INTEGRALITY OF SURGICAL PATIENT CARE: ARTICULATION BETWEEN HOSPITALS AND PRIMARY CARE

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The health care model before the Unified Health System (*Sistema Único de Saúde* – SUS) was predominantly individual, biomedical, and disease-centered. The health care approach to the patient was performed in a compartmentalized and timely manner, focused on the biological body and the resolution of the signs and symptoms presented. The hospital institution, as the maximum representative of this model, had a prominent place, both in terms of valuing its service offer and of the hierarchical level it occupied among health facilities, portraying a hierarchical and fragmented system[1].

After health reform, the understanding that health is not just the absence of disease culminated in the creation of SUS, which adopted a model of comprehensive care in which the individual is seen as an indivisible whole, and the process of illness as a result, not only of anatomical and physiological dysfunctions, but also determined by social and environmental conditions, and affected by support networks[1].

In this sense, health promotion, protection and recovery actions must also form an indivisible whole and cannot be compartmentalized, just as service providers, with their varying degrees of complexity, must be configured into a system capable of providing integral care to the patient[1,2].

Hence, it is necessary to ensure the continuity of care, through an adequate transition process between the points of attention of the health care networks, polyarchic organizations with common goals that guide service offerings and are coordinated by primary care[2].

As the demographic profile changes and chronic conditions increase, the health system is challenged to structure itself to provide ongoing care and health monitoring in an integrated and cooperative service model that entirely and continuously meets the health needs of the population[2].

The patient who undergoes a surgical intervention, after hospital discharge, needs a transition process between the hospital environment and the risk-free home environment that ensures continuity of care and preparation of both environment and family. This continuity is paramount to prevent complications and readmissions, to reduce health expenses and to promote the quality of life of both patient and family. Depending on the patient's degree of complexity, this transition can be a complicated process that requires proper communication, knowledge and skills by the professionals[3].

In the literature, strategies for comprehensive care and ensuring continuity of care in this transition process have been reported. As an example, we have the experience of the Catalan health system in Spain with Enlace hospital nurses, whose job is to verify the need for continuity of care after discharge, through consultation with the multiprofessional team and active search in the institution's information system of hospitalized patients. Nurses are aware of the resources needed to carry out this continuity and make contact with professionals in the patient's area of origin (primary care, health centers, hospitals and/or households) by telephone, e-mail or by shared computer systems services, ensuring a visit to the patient by the nurse or primary care physician within 48 hours of discharge[4].

In Brazil, a similar model to the Spanish one is developed in a region of the city of São Paulo, where there is the case manager figure, which articulates the hospital service with the Basic Health Units (*Unidades Básicas de Saúde* – UBS) and the home care service. The case manager, who may be a nurse or social worker, identifies patients with complex chronic conditions at hospital discharge, a group that often includes surgical patients, and that redirects them to the referral UBS for follow-up. If necessary, they make the assessment for admission to the home care service immediately after discharge[5].

Another initiative found in the literature is a communication system based on an internet platform, developed as a social network adapted for the use of health professionals,

which allows the sharing of information, documents and treatment plans between the hospital and the UBS, promoting the exchange of information and dialogues about the condition and treatment of patients during and after hospitalizations and readmissions[6].

Regarding the poorly integrated and articulated structure of our current health system, it needs to be further integrated, just as we are doing here in this editorial. Other actions include utilizing the tools of collaborative, patient-centered interprofessional care and promoting integration across disciplines from training with curricula that do not compartmentalize the patient into systems, specialty professionals and services on specialized care islands.

Understanding the completeness and continuity of care as protective and health-promoting factors for patients is as fundamental to better treatment outcomes as following discharge and nursing care

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EVALUATION OF CANCELLATION FACTORS OF SURGERIES IN NORTHEAST BRAZILIAN HOSPITALS

Avaliação dos fatores de cancelamento de cirurgias em hospitais do nordeste brasileiro

Evaluación de factores de cancelación de cirugía en hospitales brasileños del noreste

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ABSTRACT: Objectives: To identify the surgical cancellation rate and to evaluate the factors that cause surgery cancellation. **Methodology:** Quantitative research conducted in the surgical centers of two large hospitals, one public and one private-public, in the Northeast of Brazil. The research was approved by the Ethics Committee, under Certificate of Presentation for Ethical Appraisal (CAAE) 46831515.6.0000.5013, and data collection was performed through the electronic database of the hospitals. **Results:** From January 2014 to December 2015, in the public-private hospital, 20,810 surgeries were scheduled and 4,815 were suspended, with a surgical suspension rate of 23.3%. In the public hospital, 6,392 surgeries were scheduled and 2,702 suspended, with a suspension rate of 42.7%. The main suspension factors were related to patients and administrative aspects. **Conclusion:** It was possible to identify increased incidence of surgical cancellations over the years, showing considerable suspension rates. Thus, institutions need to seek strategies to minimize the incidence of cancellations of anesthetic-surgical procedures in health institutions.
Keywords: Health evaluation. Surgery department, hospital. Perioperative nursing. Hospitals.

RESUMO: Objetivos: Identificar a taxa de cancelamento cirúrgico e avaliar os fatores que causam o cancelamento de cirurgias. **Método:** Pesquisa quantitativa realizada nos centros cirúrgicos de dois hospitais de grande porte do Nordeste brasileiro, sendo um público e o outro privado-público. A pesquisa foi aprovada pelo Comitê de Ética, sob Certificado de Apresentação para Apreciação Ética (CAAE) 46831515.6.0000.5013, e a coleta dos dados foi realizada por meio do banco de dados eletrônico dos hospitais. **Resultados:** No período de janeiro de 2014 a dezembro de 2015, no hospital privado-público, foram programadas 20.810 cirurgias e suspensas 4.815, com taxa de suspensão cirúrgica de 23,3%. No hospital público, foram programadas 6.392 cirurgias e suspensas 2.702, com taxa de suspensão de 42,7%. Os principais fatores de suspensão relacionaram-se ao paciente e a aspectos administrativos. **Conclusão:** Foi possível identificar aumento da incidência de cancelamentos cirúrgicos no decorrer dos anos, evidenciando taxas de suspensão consideráveis. Dessa forma, é preciso que as instituições busquem estratégias com a finalidade de minimizar a incidência de cancelamentos de procedimentos anestésico-cirúrgicos nas instituições de saúde.
Palavras-chave: Avaliação em saúde. Centro cirúrgico hospitalar. Enfermagem perioperatória. Hospitais.

RESUMEN: Objetivos: Identificar la tasa de cancelación quirúrgica y evaluar los factores que causan la cancelación de la cirugía. **Método:** investigación cuantitativa realizada en los centros quirúrgicos de dos grandes hospitales en el noreste de Brasil, uno público y otro privado-público. La investigación fue aprobada por el Comité de Ética, bajo el Certificado de Presentación para la Evaluación Ética (CAAE) 46831515.6.0000.5013, y la recopilación de datos se realizó a través de la base de datos electrónica de hospitales. **Resultados:** desde enero de 2014 hasta diciembre de 2015, en el hospital público-privado, se programaron 20.810 cirugías y se suspendieron 4.815, con una tasa de suspensión quirúrgica del 23,3%. En el hospital público, se programaron 6.392 cirugías y se suspendieron 2.702, con una tasa de suspensión del 42,7%. Los principales factores de suspensión estaban relacionados con el paciente y los aspectos administrativos. **Conclusión:** fue posible identificar una mayor incidencia de cancelaciones quirúrgicas a lo largo de los años, mostrando tasas de suspensión considerables. Por lo tanto, las instituciones deben buscar estrategias para minimizar la incidencia de cancelaciones de procedimientos anestésico-quirúrgicos en instituciones de salud.
Palabras clave: Evaluación en salud. Servicio de cirugía en hospital. Enfermería perioperatoria. Hospitales.

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INTRODUCTION

The increase in the cancellation rate of surgeries impairs the planning and organization of the health service, as well as having repercussions for patients, professionals and health institutions[1]. This occurrence does not always receive proper attention from the health teams or the hospital administration itself[2].

The suspension of surgery offers inconvenience to the patient, which can cause psychological disruption and damage to the planning of daily life, as well as to the hospital, causing delays in the surgical programming, damage to other patients, increased operational and financial cost, prolongation of the hospitalization period and increased risk of infections[3]. As for emotional impact and costs, both can be minimized if suspension is made prior to admission[4].

Improvement in the quality of health services has been promoted through quality indicators used to monitor and evaluate care efficiency and service activities according to their characteristics[5]. The number of surgeries canceled is a variable that interferes with the performance of quantitative indicators, constituting parameters for evaluating productivity and the quality of services, and the surgery suspension rate is one of them[6].

"The rate of surgical suspension is defined as the number of procedures canceled, divided by the total number of scheduled surgeries over a period of time, multiplied by one hundred"[3]. Therefore, the standard of service and the improvement of quality indicators, such as the reduction of the surgery cancellation rate, need better flow management, more information and procedures scheduling, to better identify the suspension rate[6].

Surgical Center (SC) nurses have their work focused on administering and managing the unit, providing it with equipment, in order to allow for the best circumstances for the development of the surgical process, to improve the patients' health condition. Therefore, they determine the planning and thus need the programming of the surgical teams and other professionals or services involved and, in the event of complications, have a certain predictability in large SC[2].

The coordinating nurse is responsible for the administrative, technical-operational and ethical control, the provision and forecasting of adequate human and material resources, the strategic planning of nursing, the verification of the schedule in the surgical map and the orientation of the assembly of the operating rooms (OR), among other activities. Care nurses are responsible for checking the surgical schedule, supervising the nursing team's performance, elaborating the professionals' daily activities scale, among other tasks[7].

Given the above, it is clear that the cancellation of surgeries and their suspension rate are thematic evidences in the studies, and this predominance in the health service interferes with the quality of care. Therefore, institutions need to seek measures that favor better management of the SC routine, data collection, action planning and hiring trained nurses to promote adequate and humanized care, capable of developing strategies that can minimize cancellations, in order to improve the quality of health care and reduce the rate of suspension of anesthetic-surgical procedures.

OBJECTIVES

- To identify the surgical cancellation rate in two hospitals located in the Northeast of Brazil;
- Evaluate the factors that cause surgery cancellation in these two hospitals.

METHODOLOGY

This is a quantitative and descriptive research approved by the Research Ethics Committee of the Federal University of Alagoas, Alagoas, Brazil, under Certificate of Presentation for Ethical Appreciation (*Certificado de Apresentação para Apreciação Ética* – CAAE) number 46831515.6.0000.5013, conducted from January 2014 to December 2015, in the SC of two large hospitals located in a region of Northeastern Brazil, one private-public hospital and another public one.

Before beginning data collection, the researcher presented himself to the hospital directors, together with the research project, in order to request authorization for the study. When the authorization by the institution was formalized, data collection began.

Data collection was performed through electronic database, in which it was possible to obtain the pertinent information on the quantity of scheduled and suspended surgeries, generating monthly and annual surgical suspension rate,

in order to identify the factors that caused the surgical suspensions and the medical specialties that suspend surgeries the most, in addition to analyzing the gender and insurance information of patients.

Data collected were tabulated in the Microsoft Office® Excel program, and the analysis was performed using absolute frequencies, represented as tables and graphics.

RESULTS

In the public-private hospital, between 2014 and 2015, 20,810 surgeries were scheduled and 4,815 were canceled, indicating a surgical suspension rate of 23.3%. During this period, the suspension rate varied from 16.9 to 41.8%, considering the monthly statistics. As shown in Table 1, for a few months the suspension rate remained the same in both years. However, in 2014, the lowest rates were in August (17.4%) and January and September (20.4%), and, in 2015, in January (16.9%) and November (18.4%). The highest rates in 2014 were in December (25.4%) and March (26.4%), and in 2015, in October (26.8%) and December (41.8%).

Compared to the same period of 2014, in 2015, from August on, there was an increase in surgical suspension rates. During this period, in the private-public hospital, there was a reduction in the number of scheduled surgeries, but the number of suspensions remained, and December had the largest number of surgeries suspended, revealing a suspension rate of 41.8%.

In the public hospital, in the two years, 6,392 surgeries were scheduled and 2,702 were suspended, indicating a suspension rate of 42.27%. According to Table 2, during the study period, in the public hospital there was a variation in the surgical suspension rate from 3.79 to 115.53%. The lowest rates in 2014 were in September (3.79%), May (28.94%) and August (29.01%), and in 2015, in December (8.05%) and November (22.71%). The highest suspension rates in 2014 occurred in November (72.88%) and October (42.58%), and in 2015, in September (115.53%) and February (75.84%).

In 2015, the highest rates of surgical suspensions were revealed, especially in September, with an incidence of 115.53%. In data analysis, it was found that the number of surgeries suspended was higher than those scheduled. Therefore, the suspension rate was high, greater than 100%.

This was due to the fact that, in the public hospital, there are surgical procedures squeezed into the surgical planning, that arrive at the SC on the same day, after the surgical map is printed out. These fittings refer to surgeries in which the patient arrives at the hospital on the day of the operation, without having performed surgical confirmation.

Table 1. Scheduled and suspended surgeries and surgical suspension rate of the private-public hospital, according to the months of the years, in 2014 and 2015*.

Months	2014			2015		
	Scheduled	Suspended	Surgical suspension rate (%)	Scheduled	Suspended	Surgical suspension rate (%)
January	815	166	20.4	847	143	16.9
February	852	179	21.0	690	170	24.6
March	810	214	26.4	1,059	235	22.2
April	880	198	22.5	899	209	23.5
May	753	192	25.5	937	238	25.4
June	866	215	24.8	949	217	22.9
July	1,013	226	22.4	1,028	220	21.4
August	903	157	17.4	787	204	25.9
September	916	187	20.4	863	213	24.7
October	1,057	226	21.4	559	150	26.8
November	942	196	20.8	806	148	18.4
December	905	230	25.4	674	282	41.8

*%: surgical suspension rate.

Thus, the surgery is now accounted for as performed or suspended for hospital management control and not as scheduled, and therefore, the number of suspended surgeries may be higher than the scheduled ones, showing high rates of suspension. In the period studied, there was a difference in the surgical schedule, since the number of scheduled surgeries in the private-public hospital was three times higher than in the public hospital, but the public hospital, even with a smaller amount of surgical programming, had a higher number of surgeries, higher number of surgical suspension and exhibited the highest rate, equal to 42.27%.

Regarding biological gender, in the public-private hospital, of the 4,815 suspended surgeries, 2,371 (49.3%) patients were female and 2,444 (50.8%) male. In the public hospital, of the 2,702 surgeries suspended, 1,592 (58.91%) patients were female, thus the majority, and 971 (35.93%) were male.

As for health insurance cases, in the private-public hospital, in 2014, out of 2,386 (22.3%) surgeries suspended, 882 (36.9%) were private and/or health insurance covered and 1,504 (63.1%) belonged to the Unified Health System (*Sistema Único de Saúde* – SUS). In 2015, of the 2,429 suspended surgeries, 874 (35.9%) were private and/or health insurance covered and 1,555 (64.01%) were covered by SUS. In this context, it is clear that the largest number of suspensions were surgeries covered by SUS.

The factors that caused the suspension of surgical procedures were grouped and identified in this study by:

- Assistential: lack of fasting and absence of complementary exams (private-public and public hospital);
- Administrative: lack of material, lack of doctors, lack of blood and blood products, lack of medication, replacement by another urgent patient, suspension by the surgeon, marking error (in both hospitals), rescheduled surgery (only in the private-public hospital), lack of nursing staff member and non-release of the hospitalization authorization (only in the public hospital);
- Institutional structures: absence of bed and vacancy in the intensive care unit (ICU) (in both hospitals), unavailability of OR and equipment under maintenance (public hospital only);
- Patient-related: non-attendance, lack of clinical conditions, surgery already performed and death (both hospitals).
- Others: lack of available time (occurs when surgeries have prolonged performance, causing the delay of some and suspension of other procedures, due to lack of time in the day to perform other surgical procedures) and non-hospitalization of the patient due to the lack of authorization for the agreement (public-private and public hospital).

Table 2. Scheduled and suspended surgeries and surgical suspension rate of the public hospital, according to the months of the years, in 2014 and 2015*.

Months	2014			2015		
	Scheduled	Suspended	Surgical suspension rate (%)	Scheduled	Suspended	Surgical suspension rate (%)
January	168	53	31.54	242	134	55.37
February	219	81	36.98	178	135	75.84
March	201	64	31.84	322	135	41.92
April	252	88	34.92	301	73	24.25
May	304	88	28.94	275	119	43.27
June	242	86	35.53	268	97	36.19
July	271	104	38.37	322	105	32.60
August	293	85	29.01	314	150	47.77
September	316	12	3.79	206	238	115.53
October	364	155	42.58	241	170	70.53
November	284	207	72.88	317	72	22.71
December	258	90	34.88	273	22	8.05

*%: surgical suspension rate.

The main factors that caused cancellation in the public-private and in the public hospital in the two years analyzed were concerning the patient. Among these factors, the following stand out: non-attendance of the patient, with 1,145 occurrences (47.9%) in 2014 and 1,207 (42.5%) in 2015 in the private-public hospital; and 463 (41.33%) in 2014 and 425 (26.9%) in 2015 in the public hospital. The suspensions for lack of clinical conditions of the patient were: 275 (11.5%) in 2014 and 274 (11.3%) in 2015 at the public-private hospital; and 220 (19.6%) in 2014 and 390 (24.7%) in 2015 in the public hospital.

Regarding administrative factors, the lack of material and doctors was highlighted in both hospitals. In the public-private and public hospitals, respectively, the lack of material corresponded to 128 (5.4%) and 56 (5.0%) surgeries suspended in 2014; 169 (6.9%) and 150 (14.3%) in 2015; and due to the lack of doctors, 127 (5.3%) and 134 (11.7%) in 2014 and 175 (7.2%) and 137 (8.7%) in 2015. Another factor in evidence in the public hospital in 2015 was the lack of medication, which represented 121 (7.64%) suspensions. However, in both years, cancellations were found due to other factors, such as: 293 (12.1%) and 310 (12.8%) due to lack of time and 85 (3.5%) due to SUS shutdown in 2015. Table 3 shows the main causes of cancellation of surgeries in both hospitals.

As highlighted in Figure 1, patient-relevant factors were the most frequent in both hospitals. Then, there are the administrative ones, of higher proportion in the public hospital; the private-public hospital, however, stood out in other suspension factors, such as lack of available time and SUS shutdown.

The medical specialties that had the largest number of suspensions in the private-public hospital in 2014 and 2015 were, respectively: orthopedics, with 825 (34.6%) and 645 (22.7%); general surgery, with 413 (17.3%) and 468 (19.6%); otorhinolaryngology, with 208 (8.7%) and 257 (10.7%); pediatrics, with 178 (7.7%) and 159 (6.3%); urology, with 137 (5.7%) and 128 (5.3%); and gynecology, with 125 (5.2%) and 185 (7.7%).

In the public hospital, the specialties with the highest incidence of cancellation in 2014 and 2015 were, respectively: ophthalmology, with 404 (36.07%) and 561 (35.46%); general surgery, with 158 (14.10%) and 201 (12.70%); plastic surgery, with 113 (10.08%) and 93 (5.87%); urology, with 65 (5.80%) and 137 (8.65%); gynecology, with 90 (8.03%) and 101 (6.38%); and pediatrics, with 87 (7.76%) and 91 (5.75%).

