliance or verification of norms and/or clinical guidelines protocols was the main contributing factor.[3-20]

In a study of patients submitted to robotic urologic surgeries, the authors report an incidence of zero, detected in the immediate postoperative period. This incidence rate is justified by the effectiveness of the institutional protocol for the prevention of SL in SC[11]. This result demonstrates that training with a simulation of the interdisciplinary and multi-professional team, as well as the implementation of prevention strategies and protocols, are essential to guarantee the effectiveness of patient safety in the surgical environment.

When analyzing the pain score in patients who presented SL after the anesthetic-surgical procedure, all reported having pain that was not related to the surgical incision, but to the SL site occasioned in the intraoperative period. Patients with a higher ELPO score are more likely to present postoperative pain due to surgical positioning[16].

The studies on perioperative lesions in the surgical patient indicate that stage I lesions are the most frequent, and this data is corroborated by the present research, in which 34% of the lesions were classified in LP stage I[6-8,13-18]. In addition, research indicates that most of these lesions evolve to resolution, indicating post-operative care as being decisive for the improvement of the lesion[13-18].

In spite of other studies that found that the sacral and calcaneal regions were the most affected in the intraoperative period of the investigated patients, in our sample the main sites were the thorax and the gluteal region[6-9,15].

When we analyzed the means of the ELPO scores in the patients who did not present SL versus those who presented them, there was a difference of almost 4 points between the groups, close to the study of Lopes, which presented a difference of almost 5 points between the means of the ELPO in the two statistically significant ($p < 0.001$) groups[16]. Although this difference was not significant ($p = 0.06$), it was found that patients with lesions had higher ELPO scores and, in addition, 85.7% of patients with lesions presented an ELPO score greater than 20 points, corroborating the inference that elevated ELPO scores are associated with a higher incidence of perioperative SL.

Regarding ELPO scores and the occurrence of lesions, Lopes et al. identified the association of ELPO scores with the development of perioperative lesions because of positioning, showing that each additional point in which the subject is classified in the scale increases the probability of developing SL by 44%[7]. In the present study, 66.9% of the patients obtained an ELPO classification at a low risk of developing perioperative lesions, corroborating the study by Lopes et al., in which the majority of the patients (53.2%) obtained an ELPO score of 19 points, or were classified as low risk for developing SL due to surgical positioning[7]. In another population, 56.5% of the patients had a higher risk of developing perioperative lesions, according to the ELPO[15]. When we analyzed the only seven patients who presented SL in the intraoperative period, in relation to the classification of risk of the ELPO, six of them obtained a high risk for the development of this type of lesion.

Using the Student's *t* test for comparison between the means of the ELPO variable scores, significance was found in the domains of length of surgery, type of anesthesia and comorbidities. This refers to the issues directly related to the risk factors for the occurrence of both intrinsic and extrinsic perioperative lesions, demonstrated in this study.

Thus, the identification of risk and the occurrence of injuries, together with the associated factors, can generate evidence for the development of strategies and for the implementation of effective actions that help and guide the multidisciplinary team in the detection of patients at a higher risk for the development of lesions, favoring the prevention of complications in clinical practice or in solving these complications in a timely manner.

The nursing team should be attentive at the time of the surgical positioning, check to see if there are folds in the sheets, if all of the protective resources have been placed properly, and if the positioning accessories available at the institution are being utilized[18].

Because of limitations of this study, the evaluation of neuromuscular lesions was not considered, because it is not part of the objective of the study. However, this type of lesion is also considered to be a perioperative lesion, and it is an important variable to be evaluated in future studies. Further research on the subject is suggested, in which sampling is more representative.

CONCLUSION

In view of the results obtained, it was possible to conclude that, in the intraoperative period, of the 154 patients in the study, 7 (4.5%) presented some type of SL, classified in stage I, stage II and abrasions. Of these, 6 patients had an ELPO score of greater than 20 points. Regarding the risk of developing SL in the intraoperative period, 66.9% of the patients had an ELPO score that was classified as low-risk.

In this study, it was demonstrated that the following variables were the main risk factors for the appearance of LP in the intraoperative period in patients undergoing elective surgery in the studied hospital, as identified through the ELPO scale: length of the surgical procedure, type of anesthesia and comorbidities.

REFERENCES

1. Croteau RJ. Wrong-site surgery in surgical patient safety: essential Information for surgeons in today's environment. Chicago: American College of Surgeons; 2004.

2. Souza LP, Bezerra ALQ, Silva AEBC, Carneiro FS, Paranaguá TTB, Lemos LF. Eventos adversos: instrumento de avaliação do desempenho em Centro Cirúrgico de um hospital universitário. Rev Enferm UERJ. 2011;19(1):127-33.

3. Mendes W, Pavão ALB, Martins M, Moura MLO, Travassos C. Características de eventos adversos evitáveis em hospitais do Rio de Janeiro. Rev Assoc Med Bras. 2013;59(5):421-8. http://dx.doi.org/10.1016/j.ramb.2013.03.002

4. Lopes CMM, Galvão CM. Posicionamento cirúrgico: evidências para o cuidado de enfermagem. Rev Latino-Am Enferm. 2010;18(2):287-94. http://dx.doi.org/10.1590/S0104-11692010000200021

5. Spruce L. Back to basics: preventing perioperative pressure injuries. AORN J. 2017;105(1):92-9. https://doi.org/10.1016/j.aorn.2016.10.018

6. Scarlatti KC, Michel JLM, Gamba MA, Gutiérrez MGR. Pressure ulcers in surgery patients: incidence and associated factors. Rev Esc Enferm USP. 2011;45(6):1372-9. http://dx.doi.org/10.1590/S0080-62342011000600014

7. Lopes CMM, Haas VJ, Dantas RAS, Oliveira CG, Galvão CM. Assessment scale of risk for surgical positioning injuries. Rev Latino-Am Enferm. 2016;24:e2704. http://dx.doi.org/10.1590/1518-8345.0644.2704

8. Saraiva IL, Paula MFC, Carvalho R. Úlcera por pressão no período transoperatório: ocorrência e fatores associados. Rev SOBECC. 2014;19(4):207-13. https://doi.org/10.5327/Z1414-4425201400040006

9. Barbosa MH, Oliva AMB, Sousa Neto AL. Ocorrência de lesões perioperatórias por posicionamento cirúrgico. Rev Cubana Enfer. 2011;27(1):31-41.

10. Matos FGOA, Piccoli M. Diagnóstico de enfermagem Risco para Lesão Perioperatória por Posicionamento identificado no período transoperatório. Rev Ciênc Cuid Saúde. 2004;3(2):195-201. http://dx.doi.org/10.4025/cienccuidsaude.v3i2.5426

11. Angelo CS, Pachioni CFM, Joaquim EHG, Silva EAL, Santos GG, Bonfim IM, et al. Efetividade do protocolo prevenção de lesões de pele em cirurgias urológicas robóticas. Rev SOBECC. 2017;22(3):152-60. https://doi.org/10.5327/Z1414-4425201700030006

12. National Pressure Ulcer Advisory Panel. Announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Washington, D.C.: National Pressure Ulcer Advisory Panel; 2016.

13. Cruz EA, Soares E. O centro cirúrgico como espaço do cuidado na relação enfermeira/ paciente. Rev SOBECC. 2004;9(2):11-6.

14. 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. 2013;26(1):12-6.

15. Peixoto CA. Ocorrência de lesões perioperatórias por posicionamento e fatores associados [dissertação]. Uberaba: Universidade Federal do Triangulo Mineiro; 2017.

16. Lopes CMM. Escala de avaliação de risco para o desenvolvimento de lesões decorrentes do posicionamento cirúrgico: construção e validação [tese]. Ribeirão Preto: Escola de Enfermagem de Ribeirão Preto, Universidade de São Paulo; 2013.

17. Miranda AB, Fogaça AR, Rizzetto M, Lopes LCC. Posicionamento cirúrgico: cuidados de enfermagem no transoperatório. Rev SOBECC. 2016;21(1):52-8. https://doi.org/10.5327/Z1414-4425201600010008

18. Carneiro GA, Leite RCBO. Lesões de pele no intra-operatório de cirurgia cardíaca: incidência e caracterização. Rev Esc Enferm USP. 2011;45(3):611-6. http://dx.doi.org/10.1590/S0080-62342011000300009

19. Ursi ES, Gavão CM. Prevenção de lesões de pele no perioperatório: revisão integrativa da literatura. Rev Latino-am Enferm. 2006;14(1):124-31. http://dx.doi.org/10.1590/S0104-11692006000100017

20. de Oliveira KF, Nascimento KG, Nicolussi AC, Chavaglia SRR, de Araújo CA, Barbosa MH. Support surfaces in the prevention of pressure ulcers in surgical patients: an integrative review. Int J Nurs Pract. 2017;23(4). https://doi.org/10.1111/ijn.12553

21. Grigoleto ARL, Avelar MCQ, Lacerda RA, Mendonça SHF. Complicações decorrentes do posicionamento cirúrgico de clientes idosos submetidos à cirurgia de quadril. Rev Esc Anna Nery. 2011;15(3):531-5. http://dx.doi.org/10.1590/S1414-81452011000300013

22. Association of periOperative Room Nurses. Proposed recommended practices for safe care through identification of potential hazards in the surgical environment. AORN J. 1995;62(3):455-61.

PREVALENCE, INTENSITY AND DISCOMFORT OF THIRST IN SURGICAL PATIENTS IN THE IMMEDIATE POST-OPERATIVE PERIOD

Prevalência, intensidade e desconforto da sede no paciente cirúrgico no pós-operatório imediato

Prevalencia, intensidad y desconforto de la sed en el paciente quirúrgico en el post-operatorio inmediato

Leonel Alves do Nascimento[1]*, Thammy Gonçalves Nakaya[2], Marilia Ferrari Conchon[3], Aline Korki Arrabal Garcia[2], Isadora Pierotti[2], Viviane Moreira Serato[4], Lígia Fahl Fonseca[7]

ABSTRACT: Objective: To assess the prevalence, intensity and discomfort of thirst in the immediate postoperative period. **Method:** This is a cross-sectional, descriptive, quantitative epidemiological study conducted in a university hospital in the South of Brazil, from August to September 2012. The sample consisted of 386 patients in anesthesia recovery from elective and emergency surgeries. A semi-structured questionnaire was used, consisting of demographic, clinical, and thirst-related variables. **Results:** The prevalence of thirst was 78% (303 patients), with an average intensity of 6.94 (standard deviation — SD=2.2) and spontaneous complaint of thirst in 38.3% of the cases (116 patients). The discomforts reported were: dry mouth, search for water, hyposalivation, dry throat, dry lips, dry tongue and willingness to swallow. All discomforts presented a positive Pearson correlation as to the presence of thirst. **Conclusion:** Immediate postoperative thirst is intense, prevalent and with uncomfortable peripheral signs. These facts substantiate the need to intentionally identify, measure, evaluate and treat thirst in this period.

Keywords: Thirst. Nursing care. Perioperative nursing. Prevalence.

RESUMO: Objetivo: Avaliar a prevalência, a intensidade e o desconforto da sede no período pós-operatório imediato. **Método:** Estudo epidemiológico, transversal, descritivo, quantitativo, realizado em um hospital universitário do Sul do Brasil, de agosto a setembro de 2012. A amostra foi composta de 386 pacientes em recuperação anestésica de cirurgias eletivas e de urgência. Foi utilizado um questionário semiestruturado composto de dados demográficos, clínicos e variáveis relacionadas à sede. **Resultados:** A prevalência de sede foi de 78% (303 pacientes), com intensidade média de 6,94 (desvio padrão — DP=2,2) e queixa espontânea de sede em 38,3% dos casos (116 pacientes). Os desconfortos relatados foram: boca seca, procura por água, hipossalivação, garganta seca, lábios ressecados, língua seca e vontade de deglutir. Todos os desconfortos apresentaram correlação de Pearson positiva em relação à presença de sede. **Conclusão:** A sede no pós-operatório imediato é intensa, prevalente e com sinais periféricos desconfortáveis. Essas evidências fundamentam a necessidade da identificação, da mensuração, da avaliação e do tratamento do sintoma sede de forma intencional neste período.

Palavras-chave: Sede. Cuidados de enfermagem. Enfermagem perioperatória. Prevalência.

RESUMEN: Objetivo: Evaluar la prevalencia, la intensidad y el malestar de la sed en el período postoperatorio inmediato. **Método:** Estudio epidemiológico, transversal, descriptivo, cuantitativo, realizado em un hospital universitario del sur de Brasil, de agosto a septiembre de 2012. La muestra fue compuesta de 386 pacientes en recuperación anestésica de cirugías electivas y de urgencia. Se utilizó un cuestionario semiestructurado compuesto de datos demográficos, clínicos y variables relacionados con la sed. **Resultados:** La prevalencia de sed fue de 78% (303 pacientes), con una intensidad media de 6,94 (desviación estándar o standard deviation – SD=2,2) y queja espontánea de sed en el 38,3% de los casos (116 paciente). Las incomodidades reportadas fueron: boca seca, busca por agua, hiposalivación, garganta seca, labios secos, lengua seca y voluntad de deglutir. Todas las incomodidades presentaron correlación de Pearson positiva en relación a la presencia de sed. **Conclusión:** La sed en el postoperatorio inmediato es intensa, prevalente y con señales periféricas incómodas. Estas evidencias fundamentan la necesidad de identificar, medir, evaluar y tratar el síntoma de forma intencional en este período.

Palabras clave: Sed. Atención de enfermería. Enfermería perioperatoria. Prevalencia.

[1]Nurse; Doctoral student in Nursing at *Universidade Estadual de Londrina* (UEL) – Londrina (PR), Brazil.
[2]Nurse; Doctoral student in Nursing at UEL – Londrina (PR), Brazil.
[3]Nurse; PhD in Nursing by *Universidade de São Paulo* (USP). Member of the Study and Research Group on Thirst of UEL – Londrina (PR), Brazil.
[4]Nurse; master in Nursing at UEL. Member of the Study and Research Group on Thirst – Londrina (PR), Brazil.
[7]Nurse; PhD in Nursing, Adult Health Program at USP. Associate professor of the Nursing Department at UEL – Londrina (PR), Brazil.
*Corresponding author: leonel_lan@hotmail.com
Received: 08/17/2018 – Approved: 03/23/2019
DOI: 10.5327/Z1414-4425201900020006

INTRODUCTION

Thirst is a vital human need originated in a complex neuro-hormonal signalling system that regulates hydro-electrolyte balance. Given that it is a subjective discomfort, it is characterized as a symptom and leads to an urge for searching and drinking water, so that it cannot be ignored[1-3].

Considering this multifactorial symptom, thirst can be better understood by analyzing individual factors that interfere with its onset and people's perception of it. Each patient experiences, evaluates and faces thirst in a different way, especially when associated with the stressful stimuli from the perioperative period[4,5].

The perception of thirst and the desire to drink liquids to achieve satiety are conditioned physiological processes in all human beings[6,7]. Surgical patients, especially, are even more thirsty for factors such as preoperative fasting, medications used and intraoperative blood loss. These stimuli result in negative behaviors, such as stress, anxiety, irritability and despair, which intensify thirst discomfort in the perioperative period[8-10].