Figure 2 shows the comparison of the surgery suspension rate in the two hospitals, according to specialty. It was observed that the highest suspension rates of the private-public hospital were in the orthopedics and general surgery specialties, and ophthalmology and general surgery in the public hospital.

Due to the results found, an assessment was made of the factors that caused the highest rates of suspension, according to specialties, in both hospitals. In the private-public hospital, the main factor for the suspension of orthopedics and general surgery specialties was the non-attendance of the patient, followed by the lack of available time, given that, of the total suspensions of each specialty, 1,498 and 879, in 2014 and 2015, were 428 (28.57%) and 349 (39.70%) suspensions for non-attendance of the patient; and 304 (20.29%) and 122 (13.87%) due to lack of time.

In addition to these causes, it is important to note that the findings show the occurrence of suspensions in the area of orthopedics due to lack of material, in the proportion of 165 (11.01%) canceled surgeries. In the otorhinolaryngology area, with a total of 436 suspensions, the main factors were non-attendance and lack of clinical conditions,

Table 3. Main factors that caused surgical suspension in the public-private and public hospitals, in 2014 and 2015*.

Factors		Public-private Hospital				Public Hospital			
		2014		2015		2014		2015	
		N.	%	N.	%	N.	%	N.	%
Patient related	Patient unattendance	1,145	47.9	1,270	42.5	463	41.33	425	26.9
	Lack of clinical conditions	275	11.5	274	11.3	220	19.6	390	24.7
Administrative	Lack of material	128	5.4	169	6.9	56	5.0	150	14.3
	Shortage of doctors	127	5.3	175	7.2	134	11.7	137	8.7

*%: surgical suspension rate.

which represented 314 (72.01%) and 60 (13.76%) suspensions, respectively.

In the public hospital, of the specialties of ophthalmology (959), general surgery (359) and plastic surgery (206), the most recurrent suspension factors of the first two were: non-attendance, with 537 (55.99%) and 75 (20.89%); and lack of clinical condition of the patient, with 233 (24.29%) and 68 (18.9%). Regarding plastic surgery, there was a divergence in the comparison of the frequency of the factors, since the lack of clinical conditions presented the largest quantity, 51 (24.75%), compared to 49 (23.78%) due to non-attendance of the patient.

DISCUSSION

Currently, cancellation of surgeries is considered one of the indicators of quality of care, being analyzed by the surgical suspension rate[8]. In this study, the suspension rate during the study period in the public-private hospital was 23.13%, and in the public hospital, 42.27%. Compared with the research, studies reveal the variation of rates between 33.8[9], 18.45[5], 17.3[10] and 13.60%[3].

Regarding the analysis of monthly research suspension rates, there was disagreement with a study conducted in the SC of a university hospital in Paraná. The study took place

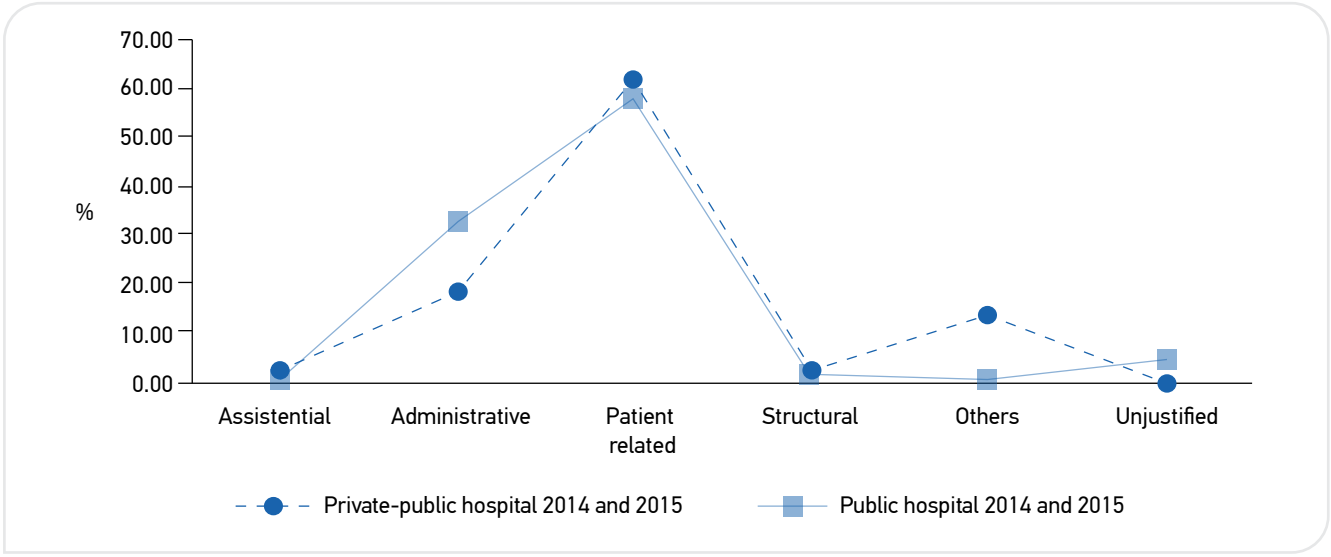

Figure 1. Comparison of factors that caused surgical suspension in the public-private and the public hospital in 2014 and 2015.

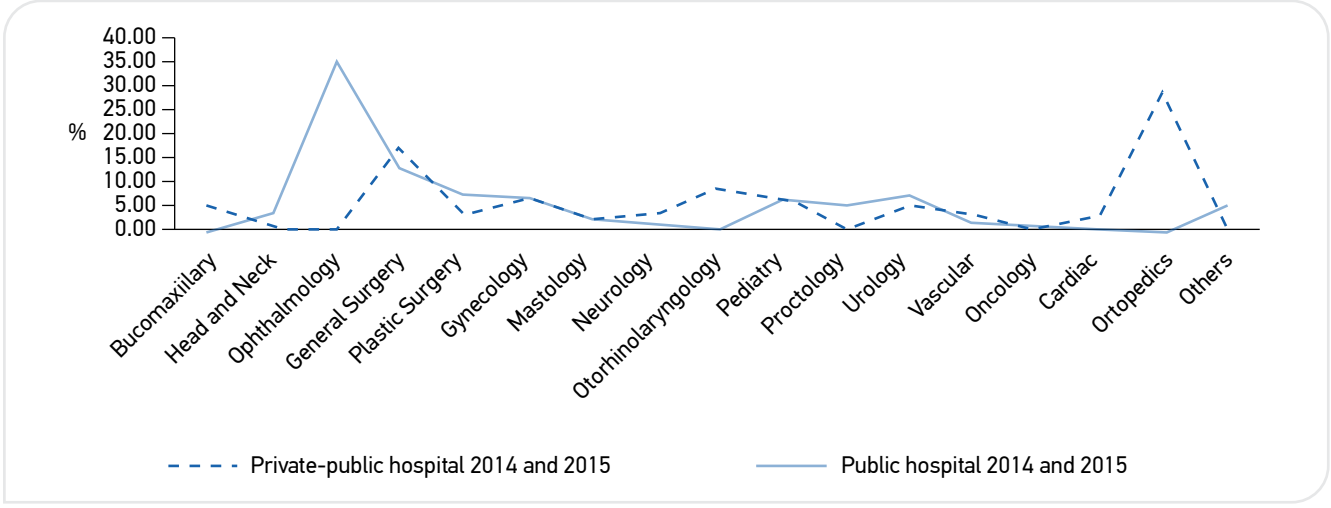

Figure 2. Comparison of surgery cancellation rates at the private-public and public hospitals, according to medical specialties, in 2014 and 2015.

over a period of eight months, with 2,828 scheduled surgeries, 522 suspended ones and a suspension rate of 18.45%, showing a variable rate frequency during the months. In May, August and October, 470, 417 and 391 surgeries were scheduled, respectively, and 73, 63, 97 were suspended, with suspension rates of 15.53, 15.1 and 24.80%. The present research differs from the study because it showed an increase between the number of cancellations and the suspension rate[5].

A study reveals that 42.12% of the suspensions were unjustified and warnings were not found, which shows failure in the planning of the surgical map, as some surgical teams, to guarantee the reservation of the OR or of the equipment, fill out the surgery notice with a fictitious patient name. This data resembles that of this research, as these are actions that directly interfere with the amount of scheduled surgeries, increase the frequency of the suspension rate and impair the quality of the service[2].

According to the literature, failure to perform surgery may occur due to failure of preoperative visits, construction of the surgical map well in advance, lack of surgeon programming, fictitious patient scheduling to ensure OR and scheduling error. All of these reasons have resoluteness and may interfere with the reduction of suspension rates. Given this, the proper filling of the reasons for replacement in the surgical map can contribute to the awareness of professionals, by knowing the causes that lead to the suspension[9].

In equivalence with this research, another study emphasizes that the computerization of surgical scheduling can implement assistance in the SC and help prevent missing of surgery warnings, optimizing activities[10]. In this context, the SC of the public hospital studied needs to have better planning and registration for the control of scheduled, suspended and performed surgeries.

One of the measures is the control of surgeries scheduled for the same day. These should be recorded and counted in the institution's electronic database as scheduled surgeries, in order to obtain a more real suspension rate. Some authors who advocate the computerization of surgical scheduling and the need for all suspended surgeries to be rescheduled for the same day or week highlight the importance of the nurse's role in planning and managing the SC routine[7].

Based on the literature, the suspension rate could be reduced with intervention processes. A measure adopted would be the implementation of the perioperative nursing care systematization (*sistematização da assistência de enfermagem perioperatória* – SAEP), as it would allow, in addition to the preoperative assessment of the patient, intrasectoral and professional communication to ensure continuity of care during hospitalization[8].

The research shows that there was no similarity between the number of suspensions and the biological gender of patients, since the hospitals had the inverse proportion. In disagreement with this research, one study emphasizes the difference between the number of surgeries suspended in relation to gender, as 298 (57.09%) surgeries were suspended in male patients and 224 (42.91%) in female ones[5].

With the present research, it was possible to identify that the main factors causing the suspensions, in both hospitals, were: non-attendance of the patient (48.8%), lack of clinical condition of the patient (11.4%), lack of doctors (6.8%) and lack of material (6.1%). The lack of available time (12.5%) in the public-private hospital is highlighted, as well as the lack of medication (7.64%) in the public one.

This predominance of non-attendance of patients is due to the fact that the individual does not attend their scheduled visit to the institution and due to the withdrawal of the surgical procedure. Suspension due to lack of time, one of the factors that appeared in the private-public hospital, occurs during the surgical planning, when surgeries have their time of execution extended, causing the delay of some surgeries and the suspension of others due to lack of time in the day.

Similar to the research, one study reveals having found in the surgical map all the surgeries suspended with their respective reasons, and it was observed that, of the 584 suspended surgeries classified as other reasons, 100% of the cases were caused by the prolonged time of the previous surgery[9].

Like this research, a study points out that the main causes of suspension were related to the patient (22.7%), such as: non-attendance or delay (22.4%) and withdrawal (0.3%), being the third major cause of cancellation of the patient's clinical conditions (20.8%). The second most frequent group of surgical suspension is represented by institutional conditions, due to problems with material resources (8.6%), scheduling errors (5.8%), impossibility of attendance by the surgeon (6.3%) and date change (3.2%)[11].

In a study conducted in a hospital in São Paulo for four years, 22,788 procedures were scheduled and 3,121 were canceled, with a suspension rate of 13.6%. The main factors for the suspensions were: absence of the patient (33.8%), unfavorable clinical conditions (20.0%), lack of time (5.5%), lack of ICU vacancy (4.9 %) and lack of materials and equipment (4.6%)[3].

In a study developed in a period of ten months with 6,926 scheduled surgeries, 2,339 of them were suspended, with a rate of 33.8%. The main reasons for suspension were: unjustified cancellations (30.1%), represented by — surgeries that

presented the description "without reason"; and surgeries that were replaced by —; other reasons (25.0%), such as time advance, scheduling error or patient withdrawal. Administrative reasons (21.8%) were represented by lack of medical records, absence of staff, urgent procedure in another patient at the same time, deficiency of materials and equipment, previous surgeries and patients without surgical indication[9].

The study mentioned above had a high suspension rate (33.8%) and a difference in the reasons for suspensions. This context may reflect the lack of planning of actions that involve the entire surgical planning process, as well as the lack of data to characterize the real reasons for surgical suspension or the lack of professionals in the institution[9].

The absence of the patient calls for an investigation, because the reason for their non-attendance is unknown. Some surgeries are scheduled well in advance and there is no active search service to confirm the user's presence in the surgery[10]. However, patients do not attend surgery due to their ignorance of the date, which shows a failure in communication between users, institution and professionals[3].

Given these factors, it is necessary that institutions adopt measures to control surgical planning and to develop a plan to improve the quality of care and reduce surgery suspension rates.

Thus, a study highlights the role of nurses in the routine dynamics of the SC, as this professional contributes with measures and strategies that provide higher quality and humanized nursing care. The preoperative visit is a way to clarify the patient and his family about the procedure, from hospitalization to discharge, and to give confidence in their care[7].

Regarding administrative factors, surgical cancellation due to lack of material may evidence management failure of the institution. Regarding human resources, it was seen that absence was due to the non-attendance of the doctor in the institution. In accordance with this research, 179 (8.14%) suspensions were identified for administrative reasons, with material (93 / 52%) and human resources (25 / 14%) being the most frequent reasons[8].

With the evaluation, it is clear that the non-attendance of the patient and the lack of clinical conditions stand out, but the other factors deserve attention, especially the area of orthopedics, since a percentage of their suspensions was due to lack of material. essential for the surgical procedure. This lack of material occurs because some materials used in orthopedic surgery are specific and there is a shortage of supplies from suppliers, as well as, for some reason, at financial management level.

Given the results of this research, the specialties of orthopedics, pediatrics and urology showed a reduction in cancellation in 2015, while for the specialties of general surgery, otorhinolaryngology and gynecology there was an increase in the suspension rate. Similarly to this research, a study conducted over a period of three months highlights, among medical specialties with higher frequency of suspension, otorhinolaryngology (20.5%), followed by general surgery (15.7%) and ophthalmology (10, 9%). Otorhinolaryngology and general surgery maintained high cancellation rates during September and November. On the other hand, ophthalmology had a high number of suspensions only in September[3].

The specialties that presented the highest frequencies of suspension were: orthopedics (18.4%), gastrosurgery (16.1%), ophthalmology (10.6%) and otorhinolaryngology (10.1%)[5]. Authors of another study found that urology and orthopedics are among the specialties with the highest suspension rates[8]. In a study conducted at a university hospital in the state of Paraná, which found that, of the 2,828 surgeries scheduled, 522 were suspended, with a suspension rate of 18.45%, the specialty with the highest cancellation rate was surgery. overall (25.48%)[5].

According to the findings, the research is similar to the aforementioned studies, since in the public-private hospital orthopedics was the specialty with the highest suspension rate, followed by gastrosurgery[4]. However, it should be taken into account that in the private-public hospital, general surgery includes gastrosurgery. In other studies, orthopedics is among the specialties with the highest incidence of suspension[8] and general surgery shows the highest rate of suspensions[5].

In relation to ophthalmology, the specialty emerges with the highest rates of suspension[10]. In the public hospital, it is the specialty of greater surgical suspension, followed by general surgery. Thus, the similarity in the most incident specialties and the difference in the proportion in which they appear are highlighted. The other specialties are also emphasized by other authors, suggesting similarity between the studies, especially on urology[8] and otorhinolaryngology[10].

A study conducted in a health institution in São Paulo shows that the cancellation of surgeries, in some situations, results from the lack of planning. The actions developed at the Sterilization and Material Center (SMC), as it is the sector responsible for the supply of materials to meet the various anesthetic-surgical procedures, have a direct impact on the dynamics of the SC. Thus, failure in any of the processes can lead to surgery delays and even cancellation. Thus, the event deserves attention from the team involved in performing the procedure, especially when the reasons are potentially preventable[12].

It is important to highlight, given the context, that nursing plays a fundamental role in the planning and control of surgical procedures and can contribute with strategies to reduce suspensions, in addition to providing patients and their families with quality care. In addition, it can seek measures of organization of services of health institutions, such as control of surgical programming and confirmation of surgery, aiming at the best quality of service of the institution.

There were some limitations to the research process, such as difficulty of access to the hospital archives and missing information in the surgical map. The research shows that the whole process needs management and planning of actions to achieve reduction of surgical suspension. Thus, an investigation focusing on the managerial, administrative and assistance measures involved in the quality of care process and the reduction of indicators and the rate of suspension of anesthetic-surgical procedures will be relevant.

CONCLUSION

With this research, it was found variations in the number of scheduled and canceled surgeries, revealing inequality in the rates of surgical suspension among the studied hospitals, being the rate of the public hospital (42.47%) twice higher than the private-public hospital (23.13%).

The main factors that caused suspension in the researched hospitals were: lack of patient and lack of clinical conditions, when related to the patient; and lack of material and doctors, regarding the administrative ones. The main surgical specialties with the highest suspension rates in the public-private hospital were orthopedics and general surgery; and in the public hospital, ophthalmology and general surgery. In this context, hospitals present differences between the main suspension specialties and similarity when it comes to general surgery.

According to the results, the incidence of surgery cancellation in the institutions is of great care and administrative importance, as well as in the scientific area, as it favors the identification of quality indicators, the reduction of the suspension rate and the search for the improvement of health care quality.

For this, nursing needs to play an essential role in the construction of measures that promote the improvement of surgical control, such as maintaining the organization of the sector with material and human resources and monitoring staff and surgical programming, avoiding suspensions. Thus, quality management tools are used in order to promote increased managerial quality, care and humanization of relationships with patients. Nursing actions can improve patient care by establishing individualized planning and follow-up from admission to hospital discharge.

Thus, institutions need to launch strategies for controlling surgical programming. One method is to improve the institution's communication with the user, with weekly planning and follow-up of the surgical schedule, so that they can contact the patient in advance for surgical confirmation, as well as perform the pre-anesthetic consultation.

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SAFE SURGERY COMPLIANCE CHECKLIST: ANALYSIS OF PEDIATRIC SURGERIES

Adesão ao checklist de cirurgia segura: análise das cirurgias pediátricas

Adhesión al checklist de cirugía segura: análisis de las cirugías pediátricas

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ABSTRACT: Objective: This study analyzed the safe surgical checklist compliance in surgeries performed in children and adolescents up to 17 years old, as well as the factors that influence its use. **Method:** Cross-sectional, analytical study performed in a public hospital. The medical charts of surgeries performed on children and adolescents up to the age of 17 were analyzed in the year 2017. Descriptive statistical analysis, Fisher's exact test and logistic regression were applied. **Results:** The sample consisted of 262 medical records of children and adolescents, 65.68% belonged to males, adenoidectomy and tonsillectomy procedures were prevalent. It was observed that 12.9% checklists were fully completed, 86.4% partially completed and 0.7% were not completed. There was no significant association between compliance to the instrument and the factors analyzed. **Conclusion:** Complete adherence to the checklist was 12.9%, with differences in completion between stages, and there was no single factor responsible for the inadequacy. The partial completion in most cases indicates the need to deconstruct the barriers related to performing the checklist, by employing educational actions involving the teams and understanding the application of the instrument, which may benefit surgical safety and quality of care.

Keywords: Checklist. Patient safety. Perioperative nursing.

RESUMO: Objetivo: Este estudo analisou a adesão ao preenchimento do *checklist* de cirurgia segura em procedimentos realizados em crianças e adolescentes de até 17 anos, bem como os fatores que influenciam a sua utilização. **Método:** Estudo analítico, transversal, realizado em um hospital público. Foram analisados os prontuários de cirurgias executadas em crianças e adolescentes de até 17 anos, no ano de 2017. Foi aplicada análise estatística descritiva, teste Exato de Fisher e regressão logística. **Resultados:** A amostra foi composta por 262 prontuários de crianças e adolescentes, 65,68% do sexo masculino, prevalecendo os procedimentos de adenoidectomia e amigdalectomia. Observou-se em 12,9% dos *checklists* o preenchimento completo, em 86,4%, parcial e em 0,7% a lista não foi preenchida. Não houve associação significativa entre a adesão ao instrumento e os fatores analisados. **Conclusão:** A adesão completa ao *checklist* foi de 12,9% com diferença no preenchimento entre as etapas, e não houve um único fator responsável pela inadequação. O preenchimento parcial na maioria dos casos sinaliza a necessidade de desconstruir as barreiras para conduzir o *checklist*, com ações educativas envolvendo as equipes e o real entendimento da aplicação do instrumento, que pode favorecer a segurança cirúrgica e a qualidade da assistência.

Palavras-chave: Lista de checagem. Segurança do paciente. Enfermagem perioperatória.

RESUMEN: Objetivo: Este estudio analizó la adhesión al llenado del *checklist* de cirugía segura en cirugías realizadas en niños y adolescentes de hasta 17 años, así como los factores que influyen su utilización. **Método:** Estudio analítico, transversal, realizado en un hospital público. Fueron analizados los prontuarios de cirugías ejecutadas en niños y adolescentes de hasta 17 años, el año de 2017. Fue aplicado análisis estadístico descriptivo, test Exacto de Fisher y regresión logística. **Resultados:** La muestra fue compuesta por 262 históricos médicos de niños y adolescentes, un 65,68% del sexo masculino,

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prevaleciendo los procedimientos de adenoidectomía e amigdalectomía. Se observó en un 12,9% de los *checklists* el llenado completo, en un 86,4%, parcial y en un 0,7% la lista no fue llenada. No hubo asociación significativa entre la adhesión al instrumento y los factores analizados. **Conclusión:** La adhesión completa al *checklist* fue del 12,9% con diferencia en el llenado entre las etapas, y no hubo un único factor responsable por la inadecuación. El llenado parcial en la mayoría de los casos señala la necesidad de deconstruir las barreras para conducir el *checklist*, con acciones educativas involucrando los equipos y el real entendimiento de la aplicación del instrumento, que puede favorecer la seguridad quirúrgica y la calidad de la asistencia.

Palabras clave: Lista de verificación. Seguridad del paciente. Enfermería perioperatoria.

INTRODUCTION

With technological advances and improved health care, surgical care has become an intervention with considerable possibilities,accessability and high complexity, but it is liable to error[1,2]. Surgical procedures have expanded, and approximately 234 million surgeries are performed each year, on average one for every 25 people, which has a great impact on public health[3].

Among these surgical interventions, it is estimated that seven million patients suffer significant complications each year and at least one million die during or after the procedure[3]. According to the World Health Organization (WHO), every year tens of millions of patients suffer disabling injuries or death due to inadequate health care, and half of the post-operative complications are considered preventable worldwide[3]. Despite advances in surgical care, adverse events in the perioperative period reach up to 3%, and more than half are considered preventable[3].

Inadequate infrastructure, poor quality of resources, lack of skills and scarce human and material resources are the primary reasons that lead to adverse surgical events[1,4]. Other factors, such as the non-identification of the patient, lack of recognition of complications, lack of verification of materials, poor communication among staff, as well as distractions, inappropriate post-operative behaviors, incorrect procedures and sites and / or patients that could be avoided[5,6].

In view of the above context and to enhance patient safety, WHO developed the Global Patient Safety Alliance in 2004. Launched in 2008, the second Global Challenge, called Safe Surgeries Save Lives, developed the Surgical Safety Checklist. This list, called The Safe Surgery Checklist, was drawn up based on the ten essential goals for a safe procedure. The aims are to improve safety in surgical interventions and reduce risks, adverse events, complications and avoidable deaths during the procedure and in the postoperative period[3].

The implementation of this worldwide surgical safety standard is accessible because it is secure, low cost, only takes 3 minutes, does not cause damages to the patient and can be adapted according to the different surgical scenarios[1,3]. A single professional, named the coordinator, is responsible for the checklist, however cooperation between the surgical team and the patient is essential[3]. It is recommended that the instrument is coordinated by any professional who knows the procedure, but that the nurse should guide its execution[3].

Researchers[7-11] prove that the use of the checklist promotes progress in communication between teams and reduces errors, complications and deaths due to surgical procedures, benefits the patient, the team and the health unit. An international survey[10] conducted in eight hospitals in eight countries with different economic contexts resulted in a 36% reduction in complications and a 47% reduction in deaths after the instrument was introduced, in addition to an increase in the use of antibiotics from 56% to 83% which resulted in reduction of surgical site infections (SSI).

In a recent study[11] developed in a large general hospital in Rio Grande do Sul, the authors reported a reduction in SSI rates, from 4.2 to 1.1%, and a 75% risk reduction identified after using the checklist. In another study[9] with 147 nurses from all regions of Brazil, 76.9% of professionals declared that they used the instrument in the institution and 83.2% reported improvement in care. Those who do not apply the instrument stated that when they were working they would like it to be employed. A change in interprofessional communication was reported by 78.8% of nurses.

Therefore, it is asked: What is the safe surgery checklist compliance in procedures performed on children and adolescents up to 17 years, after ten years of the development of the Checklist?

OBJECTIVE

To analyze compliance regarding the completion of the safe surgery checklistin procedures performed on children and adolescents up to the age of 17 years, as well as the factors that influence their use.

METHOD

This is a cross-sectional analytical study on the compliance to the completion of the safe surgery checklist by professionals of the Surgical Center (SC) of a public hospital of small and medium complexity, in São Paulo.

The hospital has four operating rooms, which specialize in general surgery, pediatric surgery, vascular surgery, urology,gynecology, ophthalmology, otorhinolaryngology, orthopedics, mastology, dermatology and plastic surgery. An average of 200 anesthetic-surgical procedures per are performed per month.

The checklists related to surgeries performed in patients up to 17 years, 11 months and 29 days in the SC, from January to December 2017 were considered as a criterion for inclusion in this study. Surgery data were verified between April and June of 2018, in the electronic medical records, through an instrument developed by the researchers specifically for the present study.

The dependent variables, or indicators related to the checklist compliance, consist of: existence of a checklist in the medical record (yes or no); checklist completion (complete, partial or uncompleted); completion of each phase: before the anesthetic induction (phase I - items 1 to 7), before the surgical incision (phase II - items 8 to 14) and before leaving the operating room (phase III - items 15 to 19); completing each of the items; and percentage of completed items.

Phase I (identification or sign in) corresponds to the period before anesthetic induction:

1. data identification and patient consent;
2. marked surgical site;
3. anesthesia safety check;
4. pulse oximeter;
5. allergies;
6. difficult airway;
7. risk of blood loss.

Phase II (confirmation or timeout) refers to the period after anesthetic induction and before the surgical incision:

8. presentation of team members;
9. Team confirms patient data;
10. expected duration;
11. anesthesiologist review;
12. nursing team review;
13. antimicrobial prophylaxis;
14. available imaging exams.

Phase III (record or sing out) related to the period during or immediately after wound closure and before the patient leaves the operating room:

15. registration confirmation and instrument count;
16. swab count;
17. identification of samples;
18. problems with equipment;
19. review of recovery concerns.

It should be noted that the checklist is inserted in the patients electronic medical record, and there were changed made to the instrument proposed by WHO. The evaluated independent variables , potentially associated with adherence, were: characterization data, with patient's age (years) and sex (female or male); surgical data, including month (January to December); shift (morning or afternoon); (general surgery, vascular surgery, pediatric surgery, urology, gynecology, ophthalmology, otorhinolaryngology, mastology, dermatology and plastic surgery); surgery performed; duration of surgery (minutes); type of anesthesia (general, regional, sedation and / or local) and professional responsible for the checklist.

A non-probabilistic intentional sample was used, including all surgeries performed in children and adolescents in 2017. Data were entered in a spreadsheet in Microsoft Excel and later analyzed by the Statistical Package for Social Sciences), version 15.0, and Rv.2.11.0. Descriptive statistics were performed with frequency, mean and median in order to characterize the surgeries. The association between checklist compliance by medical specialty was analyzed by Fisher's exact test. Boxplots were used in order to verify if the duration of the surgery interferes in the completion of the instrument. All effects and relationships associated with values of $p < 0.05$ were considered significant.

This research was approved by the Research Ethics Committee of the chosen institution, under Opinion 2,499,116 and Registration 81985417.8.0000.5411, and complied with the ethical requirements for research. Informed Consent Forms were not used as retrospective secondary data were used.

RESULTS

During the study period, 271 surgeries were identified, however, the absence of the checklist in medical charts represented 2.58% of the surgeries and the non-completion represented 0.7%. Thus, the study sample consisted of 262 medical records belonging to children and adolescents.

According to the data in Table 1, 64.9% of the patients are males, with an average age of 8 years. The month with the highest number of performed procedures was May (14.9%), with predominance in the morning (63.7%). There was a significant decrease in surgeries in the service in January, November and December, a fact that was already antecipated. During this period, only procedures with local anesthesia occurred, and the more complex surgeries were sent to the tertiary hospital.

The anesthesia presented n = 325, since more than one type of anesthetic procedure was performed in one patient, and the most used was general anesthesia (53.9%). There was a predominance of the otorhinolaryngology medical specialty (35.5%), followed by orthopeadics (24.0%) and pediatric surgery (16.4%). A total of 354 procedures were performed, because the same patient had undergone different procedures in the same surgical procedure. The main procedures performed were adenoidectomy and tonsillectomy (24.3%), followed by postectomy (8.5%), with each surgery taking na average of 45 minutes.

In 99.6% of the evaluated forms, the nursing technician was the responsible professional and in 0,4% of the evaluated forms it was the nurse From the completion of the Checklist, it was observed in 34 cases (12.9%), that the items were fully completed; in 228 (86.4%) were partially completed; and two (0.7%) were not completed. Regarding the phases of the checklist, the evaluation of the compliance to the checklist occurred in 262 instruments, since those that were not completed were excluded.

It was verified that phase I had 90.4% completion, phase II 92.5% and phase III 17.1%.

Considering the 19 items in the checklist, the one that presented the lowest adherence in regards to filling in was "Revision of the concerns regarding recovery", of phase III, with 77.1% inadequacy, followed by "Review of the nursing team", phase II, and "Data identification and patient consent" from phaseI, with 2.8% inadequacies (Table 2)

There was no association between the compliance to the checklist and the main surgical specialties (otorhinolaryngology, orthopedics, pediatric surgery, ophthalmology urology and others) in phases I (p = 0.248), II (p = 0.895) and III (p = 0.627) of the Checklist (Table 3).

Regardless of the time of the checklist or considering the completion process as a whole, it was found that the duration of the surgery did not interfere with the complete, partial or non-completion of the list (Figure 1).

Table 1. Distribution of surgeries according to gender, patient age, month, shift, anesthesia, specialty, procedure and duration.

Variables	Number	Percentage (%)
Sex		
Female	92	35,1
Male	170	64,9
Age(years)*	8; 7 (1–17)	
Month		
January	0	0
February	15	5,7
March	37	14,1
April	33	12,6
May	39	14,9
June	26	9,9
July	23	8,8
August	29	11,0
September	23	8,8
October	27	10,3
November	08	3,1
December	02	0,8
Shift		
Morning	167	63,7
Afternoon	95	36,3
Type of anesthesia (n=325)		
General	175	53,9
Sedation	82	25,2
Regional	50	15,4
Local	15	4,6
Not informed	03	0,9
Surgical speciality		
Otorhinolaryngology	93	35,5
Orthopedics / traumatology	63	24,1
Pediatric surgery	43	16,4
Ophthalmology	31	11,8
Urology	23	8,8
Other	09	3,4
Surgical procedure (n=354)		
Adenoidectomy	86	24,3
Tonsillectomy	86	24,3
Postectomy	30	8,5
Umbilical Hernioplasty	18	5,1
Other	134	37,8
Surgery time (minutes)*	45; 49 (5–170)	

*Average; median (minimum – maximum).

DISCUSSION

The sample was composed of 262 analyzed charts.The surgical profile presented a prevalence of male patients (64.9%), similar to other studies[5,12], which indicated 70% and 55% of surgeries performed on men. Regarding age prevalence, no studies were found which only used the checklist in procedures performed on children and adolescents, but an analysis[12] performed at the University Hospital of Londrina (PR) resulted in 20% of patients being 20 years of age or younger.

The purpose of the Safe Surgery Checklist is to improve the quality of surgical care and to certify the safety of anesthetic-surgical procedures through a standard that can be applied worldwide[3].

Table 2. Inadequate completion of checklist items, according to each phase of the Checklist.

Item	Number	Percentage (%)
Phase I	27	9,6
Identification of details and patient consent	8	2,8
Surgical site marked	1	0,3
Anesthetic safety check	3	1,0
Pulse oximeter	2	0,8
Allergies	6	2,1
Difficult airway	3	1,0
Risk of blood loss	4	1,4
Phase II	21	7,5
Presentation of team members	2	0,8
Patient confirmed by team members	-	-
Expected duration	2	0,8
Anesthesiologist review	2	0,8
Nursing team review	8	2,8
Antimicrobial prophylaxis	4	1,4
Available imaging exams	3	1,0
Phase III	232	82,9
Register confirmation and instrument count	7	2,5
Swab count	2	0,8
Sample identification	2	0,8
Problems with equipment	5	1,8
Review of concerns regarding recovery	216	77,1

The checklist favors the ordering and standardization of procedures, sharing of information among the team, exchange of knowledge and concerns, preparedness for possible undesirable events, and reduce discomfort caused by unexpected situations[2,8]. Thus, effective practices, improvement in communication quality and reduction of risks, adverse events and complications of surgical interventions occur, which improve patient safety[1,2,8].

The initial step for surgical safety consists of the implementation of the checklist instrument to all surgical patients. The presence of the checklist in the electronic medical records represented 97.4%, a higher percentage than that reported in an international study[13], with 83.3%, and a national study[14], which reported only 60.5%. Inserting the instrument in the institutions was considered low cost, due to inserting the instrument in the medical records and its execution by a professional, however there is still a gap in the installation of the checklist[3,9]. In this study, the instrument was not found in the medical record of seven cases, which reflects a small percentage, however it is necessary that the implantation reaches all patients, in order to implement the Checklist.

The nursing technician was the main professional responsible for employing the checklist, as portrayed in one study[5], assigning great responsibility to these professionals. Therefore, it is extremely important that nurses constantly participate in health education activities in order to teach and reinforce the correct way of performing the check, and encourage the team to pause the procedure when the phases are not in compliance. Researchers emphasize the relevance of communication among professionals and emphasize that interrupting surgery in one of the stages, depending on the professional who interrupts, can generate conflicts among the team[3,6,9].

The full completion of the instrument occurred in 12.9% of the surgeries evaluated, a difficulty also evidenced in studies performed in two teaching hospitals in Natal (RN), [14] which showed a 3.5% compliance in 375 gynecological and urological surgeries, and in Spain[13], with 27.8% compliance in the 90 procedures evaluated in nine public hospitals. In a study [5] performed in a public hospital in São Paulo which analyzed 30 cardiological procedures, 43% of the instruments were in compliance.

This deficit in the checklist compliance, with only 12.9% of the instruments with full completion and 86.4% with partial completion, indicates the need for educational actions with the whole team in the surgical units, and to clarify the application of the instrument, which may favor surgical safety and the quality of the care provided, as well as to encourage professionals and show their importance in the process as well as the positive results after the introduction of the protocol.

Considering the three phasess, the phasse which had the greatest compliance in this study was phase II, referring to the confirmation, with 92.5% completion, corroborating with a Spanish research[13], which presented 51.8%. Next, the identification, related to the first phase, resulted in 90.4%, and in Spain[13], 49.3%. The lowest compliance was the third phase, called the Register, with only 17.1%, contrasting with 43.1% in the Spanish study[13] and with a study[15] conducted in Belo Horizonte (MG), which showed compliance of less than 50% in all items of this phase. There was divergence with a national study[14], which evidenced that phase I had less completion. The analysis of the phases with other studies[5,16,17] was made difficult by the modification that some institutions made to the Checklist. Thus, there were four diverging stages in our instrument.

One study[13] highlights the exhaustion of the professionals and the absence of the responsible surgeon as causes of the lower compliance to phase III of the checklist. This phase

Table 3. Distribution of surgeries according to the main specialties in relation to inadequate phases in the checklist.

	Surgical specialties						P*
	Otorrino	Ortho.	Ped.Sur	Ofthalmo.	Urology	Other	
Inadequate Phase I	9 (9,7%)	7 (11,1%)	5 (7,0%)	7 (23,0%)	1 (4,0%)	2 (22,2%)	0,248
Inadequate Phase II	4 (4,3%)	6 (6,3%)	2 (4,7%)	1 (3,2%)	0 (0,0%)	1 (11,1%)	0,895
Inadequate Phase III	78 (83,9%)	53 (84,1%)	37 (86,0%)	24 (77,4%)	21 (91,3%)	07 (77,8%)	0,627

*Fisher exact test.