Such discomfort is highly prevalent, reaching levels from 83.7[11] to 88.6%[12] in surgical patients in the immediate postoperative period220 (IPP). In addition, studies indicate that thirst presents high intensity (6.10[13], 8.17[11] and 8.70[14]) when measured by a numerical verbal scale (NVS), which ranges from zero to ten, with zero meaning no thirst and ten, the most intense thirst ever felt. The discomfort of thirst may also be expressed by patients through a set of peripheral symptoms, also called thirst attributes such as dry lips, dry mouth and throat, thick tongue and saliva, bad or bitter taste in the mouth, and a desire to drink water[2,3,15-17].

Although thirst is not normally considered an important factor for evaluation, measurement and treatment during patients' stay in the Post-Anesthesia Care Unit (PACU), one must pay attention to this discomfort, considering its complexity and the fact that it is one of the most stressful and impetuous human experiences in IPP[3,10].

OBJECTIVE

To assess the prevalence, intensity, and discomfort of thirst in surgical patients in the IPP.

METHOD

This is a cross-sectional, descriptive and quantitative epidemiological study performed in the PACU of a public and tertiary-level school-hospital in the South of Brazil. The institution has 313 beds, all available to the Brazilian Unified Health System (SUS). The surgical center (SC) has seven operating rooms (OR) and performs, on average, 640 surgeries per month.

The population consisted of adult and elderly patients, male and female, submitted to elective and emergency surgeries, who were in the IPP, in PACU. Inclusion criteria were: to be between 18 and 65 years of age and to report thirst spontaneously or when questioned. Patients who were discharged from the OR directly to the Intensive Care Unit (ICU), Inpatient Units or patients at home were excluded from the study, as well as patients who presented disorientation over time and space and impairment in their verbal communication.

The sample had 386 participants, considering a 95% confidence level and a sampling error of 5%. Data were collected from Monday to Friday, from 7 a.m. to 7 p.m., in August and September, 2012. It was conducted by Nursing students and Residents of Perioperative Nursing, who received training by the researcher responsible for the study, with the objective of maintaining methodological rigor and compliance with ethical aspects during data collection.

Data collection script included demographic, clinical and thirst-related variables, such as the presence of thirst, spontaneous complaints, thirst characteristics and discomfort intensity assessed by a NVS, ranging from 0 to 10, with zero meaning no discomfort and ten, the most intense discomfort ever felt. The discomforts evaluated: were dry lips, dry mouth, thick tongue, dry throat, hyposalivation, desire to swallow and search for water. Other variables were evaluated to understand factors that may characterize or interfere with the process of thirst, such as preoperative fasting time, orotracheal intubation and surgical procedures' length.

Data collection was divided into two moments: preoperative and postoperative. At the first moment, in the PACU, all patients who met the inclusion criteria were approached, oriented toward the research objectives and invited to participate in the study. All participants signed the Informed Consent. In the second moment, after the anesthetic-surgical procedure, the data collection instrument was applied in the PACU.

To evaluate thirst in the IPP, the patients' spontaneous verbalization was waited until the discharge from the PACU. When it did not occur, the researcher questioned the patient about the presence or absence of thirst. If so, a NVS was applied to assess the intensity of the symptom; then, the patient was asked to explain which characteristics were perceived as a result from thirst.

Data were entered in a spreadsheet in Excel 2010, and the statistical analysis was performed in the Statistical Products and Service Solutions (SPSS) program, version 20.0, considering significance level of 5%. Pearson's χ^2 test was used to correlate thirst and the referred characteristics.

The study complied with the conditions established by Resolution No. 466/2012 of the Brazilian National Health Council and was approved by the Ethics Committee of *Universidade Estadual de Londrina* (CEP-UEL) (CAAE: 02299412.6.0000.5231 – CEP 11037/2012). All patients were invited to participate and, after accepting, they signed the Informed Consent.

RESULTS

Among the 386 participants, males predominated, with 217 (56%) patients. The average age was 42.3 years (12–89 standard deviation — SD=18.3). In relation to the preoperative fasting time, the mean absolute fasting hours were 17.53 (6.15–35.50 hours, SD=4.54 h), and a fasting time of more than 16 hours was predominant in 241 (62%) patients. The most frequent surgical clinics were Gynecology and Obstetrics, with 109 (28.2%) performed procedures, followed by Orthopedics, with 71 (18.4%).

Most patients were classified as ASA I (194 patients — 50%), followed by ASA II (127 patients — 33%), ASA III (60 patients — 16%) and ASA IV (5 patients — 1%). The spinal anesthesia technique was the most used one (199 patients — 51.6%), followed by balanced general anesthesia (121 patients — 31.3%) and other techniques (66 patients — 17%).

There was a prevalence of thirst in the IPP in 303 (78%) patients. The mean intensity of the symptom was 6.94 (SD 2.2). Thirst was intense (7-10) for 132 (34%) participants.

Concerning the assessment of thirst complaints, 116 (38.3%) patients spontaneously complained of discomfort, and 187 (61.7%) reported their thirst after being questioned about it. The coefficient of association of Pearson's χ^2tests between the presence of thirst and the discomforts was statistically significant (Table 1).

The discomforts presented by patients and related to thirst are mentioned in Figure 1.

There was a need for orotracheal intubation in 126 (32.6%) patients. Pearson's χ^2 association tests between the presence of thirst and orotracheal intubation were statistically significant (χ^2=7.11 p=0.008 Phi coefficient (Fi)=0.136), denoting that, regardless of the total of intubates, there is an association between the procedure and the presence of thirst.

DISCUSSION

The relevance of the study lies in the evaluation and identification of the attributes of thirst in the PACU, since there are no records of such a prevalent and distressing symptom in the recovery period, revealing a hidden reality of great magnitude, which is neglected and has negative repercussions in postoperative experiences, if unidentified and treated in a safe and humanized manner.

The prevalence of postoperative thirst in this study was 78%, demonstrating the relevance and expressiveness of this

Table 1. Association between the presence of thirst and the discomfort presented by patients in the immediate postoperative period (n=386).

Discomforts	n	%*	Fi**	X²**	p***
Dry lips	87	22.5	0.282	30.76	0.000
Dry mouth	267	69.2	0.784	237.24	0.000
Thick tongue	54	14.0	0.211	17.19	0.000
Dry throat	91	23.6	0.291	32.61	0.000
Hyposalivation	105	27.2	0.320	39.51	0.000
Willingness to swallow	37	9.6	0.170	11.21	0.001
Search for water	141	36.5	0.397	60.85	0.000
Did not present any discomfort	04	1.0	0.054	1.10	0.293

*More than one discomfort can be reported; **Fi: Phi coefficient/Levels of freedom:1; ***p>0.001.

symptom in patients' experiences in the IPP. Other studies corroborate this finding, when they also show high prevalence, between 75[13], 83.7[11] and 88.6%[12] in adults, and 88.5%[18] in children.

The discomforts reported by participants were remarkable. It is known that the genesis of thirst and its discomforts in surgical patients are multifactorial. Surgical experiences and emotional reactions, such as stress, fear and anxiety, trigger biochemical and hormonal reactions to maintain the homeostasis of the organism[2,9]. These responses inhibit the production of saliva by the salivary glands, causing dryness of the oral mucosa and the oropharyngeal region[2,15,16], which surgical patients report as dry mouth.

Among the discomforts of thirst, the most reported by patients is dry mouth, which reveals how uncomfortable it can become. Thus, the perception of thirst is not only due to the conscious presence and intensity of the thirst evaluated, but also by the presence of peripheral signs such as dry mouth, dry lips, thick tongue and saliva, dry throat, bad taste in the mouth, halitosis, and the desire to drink water[2,16,17].

As to the preoperative period, it is possible to identify the presence of biochemical and hormonal reactions resulting from a confluence of factors, such as water and food restriction above that recommended by the guidelines of responsible societies, such as the American Society of Anesthesiologists (ASA)[19]. In this study, the mean absolute hours of preoperative fasting was 17.53, which represents an exponential increase in the discomfort experienced by patients, a result in accordance with a study in which patients remained, on average, 16.5 hours in preoperative fasting[20].

In a study to develop and validate a discomfort scale of perioperative thirst, seven attributes were listed as the most representative of thirst discomfort: dry mouth, dry lips, thick tongue, thick saliva, dry throat, bad taste in the mouth and desire to drink water[17]. Most of them are related to those reported in the present study, demonstrating that the discomforts expressed by patients are significant and must be listened, considered and treated with care.

As to the reports given, both the thirst and the discomforts related to it, 61.7% of participants, even experiencing intense thirst, did not verbalize it. A similar result described that 88% of patients did not spontaneously verbalize the symptom[12].

The silence that permeates surgical patients reflects the undervaluation of thirst by health professionals. Discomforts such as nausea, vomiting and pain are identified and treated promptly, while perioperative thirst, even with high prevalence, is little questioned and treated[21]. Silence is perhaps an indication of "not forgetting" a suffering[22] that contributes to distressing hospital experiences[10].

This disturbing reality was the subject of a study to explore the perception of patients as to the reasons for not spontaneously verbalizing thirst for health professionals. Patients fear to externalize their feelings about thirst because they believe this is an inherent symptom of the anesthetic-surgical act, thus accepting when professionals reinforce the maintenance of absolute fasting and the need to endure such discomfort. Patients consider it is the team's role to ask them whether they feel thirsty; if the team does not question it, they silence with fear of positioning themselves and do not

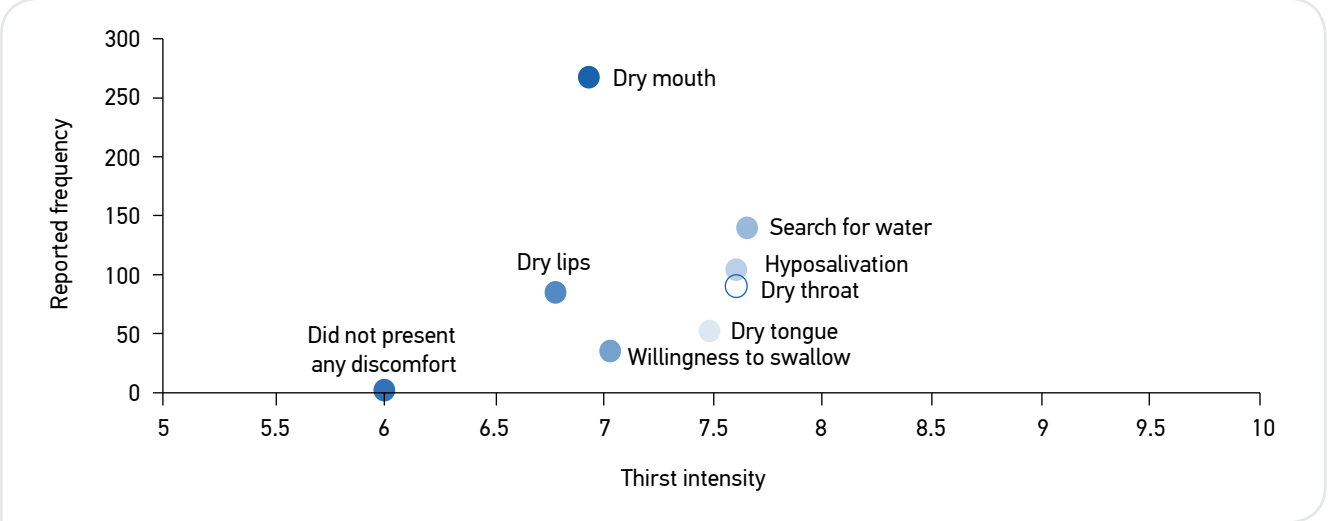


Figure 1. Frequency of discomforts mentioned as to the mean intensity of thirst in immediate postoperative patients (n=386).

expose the imposed and limiting discomfort[23]. The myth that perioperative thirst is a price to be paid to maintain life is rooted in the culture of health systems, shared by professionals and patients[3].

Such evidence corroborates the results of this study, showing the need for the surgical team to appropriate scientific knowledge to the point of changing this reality. Surgical patients belong to a group with a high risk of feeling thirst and there are, in the scientific scenario, movements that justify and describe the importance of developing strategies to identify and measure thirst, assess safety, administer relief methods and register the symptom based on literature, instrumentalizing professionals to care for surgical patients with thirst[3,17,24].

The valorization of perioperative thirst by health professionals and the intentional look for this symptom in their clinical practice, in addition to positively transform the experience of surgical patients, meet a vital human need and add humanization and quality to the surgical services.

CONCLUSION

Thirst in surgical patients in the IPP during anesthesia recovery is prevalent, intense and uncomfortable. Among the attributes related to the discomfort of the symptom, the most experienced one was dry mouth. These data corroborate other studies, pointing out that surgical patients have a high risk of developing thirst, distressing symptom that must be identified, evaluated, measured and treated intentionally, aiming to improve the quality of perioperative care. The results of this study therefore point to the need for further investigation and adoption of measures to reduce patient discomfort in anesthesia recovery.

REFERENCES

1. Antunes-Rodrigues J, Elias LLK, Castro M, De Luca Júnior LA, Vivas LM, Menani JV. Controle neuroendócrino do balanço hidroeletrolítico. In: Aires MM, editor. Fisiologia. 4ª ed. Rio de Janeiro: Guanabara Koogan; 2012. p. 1181-98.

2. Arai S, Stotts N, Puntillo K. Thirst in critically ill patients: from physiology to sensation. Am J Crit Care [Internet]. 2013 [acessado em 25 maio 2018];22(4):328-35. Disponível em: https://www.ncbi.nlm.nih.gov/pubmed/23817822. https://doi.org/10.4037/ajcc2013533

3. Conchon MF, Nascimento LA, Fonseca LF, Aroni P. Perioperative thirst: an analysis from the perspective of the Symptom Management Theory. Rev Esc Enferm USP. 2015;49(1):120-6. http://dx.doi.org/10.1590/S0080-623420150000100016

4. Dodd M, Janson S, Facione N, Faucett J, Froelicher ES, Humphreys J, et al. Advancing the science of symptom management. J Adv Nurs. 2001;33(5):668-76.

5. Humphreys J, Lee KA, Carrieri-Kohlman V, Puntillo K, Faucett J, Janson S, et al. Theory of Symptom Management. In: Smith MJ, Liehr PR, editors. Middle range theory for nursing. 2ª ed. Nova York: Springer; 2008. p. 145-58.

6. Leiper JB. Thirst. In: Caballero B, Allen L, Prentice A, editores. Encyclopedia of human nutrition. 2ª ed. Oxford: Elsevier; 2005.