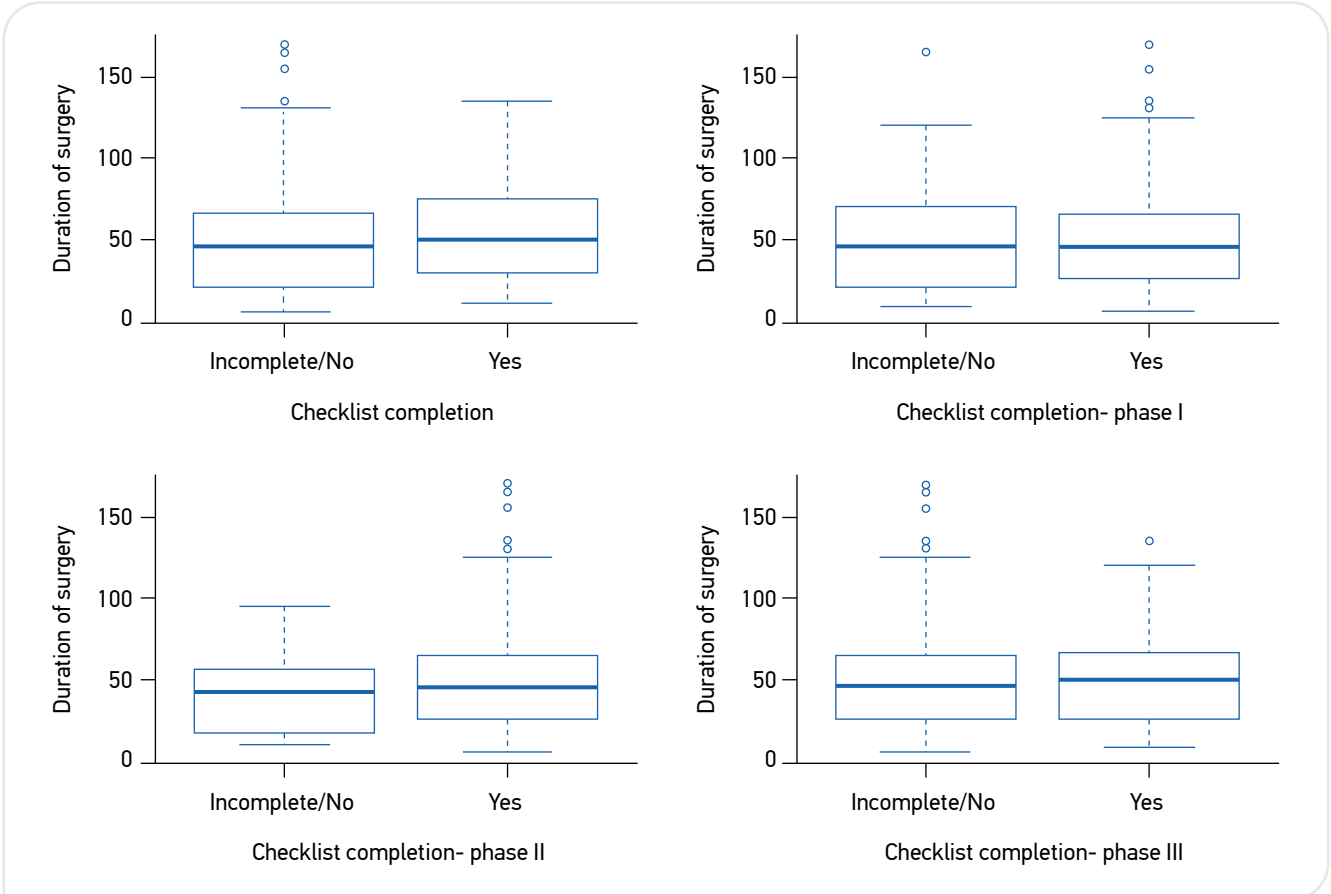

Figure 1. Boxplot of surgery duration (in minutes) according to the completion of the checklist. Botucatu, Brazil, 2018.

is not less important than the others; on the contrary, it addresses relevant issues, such as the counting of swabs and instruments, since the retention of these objects still occurs in great proportion[3,18]. In a study[18] performed with 2,872 physicians, 4,547 cases of inadvertent retention of foreign bodies were reported in surgical procedures, 68% of which were large and small swabs, 22% were gauzes and 5% were surgical instruments.

Among the19 items evaluated, the "Revision of concerns regarding recovery" corresponded to 77.1%, which was not completed, with a lower compliance to phase III. This data demonstrate the attention focused only at the phase of the procedure, generating a deficit in the follow-up of care in anesthetic recovery and in the postoperative period, which can influence care comprehensiveness, fragmenting care to the surgical patient. On the other hand, in other studies, the items that had the lowest compliance were "Marked surgical site" [14] and "Swab count" [17].

The surgical time and the specialties did not influence checklist compliance. These data indicate that there is no single cause for the inadequacy of the instrument, and that complete cooperation is essential for the proper implementation of the instrument, and that health education activities should be performed in the service and involve all professionals. The literature highlights that the absence of support from supervisors, the lack of knowledge regarding the surgical safety protocol, lack of team training, poor communication and the rejection of some professionals to verbally respond to the items in the checklist were the main problems listed related to noncompliance[6-9,19]. It was found in one study[8] that professionals reported time as an obstacle to the execution of the instrument due to the work overload.

Researchers consider that the lack of participation of the team in the implementation of the checklist reflects the culture of individual work, which unfortunately is still present today, as well as the trivialization of the instrument, issues that limit compliance to the procedure[6-7,19]. A study[15] which evaluated 30 procedures, highlighted that the multiprofessional team did not participate in any of the checklists, and another study[16] identified that most of the checks occurred individually and non verbally. Independent work impairs communication between the team, which may lead to conflicts, and thus interfere with the work environment and the outcome of the care provided[6,19].

An important factor in relation to checklist compliance is the safety culture of the patient inserted in the multiprofessional team, starting from the training of the professionals, with continuous and permanent education actions for the whole team. One study[20] showed an increase from 7.9 to 96.9% in the correct use of the checklist after training involving the surgical team. Therefore, the training of the professionals had positive results, with an impact on the care provided. In contrast, after training in a public teaching hospital, there was a reduction in protocols left blank, however, the number of incomplete instruments increased[12].

Thus, educational actions can be favorable or unfavorable to checklist compliance, depending on the method, duration and topics as well as the professionals involved[7]. The methodology of problematization addressed in study[19] reproduces an interesting strategy for training in the surgical unit, since it encourages theparticipation of all team members. Firstly, they observe reality and recognize the difficulties they face on a day-to-day basis. Interventions are then developed through joint analysis, based on the origins of the problems and why they occur. Finally, what was proposed is put into action, seeking changes in the work reality of the multiprofessional team.

The use of secondary data is a limitation of this study, however assessing checklist compliance is the first step in analyzing the impact on the quality of care provided. Therefore, new studies must be carried out.

CONCLUSION

The Safe Surgery Checklist represents a worldwide standard of surgical safety, preventing errors, adverse events, complications, and even deaths in operative care, however, it is necessary for the surgical teams to be conscientious and involved in order to apply the instrument properly and thus ensure safety to the patient.

Complete compliance to the checklist occured in 12.9% of the surgeries evaluated. The completion differed between the steps, with phase III showing less compiance. in In most cases, the partial completion indicates the need to deconstruct the barriers to this compliance by empowering the nursing team to conduct the checklist, educational actions with the teams and understanding the need for its application, which may benefit and increase the quality of the care provided. Surgical time and specialty did not influence compliance to the application of the Checklist, which indicates that there is not a single cause that explains the inadequte completion of the instrument.

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NURSING DIAGNOSES IN THE PERIOPERATIVE PERIOD: CROSS MAPPING

Diagnósticos de enfermagem no período transoperatório: mapeamento cruzado

Diagnóstico de enfermería en el período transoperatorio: mapeo cruzado

Uyara Garcia Melo[1]*, Rosimere Ferreira Santana[2], Thalita Gomes do Carmo[3], Marcos Venícios de Oliveira Lopes[4]

ABSTRACT: Objective: To map nursing diagnoses of the North American Nursing Diagnosis Association International (NANDA-I) taxonomy in patients during the perioperative period. **Method:** This is a cross-sectional and documentary study on nursing records covering the perioperative period of a hospital part of the private healthcare system of Niterói, Rio de Janeiro, developed by the cross-mapping methodological tool. **Results:** 65 medical records were evaluated. Most of the sample consisted of women with a mean age of 50.1 years and who underwent elective surgeries. Regarding the surgical specialty, the most performed procedures were general and urological surgeries. The most found terms were electric scalpel, scalpel plate, general anesthesia, and intubation. From the group of specialists, the prevalent diagnoses obtained were: risk for surgical site infection (84.6%), risk for impaired skin integrity (78.5%), impaired tissue integrity (63.1%), and risk for aspiration (58.5%). **Conclusion:** Nursing diagnoses that are primarily of risk were observed. Therefore, they lack early identification and interventions to avoid damages and prevent complications such as delayed surgical recovery.

Keywords: Nursing diagnosis. Perioperative nursing. Standardized nursing terminology.

RESUMO: Objetivo: Mapear os diagnósticos de enfermagem da taxonomia North American Nursing Diagnosis Association International (NANDA-I) em pacientes no período transoperatório. **Método:** Estudo do tipo transversal, documental, dos registros de enfermagem no período transoperatório de um hospital da rede suplementar de saúde do município de Niterói, Rio de Janeiro, desenvolvido por meio da ferramenta metodológica mapeamento cruzado. **Resultados:** Foram avaliados 65 prontuários. A maior parte da amostra foi composta de mulheres com média de idade de 50,1 anos e submetidas a cirurgias eletivas. Quanto à especialidade cirúrgica, os procedimentos mais realizados foram gerais e urológicos. Os termos mais encontrados foram bisturi elétrico, placa de bisturi, anestesia geral e entubação. Pelo painel de especialistas, obtiveram-se como diagnósticos prevalentes: risco de infecção de sítio cirúrgico (84,6%), risco de integridade da pele prejudicada (78,5%), integridade tissular prejudicada (63,1%) e risco de aspiração (58,5%). **Conclusão:** Os diagnósticos de enfermagem encontrados são prioritariamente de risco. Logo, carecem de identificação precoce e de intervenções para evitar danos e prevenir complicações, como o retardamento na recuperação cirúrgica.

Palavras-chave: Diagnósticos de enfermagem. Enfermagem perioperatória. Terminologia padronizada em enfermagem.

RESUMEN: Objetivo: Mapear los diagnósticos de enfermería de la taxonomía NANDA-I en pacientes en el período transoperatorio. **Método:** Estudio documental transversal de registros de enfermería en el período transoperatorio de un hospital de la Red de Salud Complementaria de la ciudad de Niterói, Río de Janeiro. Fue desarrollado utilizando la herramienta metodológica de mapeo cruzado. **Resultados:** se evaluaron 65 historias clínicas. La mayor parte de la muestra estaba compuesta por mujeres, con una edad media de 50,1 años y sometidas a cirugía electiva. En cuanto a la especialidad quirúrgica, los procedimientos más realizados fueron generales y urológicos. Los términos más comúnmente encontrados fueron bisturí eléctrico, placa de bisturí, anestesia general e intubación. El panel de expertos obtuvo los siguientes diagnósticos frecuentes: riesgo de infección del sitio quirúrgico (84,6%), riesgo de integridad de la piel deteriorada (78,5%), integridad del tejido deteriorada (63,1%) y riesgo de aspiración (58.5%). **Conclusión:** los diagnósticos de enfermería encontrados son principalmente de riesgo, por lo que necesitan identificación e intervenciones tempranas para prevenir daños y complicaciones, como la recuperación quirúrgica tardía.

Palabras clave: Diagnóstico de enfermería. Enfermería perioperatoria. Terminología normalizada de enfermería.

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INTRODUCTION

In the Manual for Safe Surgery[1] (from Portuguese, *Manual de Cirurgia Segura*), based on data from 56 countries, is highlighted that the annual volume of major surgeries was estimated between 187 and 281 million, which approximately represents one surgery for every 25 people per year. This consists in a considerable volume, which has been increasing in recent decades due to the high incidence of traumatic disorders, population aging, and the consequent increase in the prevalence of chronic diseases, factors which imply the increasing need for surgical interventions[2]. However, these advances have also significantly increased the occurrence of errors that may result in damages to patients and, consequently, lead to significant public health implications.

Therefore, nursing processes must be systematically implemented in order to early identify existing and potential problems in such a way to intervene and reduce damages. Hence, the Brazilian Nursing Council (Cofen) has been legislating the competencies of nursing professionals and notes that should be documented. According to Resolution No. 358/2009, the nursing care systematization (NCS) is deemed a method for the work process that highlights the nurses' contribution to the population's health care, increasing their visibility and professional recognition[3].

The NCS aims to guide the activities of the nursing team and is responsible for organizing the team's work regarding the method to be adopted, the personnel, and the required instruments to ensure the operationalization of the nursing process (NP). Until the 1960s, nursing in the Surgical Center (SC) predominantly consisted of instrumentalization, compliance with requests of the medical team, and administrative initiatives related to the proper development of the anesthetic-surgical act. However, in 1990, Castellanos and Jouclas proposed the implementation of the NP in the care of surgical patients, aiming at promoting comprehensive, continuous, participatory, individualized, and documented care. In this healthcare model, each patient is individually considered, and nursing interventions aim to promote the continuity of care, in addition to providing the participation of the patient's family and enabling the evaluation of the care provided. Its creators named this process as perioperative nursing care systematization (PNCS)[2].

Hence, we must differentiate NCS from NP: the first exists only within the Brazilian context, and the second is internationally recognized as the *modus operandi* of the nurses' work process. NP is a private activity of the nurse, which includes "data collection, nursing diagnosis, planning, implementation, and evaluation"[3].

A nursing diagnosis provides the basis for the selection of nursing interventions, in order to achieve results for which nurses are responsible[4]. The North American Nursing Diagnosis Association International (NANDA-I) has formalized a classification system aimed at describing and developing a scientific foundation to provide the basis for the nursing team to select interventions suitable for each patient[5]. Therefore, NANDA-I suggests a way to classify and categorize nursing-related areas of concern, featuring 244 diagnoses, grouped into 13 domains, which are subdivided into 47 classes[4].

However, there are still few studies on the nursing diagnoses valid for the perioperative period in the literature, and, hence, its use in clinical practice has still been insignificant.

Thus, to address the benefits of the NP implementation, it is paramount to establish the nursing terms based on records already found in the patients' medical records, in such a way, henceforth, we can compare them with nursing taxonomies in order to identify the prevalence of diagnoses in the daily life of the nursing practice. Standardizing the nomenclature of nursing practice can favor the communication between members of the nursing and healthcare teams, promote the continuity of care, and foster the development of a nursing practice based on scientific principles, with clinical reasoning.

OBJECTIVE

To map nursing diagnoses of the NANDA-I taxonomy in patients during the perioperative period.

METHOD

This is a cross-sectional and documentary study on the nursing records contained in medical charts of patients in the perioperative period of a hospital of the private healthcare system of Niterói, Rio de Janeiro, Brazil. The study was developed by the cross mapping methodological tool, which aims to compare the terms used in the daily work of nursing and the NANDA-I nursing diagnosis classification system.

A large general hospital of the private healthcare system of the city of Niterói was selected as the study location. The choice of a hospital from this system was due to there being a nurse

inside the operating room, who records and take notes on the patient's progress during the perioperative period.

Data collection was performed using an instrument developed by the researchers to standardize the data to be collected in nursing records, in which information about the patient and the perioperative period were described according to the specificity of each patient.

Patients' medical records in the perioperative period were selected by deliberate and consecutive sampling, and the records of all patients available for data collection were collected on the researcher's available days. Data were collected from August to September 2018, and the researcher attended the unit 12 times, on alternate days, remaining there between four and five hours a day.

Inclusion criteria: patients in intraoperative care at the time of collection and aged over 18 years. Exclusion criteria: medical records that, at the time of internal routines of the hospital, were unavailable; and medical records that did not contain complete and/or legible nursing records during the perioperative period.

In September, 758 surgeries were performed in the hospital of the study, and the sample was limited to 65 patients.

For data collection and analysis, a script was prepared containing:

- patient's characterization data and description of the generic terms found in nursing records during the perioperative period;
- comparison between terms and the NANDA-I classification;
- submission of forms for individual analysis by specialists in order to establish the diagnoses according to the generic terms;
- group of specialists for consensus of diagnoses, according to the generic terms.

The cross mapping was used according to the presentation of the terms to be compared and the necessary adaptations taking into account the rules considered in this study[6] and presented in Chart 1.

After evaluating the records, nursing diagnoses were established based on the terms highlighted by the researcher, which were recorded in the forms and then transcribed into an Excel spreadsheet. Related and risk factors were identified by interpreting associated terms, synonyms, or similar concepts. To do so, we performed an adapted combination analysis, in such a way that, if the term found matched the term of the classification system, the combination was deemed exact. However, if the terms consisted of synonyms, similar, or related concepts, the combination was deemed partial. Terms that were not similar to the classification system and neither combined were collected from the records, although most were not used.

After completing data collection, the forms were forwarded to specialists, in such a way they would establish nursing diagnoses according to the NANDA-I classification. Thus, the third step corresponded to the analysis made by three specialists: the researcher himself, a specialist in nursing diagnosis, and a specialist in SC nursing. Diagnoses were established by the relationship between the terms surveyed in the medical records of patients included in the sample and the terms found in the related factors and the defining characteristics of the diagnoses contained in the NANDA-I classification.

Chart 1. Rules for using the cross mapping method.

1 - Map using the context of nursing diagnosis.
2 - Map the meaning of the words, not just the words.
3 - Use the keyword to map the NANDA diagnosis.
4 - Use the descriptor and diagnostic focus as keywords for diagnosis.
5 - Maintain consistency between the NANDA diagnosis that is being mapped, its defining characteristics, and related factors.
6 - Use defining characteristics and the most specific related factors concerning the diagnosis in question.
7 - Map undesirable human responses to a health condition/life process in a person, family, or community in order to detect diagnoses focusing on the issue.
8 - Map vulnerability of individual, family, or community to the development of an undesirable human response in order to detect risk diagnoses.
9 - Map motivation and desire to increase well-being and achieve health-related human potential in order to detect diagnoses of disposition to promote health described in nursing progress notes.

NANDA: North American Nursing Diagnosis Association.
Source: Lucena and Barros[6].

Furthermore, we chose to perform a fourth step, which consisted of a group of specialists for the consensus on individually identified nursing diagnoses based on generic terms, when the specialists agreed or disagreed with each diagnosis for each patient. In this step, if a diagnosis was only surveyed by one expert, it was classified as a disagreement; when there was consensus between two or three specialists, the diagnosis was classified as an agreement. This step was made by the group and lasted around eight hours.

Finally, data from the group of specialists and their individual evaluation were inserted into a database and forwarded for statistical analysis.

The steps of data collection and analysis are represented in Figure 1.

It is worth mentioning that this project was submitted to evaluation of the Ethics Committee of Hospital Universitário Antônio Pedro, a developer institution, which is associated with *Escola de Enfermagem Aurora de Afonso Costa*, having been approved on June 11, 2018, via Plataforma Brasil, under Certificate of Presentation for Ethical Consideration (CAAE) 89858218.2.0000.5243 and protocol No. 2,705,126.

RESULTS

Data about the characterization of the study participants' profile (n=65) and the surgical specialties to which they were submitted are presented in Table 1.

Most of the participants were women (37/56.9%), with a mean age of 50.1 years; the youngest participant was aged 19 years old, and the oldest, 85. Regarding surgeries, most were elective (63/96.9%), and the most frequent specialties were general (26/40.0%) and urology (17/26.2%). Surgeries classified as general are those comprising surgeries on the abdominal region (esophagus, stomach, intestines, liver, colon, pancreas, gallbladder, and bile ducts), laparoscopic surgeries, and trauma surgeries.

The generic terms found by the researcher in the patients' nursing records during the perioperative period are presented in Table 2.

It can observed that the most common terms were "electric scalpel" and "scalpel plate" — both were found in the same proportion (51/78.5%). In addition, the terms "general anesthesia" (40/61.5%) and "intubation" (36/55.4%) were frequently found.

Table 3 presents nursing diagnoses according to the consensual agreement reached by the specialists and the researcher.

Moreover, Table 3 shows that, according to the consensus between the specialists and the researcher, the prevalent nursing diagnoses were: risk for surgical site infection, found in 55 (84.6%) patients; risk for impaired skin integrity (51/78.5%); impaired tissue integrity (41/63.1%); and risk for aspiration (38/58.5%).

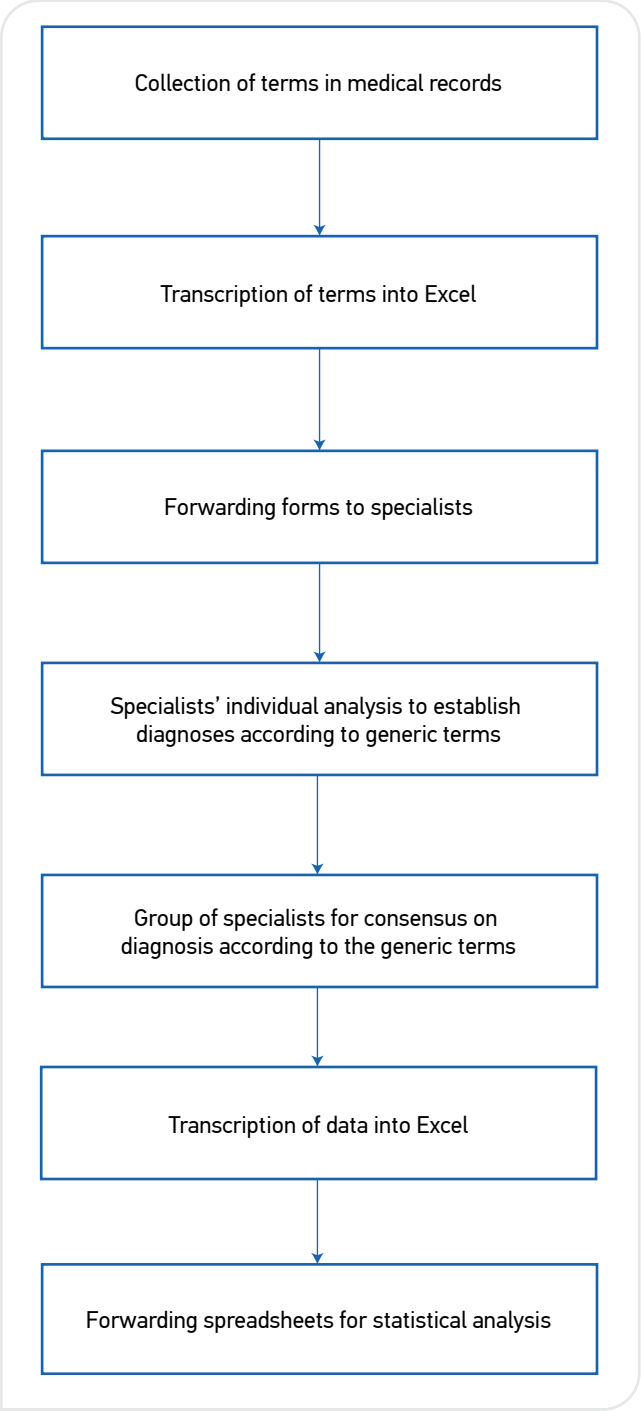

Figure 1. Steps of data collection and analysis.

DISCUSSION

With the collected data, it was possible to demonstrate the most prevalent nursing diagnoses in the perioperative period, which corroborates that, if accurately identified and treated, they can improve quality of care and reduce risks and adverse events to the patient in the intraoperative period.

Based on the consensus between specialists and the researcher, it was found that the most prevalent diagnoses were: risk for surgical site infection, risk for impaired skin integrity, impaired tissue integrity, and risk for aspiration. It is noteworthy that most diagnoses found in the perioperative period were of risk, that is, those with clinical judgment concerning the individual's susceptibility to develop an undesirable response to a health condition[4].

Authors of another study also found a higher number of risk diagnoses in the perioperative period of cardiac surgeries[7]. It is known that a risk diagnosis does not have the same consequences of the actual diagnosis, since it does not have defining characteristics; however, their risk factors, when not treated and neither prevented, may result in their very diagnosis. Hence the importance of a nursing care that seeks to associate the patient's individualities

Table 1. Patients who composed the sample, according to biological gender, surgery classification, and surgical specialty.

Variables		n (%)	
Biological gender			
Female		37 (56.9)	
Male		28 (43.1)	
Surgery classification			
Elective		63 (96.9)	
Emergency		2 (3.1)	
Surgical specialty			
General		26 (40.0)	
Urology		17 (26.2)	
Neurology		8 (12.3)	
Orthopedics		5 (7.7)	
Plastic		4 (6.2)	
Gynecology		3 (4.6)	
Cardiothoracic		1 (1.5)	
Vascular		1 (1.5)	
Variables	**Mean**	**SD**	**p**
Age	50.1	17.9	<0.001

SD: standard deviation.

Table 2. Distribution of generic terms found in the participants' medical records.

Generic terms	n (%)
Electric scalpel	51 (78.5)
Scalpel plate	51 (78.5)
General anesthesia	40 (61.5)
Intubation	36 (55.4)
Foley catheter	22 (33.8)
Protection of bony prominences and base of support	21 (32.2)
ELPO: high risk	21 (33.3)
Allergy	19 (29.2)
Hypertension/Hypotension	19 (29.2)
Noncompliance with antibiotic prophylaxis	18 (27.7)
Venous thromboembolism protocol (VTE): high risk	13 (20.0)
Hair removal	9 (13.8)
Blood reserve	8 (12.3)
VTE Protocol: moderate risk	7 (10.8)
American Society of Anesthesiologists (ASA) III	5 (7.7)
Use of orthopedic cuff	4 (6.2)
Tachycardia/Bradycardia	2 (3.1)
Hypothermia	2 (3.1)
ASA IV	1 (1.5)
ASA V	1 (1.5)

ELPO: Risk Assessment Scale for the Development of Injuries due to Surgical Positioning.

Table 3. Diagnoses with consensual agreement between the specialists and the researcher.

Diagnosis	n (%)
Risk for surgical site infection	55 (84.6)
Risk for impaired skin integrity	51 (78.5)
Impaired tissue integrity	41 (63.1)
Risk for aspiration	38 (58.5)
Risk for perioperative positioning injury	24 (36.9)
Risk for venous thromboembolism	22 (33.8)
Risk for decreased cardiac output	19 (29.2)
Risk for allergy response	16 (24.6)
Impaired urinary elimination	16 (24.6)
Risk for delayed surgical recovery	15 (23.1)
Risk for bleeding	8 (12.3)
Risk for ineffective peripheral tissue perfusion	5 (7.7)
Risk for urinary tract injury	4 (6.2)
Risk for perioperative hypothermia	1 (1.5)
Ineffective breathing pattern	1 (1.5)

with nursing diagnoses, in such a way to implement actions aiming at results that minimize the patients' length of hospitalization and recovery[8].

Other authors[9], during the follow-up of patients in the perioperative period, identified the nursing diagnosis of risk for perioperative positioning injury in 100% of the sample. In another article[10], the same authors of the previous study addressed the patient's care during the perioperative period, seeking to identify the most frequent nursing diagnosis in this period and to describe their risk factors. The sample included ten patients, of both genders, who underwent general surgeries. The most frequent diagnosis was the risk for infection, which was found in 100% of the analyzed patients[10].

The Risk Assessment Scale for the Development of Injuries due to Surgical Positioning (*Lesões Decorrentes do Posicionamento Cirúrgico* – ELPO), created by a Brazilian nurse, consists of seven items, with five subitems each, whose score varies from 1 to 5 points, presenting a total score from 7 to 35 points, in which the higher the score for classifying the patient, the greater the risk of developing injuries due to surgical positioning. The author of ELPO[11] identified the association between the scale and the development of perioperative lesion and showed that, with each additional point in which the subject is classified on the scale, the probability of developing injury increases by 44%.

Moreover, the supine position is more anatomical, and complications related to this position occur due to inadequate positioning and prolonged period of surgery[12]. Conversely, in the lithotomy position, the patient remains in the recumbent position, with abduction of lower limbs, supported on a leg support, and elevated, forming an angle of approximately 90º with the hip joint. This position provides a higher risk of complications due to pressure in the sacral and lumbar regions. Patients in lithotomy position have a higher risk for injury (59.72%) compared with patients placed in other surgical positions[2,11,12].

Regarding the risk of infection, authors of a study[13] showed that being classified as American Society of Anesthesiologists (ASA) II, III, and IV/V increases by 52, 134, and 89%, respectively, the chances of developing surgical site infection (SSI) compared with patients classified as ASA I. On the other hand, authors of a study conducted in a public hospital in the city of Belém (state of Pará, Brazil)[14] showed that the incidence of SSI increased as the ASA index increased. The rate of SSI in ASA I patients was 6.3%; in ASA II, 10.5%; and in ASA III, 100% ($p \leq 0.0001$), which makes the ASA index significantly capable of influencing SSI. Hence the importance of associating the data collected in the instrument with a nursing diagnosis and, consequently, with a nursing intervention, thus systematically seeking to achieve results. This is the actual function of identifying data and recording them.

In all aforementioned articles, the NANDA-I diagnoses identified by the authors were replaced with their referents in the current version of the taxonomy (2018–2020), since the studies were based on older versions of the NANDA-I classification.

It may be observed that most nursing diagnoses found in the perioperative period are of risk, i.e., those that can be avoided through early identification and implementation of interventions performed in the care plan. Thus, nursing care should be focused on the planning of care, considering the diagnostic evidence presented by individuals. Therefore, the importance of the nursing team in using taxonomic classifications at the time of their records, in order to improve the care provided to the surgical patient, should be highlighted.

Finally, the limitations of the study should be stated. Firstly, there are few studies addressing nursing diagnoses in the perioperative period, allowing a considerable discussion. This limitation was expected, considering the specificity of the research object and the lack of publications on the issue. Secondly, there is insufficient evidence of studies with specialists, such as consensus studies, since, for the basis of the pyramid of study quality analysis, this type of research is paramount for practice objects. Nevertheless, statistical analysis measures and individual steps were performed to reduce detection bias. All in all, care was taken in order to minimize selection bias, and data were collected on alternate days and times. Although we do not present a sample size, due to the type of study performed, a larger sample would make the specialist's evaluation expensive and error-prone, and the associations presented show that the sample met the proposed objectives.

CONCLUSION

There are generic terms of the records of daily nursing practice that refer to the nursing diagnoses proposed by NANDA-I taxonomy and which are significant to organize and direct the quality of nursing care provided to patients during the perioperative period.

It is evident, therefore, that nurses, when performing the evaluation of surgical patients through the NP, should clinically and individually assess the needs and risk factors presented by the patients. As aforementioned in the results and discussion sections of this study, most diagnoses found in the perioperative period were of risk: risk for surgical site infection, risk for impaired skin integrity, impaired tissue integrity, risk for aspiration, and risk for perioperative positioning injury. Thus, early detection measures and damage-related preventive interventions must be implemented.

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VALIDATION OF AN INSTRUMENT TO REGISTER THE SYSTEMATIZATION OF PERIOPERATIVE NURSING CARE

Validação de instrumento para registro da sistematização da assistência de enfermagem perioperatória

Validación de un instrumento para registrar la sistematización de la atención de enfermería perioperatoria

Francielle Regina dos Santos Luciano[1*], Luciana Martins da Rosa[2], Ana Graziela Alvarez[3], Elisa Borges Kuze[4]

ABSTRACT: Objectives: To construct and validate the contents of an instrument to register the systematization of perioperative nursing care. **Method:** Methodological study conducted in a teaching hospital in Southern Brazil, which included literature review, cross-mapping between unstructured observation and North American Nursing Diagnosis Association taxonomies for instrument construction and application of the Delphi technique for validation, performed between November and December 2018. An electronic form was made available to ten experts to evaluate the objectivity, clarity/understanding, appearance and feasibility of the instrument contents, registered on a Likert scale. The answers obtained were submitted to the content validity index (CVI), and scores ≥0.8 confirmed the content validation. **Results:** The nine information groups of the instrument were evaluated by expert nurses. The average CVI obtained among all contents was 0.92 in the first round of validation. The results showed that the methodological strategy allowed the construction of contents that represent the clinical need for perioperative nursing records. **Conclusion:** The implementation of a validated instrument contributes to a safer and more qualified nursing practice.

Keywords: Surgical centers. Nursing care. Checklist. Nursing process. Patient safety.

RESUMO: Objetivos: Construir e validar conteúdos de um instrumento para registro da sistematização da assistência de enfermagem perioperatória. **Método:** Estudo metodológico realizado em um hospital-escola do sul do Brasil que incluiu revisão de literatura, mapeamento cruzado entre observação não estruturada e taxonomias da North American Nursing Diagnosis Association para construção do instrumento e aplicação da técnica Delphi para validação, realizada entre novembro e dezembro de 2018. Disponibilizou-se formulário eletrônico a dez expertos para avaliação da objetividade, clareza/compreensão, aparência e exequibilidade dos conteúdos do instrumento, registrada em escala Likert. As respostas obtidas foram submetidas ao índice de validade de conteúdo (IVC), e escores ≥0,8 confirmaram a validação do conteúdo. **Resultados:** Os nove grupos de informações do instrumento foram avaliados por enfermeiros expertos. A média do IVC obtido entre todos os conteúdos foi de 0,92 na primeira rodada de validação. Os resultados demonstraram que a estratégia metodológica permitiu a construção de conteúdos que representam a necessidade clínica para os registros de enfermagem no período perioperatório. **Conclusão:** A implementação de instrumento validado contribui para uma prática de enfermagem mais segura e qualificada.

Palavras-chave: Centros cirúrgicos. Cuidados de enfermagem. Lista de checagem. Processo de enfermagem. Segurança do paciente.

RESUMEN: Objetivos: Construir y validar los contenidos de un instrumento para registrar la sistematización de la atención de enfermería perioperatoria. **Método:** Estudio metodológico, realizado en un hospital universitario en el sur de Brasil, que incluyó revisión de literatura, mapeo cruzado entre observación no estructurada y taxonomías de la Asociación Norteamericana de Diagnóstico de Enfermería para la construcción de instrumentos y la aplicación de la técnica Delphi para validación, realizada entre noviembre y diciembre de 2018, con la disponibilidad de un formulario electrónico para diez expertos

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para evaluar la objetividad, claridad/comprensión, apariencia y viabilidad del contenido del instrumento, registrado en la escala Likert. Las respuestas obtenidas se enviaron al índice de validez de contenido (IVC), y las puntuaciones ≥0,8 confirmaron la validación de contenido. **Resultados:** Los nueve grupos de información del instrumento fueron evaluados por enfermeras expertas. El IVC promedio obtenido entre todos los contenidos fue de 0.92 en la primera ronda de validación. Los resultados mostraron que la estrategia metodológica permitió la construcción de contenidos que representan la necesidad clínica de registros de enfermería perioperatoria. **Conclusión:** la implementación de un instrumento validado contribuye a una práctica de enfermería más segura y más calificada.

Palabras clave: Centros quirúrgicos. Atención de enfermería. Lista de verificación. Proceso de enfermería. Seguridad del paciente.

INTRODUCTION

The systematization of nursing care (SNC) aims to identify health-disease situations and nursing care needs, as well as assist in the development of interventions, promotion, prevention, recovery and rehabilitation of the health of individuals, their families and communities[1].

In Brazil, the application of the nursing process (NP) in the care of surgical patients in the pre, trans and immediate postoperative (IPO) periods was proposed[2] in 1990. The preoperative period is divided into intermediate and immediate, and the preoperative is intermediate from the moment the surgery is decided until the day before the procedure[2]. The immediate preoperative happens within 24 hours before the anesthetic-surgical act, the moment of physical and emotional preparation of the patient and their family[2]. The transoperative period ranges from the patient's admission into the surgical center (SC) until leaving it after the anesthetic-surgical procedure is completed[2]. The immediate postoperative period covers the first 24 hours after surgery and includes the time the patient remains in the post-anesthetic care unit (PACU)[2].

With a focus on patient care in the perioperative period the systematization of perioperative nursing care (SPNC) aims to reduce the risks of both the SC and PACU environments and promote the quantity and quality of materials, equipment and human resources. This process comprises five steps: preoperative nursing evaluation, planning of preoperative care, implementation of care, evaluation of care with the postoperative nursing visit, and reformulation of care according to the results obtained[3]. Using nursing diagnostics and interventions in the SPNC is essential to the practice, because it qualifies care and facilitates nursing care provided in the IPO in a dynamic, organized and systematic way, which requires a critical evaluation and decision making by nurses[4,5].

Seeking to guide the SPNC to prevent adverse events, the World Health Organization (WHO) has, since 2004, mobilized actions for patient safety during care processes. The global challenge Safe Surgery Saves Lives, launched by the WHO in 2008, is highlighted. The campaign consists of a proposal for a safe surgery check, carried out with an objective checklist instrument, developed after revisions of the evidence-based practices that identified the most common causes of injury to patients in the perioperative period[6,7].

Even recognizing the effectiveness of the safety checklist in the operating room (adopted by the study setting presented here), it is also of paramount importance to carefully observe the patient in the pre and postoperative phases for the success of the procedure and patient safety. Thus, surgical patients must receive care throughout this process to restore physiological balance, relieve pain and discomfort caused by surgery, and prevent and detect possible complications[6,7].

In observations made at a teaching hospital in Southern Brazil, in 2017, the need to create a new SPNC register model, seen that the model used was outdated, incomplete and fragmented and prolonged the time required for the registration filling, a fact that caused a feeling of worthlessness for the other sectors of the hospital.

An instrument for surgical safety systematically used in the surgical unit, the preoperative phase, the SC and induction of anesthesia, during surgery, the PACU and the surgical unit within the first 24 hours of the postoperative period may contribute for a greater safety of patients submitted to the surgical process. Moreover, it will value the work of the nursing team in an organized and sequential manner. It is also worth noting that the study setting did not adopt in its practices and registrations the stage of nursing diagnoses in the SC nursing process.

The motivation for the present study emerged due to the compulsory application of the SNC[8] and its development in a fragmented manner in the professional practice of the study setting.

OBJECTIVES

To construct and validate contents of an instrument for the registration of the SPNC in a teaching hospital in Southern Brazil.

METHOD

Methodological study conducted in a teaching hospital in Southern Brazil, which included literature review, cross-mapping between unstructured observation and North American Nursing Diagnosis Association taxonomies for instrument construction and further application of the Delphi technique to validate such contents. Initially, unstructured observation was performed. Therefore, the main author of this study, a nursing resident of high complexity in the study setting, observed and recorded the nursing needs seen in the daily clinical practice, difficulties of registration, complaints of the nursing staff related to the instruments already used, problems and/or health needs and more frequent surgical procedures. This observation was made in the second half of 2017 and recorded in a field diary. Sequentially, the findings were grouped, when relevant themes were identified to construct the instrument.

After this stage, a literature review was performed, through which publications were selected on the following themes: SC, nursing care, SNC, nursing process, patient safety, surgical patient, PACU and nursing diagnosis. The following databases and virtual libraries were used: Coordination for the Improvement of Higher Education Personnel (CAPES), Scientific Electronic Library Online (SciELO) and Virtual Health Library (VHL).

The literature review also included NANDA International taxonomies for the definition of nursing diagnoses, results and interventions[8,9], that should compose the instrument. These taxonomies were defined because they are adopted in the study setting.

For the selection of nursing diagnoses, the health problems/needs identified and grouped in the unstructured observation were cross-mapped[10] between these data and the NANDA-I[8] taxonomy diagnostic titles. During cross-mapping, the titles of the diagnoses made available by NANDA, related to the needs of nursing practice, were registered. Based on these diagnoses, the interventions recommended by the NANDA taxonomis/Nursing Interventions Classification (NIC)[9] were elected to compose the contents of the instrument.

The search data were grouped and recorded in tables prepared with the aid of Microsoft® Word software.

The results/contents obtained in the first methodological steps, added to the SPNC registration instruments adopted in the study setting (three instruments), were organized and adapted together with a creative process and clinical experience of the study researchers, who elaborated the instrument contents presented in the present article. The instrument construction phase took place in the first half of 2018.

The Delphi technique was applied to validate the instrument contents, a tool that provides the systematic judgment of information, seeking the consensus of experts (judges evaluators or specialists) on a certain subject for validation[11]. The technique aims to investigate methods for data collection and organization, such as: development, validation and evaluation of research tools and methods, which favors the conduct of investigations with great rigor[12]. It is usually developed in validation rounds, and the number of rounds is defined according to the range of validation indices established for the study[13].