7. Zimmerman CA, Leib DE, Knight ZA. Neural circuits underlying thirst and fluid homeostasis. Nat Rev Neurosci. [Internet]. 2017 [acessado em 1º jun. 2018];18:459-69. Disponível em: https://www.nature.com/articles/nrn.2017.71. https://doi.org/10.1038/nrn.2017.71

8. Dessotte CAM, Rodrigues HF, Furuya RK, Rossi LA, Dantas RAS. Stressors perceived by patients in the immediate postoperative of cardiac surgery. Rev Bras Enferm. 2016;69(4):694-703. http://dx.doi.org/10.1590/0034-7167.2016690418i

9. Medeiros VCC, Peniche ACG. The influence of anxiety in coping strategies used during the pre-operative period. Rev Esc Enferm USP. 2006;40(1):86-92. http://dx.doi.org/10.1590/S0080-62342006000100012

10. Silva LCJR, Aroni P, Fonseca LF. Tenho sede! Vivência do paciente cirúrgico no período perioperatório. Rev SOBECC. 2016;21(2):75-81. https://doi.org/10.5327/Z1414-4425201600020003

11. Conchon MF, Fonseca LF. Efficacy of an ice popsicle on thirst management in the immediate postoperative period: a randomized clinical trial. J Perianesth Nurs [Internet]. 2018 [acessado em 15 jul. 2018];33(2):153-61. Disponível em: https://doi.org/10.1016/j.jopan.2016.03.009

12. Pierotti I, Fracarolli IFL, Fonseca LF, Aroni P. Avaliação da intensidade e desconforto da sede perioperatória. Rev Esc Anna Nery [Internet]. 2018 [acessado em 11 jun. 2018];22(3):e20170375. Disponível em: http://www.scielo.br/pdf/ean/v22n3/pt_1414-8145-ean-22-03-e20170375.pdf. https://doi.org/10.1590/2177-9465-EAN-2017-0375

13. Aroni P, Nascimento LA, Fonseca LF. Assessment strategies for the management of thirst in the post-anesthetic recovery room. Acta Paul Enferm. 2012;25(4):530-6. http://dx.doi.org/10.1590/S0103-21002012000400008

14. Cho EA, Kim KH, Park JY. Effects of frozen gauze with normal saline and ice on thirst and oral condition of laparoscopic cholecystectomy patients: pilot study. J Korean Acad Nurs [Internet]. 2010 [acessado em 2 jun. 2018];40(5):714-23. Disponível em: https://doi.org/10.4040/jkan.2010.40.5.714

15. Gebremedhn EG, Nagaratnam VB. Audit on perioperative fasting of elective surgical patients in an African academic medical center. World J Surgery [Internet]. 2014 [acessado em 9 jun. 2018];38(9):2200-4. Disponível em: https://doi.org/10.1007/s00268-014-2582-3

16. Landström M, Rehn IM, Frisman GH. Perceptions of registered and enrolled nurses on thirst in mechanically ventilated adult patients in intensive care units: a phenomenographic study. Intensive Crit Care Nurs [Internet]. 2009 [acessado em 13 jun. 2018];25(3):133-9. Disponível em: https://doi.org/10.1016/j.iccn.2009.03.001

17. Martins PR, Fonseca LF, Rossetto EG. Developing and validating the Perioperative Thirst Discomfort Scale. Rev Esc Enferm USP. 2017;51:e03240. http://dx.doi.org/10.1590/s1980-220x2016029003240

18. Riviera AA. Prevalência e intensidade da sede infantil no pós-operatório imediato [dissertação]. Londrina: Universidade Estadual de Londrina; 2015 [acessado em 15 jun. 2018]. Disponível em: http://www.bibliotecadigital.uel.br/document/?code=vtls000210646

19. Practice Guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration: application to healthy patients undergoing elective procedures: an updated report by the American Society of Anesthesiologists task force on preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration. Anesthesiology [Internet]. 2017 [acessado em 21 jun. 2018];126(3):376-93. Disponível em: https://doi.org/10.1097/ALN.0000000000001452

20. Cestonaro T, Schieferdecker MEM, Thieme RD, Cardoso JN, Campos ACL. The reality of the surgical fasting time in the era of the ERAS protocol. Nutr Hosp [Internet]. 2014 [acessado em 2 jun. 2018];29(2):437-43. Disponível em: https://doi.org/10.3305/nh.2014.29.2.7025

21. Pavani MM, Fonseca LF, Conchon MF. Sede no paciente cirúrgico: percepções da equipe de enfermagem nas unidades de internação. Rev Enferm UFPE [Internet]. 2016 [acessado em 18 jun. 2018];10(9):3352-60. Disponível em: https://periodicos.ufpe.br/revistas/revistaenfermagem/article/download/11416/13201. https://doi.org/10.5205/reuol.9571-83638-1-SM1009201621

22. Cardoso E, Cunha T. O silêncio na comunicação. BOCC – Biblioteca On-line de Ciências e Comunicação. Portugal, Universidade Nova de Lisboa: LabCom, 2011.

23. Garcia AKA, Fonseca LF, Lodi CR. O silêncio que permeia a sede perioperatória: um estudo de caso. In: Anais do Encontro Internacional de Produção Científica da UNICESUMAR, 2017, Maringá [Internet]. 2017 [acessado em 14 jun. 2018]. Disponível em: http://sobecc.tmeventos.com.br/anais2017/pdfs/trabalho_2255.pdf

24. Nascimento LA, Fonseca LF, Santos C. Inter-rater reliability testing of the safety protocol for thirst management. J Perianesth Nurs [Internet]. 2018 [acessado em 5 ago. 2018];33(4):527-36. Disponível em: https://doi.org/10.1016/j.jopan.2016.07.008

USE OF PORTABLE ULTRASOUND TO DETECT URINARY RETENTION BY NURSES IN ANESTHESIA RECOVERY

Uso do ultrassom portátil para detecção de retenção urinária por enfermeiros na recuperação anestésica

Uso del ultrasom portátil para detección de retención urinaria por enfermeros em la recuperación anestésica

Barbara Mendes Carnaval[1], Alzira Machado Teixeira[2], Rachel de Carvalho[3]*

ABSTRACT: Objective: To assess the opinion of nurses as to the use of portable ultrasounds to detect urinary retention during patients' recovery from anesthesia. **Method:** Field research, descriptive-exploratory and quantitative study; conducted with 34 nurses from two surgical suites at a private hospital in São Paulo. A questionnaire with two parts was applied: the characterization of professionals and questions about the use of portable ultrasounds. The collection took place between May and June 2018, after complying with the recommendations of Resolution No. 466/2012. The results were described and analyzed quantitatively, using statistical techniques and presented in tables; they were evaluated individually and comparatively, horizontally and vertically. **Results:** All nurses expressed their opinion on alternatives, which showed that ultrasound technology enables the diagnose of urinary retention. The confidence and reliability levels were high and very high. Nurses stated they were satisfied with the technology and considered their use important for the autonomy of nurses. Moreover, the use of portable ultrasounds to detect urinary retention during recovery from anesthesia was said to present only advantages. As to the training, most considered the time enough and approved the presented material. The device was easy to use. **Conclusion:** Regarding recovery from anesthesia, results showed that the technology is effective in the clinical practice of nurses at the research institution. The theme is pertinent to the accomplishment of new studies and interventions for continuous improvement of nursing processes, offering greater reliability and less difficulty to handle the device.

Keywords: Nursing. Nursing care. Recovery room. Urinary retention. Ultrasonography.

RESUMO: Objetivo: Verificar a opinião dos enfermeiros em relação à utilização do ultrassom portátil para detectar retenção urinária na recuperação anestésica. **Método:** Pesquisa de campo, descritivo-exploratória, quantitativa; com 34 enfermeiros de dois blocos cirúrgicos de um hospital privado de São Paulo; aplicado questionário com duas partes: caracterização do profissional e questões sobre o uso do ultrassom portátil. A coleta deu-se entre maio e junho de 2018, após cumpridas as recomendações da Resolução nº 466/2012. Resultados descritos e analisados quantitativamente, utilizando-se técnicas estatísticas e apresentados em tabelas; avaliados individualmente e comparativamente, de forma horizontal e vertical. **Resultados:** Todos os enfermeiros opinaram em alternativas que demonstraram que a tecnologia do ultrassom é facilitadora no diagnóstico da retenção; o grau de confiança e segurança constatado foi alto e muito alto; se mostraram satisfeitos com a tecnologia; consideraram importante seu uso para autonomia do enfermeiro e opinaram que o uso do ultrassom portátil para detecção de retenção urinária na recuperação anestésica só apresentou vantagens. Em relação ao treinamento, a maioria considerou que o tempo foi suficiente, se mostrou satisfeita com os materiais apresentados e teve facilidade em usar o dispositivo. **Conclusão:** Os resultados demonstraram que a tecnologia é eficaz na prática clínica dos enfermeiros da recuperação anestésica da instituição pesquisada. O tema é pertinente à realização de novos trabalhos e intervenções para melhoria contínua dos processos de enfermagem, oferecendo maior segurança e menor dificuldade no manuseio do dispositivo.

Palavras-chave: Enfermagem. Cuidados de enfermagem. Sala de recuperação. Retenção urinária. Ultrassonografia.

[1]Nurse at Faculdade Israelita de Ciências da Saúde Albert Einstein (FICSAE) – São Paulo (SP), Brazil.
[2]Nurse; specialist in Training and Continuing Education in Health. Senior nurse at the Surgical Wing at Hospital Israelita Albert Einstein (HIAE) – São Paulo (SP), Brazil.
[3]Nurse; doctor. Professor of the undergraduate and graduate courses at FICSAE – São Paulo (SP), Brazil.
*Corresponding author: prof.rachelcarvalho@gmail.com
Received: 12/19/2018 – Approved: 03/22/2019
DOI: 10.5327/Z1414-4425201900020007

RESUMEN: Objetivo: Verificar la opinión de los enfermeros em relación a la utilización del ultrasonido portátil para detectar retención urinaria em la recuperación anestésica. **Método:** Investigación de campo, descriptivo-exploratoria, cuantitativa; con 34 enfermeros de dos bloques quirúrgicos de un hospital privado de São Paulo; aplicado cuestionario con dos partes: caracterización del profesional y cuestiones sobre el uso del ultrasonido portátil. La recolección se dio entre mayo y junio de 2018, después de cumplidas las recomendaciones de la Resolución 466/2012. Resultados descritos y analizados cuantitativamente, utilizando técnicas estadísticas y presentadas en tablas; evaluados individualmente y comparativamente, de forma horizontal y vertical. **Resultados:** Todos los enfermeros opinaron em alternativas que demostraron que la tecnología del ultrasonido es facilitadora en el diagnóstico de la retención; el grado de confianza y seguridad constatado fue alto y muy alto; se mostraron satisfechos con la tecnología; consideraron importante su uso para autonomía del enfermero y opinaron que el uso del ultrasonido portátil para detección de retención urinaria em la recuperación anestésica sólo presentó ventajas. Em cuanto al entrenamiento, la mayoría consideró que el tiempo fue suficiente, se mostró satisfecha con los materiales presentados y tuvo facilidad em usar el dispositivo. **Conclusión:** Los resultados demostraron que la tecnología es eficaz em la práctica clínica de los enfermeros de la recuperación anestésica de la institución investigada. El tema es pertinente a la realización de nuevos trabajos e intervenciones para la mejora continua de los procesos de enfermería, ofreciendo mayor seguridad y menor dificultad em el manejo del dispositivo.

Palabras clave: Enfermería. Atención de enfermería. Sala de recuperación. Retención urinaria. Ultrasonografía.

INTRODUCTION

Urinary retention (UR) can be defined as the spontaneous, partial or total inability of the bladder to eliminate the urine produced by the kidneys. Distended, tense and painful bladder sensation and unsatisfactory urination characterize acute UR[1]. In more severe cases of UR, there may be loss of secondary bladder tone or excessive stretching of the detrusor muscle fibers, leading to bladder hypotonicity, urinary tract infections (UTIs), and even to the formation of kidney stones[2].

In view of the UR, nurses are responsible for evaluating the patient's clinical data for the correct diagnosis and, consequently, for proposing appropriate nursing interventions. Thus, they identify UR, describe its defining characteristics and related factors, and develop appropriate care actions[2-4].

For clinical evaluation of patients with UR, data collection from the clinical history is performed or, as in the case of surgical patients, assessment of postoperative and post-anesthetic conditions, and physical examination of the bladder[2,3].

The physical examination of the bladder is based on inspection, palpation and percussion, which can identify changes in organ texture, thickness, consistency, sensitivity, volume and hardness[1-3].

Thus, it is a complex procedure, since it involves the subjectivity of the examiner and the changes in the conditions of patients that directly interfere with the evaluation process, such as drug use and patients' age[1,4].

Unlike conventional imaging techniques, such as conventional radiography, computed tomography, magnetic resonance imaging, and scintigraphy and ultrasonography, traditional physical examination does not allow visualizing under the patient's skin[5,6].

Among imaging methods, ultrasound is the most accepted one, because it does not use ionizing radiation, it is not invasive, it allows dynamic studies and the orientation of procedures. That is why this method has a great potential for being incorporated into the clinical practice and serves as an extension to physical examinations[5,6].

The most common nursing intervention in UR cases is urinary catheterization[3,4], which aims to reduce the risks of mechanical and infectious complications, pain and discomfort. Despite that, much has been questioned about the use of intermittent catheterization or delay in events of postoperative UR[3].

The risk involved in patients undergoing urinary catheterization recently led the Brazilian Federal Nursing Council (*Conselho Federal de Enfermagem* - COFEn) to recommend that the insertion of urinary catheters is a specific function of nurses[7].

The etiology of postoperative UR is related to the use of anticholinergic or analgesic drugs, the type of surgery, intravenous therapy, the positioning and loss of patient privacy during urination[8-10].

In the physiology of UR, opioids increase the tone and amplitude of urinary sphincter contractions and decrease contractions of the ureter, hindering spontaneous urination[8-10].

Portable bladder ultrasounds are a non-invasive method that allows professionals to safely and reliably diagnose UR, assess the volume of urine in the bladder and decide whether or not to perform urinary catheterization[11].

Such equipment provides a quick and accurate assessment of the volume of urine in the bladder and helps in the diagnosis and management of UR. Catheterization is recommended when the volume of the bladder exceeds 600 mL, in order to avoid negative sequelae of prolonged bladder distension[11].

Because it is an unusual equipment in the practice of nursing care, theoretical-practical training is needed to access all resources of the device. A scientific basis to understand the need for its use and the appropriate time for it are of utmost importance.

In order to improve the quality of training and nursing care in anesthesia recovery (AR), preventing complications in surgical patients, the perception of nurses using ultrasound technology to assess UR in immediate postoperative patients was studied.

OBJECTIVE

To assess the opinion of nurses as to the use of portable ultrasounds to detect UR in patients admitted to AR.

METHOD

Field research, descriptive-exploratory study, with quantitative analysis. Data collection was performed in a large private hospital (with more than 700 active beds), in the south region of São Paulo, which has two surgical wings (SW): one consisting of 21 operating rooms (OR) and 30 beds of AR; and another with 14 OR and 10 beds of AR. An average of 3,000 anesthetic-surgical procedures are performed per month in both SW.

The sample consisted of 34 nursing assistants from both SW, who work in the surgery center (SC) and at AR. They all complied with the inclusion criteria, which was calculated by a population of 36 nurses, composed of all nurses from the SW. The sample was calculated considering a confidence interval of 99% and a margin of error of 3%.

Inclusion criteria were: to have already taken specific training to handle portable ultrasounds; to provide direct care to surgical patients in AR; to be present at the SW during data collection; to consent to be part of the research and to sign the Informed Consent. Exclusion criteria were: nurses on vacation or leave in the period of data collection.

The first training to handle portable ultrasounds for nurses working at AR was performed by a nurse specialist in severe condition patients, who is a reference in patients with ITU of the study's host institution, in January 2016. The training was theoretical and practical and lasted 2 hours, during which the following items were addressed: assessing the shape and location of the bladder; identifying pathologies and the consequences of UR; quantifying urinary volume using the ultrasound and how to proceed given such findings. A flow protocol was created for patients with suspected UR, in which nurses should act based on guidelines on whether to use ultrasounds or not, and how to behave considering the study's findings. Only 20 nurses were trained in this first stage. From then on, a full-time nurse, from one of the SW, became responsible for training nurses of both SW.

This training is carried out using the institution's portable ultrasound (by Sonosite) of the AR of the institution and, at the end of the course, a practical test is applied for evaluation. This test consists of performing ultrasounds, one nurse at the other, with their bladders full.

The authors created a two-part instrument for data collection: a sample characterization and a questionnaire with specific questions about the use of portable ultrasounds to detect UR in AR patients.

Data collection was carried out between May and June 2018, after approval of the research project by the Research Ethics Committee of the study institution, via *Plataforma Brasil* (CAAE 81442917.8.0000.0071), with the approval of the nurse manager of both SW.

Data was collected by the first researcher, through the application of the questionnaire to the nurses of both SW, which were individually addressed. All information was recorded in the instrument, which was immediately delivered to the researcher, along with the Informed Consent in two copies, one of the participant's and the other of the researcher's.

The data obtained was treated statistically, using descriptive statistics, besides the hypothesis test for sample calculation. To present the results, tables with absolute numbers and percentages were constructed, analyzed individually and comparatively, and horizontally and vertically.

RESULTS

Thirty-four nurses from both SW who worked at AR participated in the study. The characterization of professionals is presented in Table 1.

The questionnaire applied to the nurses of both SW presents the first seven questions regarding their opinion on the use of portable ultrasounds in AR to detect UR, taking into account factors such as: the importance of the technology, methods used to detect retention and which are considered more effective, and the confidence level and autonomy of nurses to handle the device. Results are shown in Table 2.

None of the alternatives in the questionnaire of the first seven questions showed dissatisfaction and/or little importance regarding the use of ultrasounds.

The last four questions of the instrument were applied to evaluate the satisfaction of nurses as to the training received, considering the theoretical material, the training period and the problems to handle/interpret the device. Results are shown in Table 3.

Table 1. Characterization of nurses, according to gender, age, training period, working period and field of action.

Variables	Nurses (n=34)	
	n	%
Gender		
Female	26	76.47
Male	8	23.53
Age range (years)		
25 to 34	9	26.47
35 to 44	17	50.00
45 to 54	5	14.71
55 to 64	3	8.82
Training period (years)		
1 to 5	7	20.59
6 to 10	19	55.88
11 to 15	5	14.71
16 to 20	1	2.94
21 to 25	2	5.88
Working period (years)		
1 to 5	12	35.29
6 to 10	17	50.00
11 to 15	2	5.88
16 to 20	1	2.94
21 to 25	2	5.88
Field of action		
AR 1	18	52.94
AR 2	16	47.06
Total	34	100

AR: anesthesia recovery.

Regarding the difficulty to handle the device, cross-analyzes were performed, presented in Tables 4 and 5.

In a horizontal analysis (Table 4), it is observed that, of all nurses who answered whether the theoretical content was enough to handle the device, only 21.74% of them classified its difficulty as average, whereas the rest of them (78.26%) rated it as easy. Nurses who did not receive theoretical content classified interpretation as mean and difficult; and 80% of nurses who said there was little theoretical-scientific content evaluated the equipment as difficult to handle.

In a vertical analysis (Table 5), of all nurses who had problems to handle/ interpret the device, 60% were in the age range from 35 to 44, whereas nurses aged from 55 to 64 reported no difficulties.

When asked about the training to use the device, given during the classes of the Nursing Graduate Course in SC and at AR, 20 nurses found it a good practice and 14 reported it was great and necessary.

At the end of the questionnaire, a dissertation question was applied to collect suggestions, in which some professionals expressed the following: "All nurses should be trained; this will guarantee quality care and avoid unnecessary invasive procedures"; "Unfortunately, not all hospitals have this technology available for professional nurses to use"; "Periodic training should be performed".

DISCUSSION

The use of portable ultrasounds as instruments to assess the urinary volume of patients in the immediate postoperative phase (IPP), hospitalized in AR, was a very reliable and used method, according to the opinion of the 34 nurses from this study. According to the data obtained in the questionnaire, no nurse was against the use of such device. Quite to the contrary, they considered that this technology facilitates the process of identifying UR and found no disadvantages in its use in the field. Thus, 67.65% performed physical examinations using the device to detect UR, whereas the other 32.35% used the device only for evaluation.

Results show the comprehension of nurses who work at AR as to the importance of patient evaluation in IPP, still in the unit, and how complex the UR evaluation procedure is, which involves clinical and anesthetic signs and symptoms that lead to different degrees of reliability, often leading to invasive treatment such as urinary catheterization.

Table 2. The opinion of nurses on the use of portable ultrasound to detect urinary retention during patients' recovery from anesthesia.

Questions (1 to 7)	Nurses (n=34)	
	n	%
1. Method used to detect UR		
Physical examination + use of the portable ultrasound	23	67.65
Use of the portable ultrasound	11	32.35
2. Method considered the most effective to detect UR in AR		
Physical examination + use of the portable ultrasound	17	50
Use of the portable ultrasound	17	50
3. Facilitating technology in the diagnosis and treatment of UR in AR		
Yes	34	100
4. Confidence/reliability levels when detecting a condition of UR by using the portable ultrasound		
High	9	26.47
Very high	25	73.53
5. Satisfaction with the portable ultrasound technology in AR		
Extremely satisfied	26	76.47
Satisfied	8	23.53
6. UR events in patients in the IPP in HU decreased with the use of portable ultrasounds		
Yes	34	100
7. Importance of this technology for the autonomy of nurses who work at AR		
High	7	20.59
Very high	27	79.41
Total	34	100.00

UR: urinary retention; AR: anesthesia recovery; IPP: immediate postoperative phase; HU: hospitalization unit.

Table 3. The opinion of nurses on their training and difficulties in handling the portable ultrasound device.

Questions	Nurses (n=34)	
	n	%
8.1 Satisfaction with the training period to handle the portable bladder ultrasound		
Little time	8	23.53
Enough time	26	76.47
8.2 Satisfaction with the presented material to handle the portable bladder ultrasound		
Theoretical-scientific content was enough for learning	23	67.65
Did not receive theoretical content	6	17.65
Little theoretical-scientific content	5	14.71
9. Classification regarding difficulties in handling/interpreting the device		
Difficult	5	14.71
Easy	18	52.94
Medium	11	32.35
10. Opinion on the training being given during the classes of the Nursing Graduate Course in the SC and at AR		
Good	20	58.82
Great and necessary	14	41.18
11. Are there more advantages or disadvantages as to the use of the portable ultrasound in AR?		
Advantages	34	100
Total	34	100

SC: surgery center; AR: anesthesia recovery.

Table 4. Relation between the classification of problems in handling the portable ultrasound *versus* satisfaction with the available material for training.

8.2 Satisfaction with the presented material to handle the portable ultrasound	9. Classification as to the difficulties to handle/interpret such equipment (%)			
	Difficult	Easy	Medium	Total
Theoretical-scientific content was enough for learning	-	78.26	21.74	100
Did not receive theoretical content	16.67	-	83.33	100
Little theoretical-scientific content	80.00	-	20.00	100
Total	14.71	52.94	32.35	100

Table 5. Relation between the classification of difficulties in handling the portable ultrasound *versus* age range.

Age range (years)	9. Classification as to the difficulties to handle/interpret such equipment (%)			
	Difficult	Easy	Medium	Total
25 to 34	20	44.44	-	26.47
35 to 44	60	22.22	90.91	50.00
45 to 54	20	22.22	-	14.71
55 to 64	-	11.11	9.09	8.82
Total	100	100	100	100

Such intervention should not be performed without careful evaluation to safely diagnose UR, due to the high risk of trauma and infections, which has economic repercussions, can cause sequelae, complications and the possibility of damage to patients[1-4].

The use of ultrasound eliminates unnecessary catheterization, which leads to a strong impact on reducing UTI rates and decreasing hospitalization time[1-3]. In addition, the use of portable ultrasounds results in low cost and high benefits, given there is a small initial investment to buy equipment and reduce urinary catheterization. It also reduces nurse's working periods and expenditures on material resources to perform the procedure[1-3,11,12].

All nurses participating in the study considered that, with the use of the ultrasound in AR, the occurrence of UR events decreased in the hospitalization unit (HU). Thus, all these advantages are onset still in the SW, resulting in less exposure and embarrassment to patients in HU, especially in orthopedic surgeries and/or spinal anesthesia, in which there is a temporary impairment of sensitivity of the pelvic region and, often, patients present significant urinary leakage. The relevance of early identification of bladder distension lies in the fact that prolonged overdistension of the bladder can cause damage to the detrusor muscle and bladder dysfunction[2].

Equipment's reliability has been verified using the proximity between the measurement of the urine volume estimated in the bladder by the piece of equipment and the urine volume measured after emptying the bladder with catheterization. The difference found was only of 15 mL between volumes. Thus, the use of ultrasonography was proven to be an effective method that overcomes a clinical examination palpating the bladder[13].

In this study, professionals stated a high confidence level when detecting UR via ultrasonography. Studies present sensitivity data of 97%, specificity of 91% and accuracy of 94% in the identification of urine volumes greater than or equal to 100 mL, through ultrasonography[13].

Considering the clinical repercussions that non-diagnosed UR can have and the benefits that ultrasonography has to this end, a systematic evaluation of patients' bladder contents at the time of admission and discharge from AR is suggested, especially in those where a known risk factor is present[13].

As to the importance of the use of portable ultrasounds for the autonomy of nurses to detect UR, it was described

as very high or high by all nurses. Data demonstrates that the use of the device enables decision making and the initiative of professionals in face of symptoms or even circumstances that lead to UR in patients during the IPP, preventing complications and/or anticipating actions that previously depended on medical actions.

Prior to the use of this technology, nurses had to ask the responsible anesthesiologist and/or surgeon to use ultrasounds, who would then be responsible for prescribing catheterization, if needed. With the use of portable ultrasounds by trained nurses, they perform the test, quantify the volume and prescribe immediate treatment, anticipating the prevention of complications, even in AR. Thus, the benefits not only cover the nursing team and their patients, but also optimize the time of doctors, who previously had to evaluate patients and prescribe the appropriate actions to be taken.

Regarding the training received by nurses, results obtained in the last four questions showed that 76.47% considered the training period enough for learning and, consequently, handling portable ultrasounds. As to the theoretical-scientific material, six nurses (17.65%) reported not having received theoretical content, only practical, and other five nurses (14.71%) considered the presented theoretical content to be little.

Although most nurses evaluated the theoretical training period as sufficient for learning, those who did not receive the training reported having only performed the practical part, in a single moment, during their working day, when there was an opportunity.

Based on the result of the horizontal analysis of data, it is possible to say that the degree of difficulty presented by nurses is directly related to the training they received. Those who did not receive training or stated that the theoretical material was not enough, presented more difficulty when compared to those who received the training and stated the material was enough for learning.

Well-trained professionals are more confident and efficient, present better performance, lower stress, greater motivation, persistence and expectation of success[14]. The possibilities and limitations to develop new skills must be known.

A vertical analysis was performed to assess the problems nurses had to handle the device, which indicated that older professionals had less difficulty in handling portable ultrasounds.

Therefore, continuing education of health professionals should be part of the institution's culture and initiatives, providing individual and personal growth to contribute to the organization of work processes. This would allow higher quality of health care for the effective articulation of the improvement actions and the processes of care management.

CONCLUSION AND FINAL CONSIDERATIONS

The analysis of answers given by 34 nurses who worked at AR and used portable ultrasounds to detect UR help to conclude that all professionals considered that this technology facilitated the diagnosis of UR in AR. The confidence and reliability levels were high and very high in the detection of UR and professionals were extremely satisfied or satisfied with this UR technology. Its use is seen as very important or important regarding nurses' autonomy and professionals believe that the use of portable ultrasounds to detect UR in AR only has advantages. As to the training, most considered the learning time to be enough, approved the material presented, and thought the device was easy to use.

The opinion of nurses is extremely positive and shows their concern about a more accurate diagnosis for immediate treatment/actions, thus preventing complications in HU. They did not find disadvantages in the use of ultrasounds and said actions are taken according to the institutional protocol.

On the other hand, some answers about the training highlight the need for continuous recycling during the year, *in loco*, and consider that it should be carried out in Nursing Graduate courses, because it is an innovative trend/enabler, which ensures safety and reliability to the diagnosis of UR.

The result of the questionnaire applied was positive, demonstrating that the technology is effective and promising in the clinical practice of nurses who work at AR in the institution being researched. This is an incentive study for institutions that have not yet adopted the use of portable ultrasounds in AR, which helps nurses who know their advantages and benefits, demonstrated by the professionals of the same sector, to improve the quality of care provided.

It is important to emphasize that the study assessed the opinion of nurses who work at AR. Future comparisons are intended to know the opinion of nurses working at HU and highlight the impacts of ultrasounds in detecting UR, still in AR, for professionals and their patients in HU.

This study paves the way for further research and interventions to be conducted, aiming at continuously improving nursing processes and providing more safety and less problems in handling the portable ultrasound device.