Delphi studies allow us to identify the missing and/or unnecessary presence of items to better measure the objective, and these aspects can only be perceived with content validation by experts in the area in question. Therefore, an objective questionnaire must be elaborated and applied, structured or not, in which pertinent questions are presented, seeking the expert's feedback, in subsequent rounds of evaluation. In its original proposal, Delphi is, therefore, a technique for seeking consensus among the opinions of a group of experts on a given event/phenomenon[13,14].

The study complied with the ethical principles in force in Brazil and was approved by the Research Ethics Committee, according to Opinion No. 2.985.962, Certificate of Presentation for Ethical Appreciation (CAAE) No. 92148218.3.0000.0121, via *Plataforma Brasil*.

Validation contents were associated to Likert's scaling method[14]. To confirm the content validation by judges, the percentage of total and partial agreement and the content validity index (CVI) were calculated, considering a CVI ≥0.80 as the minimum value for the content validation (average obtained among all experts). In case of results below this value, the contents would be revised or eliminated, as suggested by the experts.

The CVI calculation consists of dividing the total number of experts who assigned scores 3 (partially agree) and 4 (agree) by the total number of experts who participated in the validation round.

The study participants were expert nurses working in the field of surgical nursing and linked to the study setting, having as inclusion criteria: minimum experience of two years in clinical and/or nursing teaching in surgical clinic, SC and intensive care unit; minimum degree of a master; and clinical performance in the study setting. Prior face-to-face contact was made to clarify the purpose and method of development of the study and to know the interest of expert nurses in participating in it. After expressing their interest, the Free and Informed Consent Form was applied and the participants' signature was requested, confirming their inclusion in the study.

The exclusion criteria established were nurses who did not return the online form, emphasizing that the partial returns of experts would not be excluded. That is, if in the first phase the expert returned and in the second stage did not do so, each evaluation would be considered as a result of this study for statistical analysis.

In validation studies, one of the controversial points refers to the number and qualification of judges, with a minimum of five and a maximum of ten recommended[15]. In the present study, the minimum inclusion of ten evaluating judges in all validation rounds was estimated. If this number was not reached, new experts would be invited for inclusion in the study.

For data collection, an electronic form was prepared in Google Drive® storage service, containing the topics that make up the instrument developed. For each content presented, the four-point Likert scale was inserted (1 for disagree, 2 for partially disagree, 3 for partially agree, and 4 for agree). The form also provides a space to register suggestions and/or comments by the evaluators.

Validating the items covered issues related to content (appropriate, relevant, achievable, semantic content), appearance (layout, distribution graphic elements), clarity/understanding (intuitive content, easy to understand) and objectivity (unbiased, direct, practical and clear content).

The form was sent to the experts after previous contact by email, complementing the clarification for the content validation procedure, agreeing with the maximum delivery deadline (15 days) and providing the access link to the evaluation instrument. The validation rounds took place in November and December 2018.

The results were submitted to CVI calculation and presented in a descriptive form in table and chart. The discussion of data was supported by updated scientific literature linked to the theme.

RESULTS

Twelve nurses were invited for inclusion in the study, and ten accepted. Of these, five were working as professors in the Nursing Department of a university in Southern Brazil, three in the SC and two in the surgical inpatient unit of the study setting.

The age of experts ranged from 27 to 58 (average 41); time since graduation ranged from six to 37 years (average 17.5 years); five were masters (50%) and five, doctors (50%); and the experience time of the perioperative experts ranged from two to 20 years (average 11 years).

The results obtained from unstructured observation, literature review, cross-mapping and selection and adaptation of contents to the composition of the instrument allowed the elaboration of contents and the instrument's appearance, entitled "Nursing process: surgical patient".

The contents of the instrument were grouped into the following topics (T):

- T1: Preoperative general data;
- T2: Preoperative inpatient unit;
- T3: Preoperative SC;
- T4: Intraoperative;
- T5: Immediate postoperative, PACU;
- T6: Discharge report, PACU;
- T7: Nursing diagnosis, IPO, PACU, ward;
- T8: Nursing interventions in the immediate postoperative period;
- T9: IPO, ward.

Regarding nursing diagnoses, 18 were chosen from the NANDA International taxonomy[8], interrelated to 22 nursing interventions withdrawn and adapted from NANDA/NIC[9]. Besides that, a space was reserved in the instrument for new inclusions, as evaluated by the nurse.

As to the instrument's appearance, we chose Calibri Light and Calibri fonts, size 12 for titles and 11 for other information, for separating the topics into tables from the titles of each topic and using the figure. The contents were distributed in two sheets (four pages — front and back) in a booklet format. This format was designed so that the instrument's sheets were not separate, considering that the study setting still uses printed medical records.

In the first validation round, all topics assessed reached the CVI percentage ≥0.80, ranging from 0.80 to 1.00. The item that obtained the CVI closest to the 0.80 limit was the *content*. The item with the highest CVI of agreement was that of *appearance*,

obtaining eight times the assessment 1.00. The final CVI of the instrument, taking all evaluations into account, reached an overall average of 0.92. The percentages of partial and total agreement of T1-T9 as to *content*, *appearance*, *clarity/comprehension* and *objectivity*, and all CVI are presented in Table 1.

Based on these results, all contents were validated in the first validation round. However, some expert recommendations were considered relevant and, therefore, grouped, analyzed and inserted in the instrument. Expert recommendations are presented in Chart 1.

All the contents and instrument's appearance (two sheets with front and back contents) can be seen in full in Appendix 1.

DISCUSSION

The results obtained in the validation of the instrument, object of the present study, show that the proposed methodological strategy allowed the construction of contents that represent the clinical needs for SPNC records. For this reason, the minimum CVI required for validation was achieved in the first evaluation round, which indicates that the contents represent the need for clinical practice in the perception of experts and that the construction met the scientific rigors for knowledge production and praxis.

Thus, associating theory, practice and articulation among professionals clearly strengthens the praxis, facilitates the use of scientific knowledge and the science of clinical care, contributing to improvements in the dialogical relationship[16] between nurses/nursing, patients and the health team, transforming and improving nursing care and its registration.

The contributions by experts were also the result of their clinical experience in the study setting, the surgical context and related scientific knowledge, essential factors for the conclusion of this validation study. Improvements in the contents by expert recommendations were mostly related to grammar and layout, perfecting layout and making the instrument more visually pleasing and better to fill out, making it easier for nurses to use. The study states that these changes are relevant in validation studies, because, even in the case of subjective evaluations, such changes allow better presentation, understanding of contents, instrument's clarity and objectivity, as well as facilitate reading, interpretation of contents and the objectivity of the instrument[17].

Regarding nursing diagnoses and interventions, expert recommendations were considered pertinent to the care of surgical patients. With the inclusion, the total was 22 diagnoses and 24 nursing interventions. The diagnoses included are based on real and/or potential problems, facilitating the train of thought to develop interventions related to them, so that nursing outcomes can be the best answers. The use of diagnoses and interventions proposed by NANDA optimizes the time to elaborate nursing diagnoses and contributes to the decision of the best care to be provided, besides standardizing the practice and reducing the time spent by nurses with nursing diagnoses[18].

Table 1. Content validity index (CVI) of the instrument to register the systematization of perioperative nursing care. Florianópolis City, Santa Catarina State, 2018 (n=10).

Evaluated topics	% - Partial Agreement - CVI % - Total Agreement - CVI				CVI
	Content	Appearance	Clarity/Understanding	Objectivity	
T1	40% - 40% - 0.8	50% - 50% - 1.0	40% - 60% - 1.0	30% - 70% - 1.0	0.92
T2	40% - 40% - 0.8	20% - 80% - 1.0	20% - 70% - 0.9	20% - 80% - 1.0	0.92
T3	0% - 80% - 0.8	30% - 60% - 0.9	20% - 80% - 1.0	20% - 80% - 1.0	0.92
T4	20% - 60% - 0.8	0% - 100% - 1.0	0% - 80% - 0.8	20% - 70% - 0.9	0.87
T5	20% - 60% - 0.8	20% - 80% - 1.0	20% - 70% - 0.9	10% - 80% - 0.9	0.90
T6	40% - 50% - 0.9	10% - 90% - 1.0	10% - 80% - 0.9	10% - 80% - 0.9	0.92
T7	30% - 60% - 0.9	0% - 100% - 1.0	0% - 100% - 1.0	0% - 100% - 1.0	0.97
T8	20% - 70% - 0.9	10% -90% - 1.0	20% - 80% - 1.0	10% - 80% - 0.9	0.95
T9	40% - 40% - 0.8	10% - 90% - 1.0	30% - 60% - 0.9	30% - 70% - 1.0	0.92
Average	0.83	0.98	0.93	0.95	0.92

T1: preoperative general data; T2: preoperative inpatient unit; T3: preoperative surgical center (SC); T4: intraoperative; T5: immediate postoperative, post-anesthetic care unit (PACU); T6: discharge report, PACU; T7: nursing diagnosis, pre, trans and immediate postoperative (IPO) periods, PACU and ward; T8: nursing interventions in the IPO; T9: IPO, ward.

It should be noted that the study setting did not count on a taxonomy for the use of nursing diagnoses in the SC. With the implementation of this new instrument, there will be standardization of language and communication between nurses and the nursing staff.

It is pointed out that one of the difficulties found to construct the instrument was the grouping of the needed content and the most relevant items in the smallest possible space for the execution of SPNC and the proper registration of nursing actions. Divided into nine parts, the instrument is considered easy to use and includes comprehensive and meaningful contents to the clinical practice in the surgical context, given that each professional is responsible for completing information pertinent to their respective patient care sector and can fill them quickly, because the instrument is arranged simply and objectively.

Chart 1. Recommendations by experts for changes in the instrument. Florianópolis City, Santa Catarina State, 2018.

Evaluated topics	Recommendations by experts
T1	• Add "Lack of medical staff" in the reasons for suspending surgeries; • Include the item "Infections" in comorbidities; • Add "( ) Yes ( ) No" in the item "Suspended surgery"; • Change "No room in the ICU" for "Lack of beds in the ICU".
T2	• Add item "Blood supply"; • Add item "Oral hygiene performed".
T3	• Add line for writing "Other invasive devices".
T4	• Change "Heating system available" for "Heating system installed"; • Change "Balance" for "Total volume"; • In the item "Anesthesia", add a line for notes on the anesthesia and the word "Intubation"; • Add in the checking table the item "N/A".
T5	• No changes.
T6	• Change the word "Secretions" for "Drainage".
T7	• Add "Nursing diagnosis", "Risk for pressure injury", "Risk for acute confusion", "Risk for infection in the surgical site" and "Risk for perioperative hypothermia"; • Add extra lines in case further diagnoses are needed.
T8	• Add the word "Register" in the care referring to bleeding; • Add "Perform care with fluid therapy" and "Look out for signs ofhypothermia".
T9	• No changes.

T1: preoperative general data; T2: preoperative inpatient unit; T3: preoperative surgical center (SC); T4: intraoperative; T5: immediate postoperative, post-anesthetic care unit (PACU); T6: discharge report, PACU; T7: nursing diagnosis, pre, trans and immediate postoperative (IPO) periods, PACU and ward; T8: nursing interventions in the IPO; T9: IPO, ward; ICU: intensive care unit; N/A: none of the alternatives.

The use of care instruments by nurses should be combined with the systematized technical and scientific knowledge of the actions to be performed during the perioperative period. In addition, the definition of actions to be performed contribute to greater synchronism and effectiveness among the various professionals and, therefore, greater probability of success in interventions is expected[19].

The study limitations include the non-inclusion of experts outside the study setting, the non-application of analytical procedures and the non-inclusion of all contents of the safe surgery checklist. This last aspect is justified because it was a decision of the professionals in the study setting, because, in this context, a proper instrument for this purpose is applied.

The instrument produced and validated in the present study will contribute to safer nursing care, as well as to the appreciation of the work performed by nurses in the perioperative period.

Finally, the relevance of the study is due to the construction and validation of an instrument, proposing safer care for surgical patients and promoting greater visibility of the work of nurses and nursing staff in this process. In addition, it allows a continuum in the study setting by suggesting a single instrument for all stages of SPNC, organizing and standardizing nursing records.

Another paper, similar to the present one, points to the importance of studies that associate the academy and the needs of the clinic, i.e., theory and practice. Moreover, it emphasizes that the relevance of investigations of this size lies in the fact that they meet the real needs of the service, enabling the valuation of the nursing profession and patient safety[4].

CONCLUSION

The final version of the instrument was validated by 10 experts to implement the registration of SPNC phases in the study setting - a teaching hospital in Southern Brazil - and the average CVI obtained from all contents was 0.92. in the first validation round. It is noteworthy that the experts' contributions were essential, because they provided the construction of an appropriate instrument to the daily routine of the surgical nurse, using more coherent, updated and easily completed terms, facilitating their adherence.

Content validation with the application of analytical procedures and experts outside the study setting is recommended.

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Appendix 1. Validated instrument to register the systematization of perioperative nursing care. Florianópolis City, Santa Catarina State, 2018.

HOSPITAL POLYDORO HERNANI DE SÃO THIAGO
UNIVERSIDADE FEDERAL DE SANTA CATARINA

PROCESSO DE ENFERMAGEM
PACIENTE CIRÚRGICO

Nome: Quarto/Leito Registro:

DN: / / Idade: Raça: Sexo: Altura: Peso: Cond. UTI: ☐ Sim ☐Não

Diagnóstico Médico: Cirurgia Proposta: Data Cirurgia: / /

Comorbidades / Vícios / Informações Importantes			Cirurgia:	Unidade de Internação:	
☐HAS	☐Gravidez	☐D. pulmonar	☐Eletiva	☐CMI	☐UTI
☐DM	☐Sepse	☐D. hematológica	☐Urgência	☐CMII	☐Gineco
☐Tabagismo	☐D. coronariana	☐D. tireoide	☐Emergência	☐UICI	☐Emergência
☐Etilismo	☐Disritmia	☐Alergias _____		☐UICII	☐Externo
☐Substância Ilícita	☐D. Renal	☐Infecções _____			

Cirurgia suspensa: ☐Sim ☐Não

☐Falta de leito de UTI
☐Decisão da equipe médica
☐Falta de equipe: enfermagem/médica
☐Erro na estimativa do tempo de cirurgia
☐Falta de material
☐Paciente sem condições clínicas

PRÉ-OPERATÓRIO - UNIDADE DE INTERNAÇÃO

☐Jejum pré-operatório - desde: _____hs ☐Preparo especial: _____
☐Exames de pré-operatórios disponíveis (impressos ou no sistema HU)
☐Termo de consentimento preenchido e assinado: ☐Cirúrgico ☐Anestésico ☐Reserva de sangue
☐Realizado banho pré-cirúrgico com: _____ ☐Realizada higiene oral
☐Realizada tricotomia às _____hs (Máx. 2 hs antes da cirurgia) ☐Unidade Internação ☐Centro cirúrgico
☐Remoção de adereços/pertences pessoais ☐Remoção de próteses
☐Demarcação de sítio cirúrgico – Lateralidade: ☐Direito(a) ☐Esquerdo(a) ☐N/A
☐Orientado sobre cirurgia/cuidados perioperatórios ☐Prontuário acompanha o paciente

Avaliação de enfermagem:

Sinais Vitais: PA:_____mmHg FC:_____bpm FR:_____mrpm T:_____°C SatO2:_____%

Enfermeiro responsável / COREN:

PRÉ-OPERATÓRIO CENTRO CIRÚRGICO

Paciente e equipe confirmam as informações:

Identidade (nome completo, data de nascimento e prontuário): ☐Sim ☐Não ☐N/A
Confirmação/demarcação de sítio cirúrgico – Lateralidade (se houver): ☐Direito(a) ☐Esquerdo(a) ☐N/A
Termo de Consentimento da cirurgia assinado ☐Sim ☐Não ☐N/A
Fluidoterapia: ☐Acesso venoso adequado ☐Acesso venoso inadequado ☐Não
Outros dispositivos invasivos: _____
Alergias: ☐Nega/desconhece ☐Sim – Qual(is) _____

Continue...

Appendix 1. Continuation.

PERÍODO INTRAOPERATÓRIO

Posição do paciente: ☐DD ☐DV ☐DLD ☐DLE ☐Litotômica ☐Ginecológica ☐ Outros _____

Risco de lesão por pressão devido ao posicionamento do paciente (Escala de BRADEN):
☐Risco brando (15 a 16) ☐Risco moderado (12 a 14) ☐Risco severo (abaixo de 11)

Medidas implementadas para prevenção de lesão por pressão:
☐Coxins ☐Almofadas ☐Travesseiro(s) ☐Perneiras ☐Braçadeiras ☐Não ☐N/A

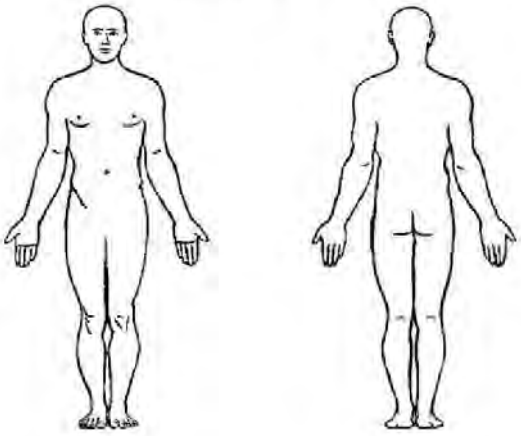
Sistema de aquecimento instalado:
☐Bota de algodão ☐Manta térmica ☐Fluídos aquecidos ☐Cobertores ☐Não ☐N/A

Antissepsia: ☐Clorexidina alcoólica ☐PVPI tópico ☐Clorexidina aquosa 2% ☐Outros: _____

Anestesia:
☐ Geral _____ Intubação - ☐Oral ☐Nasal
☐ Bloqueio Tipo: _____
☐Cateter peridural
☐ Local ☐Sedação

Início Incisão: _____
Término Cirurgia: _____

♥ Punção Arterial ● Punção Venosa ▲ A.V. profundo
Incisão (Desenhar) ■ Placa Bisturi



Drenos:
☐ Tórax _____
☐ Sucção _____
☐ Penrose _____
☐ Tubular _____
☐ Tubulaminar _____
☐ Outro(s) _____

Cateteres/Sondas:
☐ Vesical _____
☐ Nasogástrica _____
☐ Enteral _____
☐ Cistostomia _____
☐ Nefrostomia _____
☐ Outro(s) _____

Volume total		Conferências	
Diurese		Amostras para anatomia patológica identificadas	☐ SIM ☐ NÃO ☐N/A
Cristalóides		Requisições para anatomia patológica preenchidas	☐ SIM ☐ NÃO ☐N/A
Sangue		Requisição de material consignado assinado e preenchido	☐ SIM ☐ NÃO ☐N/A
Colóide		Realizado prescrição dos fármacos utilizados em sala	☐ SIM ☐ NÃO ☐N/A
Sangramento		Pertences do paciente identificados	☐ SIM ☐ NÃO ☐N/A

Avaliação de enfermagem:

_____

_____

_____

Enfermeiro responsável / COREN:

Continue...

Appendix 1. Continuation.