REFERENCES

1. Jorge BM, Mazzo A, Napoleão AA, Bianchini A. Evidências científicas das práticas de diagnóstico da retenção urinária: scoping review. Rev Enferm UERJ. 2018;26:e25840. https://doi.org/10.12957/reuerj.2018.25840

2. Jorge BM, Mazzo A, Martins JCA, Henriques FMD, Cassini MF. A pessoa com retenção urinária: percepção do estudante e evidências científicas da utilização do ultrassom portátil. Rev Enf Ref. 2017;serIV(12):19-26. http://dx.doi.org/10.12707/RIV16078

3. Meska MHG, Mazzo A, Jorge BM, Souza-Junior VD, Negri EC, Chayamiti EMPC. Retenção urinária: implicações do treino simulado de baixa fidelidade na autoconfiança do enfermeiro. Rev Esc Enferm USP. 2016;50(5):831-7. https://doi.org/10.1590/s0080-623420160000600017

4. Cruz DALM, Guedes ES, Santos MA, Sousa RMC, Turrini RNT, Maia MM, et al. Nursing process documentation: rationale and methods of analytical study. Rev Bras Enferm. 2016;69(1):197-204. http://dx.doi.org/10.1590/0034-7167.2016690126i

5. Geria RN, Raio CC, Tayal V. Point-of-care ultrasound: not a stethoscope-a separate clinical entity. J Ultrasound Med. 2015;34(1):172-3. http://dx.doi.org/10.7863/ultra.34.1.172

6. Novaes AKB, do Carmo WB, de Figueiredo AA, Lopes PC, Dias ZMM, Silva LAL, et al. Point of care kidney ultrasonography and its role in the diagnosis of urinary obstruction: a case report. J Bras Nefrol [Internet]. 2017 [acessado em 16 mar. 2019];39(2):220-3. Disponível em: https://www.ncbi.nlm.nih.gov/pubmed/29069248

7. Conselho Federal de Enfermagem. Resolução nº 450, de 11 de dezembro de 2013. Normatiza o procedimento de Sondagem Vesical no âmbito do Sistema Cofen / Conselhos Regionais de Enfermagem [Internet]. Brasília: COFEn; 2013 [acessado em 2 out. 2017]. Disponível em: http://www.cofen.gov.br/resolucao-cofen-no-04502013-4_23266.html

8. Dias AS, Rinaldi T, Barbosa LG. O impacto da analgesia controlada pelos pacientes submetidos a cirurgias ortopédicas. J Bras Anestesiol [Internet]. 2016 [acessado em 16 mar. 2019];66(3):265-71. http://dx.doi.org/10.1016/j.bjane.2013.06.023

9. Moro ET, Silva MAN, Couri MG, Issa DS, Barbieri JM. Qualidade da recuperação da anestesia em pacientes submetidos à cirurgia ortopédica em membros inferiores. J Bras Anestesiol [Internet]. 2016 [acessado em 16 mar. 2019];66(6):642-50. Disponível em: http://dx.doi.org/10.1016/j.bjane.2015.05.001

10. Moraes KB, Schnath F, Espírito Santo DMN. Retenção urinária no pós-operatório imediato. In: Anais da 36ª Semana Científica do Hospital de Clínicas de Porto Alegre [Internet]. Porto Alegre; 2016 [acessado em 16 mar. 2019]. Disponível em: https://lume.ufrgs.br/handle/10183/173171

11. Jorge BM. Construção e validação de protocolo de avaliação clínica para o diagnóstico de enfermagem de retenção urinária em pacientes adultos [tese] [Internet]. Ribeirão Preto: Escola de Enfermagem da Universidade de São Paulo; 2017 [acessado em 16 mar. 2019]. http://dx.doi.org/10.11606/T.22.2017.tde-11082017-190933

12. Jorge BM. Ultrassom portátil de bexiga: evidências científicas e autoconfiança do enfermeiro [dissertação] [Internet]. São Paulo: Universidade de São Paulo; 2014 [acessado em 16 mar. 2019]. Disponível em: http://bdtd.ibict.br/vufind/Record/USP_23c94da838641d4bc64a1b11754efda0

13. Mago AJ, Helayel PE, Bianchini E, Kozuki H, Oliveira Filho G. Prevalence and predictive factors of urinary retention assessed by ultrasound in the immediate post-anesthetic period. Rev Bras Anestesiol. 2010;60(4):387-90. http://dx.doi.org/10.1590/S0034-70942010000400005

14. Mazzo A, Martins JCA, Jorge BM, Batista RCN, Almeida RGS, Henriques FMD, et al. Validation of the self-confidence scale of nursing care in urinary retention. Rev Latino-am Enferm. 2015;23(5):814-20. http://dx.doi.org/10.1590/0104-1169.0256.2619

ELECTRONIC COMMUNICATION BETWEEN HEALTH PROFESSIONALS IN PATIENT ASSISTANCE: INTEGRATIVE REVIEW

Comunicação eletrônica entre profissionais de saúde na assistência ao paciente: revisão integrativa

Comunicación electrónica entre profisionales de salud em la asistencia al paciente: revisión integrativa

Ana Maria Rodrigues Moreira[1], Cristina Silva Sousa[2*], Ruth Natalia Teresa Turrini[3]

ABSTRACT: Purpose: To analyze scientific literature regarding the communication via electronic means between health professionals. **Method:** Integrative revision of the literature carried through databases and/or portals PubMed, Virtual Health Library and Cochrane, until August 2018, with combined describers, who answer to the leading question: "How does the electronic communication between health professionals in patient assistance occur?". **Results:** Six articles were included, published from 2011 to 2016 in the English language. Features were smartphone, pager and tablet. The applications used were WhatsApp, Medigram and Short Message Service (SMS). Agility, ease of use and support in decision-making were the advantages found in the use of this resource in the communication of professionals; among the disadvantages are lack of privacy and confidentiality of information, interruptions in assistance and inability to use the technological resource. **Conclusion:** The use of applications for messaging and interdisciplinary communication does indeed provide agility in communication, but the confidentiality of such data is still an issue to be addressed. Thus, it is up to the nurse to conduct communication with the other professionals, preserving the patient's privacy.

Keywords: Mobile applications. Information exchange. Smartphone. Communication. Nursing.

RESUMO: Objetivo: Analisar a literatura científica a respeito da comunicação por meios eletrônicos entre profissionais de saúde. **Método:** Revisão integrativa da literatura, realizada nas bases de dados e/ou portais PubMed, Biblioteca Virtual em Saúde e Cochrane, até agosto de 2018, com descritores combinados, que respondem à pergunta norteadora: "Como ocorre a comunicação eletrônica entre os profissionais de saúde na assistência ao paciente? . **Resultados:** Seis artigos foram incluídos, publicados de 2011 a 2016, no idioma Inglês. Os recursos foram *smartphone*, *pager* e *tablet*. Os aplicativos utilizados foram WhatsApp, Medigram e Serviço de Mensagens Curtas (SMS). Agilidade, facilidade de uso e auxílio na tomada de decisão foram as vantagens encontradas no uso desse recurso na comunicação dos profissionais; dentre as desvantagens estão ausência de privacidade e de confidencialidade das informações, interrupções na assistência e inabilidade no uso do recurso tecnológico. **Conclusão:** O uso de aplicativos para troca de mensagens e comunicação interdisciplinar de fato proporciona agilidade na comunicação, mas a confidencialidade desses dados ainda é uma questão a ser tratada. Assim, cabe ao enfermeiro conduzir a comunicação com os demais profissionais, preservando a privacidade do paciente.

Palavras-chave: Aplicativos móveis. Troca de informações. Smartphone. Comunicação. Enfermagem.

RESUMEN: Objetivo: Analizar la literatura científica acerca de la comunicación por medios electrónicos entre profesionales de salud. **Método:** Revisión integrativa de la literatura, realizada en las bases de datos y/o portales PubMed, Biblioteca Virtual em Salud y Cochrane, hasta agosto de 2018, con descriptores combinados, que responden a la pregunta orientadora: "¿Cómo ocurre la comunicación electrónica entre los profesionales de salud en la asistencia al paciente?". **Resultados:** Seis artículos fueron incluidos, publicados de 2011 a 2016, en el idioma Inglés. Los recursos fueron teléfono inteligente,

[1]Nurse. Specialist in Management in Health Services by University Nove de Julho (Uninove) - São Paulo (SP), Brazil.
[2]Post Doctorate in Nursing. Temporary professor of the Medical-Surgical Nursing Department of the School of Nursing of the University of São Paulo (USP) - São Paulo (SP), Brazil.
[3]Associate Professor, Department of Medical-Surgical Nursing, School of Nursing, USP - São Paulo (SP), Brazil.
*Corresponding author: thicoteco@bol.com.br
Received: 10/24/2018 – Approved: 04/24/2019
DOI: 10.5327/Z1414-4425201900020008

pager y tablet. Las aplicaciones utilizadas fueron Whatsapp, Medigram y Servicio de mensajes cortos (SMS). Agilidad, facilidad de uso y ayuda em la tomada de decisión fueron las ventajas encontradas en el uso de ese recurso en la comunicación de los profesionales; entre las desventajas están la ausencia de privacidad y de confidencialidad de las informaciones, interrupciones em la asistencia e inhabilidad en el uso del recurso tecnológico. **Conclusión:** El uso de aplicaciones para el intercambio de mensajes y la comunicación interdisciplinaria de hecho proporciona agilidad en la comunicación, per la confidencialidad de estos datos sigue siendo una cuestión a tratar. Así, corresponde al enfermero conducir la comunicación con os demás profesionales, preservando la privacidad del paciente.

Palabras clave: Aplicaciones móviles. Intercambio de información. Teléfono inteligente. Comunicación. Enfermería.

INTRODUCTION

With the expansion of the use of smartphones, combined with increased mobile connectivity and Wi-Fi, there has been significant increase in their use in hospital environment[1].

In Brazil, a law on the protection of personal data has recently been published, which provides for specific rules on sensitive data. The importance of the so-called "precautionary principle", which provides for the reversal of the burden of proof, is emphasized, that is, those who practice the action that could cause individual or collective damages must present the evidence. In the United States of America, for example, there is the Health Insurance Portability and Accountability Act (HIPAA), an institution intended to protect all personal information used in the provision of health services[2].

In Brazil, the most common messaging application is known as WhatsApp (WhatsApp Inc. Mountain View, CA), an instant messaging application for smartphones, which uses internet to send text messages, images, videos, user location and audio messages[3].

Printed communication, as an important vehicle for mass communication, is gradually losing space for new media, including in hospital environments, with electronic medical records and telemedicine. Thus, the possibilities of communication have expanded among health professionals, made possible by the internet and by the use of smartphones.

We live in a professional environment with constant exchange of information through messages. Through these applications, it is possible to share images and have immediate access to answers, with the ease of interaction between professionals and patients.

According to the legislation of the Federal Council of Medicine (*Conselho Federal de Medicina* – CFM) No. 1643/2002, information about the identified patient can only be transmitted to another professional with prior permission, through their free and informed consent and under strict security standards, capable of guaranteeing confidentiality and integrity of the information[4], however empirical practice shows that communication occurs indistinctly, which may compromise the confidentiality of patient data.

In this process of communication by electronic means, interferences such as noise and parallel conversations can cause failures in the transmission of information; and these failures can bring direct harm to patient care[5].

It is important to take a critical look at the use of smartphones in communication among professionals, to better understand their positive and negative impact on patients, as the media often report cases of violation of privacy and secrecy in the area of health.

Given the lack of review studies on this communication medium and the expansion of the use of electronic media in health area, the current integrative literature review is justified.

OBJECTIVE

To analyze scientific literature regarding the communication via electronic means between health professionals.

METHOD

This is an integrative literature review, a research method used since the 1980s, guided by evidence-based practice. It aims to integrate scientific research and professional practice, enabling the synthesis of the state of knowledge of a subject and being able to point to knowledge gaps that deserve to be investigated[6].

This type of review proposes the following steps: formulation of a guiding question, search in the literature

for studies related to the theme, categorization, evaluation, inclusion, interpretation, results and synthesis of the knowledge evidenced in the articles analyzed[6]. Thus, this study presents as guiding question: "How does the electronic communication between health professionals in patient assistance occur?"

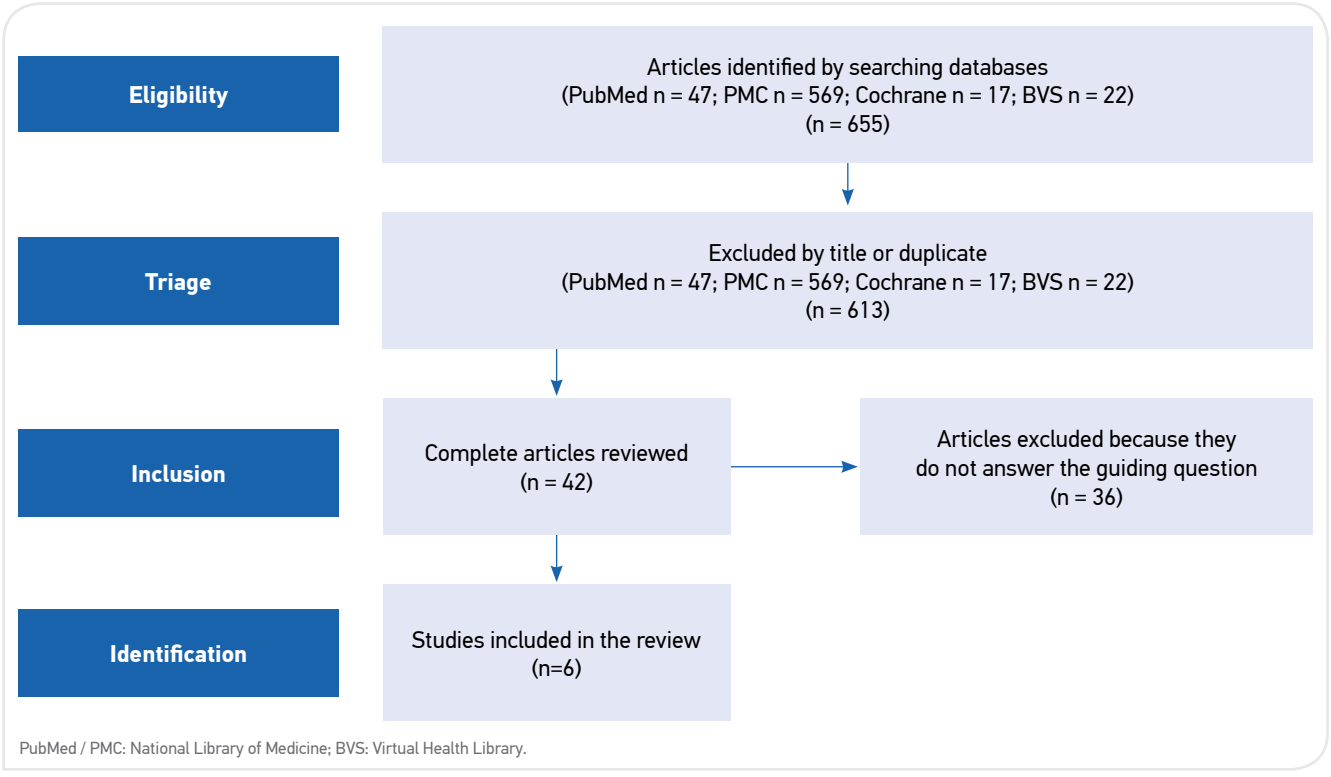
Inclusion criteria were: studies addressing the communication between health professionals, published in English, Spanish, Portuguese, French and Italian. Exclusion criteria were: studies addressing the communication between patients and health professionals, hospital management, monitoring of signs and symptoms.

The search was performed in databases and/or portals: National Library of Medicine (PubMed, PMC), Virtual Health Library (*Biblioteca Virtual em Saúde* - BVS) and Cochrane[7]. As the oldest database, Medical Literature Analysis and Retrieval System Online (MEDLINE) incorporates articles since 1966, the search period considered was from that year to August 2018.

Uncontrolled descriptors and Boolean operators were used in the search structure: (smartphone) AND (communication) AND (health team OR health staff) NOT (pain OR diabetic OR health promotion OR mental health). In databases without interface with this strategy, the same structure was used with the Boolean term AND to make the connection between the search boxes. It is noteworthy that numerous combinations with controlled descriptors were performed, which resulted in a high number of studies, rendering the analysis unfeasible. Thus, to allow an analysis according to the criteria established, the use of uncontrolled descriptors was fundamental to select the studies.

Thus, 655 articles were found in the databases. Initially, an analysis of the titles was performed according to the inclusion criterion, excluding 613 articles because they did not answer the guiding question. Subsequently, the remaining 42 articles were evaluated by the abstracts and six articles remained for full reading (Figure 1).

For data collection, an instrument was elaborated with information about: authors, article title, year, location, objective, type of study, population, sample characteristics, type of equipment and application, inclusion criteria and conclusions. The data were analyzed based on a summary table. For the methodological evaluation of the selected studies, the Oxford[7] level of evidence was used. In order to present the synthesis of the articles, a synoptic



PubMed / PMC: National Library of Medicine; BVS: Virtual Health Library.

Figure 1. Diagram of the search in the databases and/or portals.

table was prepared, containing the following characteristics: authors/year, type of study, type of institution/country, type of equipment/communication, population/number of participants, observation time, study objective and level of evidence.

RESULTS

The six articles selected were published in the period from 2011 to 2016. Among them, two articles resulted from a research conducted in the United States[8,9], three in Canada[10-12] and a population-based study in Kenya[13] (Chart 1).

Two studies were survey type cross-sectional quantitative studies[9,10], a randomized clinical trial[8], a qualitative study with ethnographic method[10] and two with quantitative and qualitative analysis by content[11,13]. Observation time, when described, ranged from 8 weeks to 17 months.

The study population in the articles included assistant physicians[8,10,11], clinical group coordinators, resident physicians[8-12], interns[9], medical students[10], nurses[10,11], pharmacists[8], community health agents[13], supervisors of groups of community health agents[13], professionals from the local Ministry of Health[13], professionals connected to non-governmental organizations or academic institutions participating in the project[13].

The equipment used for electronic communication in five studies was the smartphone[9-11], and, in another one, the pager and the tablet[8]. The studies looked at different forms of communication: messaging applications such as WhatsApp[12,13] and Medigram[8], suitable for health professionals; e-mail through the Blackberry server[10,11], smartphone messaging system (SMS)[9] and messages by pager[8].

The use of smartphone occurred in different ways: communication of professionals in intrahospital environment[8], communication and education of patient[9,10], patient image and video exchanges between residents and medical assistants for diagnostic assistance[9,10], electronic communication between nurses and physicians to transmit information and request physician's action[10,11], messages and photos between community agents and health supervisors for guidance on conduct[13].

Message exchanges occurred between residents and medical preceptors during patient's evaluation to report changes and to clarify doubts[8,9,12]; and among physicians and nurses to report clinical changes or to obtain information about the patient[10,11]. Some authors mentioned the number of analyzed messages: 12,936[10], 13,717 calls[10,11] and 1,830 posts [13].

The greatest occurrence of message exchanges occurred during medical visits and in the release of results of exams with laboratory or imaging alterations, mainly when other professionals were needed for distance evaluation[8-11].

The studies were carried out in health/teaching institutions: University of Toronto[12] and four teaching hospitals: Toronto General Hospital (Western), Brigham and Women's Hospital Massachusetts, University of Utah and Stanford Hospital[8,9,11]. One study involved community primary health care agents and workers participating in a distance-learning project through a forum in Makueni and Kibera, Kenya[13].

Advantages were identified in the use of electronic communication: agility in the exchange of information, since most of the participants had the habit of also using the smartphone feature for personal communication[12,13]; benefit for distance education with the WhatsApp application as a tool for improvement in environments with expressive sociodemographic problems and in professional mentoring for problem solving, in this case an outbreak of cholera[13]; possibility of forums for distance health education[13]; availability of calculation of medication and other applications that support decision-making by health professionals[9].

Positive aspects regarding the perception about the use of applications for interprofessional communication were reported, such as agility in the exchange of information[12,13]; doctors' knowledge of the names of the nurses responsible for their patients[10]; greater efficiency of residents in clinical work and perception of better care[8,9,11,12].

Although studies have evaluated the use of such equipment as a powerful communication tool[8-11], some aspects were pointed out as a cause for concern. These include the privacy and confidentiality of patient-related information; frequent interruptions during medical care (about 46%)[9, 12] and during teaching activities[10,12]; incompatibility in responses among physicians; frustration reported by nurses, since they did not receive a return in about 50% of messages sent, which required new telephone calls[10,11]; adherence to patient-specific use, including calculators, scoring systems, diagnosis and medical records[9].

Communication weaknesses were also reported, such as little return on the nurse's call due to divergence in

Chart 1. Synthesis of the six selected studies as a sample of the present research.

Authors/ year	Type of study	Type of institution, country	Type of equipment, communication	Population (No. of participants)	Observation time	Objective of the study	Evidence
Przybylo et al. (2014)[8]	Randomized clinical trial	Stanford Hospital, United States	Smartphone, Medigram compliant group messaging (HCGM) and traditional pager system	Participants divided into five groups of internal medicine: three randomized to the study group and two to the control group (n = 75)	8 weeks	To determine whether adding a Medigram text messaging application to the one-way pager improves communication between the hospital staff	1B
Raaum et al. (2015)[9]	Survey type cross-sectional study	University of Utah, Brigham and Women's Hospital, United States	Smartphone, SMS	Resident physician (175/330) (n = 175)	Not reported	To characterize the use of smartphone by resident physicians from academic institutions and to investigate their training in the clinical use of these devices	2C
Wu et al. (2011)[10]	Qualitative study with ethnographic reference	Toronto General Hospital, Canada	Blackberry cell phone, email	Resident doctors in medical clinic and nurses (n = 34)	17 months	To evaluate the use pattern of the use of smartphone , the advantages and disadvantages of its use; determine aspects to improve its use	2C
Smith et al. (2012)[11]	Quantitative-qualitative cross-sectional study of e-mail	Clinics of general hospital in Toronto, Canada	Blackberry cell phone, email	Resident physicians of medical clinic (34/67) (n = 34)	6 months	To analyze the content of e-mail communication between doctors, nurses and other health professionals	2C
Tran et al. (2014)[12]	Survey type cross-sectional study	Faculty of Medicine, University of Ontario, Canada	Smartphones, WhatsApp	Medical students of the 4th year (99/218) (n = 99)	Not reported	To evaluate the use of smartphones during the clinical stage and describe the perception of impact on the privacy and confidentiality of health information	2C
Henry et al. (2016)[13]	Quantitative-qualitative cross-sectional study of e-mail	Two units of mobile learning intervention (mCHW) study in Kenya	WhatsApp, forum learning	Community health agents, project supervisors, government health agency staff, non-governmental organizations or partner institutions (n = 41)	6 months	Document the use of WhatsApp as a support for supervision of community agents; identify how this is done and how it relates to overall project oversight	2C

SMS: Short Message System.

the severity criteria of the situation[10]; residents reported that 42% of the nurses' e-mails did not require answers, as they were informative only[11]; and lack of ability to use smartphone and applications[8,9].

The study that aimed to compare two messaging systems, one according to the information protection law, the Medigram (free access application for smartphone with access password) and a pager for use in the study hospital, did not observe statistical difference in relation to the aspects of the messages received in each modality; however, Medigram was best evaluated regarding the perceived effectiveness in the two means of communication,[8]. The most effective features of Medigram were: ease of use, ability to communicate by messages in the group, speed. The least effective features mentioned were: ability to be everywhere at the same time (ubiquity), inconsistent use by those who accessed the application, and reliability in the transmission of the message[8].

The authors of one of the studies[12] addressed the ethical question of this form of communication and observed that 78% of residents reported never identifying the patient during the exchange of messages about clinical behavior and 59% of these professionals stated that they received, in their training, guidelines on how to use the electronic communication feature and how to preserve confidentiality about patient data[13].

Overall, the results demonstrate that electronic communication brings benefits, but there must be prudence.

DISCUSSION

Few studies answered the guiding question, which may be due to the short time of use of this resource in the professional environment, since the oldest publication was in 2011. The studies included here have a predominant level of evidence 2C. In addition, no national studies on the subject were found.

The use of BlackBerry was surpassed by iPhone® in 2010, and extinct in 2016. With this, current studies depict other smartphone systems such as IOS, Android or Windows Phone. However, regardless of the technological resource used, the benefits evidenced in the use of the communication tool are similar to the findings of this study: agility in communication and efficiency in clinical work due to case sharing and the exchange of information on clinical behavior[14,15].

The SMS is similar to WhatsApp, in the exchange of text messages, but has become less used with the arrival of this new application.

Two studies[12,13] made use of the WhatsApp application for exchanging messages among health professionals. This feature has proven to be a cheap and agile tool that can be used in any mobile phone system with easy handling, speed and agility in the return of answers. On the other hand, there is a lack of understanding of how information is transmitted and stored when using WhatsApp, and problems with patient confidentiality and data security[14].

Additional WhatsApp benefits include the ability to create group messages, allowing better team communication, reviewing outgoing conversations, and additional opinion on patient cases and management[1,16].

The use of WhatsApp groups is observed in clinical practice for nurses and area coordinators for rapid communication of information related to work routine, shifts and guidelines. Another group profile consists of nurses from various hospitals to exchange information on routines and guidelines for materials.

This type of communication facilitates the transmission of messages and can be quickly visualized; however, it increases the use of smartphone in the working environment.

The use of the Medigram application was only identified in one study[8]. Messages are encrypted and access to the application is password-protected. This feature has been used in health working spaces, demonstrating increased accountability, improved efficiency, workflow integration, and overall satisfaction[1]. There is another commercially available application, Vocera, for intrahospital and secure communication and privacy of the shared data[17].

Message exchange features require careful typing, since errors, abbreviations, and auto-correction are common and may distort information. Subsequent corrections generate numerous messages, which propitiate the loss of important information, once that they go unnoticed in reading. There are also the errors of sending and receiving messages, absence of internet network, forgetting, losing or having the smartphone stolen, which prevent contact with the professional. Therefore, this should not be the only communication tool[18].

The disadvantages of these communication features were also observed in other studies, such as: interruption of work activities to consult and answer messages and calls[16,17] and possible patient exposure[16].

The use of smartphones in the workplace can be recognized as an indispensable tool to complete everyday tasks and certain clinical routines[19]; however there is concern regarding job performance, given that about 70% of the nurses witnessed improper use of the smartphone during labor activities[20].

This review also identified that nurses are concerned about the use of smartphones[8,10,12]. In a study carried out with students and nurses, there were reports of incidents caused by the use of the device during care and complaints of patients regarding the overuse of the device by the professional[21].

Health professionals, such as doctors and nurses, were extremely annoyed by interruptions to the workflow during assistance because of calls and electronic messages[22].

In a study[23], undergraduate nursing students mentioned that they observed 83% of nurses using the smartphone during clinical practice and 15% of them said that there should be regulatory policies for the use of the device. On the other hand, students, during their graduation studies, are encouraged to use the smartphone to complete the learning contents[23]. Assistant nurses, when asked about the use of the smartphone, reported that these devices bring benefits to patient care by applying technology in favor of good practices[21].

Among the limitations of this study are the few articles published about the use of this resource in communication among health professionals, which limits the evaluation of its use, as well as the variety of research outlines. The results allowed to identify the need for studies that discuss the ethical issues involved in this process of message exchange, security and data confidentiality.

CONCLUSION

It is concluded that there is little literature, so far, on the subject of electronic communication among health professionals. The advantage of information agility and the possibility of creating groups of conversation with greater dissemination of guidelines and routines among professionals is evident. However, there is still a long road to be travelled, due to legal and ethical demands, when this information is related to patients. Healthcare professionals do not yet have defined criteria for exchanging sensitive patient information and should be aware of disruptions and possible incidents related to the use of the smartphone in the workplace.

It is desirable that the nurse is the protagonist in conducting and transmitting patient's information, identifying pertinent information to be transmitted to the multidisciplinary team, maintaining the privacy of the information in an ethical and respectful way and managing assistance so the patient is benefited by the use of electronic communication, in favor of its recovery.

REFERENCES

1. Pourmand A, Roberson J, Gallugi A, Sabha Y, O'Connell. Secure smartphone application-based text messaging in emergency department, a system implementation and review of literature. Am J Emerg Med. 2018;36(9):1680-5. https://doi.org/10.1016/j.ajem.2018.06.067

2. Brasil. Lei nº 13.709, de 14 de agosto de 2018. Dispõe sobre a proteção de dados pessoais e altera a Lei nº 12.965, de 23 de abril de 2014 (Marco Civil da Internet). Diário Oficial da União [Internet]. 2018 [acessado em 30 set. 2018];Seção I(157):59-64. Disponivel em: http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2018/Lei/L13709.htm

3. Petruzzi M, Benedittis M. WhatsApp: a telemedicine platform for facilitating remote oral medicine consultation and improving clinical examinations. Oral Surg Oral Med Oral Pathol Oral Radiol. 2016;121(3):248-54. https://doi.org/10.1016/j.oooo.2015.11.005

4. Conselho Federal de Medicina. Resolução CFM nº 1.643/2002. Define a disciplina a proteção de serviços através da telemedicina. Diário Oficial da União [Internet]. 2002 [acessado em 30 set. 2018];Seção I:205. Disponível em: http://www.portalmedico.org.br/resolucoes/cfm/2002/1643_2002.pdf

5. Sousa CS, Souza RCS, Gonçalves MC, Diniz TRZ, Cunha ALM. Comunicação efetiva entre o centro cirúrgico e a unidade de terapia intensiva. Rev SOBECC. 2014;19(1):44-50. https://doi.org/10.4322/sobecc.2014.004

6. Mendes KDS, Silveira RCCP, Galvão CM. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem. Texto Contexto Enferm. 2008;17(4):758-64. http://dx.doi.org/10.1590/S0104-07072008000400018

7. Centre for Evidence-Based Medicine. Levels of evidence [Internet]. Oxford: Centre for Evidence-Based Medicine; 2009 [acessado em 30 set. 2018]. Disponível em: http://www.cebm.net/oxford-centre-evidence-based-medicine-levels-evidence-march-2009/

8. Przybylo JA, Wang A, Loftus P, Evans KH, Chu I, Shieh L. Smarter hospital communication: secure smartphone text messaging improves provider satisfaction and perception of efficacy, workflow. J Hosp Med. 2014;9(9):573-8. https://doi.org/10.1002/jhm.2228

9. Raaum SE, Arbelaez C, Vallejo CE, Patino Am, Colbert-Getz JM, Milne CK. Emergency medicine and internal medicine trainees' smartphone use in clinical settings in the United States. J Educ Eval Health Prof. 2015;12:48. http://dx.doi.org/10.3352/jeehp.2015.12.48

10. Wu R, Rossos P, Quan S, Reeves S, Lo V, Wong B, et al. An evaluation of the use of smartphone to communicate between clinicians: a mixed-methods study. J Med Internet Res. 2011;13(3):e.59. https://doi.org/10.2196/jmir.1655

11. Smith CN, Quan SD, Morra D, Rossos PG, Khatibi H, Lo V, et al. Understanding interprofessional communication: a content analysis of email communications between doctors and nurses. Appl Clin Inf. 2012;3(1):38-51. http://dx.doi.org/10.4338/ACI-2011-11-RA-0067

12. Tran K, Morra D, Lo V, Quan SD, Abrams H, Wu RC. Medical students and personal smartphones in the clinical environment: the impact on confidentiality of personal health information and professionalism. J Med Internet Res. 2014;16(5):e132. https://doi.org/10.2196/jmir.3138

13. Henry JV, Winters N, Lakati A, Oliver M, Geniets A, Mbae SM, et al. Enhancing the supervision of community health workers with WhatsApp mobile messaging: qualitative findings from 2 low-resource settings in Kenya. Glob Health Sci Pract. 2016;4(2):311-25. https://doi.org/10.9745/GHSP-D-15-00386