PÓS-OPERATÓRIO IMEDIATO – SALA DE RECUPERAÇÃO										
Admissão SRPA	Hora:						Aldrette:			
Nível consciência	☐Acordado		☐Sonolento		☐Acorda quando chama			☐Dormindo		
Oxigenação	☐Máscara		☐Catéter _____L/min			☐Ar ambiente		☐Outro _____		
Drenos/Cateteres	☐Funcionante		☐Não funcionante							
Curativo cirúrgico	Local: _____ Condições: _____									
Sinais vitais da chegada na SRPA	PA: _____ mmHg FC :_____ bpm FR: _____mrpm T: _____°C SatO2: _____%									
Escala da dor (Circule o número)	0	1	2	3	4	5	6	7	8	9	10
	LEVE			MODERADA					INTENSA		

RELATÓRIO DE ALTA – SALA DE RECUPERAÇÃO	
Encaminhado alta: ☐Acordado ☐Sonolento ☐Dormindo	Queixas durante RPA: ☐Não ☐Sim - ☐Dor ☐Vômitos ☐Outro _____
Trocado curativo: ☐Sim _____/Vezes ☐Não Motivo: _____	Desprezado drenagem sonda e/ou dreno: ☐Sim ☐Não Volume:_____
Diurese desprezada: ☐Sim ☐S Não Volume:_____mL Cor:_____	Pertences do paciente, prontuário e receita dos psicotrópicos encaminhadas para unidade: ☐Sim ☐Não

Avaliação de enfermagem:

_____

_____

_____

_____

Enfermeiro responsável / COREN:

DIAGNÓSTICO DE ENFERMAGEM - PÓS-OPERATÓRIO IMEDIATO - SRPA E ENFERMARIA		
☐Ansiedade	☐Dor aguda	☐Integridade da pele prejudicada
☐Mobilidade no leito prejudicada	☐Náusea	☐Padrão respiratório ineficaz
☐Risco de desequilíbrio de volume de líquidos	☐Risco de perfusão tissular cardíaca diminuída	☐Risco de motilidade gastrintestinal disfuncional
☐Risco de constipação	☐Retenção urinária	☐Risco de glicemia instável
☐Risco de infecção	☐Risco de desequilíbrio eletrolítico	☐Risco de resposta alérgica
☐Risco de sangramento	☐Risco de aspiração	☐Risco de perfusão tissular periférica ineficaz
☐Risco de lesão por pressão	☐Risco de confusão aguda	☐Risco de infecção no sítio cirúrgico
☐Risco de hipotermia perioperatória	☐	☐
☐	☐	☐
☐	☐	☐
☐	☐	☐
☐	☐	☐

INTERVENÇÕES DE ENFERMAGEM NO PÓS-OPERATÓRIO IMEDIATO	APRAZAMENTO/EXECUÇÃO
☐Verificar sinais vitais.	
☐Atentar para alergia a:	
☐Avaliar padrão respiratório e verificar saturação de O2.	
☐Estimular exercícios respiratórios, orientar paciente a realizar inspiração profunda.	
☐Realizar aspiração traqueal/oral.	
☐Manter o paciente com a cabeceira elevada em 45°.	

Continue...

Appendix 1. Continuation.

☐Manter o paciente com a cabeceira elevada em 0°	
☐Atentar para sinais e sintomas de hiperglicemia e de hipoglicemia.	
☐Realizar rodízio para medicação subcutânea.	
☐Atentar para sinais de hipotensão e hipertensão.	
☐Atentar para sinais de dor ou desconforto, avaliando local, frequência e duração, intensidade (0-10).	
☐Realizar curativo em incisão cirúrgica com:	
☐Observar e registrar sangramento incisional/vaginal.	
☐Observar turgor, perfusão periférica e coloração da pele.	
☐Monitorar sinas e sintomas de infecção em acessos centrais, periféricos, sondas, drenos e incisões cirúrgicas.	
☐Realizar cuidados com fluidoterapia.	
☐Estimular movimentação ativa no leito e deambulação precoce.	
☐Auxiliar/estimular higiene oral.	
☐Banho: auxiliar / no leito / chuveiro em cadeira / aspersão.	
☐Realizar cuidados e registrar débito e características do (os) dreno (os).	
☐Realizar cuidados com: sonda vesical de demora / nefrostomia / cistostomia.	
☐Observar e registrar características das eliminações intestinais e vesicais quanto a: frequência, consistência (fezes), coloração e débito (diurese).	
☐Atentar para irrigação vesical, contabilizar o volume de entrada e de saída de líquidos na sonda e verificar coloração.	
☐Atentar para a presença de ruídos hidroaéreos, flatos e distensão abdominal.	
☐Atentar para sinais de sintomas de hipotermia.	
☐	
☐	
☐	
☐	
☐	
☐	

PÓS-OPERATÓRIO IMEDIATO - ENFERMARIA	
Sinais Vitais: PA:_____ mmHg FC:_____ bpm FR:_____ mrpm T:_____°C SatO2:_____%	
Nível consciência ☐Acordado ☐Sonolento ☐Acorda quando chama ☐Dormindo	
Queixas: ☐Dor ☐Êmese ☐Náusea ☐Frio ☐Dispnéia ☐Tonturas ☐Retenção ☐Urinária ☐Outro _____	
Oxigenação: ☐Máscara ☐Catéter _____L/min ☐Ar ambiente ☐Outro _____	
Drenos/Cateteres: ☐Funcionante ☐Não funcionante	Local curativo cirúrgico:_____ Condições:_____
Anotações de enfermagem _____ _____ _____ _____	
Enfermeiro responsável / COREN:	**Horário de chegada:**

INCIDENCE OF INFECTION OF SURGICAL SITE IN HOSPITAL DAY: COHORT OF 74,213 PATIENTS MONITORED

Incidência de infecção de sítio cirúrgico em hospital dia: coorte de 74.213 pacientes monitorados

Incidencia de la infección del sitio quirúrgico en el día de hospital: cohorte de 74,213 pacientes monitoreados

Eliana Auxiliadora Magalhães Costa[1]*, Lícia Lígia Moreira[2], Maria Enoy Neves Gusmão[3]

ABSTRACT: Objectives: To describe the incidence of surgical site infection (SSI) after discharge from a Daycare Unit (DU) and to compare these indicators with data from conventional hospitals. **Method:** This is a historical cohort study including 74,213 patients who underwent surgery and were monitored at a DU in Salvador (Bahia State, Brazil), between 2012 and 2017. **Results:** During the studied period, the DU surveillance system monitored 85.1% of patients after discharge. We found a total SSI incidence of 0.3%, varying between 0.2 and 0.4% in those years. These rates were statistically lower than those reported for SSI in hospitalized patients. **Conclusion:** The SSI indicators revealed in this study confirm that outpatient surgical care poses lower risks of infection acquisition for the operated patients, when compared with surgical infection data of patients from conventional hospitals. However, a follow-up system for patients after discharge is essential to avoid sub-reporting and sub-records regarding SSI data, considering that risks can be hidden and unrealistic rates can be identified in their absence.
Keywords: Surgical wound infection. Day care, medical. Patient safety.

RESUMO: Objetivos: Descrever a incidência de infecção do sítio cirúrgico (ISC) em seguimento após alta em hospital dia (HD) e comparar esses indicadores com dados de hospitais convencionais. **Método:** Estudo de coorte histórica composto de 74.213 pacientes operados e monitorados num HD de Salvador (BA), entre 2012 e 2017. **Resultados:** No período estudado, o sistema de vigilância do HD monitorou 85,1% dos pacientes após a alta e foi identificada incidência total de ISC de 0,3%, com variação de 0,2 a 0,4% entre os anos, taxas estatisticamente menores do que as reportadas para ISC em regime de internação hospitalar. **Conclusão:** Os indicadores de ISC revelados neste estudo ratificam que a modalidade da assistência cirúrgica ambulatorial porta menor risco de aquisição de infecção para os pacientes operados, quando comparados com os dados de infecção cirúrgica de pacientes em hospitais convencionais. Entretanto, torna-se indispensável um sistema de seguimento dos pacientes após a alta, no sentido de evitar a subnotificação e os sub-registros dos dados de ISC, pois na ausência de ambos se podem ocultar riscos e identificar taxas irreais.
Palavras-chave: Infecção da ferida cirúrgica. Hospital dia. Segurança do paciente.

RESUMEN: Objetivos: Describir la incidencia de la infección del sitio quirúrgico (ISQ), después del alta del centro de día (CD) y comparar esos indicadores con los datos de hospitales convencionales. **Método:** Estudio de cohorte histórico con 74,213 pacientes operados y monitoreados en un CD en Salvador (Bahia, Brasil), entre 2012 y 2017. **Resultados:** Durante el período estudiado, el sistema de vigilancia del CD monitorizó el 85,1% de los pacientes después del alta, y se identificó una incidencia total de la ISQ del 0,3%, que varía desde el 0,2% hasta el 0,4% entre los años. Esas tasas son estadísticamente más bajas que las reportadas para ISQ bajo el régimen de hospitalización integral. **Conclusión:** Los indicadores de la ISQ revelados en este estudio confirman que la modalidad de atención quirúrgica ambulatoria conlleva un menor riesgo de adquisición de infección para los pacientes operados, en comparación con los datos de infección quirúrgica de pacientes en hospitales convencionales. Sin embargo, es indispensable un sistema de seguimiento para los pacientes después del alta hospitalaria, para evitar el sub-reporto y los subregistros de los datos de la ISQ, ya que en ausencia de ambos se pueden ocultar riesgos y se pueden identificar tasas poco realistas.
Palabras clave: Infección de la herida quirúrgica. Centro de atención diurna. Seguridad del paciente.

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INTRODUCTION

Despite all the progress of technical and scientific knowledge and technological improvements in the Health area, health care-associated infections (HAI) are still a threat to the safety of patients worldwide.

Among these infections, the surgical site infection (SSI) is considered the most common in health care, affecting 31% of all HAI among hospitalized patients. It is associated with a 3% mortality rate and with 75% of deaths due to surgical procedures. Despite this negative potential, these infections can be prevented in up to 60% of cases by adopting prevention and control measures[1-4].

SSI conceptually refers to infections that occur after surgery in the body site where the procedure was performed, and they may involve skin, tissues, organs or implanted material, within the first 30 days or up to 90 days, if implants are placed[1-3].

The development of a SSI causes a substantial increase in the clinical, psychological and economic burden of surgery, which is attributed to the increase in direct costs by expanding patient's hospitalization time, diagnostic tests and treatments. Therefore, it is more costly to health systems, especially public ones. Patients with SSI are twice as likely to die or need intensive care and five times as likely to be re-hospitalized. Hospitalization costs are twice high for an infected patient if compared to an operated or uninfected patient[5,6].

In addition, SSI have an adverse impact on patients' mental and physical health, which can range from delayed wound healing to secondary complications. This consequently increases their morbidity and mortality to other intangible situations, such as pain, anguish, anxiety, prolonged time away from home, family and work[5].

Many factors contribute to the risk of these infections, such as those related to patients and team, and mainly to the possibility of surgical wound contamination during the operative procedure and perioperative. Therefore, the greater the microbial contamination in this period, the greater the chance of infection due to the introduction of microorganisms in the open and manipulated surgical cavity[6,7].

SSI epidemiological surveillance is an important strategy for the quality and safety of operated patients. Such surveillance occurs through the systematic monitoring of infection data and the possibility of adopting measures to prevent and control these diseases. However, most of these surveillance systems are aimed at hospitalized patients, and a few follow-up those who have already been discharged. This contributes to insufficient reporting of these infections, considering that 12 to 84% of the SSI are manifested after discharge, thus emphasizing the relevance of a post-discharge surveillance system[6,8,9].

Studies by the World Health Organization (WHO) show that SSI affect one third of operated patients, and their incidence varies in underdeveloped and developing countries (11.8 per 100 surgeries, ranging from 1.2 to 23.6). In European countries, rates are of 9.5% (colon surgeries), 3.5% (cardiac surgeries), 2.9% (caesarean sections), 1.4% (cholecystectomies), and 1.0% (orthopedic surgeries)[2].

A systematic review by European researchers at hospitals in France, Germany, Italy, Spain, and the United Kingdom confirmed a significant number of SSI occurring in various surgical specialties in Europe: cardiothoracic surgeries (9.2% SSI rate in the United Kingdom; from 1.9 to 2.5% in France), general surgeries (7.8% rate in the United Kingdom), and ear, nose and throat (ENT) surgeries (36% rate in France)[5].

A research conducted in hospitals from 16 cities in Turkey identified an overall SSI rate of 4.3% among 41,563 procedures[10]. A similar study in six cities in India reported a 4.2% SSI rate in 28,340 surgeries[11]. An international study, which aimed to determine the impact of SSI on health care costs in outpatient procedures, through a retrospective cohort of patients, identified rates of 0.3 and 0.5% (cholecystectomies), 0.6 and 0.5% (herniorrhaphy), and 0.8% (breast surgeries)[12]. In Colombia, 193 cases of SSI were observed in 5,063 procedures (3.8%)[13].

In Brazil, the pioneering assessment of incidence of SSI dates back to 2000, in a 23-year prospective study conducted in Recife City, Pernambuco State, Brazil, which identified an 11% total incidence of SSI (1,622 cases in 14,694 surgeries) and a 5.8% rate in clean surgical procedures. This study reports an SSI total rate of 0.4% for outpatient surgeries (130 cases in 27,580 procedures) and an SSI rate of 0.5% for clean surgical procedures[14].

A study that investigated the occurrence of SSI after discharge from an outpatient clinic of a Brazilian university hospital found that in 2,772 procedures performed within the general surgery specialty, 2,283 patients (82%) attended their follow-up consultations after discharge, in which 85 cases were of infection, with a total incidence of 3.7%[6].

Despite the growing number of published studies on SSI, few data, such as those cited here, have been published on the incidence of these infections after discharge, specifically in non-conventional health services, such as Daycare Units (DU). Thus, there is a significant knowledge gap, considering that outpatient surgeries are an increasing trend that allows major benefits, such as lower costs, more care provided and, *a priori*, lower risks of infection.

Hence, this study seeks to answer the following main question: What is the incidence of SSI after discharge and surgeries performed at Daycare Units? Are these infections comparatively lower than those observed in conventional hospitals?

OBJECTIVE

To describe the incidence of SSI after discharge from a Daycare Unit (DU) and to compare these indicators with conventional hospitals.

METHOD

This is a retrospective cohort study, which allows the observation of groups exposed (patients operated at a DU) to a risk factor that may be the cause of a disease that will be detected in the future[15]. The concept of DU was used as "intermediate assistance between hospitalization and outpatient care for the performance of clinical or surgical procedures that require patients to remain in the unit for a maximum of 12 hours," as defined in legislation.

The studied DU is a private organization, located in Salvador City, Bahia State, Brazil, which serves patients with health insurance plans and performs, exclusively, surgical procedures following the DU system. It has figures around 1,000 surgeries per month and an average of 12,000 surgical procedures per year. The most frequent performed surgeries in this unit, included in this study, are from the following specialties: general (hernioplasty, skin lesion and breast lump removal), otorhinolaryngology (tonsillectomy, tonsillectomy), vascular (varicose vein excision), hand surgeries, plastic surgeries, hysteroscopy, ophthalmology (facetectomy), hemorrhoidectomy, among others.

In this hospital, the Hospital Infection Control Program (HICP) has an epidemiological surveillance system for every patient operated at the institution, which consists of monitoring patients during hospitalization and after discharge. Patients admitted for endoscopic examinations and other non-surgical procedures, such as central catheter implantations for chemotherapy, laser and double J stent removal, were excluded from this surveillance system.

Each operated patient has a HCAI follow-up form, including the following data: identification, age, telephone, base diagnosis, date and type of surgery, name and number of the surgeon's regional council, surgical time, clinical classification system (ASA), prophylactic antibiotic use, and complications during the intraoperative phase.

Follow-up after discharge is performed by three HICP nursing interns, who were properly trained and systematically supervised. It consists of contacting all operated patients by telephone within 28 to 30 days after surgery to identify their postoperative evolution and possible adverse events, including infections after surgical procedure that was manifested after discharge from the institution. During this telephone call, interns follow a standard procedure to identify the patient's general condition, surgical incision conditions, occurrence of secretions or fever, return to medical consultation, and use of subtle medications to minimize biased responses. A maximum of three telephone attempts per patient is the standard, and, if contact is not possible, the patient is considered a "non-contact" and is excluded from the database of patients monitored by the HICP. Telephone contact data are recorded on patient records.

This cohort included the HCAI follow-up forms of patients undergoing surgical procedures at the researched DU headquarters, between 2012 and 2017. A total of 74,213 monitored patients was contacted during follow-up after discharge.

Data were collected in January and February of 2018, with the aid of a specific instrument to record the research variables of interest: number of performed surgeries, number of patients monitored after discharge by the HICP, and number of SSI per contamination potential of surgeries. We used the diagnostic criteria for SSI adopted by the Brazilian Health Regulatory Agency (ANVISA)[3].

Data were stored and analyzed in the Epi-Info program.

The research project was submitted to the Research Ethics Committee and approved according to the Certificate of Presentation for Ethical Consideration (CAAE) No. 84696018.9.0000.0057.

RESULTS

The distribution of surgical procedures performed and monitored in the studied DU is shown in Table 1.

Table 1 shows that, between 2012 and 2017, 87,166 patients underwent surgeries at the hospital under study, of whom 73,734 patients were monitored after discharge. The proportion of patients monitored between the studied years ranged from 78.7% (2016) to 90.6% (2012), with a total of 85.1% of patients followed-up after discharge.

Table 2 presents the incidence of SSI in DU-monitored patients according to the study years. There is a total SSI incidence of 0.3%, and an almost constant annual incidence during the analyzed period, with a variation of 0.2% in 2013; 0.3% in 2012 and 2015; and 0.4% in 2014 and 2017.

The incidence of SSI according to the potential for surgery contamination is presented in Table 2. 177 SSI (0.4%) were observed during the studied period, of which 41,771 were clean surgical procedures, 15 infections among the potentially contaminated surgeries (0.2%), 39 SSI in contaminated surgeries (0.2%), and no infections in surgeries classified as infected. Table 3 data also show that among 73,734 surgeries monitored in the studied years, 56.6% were considered clean (41,771/73,734), 32.1% were contaminated surgeries (23,701/73,734), 11.8% were potentially contaminated surgeries (8,724/73,734), and only 0.02% were infected surgeries (17/73,734).

DISCUSSION

In this study, the surveillance system after discharge of operated patients, which was implanted in the researched DU headquarters, monitored 85.1% of the cohort of 73,734 patients. Such monitoring was considered significant and in accordance with a study at a Brazilian university hospital[6], in which the authors followed-up after discharge 82% of outpatient surgical patients, thus validating the telephone contact methodology. When well systematized, this is an effective method for monitoring post-discharge surgical patients, as verified here.

Between 2012 and 2017, the total incidence of SSI at a DU was 0.3%, ranging from 0.2 to 0.4%. These rates are lower than those reported for SSI in international conventional hospitals, such as the percentages cited by the WHO[2] (11.8%), rates in conventional hospitals in European countries[5] (7.8, 8.6, and 3.2%), rates in hospitals in Turkey and India[10,11] (4.3 and 4.2%), and Colombia (3.8%)[13].

In addition, when comparing SSI rates of this study with two national surveys conducted in conventional hospitals[6,15], there were lower rates at the DU. This confirms that outpatient surgeries pose lower risks of infection.

The overall SSI incidence of 0.3% reported in this study resembles data from an international study on outpatient surgical procedures[12], which also used a retrospective cohort of patients and identified rates of 0.3 and 0.5% (cholecystectomies), 0.5 and 0.6% (herniorrhaphy), and

Table 1. Proportional distribution of monitored patients into surgical procedures according to year, at a Daycare Unit.