14. Popovici I, Morita PP, Doran D, Lapinsky S, Morra D, Shier A, et al.Technological aspects of hospital communication challenges: an observational study. Int J Qual Health Care. 2015;27(3):183-8. https://doi.org/10.1093/intqhc/mzv016

15. Ganasegeran K, Renganathan P, Rashid A, Al-Dubai SA. The m-health revolution: exploring perceived benefits of WhatsApp use in clinical practice. Int J Med Inform. 2017;97:145-51. http://dx.doi.org/10.1016/j.ijmedinf.2016.10.013

16. Boulos MNK, Giustini DM, Wheeler S. Instagram and Whatsapp in health and healthcare: an overview. Future Internet. 2016;8(3):37. https://doi.org/10.3390/fi8030037

17. Webb C, Spina SP, Young S. Integrating smartphone communication strategy and technology into clinical practice: a mixed methods research study. Health Policy and Technology. 2016;5(4):370-5. http://dx.doi.org/10.1016/j.hlpt.2016.07.004

18. Redelmeier DA, Detsky AS. Pittalls with Smartphones in Medicine. J Gen Intern Med. 2013;28(10):1260-3. https://doi.org/10.1007/s11606-013-2467-4

19. Putzer GJ, Park Y. The effects of innovation factors on smartphone adoption among nurses in community hospitals. Perspect Health Inf Manag [Internet]. 2010 [acessado em 30 ago. 2018];7:1b. Disponível em: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2805554/pdf/phim0007-0001b.pdf

20. McBride D, LeVasseur SA, Li D. Nursing performance and mobile phone use: are nurses aware of their performance decrements? JMIR Hum Factors. 2015;2(1):e6. http://dx.doi.org/10.2196/humanfactors.4070

21. McNally G, Frey R, Crossan M. Nurse manager and student nurse perceptions of the use of personal smartphones or tablets and the adjunct applications, as an educationaltool in clinical settings. Nurse Educ Pract. 2017;23:1-7. http://dx.doi.org/10.1016/j.nepr.2016.12.004

22. Locke KA, Duffey-Rosenstein B, De Lio G, Morra D, Hariton N. Beyond paging: building a web-based communication tool for nurse and physicians. J Gen Interm Med. 2009;24(1):105-10. http://dx.doi.org/10.1007/s11606-008-0827-2

23. Cho S, Lee E. Distraction by smartphone use during clinical practice and options about smartphone restriction policies: a cross-sectional descriptive study of nursing students. Nurse Educ Today. 2016;40:128-33. http://dx.doi.org/10.1016/j.nedt.2016.02.021

COMPUTERIZED STRUCTURE FOR PROCEDURES AT THE CENTRAL STERILE SERVICES DEPARTMENT

Estrutura informatizada para processos no centro de material e esterilização

Estructura informatizada para procedimientos en el centro de material y esterilización

Alisson Francisco Vargas Rodrigues[1]*, Daniela Silva dos Santos Schneider[2], Denise Tolfo Silveira[3], Ivana Trevisan[4], Maximiliano Dutra de Camargo[5], Elisabeth Gomes da Rocha Thomé[6]

ABSTRACT: Objective: To describe the stages of development and evaluation of the computerized structure for the processing of surgical trays processing at the preparation room of the central sterile services department (CSSD). **Method:** This is a technological production development project based on the "system life cycle" theory. **Results:** The structure was created using Google Apps forms and spreadsheets. The forms were developed based on the collection of information from references recorded in the surgical instruments, and checking of correct names in manufacturers' catalogs and photographic records of details of the parts. The evaluation was performed by the employees, and changes suggested by them were applied. The forms allowed to identify the name each surgical instrument and the manufacturer's reference, and to access the photos of materials, which was input to spreadsheets that allowed the keeping track of and managing surgical instruments. **Conclusion:** The computerization of the process of preparation of minimally invasive surgery trays made it easier, more intuitive and traceable. Technology can optimize the nursing care time at the CSSD in what concerns the planning of actions and the keeping track of procedures.

Keywords: Surgery department, hospital. Information systems. Surgical instruments. Sterilization.

RESUMO: Objetivo: Descrever as etapas de desenvolvimento e avaliação da estrutura informatizada para processamento de bandejas cirúrgicas na área de preparo do centro de material e esterilização. **Método:** Trata-se de um projeto de desenvolvimento de produção tecnológica embasada na teoria de "ciclo de vida do sistema". **Resultados:** A estrutura foi criada utilizando formulários e planilhas do Google Apps. Os formulários foram desenvolvidos com base na coleta de informações das referências gravadas nos instrumentais, consulta ao nome correto nos catálogos dos fabricantes e registros fotográficos de detalhes das peças. Foi realizada a avaliação pelos colaboradores, e foram feitas as alterações sugeridas pelos mesmos. Os formulários permitiram identificar o nome do instrumental e a referência do fabricante e acessar as fotos dos materiais, o que passou a gerar planilhas que permitiram a rastreabilidade e o gerenciamento dos materiais cirúrgicos. **Conclusão:** A informatização do preparo das bandejas de cirurgia minimamente invasiva contribuiu para o preparo de maneira fácil, intuitiva e de forma rastreável. A tecnologia pode otimizar o tempo de assistência do enfermeiro do centro de material e esterilização com as questões relacionadas ao planejamento das ações gerenciais e à rastreabilidade dos processos.

Palavras-chave: Centro cirúrgico hospitalar. Sistemas de informação. Instrumentos cirúrgicos. Esterilização

RESUMEN: Objetivo: Describir las etapas de desarrollo y evaluación de la estructura informatizada para el procesamiento de bandejas quirúrgicas en el área de preparación del centro de material y esterilización. **Método:** Se trata de un proyecto de desarrollo de producción tecnológica basada en la teoría de "ciclo de vida del sistema". **Resultados:** La estructura se creó utilizando formularios y hojas de cálculo de Google Apps. Los formularios fueron

[1]Nurse; Nurse at Hospital Tacchini – Bento Gonçalves (RS), Brazil.
[2]Nurse; MD in Applied Toxology. Nurse at the Central Sterile Services Department of Hospital de Clínicas de Porto Alegre – Porto Alegre (RS), Brazil.
[3]PhD in Sciences. Associate Professor of the Nursing School, Department of Medical-Surgical Nursing, Universidade Federal do Rio Grande do Sul (UFRGS) – Porto Alegre (RS), Brazil.
[4]Nurse; MD in Nursing. Nurse at Hospital de Clínicas de Porto Alegre – Porto Alegre (RS), Brazil.
[5]Nurse by UFRGS – Porto Alegre (RS), Brazil.
[6]PhD in Nursing. Adjunct Professor of the Department of Medical-Surgical Nursing, Nursing School, UFRGS – Porto Alegre (RS), Brazil.
*Corresponding author: alisson.fvr@gmail.com
Received: 08/26/2018 – Approved: 05/01/2019
DOI: 10.5327/Z1414-4425201900020009

desarrollados en base a la recolección de informaciones de las referencias grabadas en los instrumentos, consulta al nombre correcto en los catálogos de los fabricantes y registros fotográficos de detalles de las piezas. Se realizó la evaluación por los colaboradores, y se efectuaron las alteraciones sugeridas por los colaboradores. Los formularios permitieron identificar el nombre del instrumental y la referencia del fabricante y acceder a las fotos de los materiales, lo que pasó a generar hojas que permitieron la trazabilidad y la gestión de los materiales quirúrgicos. **Conclusión:** La informatización de la preparación de las bandejas de cirugía mínimamente invasiva contribuyó a la preparación de manera fácil, intuitiva y de forma rastreable. La tecnología puede optimizar el tiempo de asistencia del enfermero del centro de material y esterilización con las cuestiones relacionadas con la planificación de las acciones gerenciales y la trazabilidad de los procesos.

Palabras clave: Servicio de cirugía en hospital. Sistemas de información. Instrumentos quirúrgicos. Esterilización.

INTRODUCTION

Year after year, hospital institutions tend to be audited, both financially and on the quality of the service provided, which is a challenge to be overcome. In search of improvements, hospital managers, in general, know the importance of information technology (IT) for the institution, but do not prioritize it in their management, demoting it to a background position, behind assistance activities, consultations, medications, reforms of the units, among other activities[1].

The use of computerized systems allows immediate access to information and processes, contributing to assistance planning, cost management and decisionmaking, in order to assist in the efficiency of the institutional system[1].

The central sterile services department (CSSD), in the context of patient care, is a functional department assigned for the processing of health products. This processing encompasses a set of actions, such as pre-cleaning, following to stages related to reception, drying, integrity and functionality evaluation, preparation, sterilization, storage and distribution to the consumer deparments[2]. The nurse in this sector has the task of managing, organizing and planning procedures; developing management activities for procedures and materials, having as one of their responsibilities to ensure the safe sterilization of the materials that will be used in the development of patient care[3].

Given this, the nurse is one of the most skilled professionals for the management of hospital supplies. Nurses, by trade, are put in charge of management activities, they make use of norms of sanitary regulation and legislation to evaluate the best choice of materials that meet the needs of patients and professionals, with quality and safety in care[4].

Technological innovation has an increasing impact on nursing activity, creating the need for these professionals to understand that computerized tools, which can strongly contribute to the improvement of care, will be more and more present in their practice. In their daily activity, it is essential, for example, that the CSSD nurse be able to dynamically and quickly find, in real time, the location of surgical instruments, using some type of computerized system to keep track of them.

According to the Brazilian Association of Technical Standards (*Associação Brasileira de Normas Técnicas* – ABNT), in NBR ISO 9000, the traceability process is defined by the ability to keep track of the history, application, use and location of a single piece of merchandise[5]. Based on this principle, at the CSSD, the most important information is related to the origin and destination of surgical trays. However, in order for this department's traceability process to be transparent and uneventful, its application should not be seen as an obligation, but as an auxiliary tool for decision-making and quality management[6].

When observing the CSSD workflow, one may observe that it involves concepts of logistics, which include the process of supply chain management — which deals with planning, implementation, efficient and effective control over the flow and storage of goods, services and related information, from its point of origin to its point of consumption, in order to meet the needs of customers[7].

At the CSSD, the flow of procedures is the key point. Logistics must be clear, fast and efficient, with the objective of meeting the demands of the final consumers, namely, hospital service users.

For this purpose, a computerized structure was developed, for the CSSD, to trace the processes at the surgical tray preparation room, also meeting the needs of database generated from this process, such as support to other management and service quality indicators.

In this perspective, the premise in this article was to describe the stages of development and to evaluate the computerized structure to surgical tray processing at the CSSD preparation room, in addition to contributing with information and propositions that prompted some reflections on construction of knowledge in the field of information systems.

OBJECTIVE

To describe the stages of development and evaluation of the computerized structure for surgical trays processing at the CSSD preparation room.

METHOD

This is a technological production development project based on the "system life cycle" theory, consisting of seven phases: problem identification, feasibility study, analysis (of current system activities, material needs such as hardware, software; cost and benefit per activity and database requirements), detailed project design (developed flowcharts of programs, file layouts, data description and others), implementation, testing and maintenance[8].

Google Apps was the technology chosen in order to make the computerized structure. The electronic form is filled out by the nursing team via mobile device or on computers. For each input of a form, a line is generated on Google Sheets. This computerized structure is at a cloud-hosted website, which was also developed with the Google tool with information access profile controls, using Google Groups and sharing rules.

The study was carried out at the CSSD of *Hospital de Clínicas de Porto Alegre* (HCPA), a public institution academically linked to *Universidade Federal do Rio Grande do Sul* (UFRGS), which is part of a network of university hospitals of the Ministry of Education (*Ministério da Educação* – MEC). Its excellence in management, infrastructure, service and professional qualification is certified since 2013 by accreditation of the Join Commission International (JCI)[9].

The CSSD meets all the disinfection and sterilization procedures of the institution and is linked to the surgical center nursing service (SCNS), which consists of four departments: surgical ward, ambulatory operating room, recovery room and CSSD[10].

This study was carried out following the precepts of resolution No. 466/2012, which regulates ethical norms for research involving human beings[11]. The project was approved by the Nursing School's Research Committee (*Comissão de Pesquisa da Escola de Enfermagem* – COMPESQ/ENF) of UFRGS and by the Research Ethics Committee of the HCPA (*Comitê de Ética em Pesquisa* – CEP/HCPA), under number 64023317.8.0000.5327, via Plataforma Brasil.

The current study is socially relevant by serving as a structure and a tool for management of CSSD's procedures in the perspective of traceability and management of health service quality.

RESULTS

The research result was the application of the stages of development, based on the "system life cycle" theory[8].

Problem Identification

Problem identification was performed through activities of CSSD nurses of HCPA, who observed the need to computerize the system that, until then, was done manually; the need to collect information of production from a particular stage of the traceability process; and, ultimately, the need to mitigate the probability of making mistakes in assembling surgical kits.

Feasibility study

Meetings were held with the SCNS heads of the institution and CSSD nursing professionals to discuss the feasibility of the applicability of the computerized structure at the CSSD. The project prioritized, then, to start with the CSSD material preparation room, working with only one surgical specialty, videosurgery.

Analysis

In this stage, four nursing technicians specialized in assembling videosurgery surgical trays were consulted about how to facilitate visualizing and accessing the forms.

The computerized structure for surgical tray preparation used resources from Google Drive, such as: Google Forms, Google Sheets e Team Drives. Forms were used in the operational part of the CSSD preparation room, and the spreadsheets were used as a database for managing surgical equipment. It was agreed that access would be granted through use of the QR code.

Project

The idea of a computerized structure was discussed and matured with a nurse, chosen by the first researcher, with

experience in building websites using Google Sites and Google Forms. This professional devised and structured a first form, used for pre-test with CSSD employees.

The pre-test form was evaluated by future users of the system in what concerns to its structure, and was modified, facilitating the work to be executed. After the creation of all forms and their spreadsheets, several meetings were held with hospital IT specialists, CSSD managers, nurses and nursing technicians, reviewing access to content in a dynamic and less stressful way.

Implementation

At this stage, the computerized structure was implemented, following the steps below:

All the equipment of a surgical specialty was photographed and, subsequently, the photos were edited and saved in Google Drive;

The sheets, which previously were used for the assembly of trays, were withdrawn and computerized, using Google forms, which contain links so that one can examine the photos of the equipment used in the tray assembly (Figure 1);

A QR code was created for each tray (Figure 2) and shared with the nursing team. This code links to Google forms;

Each workbench at the preparation room has a computer and a webcam that reads the QR codes. The freeware Quickmark was the structure found that meets the compatibility criteria of the webcams and the operating system of the department's computers ;

Figure 2. QR Code model used.

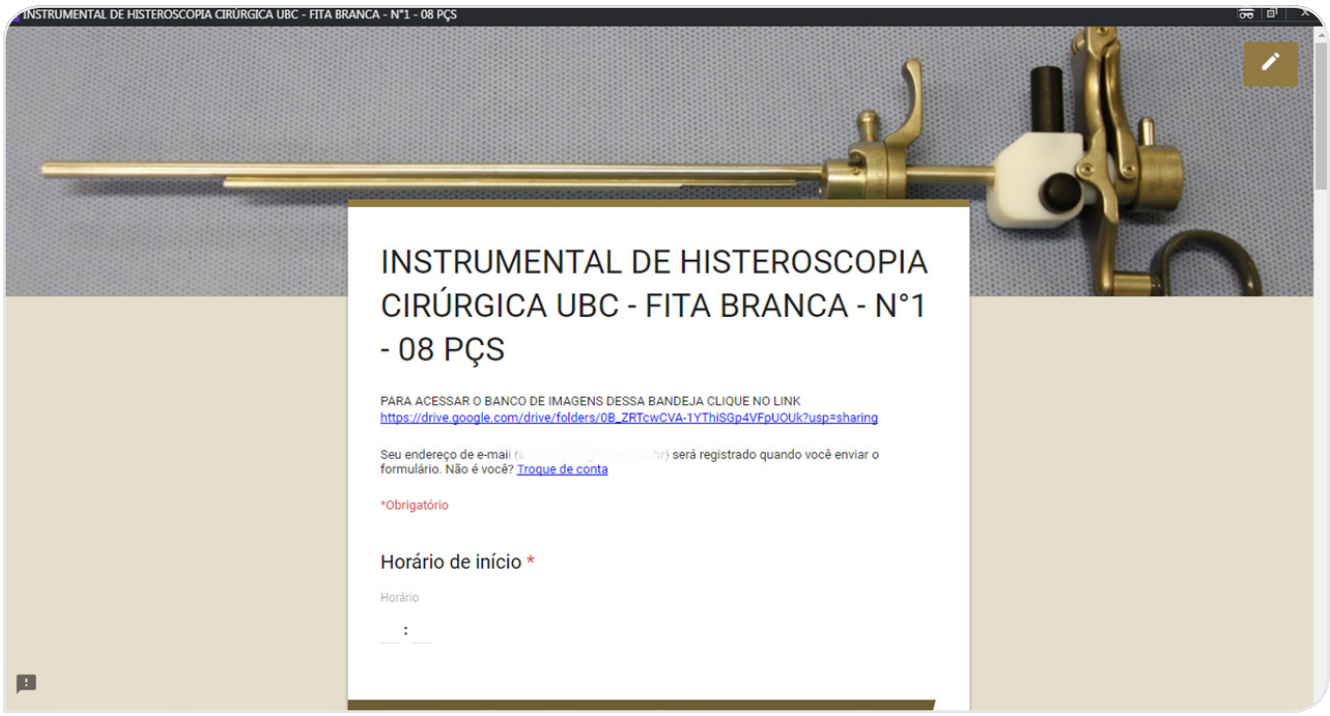


Figure 1. Google form created from the tray assembly sheets.

When Quickmark is used, the webcam is activated to read the QR code, opening the corresponding form automatically. Then, a log in with the e-mail and password used at the institution is required.

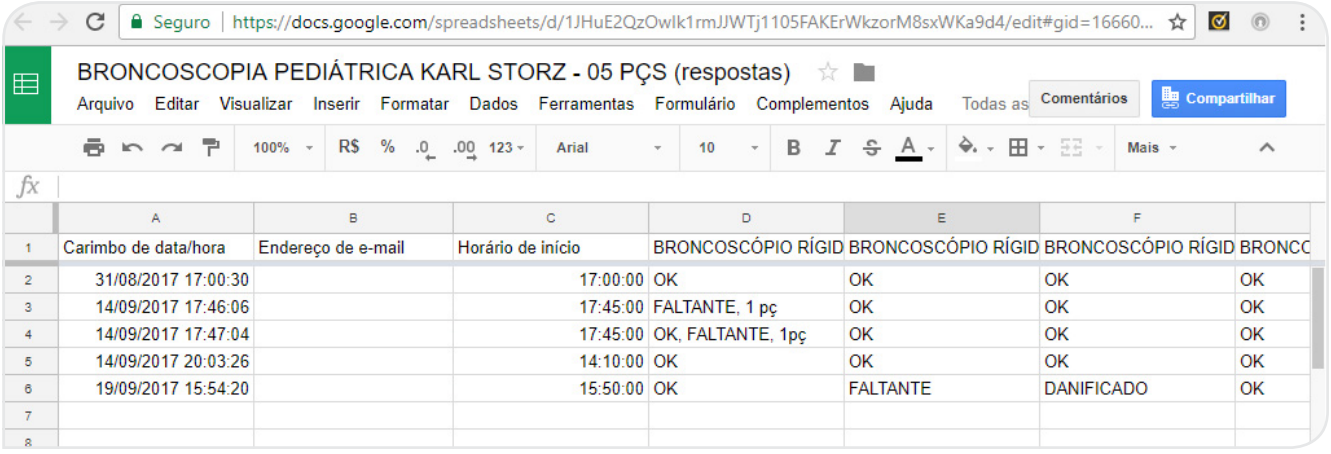
From that moment on, the employee performs the assembly of the tray with the equipment described in the form, all of which are mandatory answers (Figure 3);

At the end of the form, it is optional to send a copy of the answers to the employee by e-mail.

Having finished the tray assembly, the answers appear on a new line generated in a corresponding Google spreadsheet (Figure 4), providing information for managers — nurses of the department, in this case —, in real time, of what is being produced in the work shift;

By Google Drive and Google Forms sharing rules, it was defined who could answer the forms and view the surgical equipment photos. In this case, any employee who has the institutional e-mail can access the forms within the CSSD premises.

Figure 3. Example of answers that can be made on Google Form.



	A	B	C	D	E	F	
1	Carimbo de data/hora	Endereço de e-mail	Horário de início	BRONCOSCÓPIO RÍGID	BRONCOSCÓPIO RÍGID	BRONCOSCÓPIO RÍGID	BRONCC
2	31/08/2017 17:00:30		17:00:00	OK	OK	OK	OK
3	14/09/2017 17:46:06		17:45:00	FALTANTE, 1 pç	OK	OK	OK
4	14/09/2017 17:47:04		17:45:00	OK, FALTANTE, 1pç	OK	OK	OK
5	14/09/2017 20:03:26		14:10:00	OK	OK	OK	OK
6	19/09/2017 15:54:20		15:50:00	OK	FALTANTE	DANIFICADO	OK
7							

Figure 4. Report generated by Google Forms from the answers of users.

Tests

The proposal for this moment was the implementation of a pilot project at CSSD preparation room, to assess operational practice in a single surgical specialty, evaluated by specialists by an instrument in accordance with ISO/IEC 25.010.

Maintenance

When we reached this stage, the system had already passed the tests of acceptance and was considered ready for implementation. In case of any need for change on the system starting from implementation, this need was called maintenance[8].

In the current phase, the computerized structure for surgical tray traceability did not require maintenance, but it is planned according to the steps of the life cycle of systems.

DISCUSSION

The computerized structure for feasibility of traceability of surgical equipment was built within an innovative and low-cost logic for the institution. Especially if compared to what is available in the market in terms of software for traceability, with a high cost for acquisition and support, this structure becomes even more attractive to be multiplied in other health institutions.

However, many innovative ideas are not widespread in the scientific community. They are only broadcast locally on newspapers or television, not being discussed deeply, as they should, to show their real effect on health assistance. Sometimes, these same news discredit the system that one tries to implement, when it causes minimal slowness in the process, without knowing the real importance of the system in the organization and in management[1].

The phase of analysis was one of the most exhausting ones, because of the compatibility research of the software available in the institution, the hardware in the project budget and the human resources necessary to enable its construction. According to ISO/IEC 25.000, which assesses software quality, compatibility is the ability to exchange information between software, so that there is good performance in the functions required, while sharing hardware and software resources, without any interrupting the functioning of one another or of other products[12].

As the computerized structure was created in Google Drive, it allows any hospital employee to log in and access the forms, because the corporate e-mail (Gmail) login is the same used to access the forms, being easy to connect to Google Apps.

The entire project was created using Google Drive, more specifically Google Forms and Google Sheets. Forms were used for the operational part at the CSSD preparation room, and the spreadsheets generated through these forms are used as a database to assist the best management of surgical equipment.

The North American company, that created the applications under discussion, aims at making information globally accessible and organized through internet-based products. Its tools are widely recursive and easy to apply, allowing collective work among users, so that simultaneous editing and collaboration are possible in a single document dynamically, enabling new experiences[13].

These apps were also chosen due to their similarity to Microsoft Office software such as Word, Excel, and PowerPoint, which caused less oddity to users, by the fact that these programs are currently very popularized, except for Google Forms[14].

Having all the forms and their spreadsheets been created, several meetings were held with the hospital IT specialists, managers, nurses and CSSD nursing technicians, about accessing this content dynamically, and it was agreed that this access would be through QR code.

To make access to the forms easier, QR code was identified as the best technological solution, once it is a barcode of rapid two-dimensional response that — when compared to other codes, including one-dimensional classics — can store more information and access a webpage[15].

Another positive point for the adherence to QR code is that it can be generated by numerous software programs and applications available on the internet, basically changing a raw text, in this case a weblink, into a two-dimensional code matrix[16].

It is a fact that we are in a time of constant renewal and technological innovation, so it is necessary to search for solutions without costs of acquisition and support, and which work in various operating systems and hardware configurations (multi-platform system)[17].

The whole system was created aiming at enabling the professional nurse, a team leader who manages the sector, to perform activities in real time, optimizing time of assistance, in order to be able to absorb daily demands and to

better organize the flows and routines of the department, helping to control what is being produced daily[18].

FINAL CONSIDERATIONS

The applied computerized structure was able to meet the objectives contemplated in this study, enabling the beginning of the computerization of the traceability process at the CSSD of the Institution where the study was conducted, HCPA.

The entire system scope was thought together with the nursing team, aiming at optimizing the process of assembling surgical trays, the reliability of the data collected, the dynamicity of work by the nursing team and the monitoring of daily production or shift-to-shift.

The process of implementing this technology at the department was not as simple as expected, due to the great difficulty of interaction between the software and the hardware available. Thus, the IT department of the institution was essential for everything to function stably.

The study promoted the reflection that nursing needs updating in the field of information systems. Thus, technology optimizes nurse's assistance time with bureaucratic issues and provides planning of actions based on constantly updated data.

REFERENCES

1. Santos TO, Pereira LP, Silveira DT. Implantação de sistemas informatizados na saúde: uma revisão sistemática. Eletronic Maganize *Comunicação Informação Inovação Saúde. 2017;11*(3):1-11. http://dx.doi.org/10.29397/reciis.v11i3.1064

2. Brazil. Ministério da Saúde. Agência Nacional de Vigilância Sanitária. Resolução da Diretoria Colegiada (ANVISA) RDC nº 15, March 15 2012. It informs about good practice requirements for the processing of health products and provides other measures. Diário Oficial da União da República Federativa do Brasil. 2012.

3. Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Central Sterile Services Department. Diretrizes de práticas em enfermagem cirúrgica e processamento de produtos para saúde. 7ª ed. São Paulo: SOBECC; 2017.

4. Bogo PC, Bernardino E, Castilho V, Cruz ED. The nurse in the management of materials in teaching hospitals. Rev Esc Enferm USP. 2015;49(4):632-9. http://dx.doi.org/10.1590/S0080-623420150000400014

5. Associação Brasileira de Normas Técnicas. NBR ISO 9000: Sistemas de gestão da qualidade: fundamentos e vocabulário. 3ª ed. Rio de Janeiro: ABNT; 2015.

6. Campos MRR. Gestão de estoques com rastreabilidade de materiais: estudo de caso de impactos no inventário de uma indústria eletrônica. Rev Ciên Gerenc. 2008;12(15):177-94. http://dx.doi.org/10.17921/1415-6571.2008v12n15p177-194

7. Council of Supply Chain Management Professionals. Supply chain management terms and glossary [Internet]. Lombard: Council of Supply Chain Management Professionals [accessed in: September 10 2017]. Retrieved from: https://cscmp.org/imis0/CSCMP/Educate/SCM_Definitions_and_Glossery_of_Terms/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx?hkey=60879588-f65f-4ab5-8c4b-6878815ef921

8. Meilir PJ. Projeto estruturado de sistemas. São Paulo: McGraw-Hill; 1988.

9. Hospital de Clinicas de Porto Alegre. Institucional/Apresentação: Características [Internet]. Porto Alegre: Hospital de Clinicas de Porto Alegre [accessed in: September 27 2018]. Retrieved from: https://www.hcpa.edu.br/institucional/institucional-apresentacao/institucional-apresentacao-caracteristicas

10. Hospital de Clinicas de Porto Alegre. Serviços de Enfermagem: Enfermagem em Centro Cirúrgico [Internet]. Porto Alegre: Hospital de Clinicas de Porto Alegre [accessed in: September 27 2018]. Retrieved from: https://www.hcpa.edu.br/assistencia-servicos-de-enfermagem-enfermagem-em-centro-cirurgico

11. Brazil. Conselho Nacional de Saúde. Resolução nº 466, December 12 2012. Guidelines and regulatory norms for research involving human beings. [Internet]. 2012 [accessed in: July 07 2017. Retrieved from: http://bvsms.saude.gov.br/bvs/saudelegis/cns/2013/res0466_12_12_2012.html

12. Organização Internacional de Normalização. ISO/IEC 25000. Software engineering: System and Software Quality Requirements and Evaluation (SQuaRE). Genebra: ISO; 2014.

13. Sampaio A, Oliveira L, Gomes E. Formação docente em aplicativos Google Drive: desafios colocados à prática docente. Rev Estudios Investigación en Psicología y Educación. 2017;(13):168-71. http://dx.doi.org/10.17979/reipe.2017.0.13.2659

14. Ramos R, Ramos S, Asega F. Google Drive: potencialidades para o design de Material Educacional Digital (MED) para ensino de línguas. The Especialist. 2017;38(1):1-17. http://dx.doi.org/10.23925/2318-7115.2017v38i1a6

15. Liu C, Shi L, Xu X, Li H, Xing H, Liang D, et al. O código de barras do DNA é de duas dimensões: o servidor web do código QR do DNA. PloSone [Internet]. 2012 [accessed in: August 15 2017];7(5):e35146. Retrieved from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3344831/pdf/pone.0035146.pdf

16. Barrera JF, Mira-Agudelo A, Torroba R. Experimental QR code optical encryption: noise-free data recovering. Opt Lett. 2014;39(10);3074-7. http://dx.doi.org/10.1364/OL.39.003074

17. Santos SR. Informática em enfermagem: desenvolvimento de software livre com aplicação assistencial e gerencial. Rev Esc Enferm USP. 2010;44(2):295-301. http://dx.doi.org/10.1590/S0080-62342010000200008

18. Camargo MD, Martinato LHM, Silveira DT. Higienização hospitalar: etapas de desenvolvimento em ambiente de intranet. J Health Inform [Internet]. 2015 [accessed in: December 10 2017];7(4):121-6. Retrieved from: http://www.jhi-sbis.saude.ws/ojs-jhi/index.php/jhi-sbis/article/view/362/244

DOI: 10.5327/Z1414-4425201800040004erratum

In the manuscript "Evaluation of academics on nursing teaching and learning in a material and sterilization center", DOI: 10.5327/Z1414-4425201800040004, published in the Revista SOBECC, 23(4): 178-183, page 178.

Where it reads:

Eriraniele Wanessa Florencio de Souza[2]

It should read:

Eiraniele Wanessa Florencio de Souza[2]