Period	Performed surgeries	Number of monitored patients	
		Number	%
2012	12,769	11,577	90.6
2013	13,557	12,002	88.5
2014	13,271	11,292	85.1
2015	14,710	12,723	86.5
2016	16,211	12,754	78.7
2017	16,648	13,865	83.3
Total	87,166	74,213	85.1

Table 2. Incidence of surgical site infection in monitored patients according to year of study, at a Daycare Unit.

Period	Number of monitored patients	Surgical Site Infection	
		Number	%
2012	11,577	32	0.3
2013	12,002	28	0.2
2014	11,292	41	0.4
2015	12,723	43	0.3
2016	12,275	36	0.3
2017	13,865	51	0.4
Total	73,734	231	0.3

Table 3. Incidence of surgical site infection (SSI) in monitored surgeries according to the potential of contamination at a Daycare Unit.

Period (year)	Clean surgeries N (n/SSI%)	Potentially contaminated surgeries N (n/SSI%)	Contaminated surgeries N (n/SSI%)	Infected surgeries N (n/SSI%)
2012	7,052 (26/0.4%)	1,778 (3/0.2%)	2,742 (3/0.1%)	05 -
2013	6,624 (19/0.3%)	2,175 (4/0.2%)	3,201 (5/0.2%)	02 -
2014	6,338 (33/0.5%)	1,191 (1/0.08%)	3,761 (7/0.2%)	02 -
2015	7,038 (30/0.4%)	1,314 (2/0.1%)	4,371 (11/0.2%)	-
2016	7,169 (29/0.4%)	976 0	4,608 (07/1.8%)	01 -
2017	7,550 (40/0.5%)	1,290 (5/0.4%)	5,018 (06/0.1%)	07 -
Total	41,771 (177/0.4%)	8,724 (15/0.2%)	23,701 (39/0.2%)	17 (0)

0.8% (breast surgeries), as well as data reported in a university hospital in Recife[14], which identified 0.4% of SSI in the outpatient clinic.

The infection rate in clean surgical procedures is an indicator of the institution surgical quality. Literature recommends, without specifying to what type of surgical procedure, whether conventional or non-conventional, infection rates lower than 2%. For surgeries classified as potentially contaminated, contaminated and infected, rates lower than 10%; rates of 20%, and 30 to 40%, respectively, are acceptable[15].

In the studied DU, the SSI rate in clean surgical procedures was 0.4, and 0.2% in potentially contaminated and contaminated surgeries, which are significantly lower than those percentages recommended in literature and in some international studies (3.5, 2.5, 6.8, and 8.6%)[4,9].

The total SSI percentage of 0.3% over the years studied in this DU, and the total SSI percentage of 0.4% in clean surgical procedures reveal not only the surgical excellence of such service, but that these rates are much lower than those reported for patients operated using the conventional practices. It confirms that outpatient care poses a lower risk of infection acquisition for operated patients, when compared with data from patients who underwent surgeries in conventional hospitals.

However, a follow-up system for patients after discharge is of utmost importance to avoid insufficient reports and notification of data. Whenever there is lack of both data, information can be hidden, and unrealistic rates can be identified.

CONCLUSION

This study achieved its objective and answered the guiding questions. It managed to identify the incidence of SSI in patients after discharge (total incidence of 0.3%, between 2012 and 2017) and to compare these indicators with those of conventional hospitals.

Results showed that the adequacy of the epidemiological surveillance system of SSI, adopted in the researched DU headquarters, proved to be robust. A complete follow-up of 85.1% of patients after discharge was performed, as well as the elaboration of a database including the indicators of SSI of the institution.

The percentages of SSI identified in the studied DU confirm the modality of outpatient surgery as of lower risk of SSI, when compared to data from surgeries performed in conventional hospitals.

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MANAGEMENT INDICATORS OF THE SURGICAL SCHEDULE IN A UNIVERSITY HOSPITAL

Indicadores gerenciais do mapa cirúrgico de um hospital universitário

Indicadores de gestión del mapa quirúrgico de un hospital universitario

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ABSTRACT: Objectives: To analyze the surgical productivity in a university hospital, correlating the management indicators of the surgery schedule with planning aspects, and propose strategies for developing the surgery schedule. **Method:** This is a quantitative and qualitative study of descriptive, documentary, and cross-sectional nature, performed at the surgical center of a university hospital, from April to June 2018, based on the analysis of surgery schedules. **Results:** In the quarter, an average of 400 monthly surgeries were assessed. We identified that magnitude II (55.9%) surgeries were the most frequent, and urology (18.7%) was the predominant specialty. The cancellation rate evaluated the planning performance index, which was 16.9%. **Conclusions:** The surgical productivity and the cancellation rate found were close to those of other university hospitals in the country, and the weaknesses detected are related to planning failures, leading to institutional costs. We recommend the implementation of a schedule review, a preoperative nursing visit, and patient confirmation as a planning strategy.
Keywords: Operating room nursing. Health management. Hospital planning. Hospitals, university.

RESUMO: Objetivos: Analisar a produtividade cirúrgica de um hospital universitário relacionando os indicadores gerenciais do mapa cirúrgico com os aspectos do planejamento e propor estratégias para elaboração do mapa e agendamento cirúrgico. **Método:** Trata-se de uma pesquisa quantiqualitativa, descritiva, documental, transversal, realizada no centro cirúrgico de um hospital universitário, de abril a junho de 2018, por meio da análise dos mapas cirúrgicos. **Resultados:** Analisou-se no trimestre uma média de 400 cirurgias mensais. Identificou-se que as cirurgias de porte II (55,9%) foram as mais frequentes, sendo a urologia (18,7%) a especialidade mais recorrente. A taxa de cancelamento avaliou o índice de desempenho do planejamento, que foi de 16,9%. **Conclusões:** A produtividade cirúrgica e a taxa de cancelamento encontrada aproximam-se da realidade de outros hospitais universitários do país, e as fragilidades apontadas são pertinentes às falhas no planejamento, gerando custos institucionais. Recomenda-se, como estratégia de planejamento, a realização do bate-mapa, a visita pré-operatória de enfermagem e a confirmação do paciente.
Palavras-chave: Enfermagem de Centro Cirúrgico. Gestão em saúde. Planejamento hospitalar. Hospitais universitários.

RESUMEN: Objetivos: Analizar la productividad quirúrgica de un hospital universitario contra los indicadores de gestión del mapa quirúrgico con los aspectos de planificación y proponer estrategias para la elaboración del mapa y el calendario quirúrgico. **Método:** Esta es una investigación cuantitativa, cualitativa, descriptiva, documental, transversal, realizada en el quirófano de un hospital universitario, de abril a junio de 2018, a través del análisis de mapas quirúrgicos. **Resultados:** Se analizó un promedio de 400 cirugías mensuales durante el trimestre. Se encontró que las cirugías de tamaño II (55.9%) fueron las más frecuentes, siendo la urología (18.7%) la especialidad más recurrente. La tasa de cancelación evaluó el índice de desempeño de planificación, que fue de 16.9%. **Conclusiones:** la productividad quirúrgica y la tasa de cancelación están cerca de la realidad de otros hospitales universitarios en el país y las debilidades identificadas son pertinentes a las fallas de planificación, generando costos institucionales. Como estrategia de planificación, se recomienda realizar el toque de mapa, la visita de enfermería preoperatoria y la confirmación del paciente.
Palabras clave: Enfermería de quirófano. Gestión en salud. Planificación hospitalaria. Hospitales universitarios.

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INTRODUCTION

Planning perioperative care services requires an information flow capable of integrating some sectors and services. Some aspects are essential to ensure proper surgical productivity, such as: adjusting the physical infrastructure, sizing human resources, estimating and providing material resources and equipment, and support from the services that act directly or indirectly in the execution of surgical procedures[1].

In this context, the Surgical Center (SC) Unit stands out for its technical, procedural, and multidisciplinary complexity, as it involves a set of elements intended for the performance of anesthesia-surgical procedures, as well as patient recovery[2,4].

The full integration and organization of services of hospitalization, storeroom, pharmacy, blood bank, laboratory, radiology, material and sterilization center, laundry, clinical engineering, intensive care units, as well as orthoses, prostheses, and special materials, are essential to implementing these surgical procedures.

The surgery schedule is a crucial instrument in this planning, since it allows an overview of operating rooms (ORs) and scheduled procedures, in addition to providing patient data, such as name, age, record, origin, type of surgery, surgical magnitude, surgical teams, anesthesiologists, nursing staff, and critical support services[5].

The perioperative nurse is considered a qualified professional to manage anesthesia-surgical procedures because this position demands specific training and is responsible for nursing interventions. Also, this professional acts in the prevention of complications resulting from planning failures. The best manager is the one who thoroughly knows the activities carried out in their unity[2,3,6].

SC efficiency can be quantitatively represented by results, situations, incidents, and events related to its operation. Quality indicators constitute an essential element for decision making since they enable the staff to monitor events more successfully and provide information for correction and standardization measures. These data comprise a management strategy to evaluate productivity[7].

This research is justified by its management aspects in the analysis of the surgery schedule, exposing outcomes directly connected to patient safety during the performance of surgical procedures, particularly in the reality of a university hospital (UH). Thus, we formulated the following research questions: analyzing the surgery schedule, which indicators result from planning? What strategies should be adopted before surgical productivity?

OBJECTIVES

To analyze the surgical productivity of a UH through surgery schedule indicators and develop strategies to plan and schedule surgeries.

METHOD

This is a quantitative and qualitative study of descriptive, documentary, and cross-sectional nature, performed at the SC of a high-complexity UH, in the state of Rio de Janeiro, which stands out as a training, education, and research site.

The research covered the period from April to June 2018, when the SC had 10 working ORs, with an average of 400 monthly surgeries.

The surgery schedule consisted of elective surgeries performed during the daytime, from Monday to Friday, with fewer patients on Saturdays.

The schedule planning used a previously filled appointment book of surgical specialties, displaying the days of the week between shifts for the distribution of ORs.

Printed and manually filled records were used to create the schedule, which provided information about the patient, the procedure, the support services, and the surgical team.

The specialties were responsible for checking the availability of beds for hospitalization, as well as the support services needed for the procedure. Next, the medical management received the prototype of the schedule and forwarded it to anesthesiologists and nurses to compose the teams for each OR.

The document analysis followed a semi-structured guideline and evaluated the surgery schedule, the printed urgent requests, the patient reception form, and the record book of SC nurses.

The description of qualitative data involved field observation, which aimed mainly at recording the information relevant to the schedule flow.

The eligibility criteria consisted of surgeries registered on the schedule, including urgent surgeries and those performed through projects that received external funding from the Ministry of Health, research funds, or private companies.

Ophthalmic and endourological surgeries, as well as those not carried out on the premises of the SC, were excluded.

This study complied with the regulations of Resolution no. 466/2012 of the National Health Council, and the Research Ethics Committee of the UH Pedro Ernesto approved the project, which received a favorable report (Certificate of Presentation for Ethical Consideration – Certificado de Apresentação para Apreciação Ética – CAAE 82754217.6.0000.5259).

RESULTS

From April to June 2018, 1,481 surgeries were planned in the UH, of which 282 were canceled. Table 1 shows that 186 urgent surgeries were requested. Among the surgeries registered in the surgery schedule, 1,079 had no financing from projects, while 402 were funded by projects.

In the period studied, the quarterly average was 400 surgeries per month, which represented a rate of 1.3 surgery per OR per day.

The elective surgeries performed without funding from projects corresponded to 81.1% (n=875), and those funded by projects, to 88.1% (n=354). Out of the urgent requests, 83.9% (n=156) of the surgeries were performed.

The overall cancellation rate was 16.9% (n=282). Among the cancellations, the procedures without projects had a frequency of 18.9% (n=204), those with projects, 11.9% (n=48), and urgent surgeries, 16.1% (n=30).

The elective surgeries performed had their medical specialties organized according to surgical magnitude, following the classification of surgical time, in which magnitude I represented surgeries that lasted up to 2 hours, magnitude II – 2 to 4 hours, magnitude III – 4 to 6 hours, and magnitude IV – more than 6 hours[1].

Urology had 14.4% (n=177) of magnitude II surgeries and 2.8% (n=35) of magnitude III. General surgery stood out among magnitude II procedures, with 6.7% (n=82), while reaching 2.0% (n=25) among those of magnitude I. Pediatric surgery represented 5.6% (n=69) of magnitude II surgeries and 2.7% (n=33) of magnitude I.

Most specialties presented higher frequencies in surgeries of magnitudes I, II, and III; however, cardiac surgery and neurosurgery predominated among magnitude IV surgeries, with 6.7% (n=82) and 2.4% (n=29), respectively (Table 2).

The support services requested in the surgery schedule were X-ray; blood bank; intensive care unit; intensifier, which provides high-resolution images; and laparoscope.

Laparoscope had the highest frequency – 30.8% (n=472), followed by blood bank – 26.4% (n=398), and C-arc images – 23.8% (n=293). The least required services in the OR were X-ray – 21.8% (n=272), intensive care unit – 15.7% (n=234), and laboratory – 7.1% (n=113), as shown in Table 3.

The surgical specialties with more urgent requests were general surgery – 22.6% (n=42); urological – 19.9% (n=37); neurosurgery – 10.2% (n=19); cardiac – 9.1% (n=17); vascular – 9.1% (n=17); and thoracic – 7.5% (n=14) (Table 4).

The overall cancellation rate was 16.9% (n=282) among elective and urgent surgeries. The main reasons were the lack of blood – 13.5% (n=38); the lateness of the hour – 12.4% (n=35); patients not clinically fit, 11.3% (n=32); patient not hospitalized – 9.9% (n=28); stand-by – 9.9% (n=28); lack of bed in the intensive care unit – 8.5% (n=24); patient without exams – 7.8% (n=22); lack of material/equipment – 6.4% (n=18). Frequencies were lower for patients who had eaten – 6% (n=17); other reasons – 5.7% (n=16); blank – 3.5% (n=10); absence of medical staff – 3.2% (n=9); and change in therapeutic approach – 1.8% (n=5), as presented in Table 5.

Table 1. Production of scheduled, urgent, and canceled surgeries, with and without projects, from April to June 2018.

Surgeries	Scheduled/Requested		Performed		Canceled	
	n	%	n	%	n	%
Elective without projects	1,079	64.7	875	81.1	204	18.9
Elective with projects	402	24.1	354	88.1	48	11.9
Urgent	186	11.2	156	83.9	30	16.1
Total	1,667	100.0	1,385	83.1	282	16.9

DISCUSSION

Using some indicators of SC procedures, we could assess the quality of perioperative care services by measuring management processes, the productivity rate, and the surgery cancellation rate. Among the productivity rate aspects, we analyzed those related to the OR utilization rate per day and the number of surgeries per month and teams[2].

The surgical productivity in the quarter for elective and urgent surgeries was close to the results of research carried out in a UH in Minas Gerais, with a sample of 1,895 surgeries, of which 1,542 were elective and 353 were urgent, revealing a characteristic of UHs regarding elective care[8].

In the present study, the cancellation rate (16.9%) was close to that of UHs in Sergipe and Paraná, whose rates were 19.5 and 18.45%, respectively. On the other hand, a study conducted in a UH in the south of Minas Gerais identified a frequency of 27.4%, while in a hospital in Pernambuco, this value was 30.6%, almost double the one found here[9,12].

However, despite the national average being close to the cancellation rate of the UH, another public teaching hospital in the inland of São Paulo reached 6.79%, a result associated with the preoperative visit[13].

The most frequent reasons for surgery cancellation in this study were connected to planning inefficiency related to avoidable issues, such as lack of blood and the lateness of the hour[14].

A communication failure in the SC between its users and the support services, associated with low blood bank supply and patients being admitted less than 24 hours before the procedure hindered the identification and availability of the fluids, affecting the results[14].

The surgery schedule is a document that allows the flow of elective patient care in the sector. An effective scheduling system favors the work of surgeons, anesthesiologists, nursing professionals, equipment, and ORs[15,16].

The clinical fitness of the patient is an interdependent variable in surgery cancellation, because, as doctors are

Table 3. Request for support services in the surgery schedule, from April to June 2018.

Support services	Request in the surgery schedule n	%
Laparoscope	472	30.8
Blood bank	398	26.4
Image intensifier (C-arc)	293	23.8
X-rays	272	21.8
Intensive care unit	234	15.7
Freezing laboratory	113	7.1

Table 2. Surgical productivity per specialty and magnitude, from April to June 2018.

Surgical specialty	Magnitude I		Magnitude II		Magnitude III		Magnitude IV		Specialty ranking	
	n	%	n	%	n	%	n	%	n	%
Urological	18	1.5	177	14.4	35	2.8	-	-	230	18.7
General	25	2.0	82	6.7	18	1.5	-	-	125	10.2
Pediatric	33	2.7	69	5.6	9	0.7	-	-	111	9.0
Plastic	23	1.9	54	4.4	31	2.5	-	-	108	8.8
Cardiac	-	-	3	0.2	18	1.5	82	6.7	103	8.4
Neurological	12	1.0	27	2.2	33	2.7	29	2.4	101	8.2
Colorectal	18	1.5	52	4.2	12	1.0	-	-	82	6.7
Head and neck	09	0.7	27	2.2	46	3.7	-	-	82	6.7
Orthopedic	14	1.1	42	3.4	10	0.8	-	-	66	5.4
Gynecologic	7	0.6	54	4.4	03	0.2	-	-	64	5.2
Thoracic	17	1.4	32	2.6	12	1.0	-	-	61	5.0
Vascular	12	1.0	29	2.4	05	0.4	-	-	46	3.7
Oral and maxillofacial	-	-	27	2.2	03	0.2	-	-	30	2.4
Craniofacial	8	0.7	12	1.0	-	-	-	-	20	1.6
Total	196	16.1	687	55.9	235	19.1	111	9.0	1,229	100.00

responsible for scheduling these procedures, this aspect can change in some patients due to decompensated chronic diseases, such as hypertension, hypoglycemia, infections, and other afflictions[8].

Similar results were found in other contexts, such as in the UH of Minas Gerais, with 19.1%, and Recife, with 20.8%[8,12].

Table 4. Urgent request per specialty, from April to June 2018.

Urgent request per specialty	n	%
General	42	22.6
Urological	37	19.9
Neurological	19	10.2
Cardiac	17	9.1
Vascular	17	9.1
Thoracic	14	7.5
Colorectal	9	4.8
Pediatric	8	4.3
Head and neck	7	3.8
Obstetric center	5	2.7
Plastic	5	2.7
Gynecologic	2	1.1
Craniofacial	2	1.1
Orthopedic	2	1.1
Total	186	100.0

Table 5. Reasons for surgery cancellation, from April and June 2018.

Reasons for suspension	n	%
Lack of blood	38	13.5
Lateness of the hour	35	12.4
Patient not clinically fit	32	11.3
Patient not hospitalized	28	9.9
Stand-by	28	9.9
Lack of bed in the intensive care unit	24	8.5
Patient without exams	22	7.8
Lack of material/equipment	18	6.4
Patient had eaten	17	6.0
Other	16	5.7
Blank	10	3.5
Absence of medical staff	9	3.2
Change in the therapeutic approach	5	1.8
Total	282	100.0

The preoperative visit is a strategy for the early identification of issues related to the clinical fitness of the patient since it prevents the inclusion of this individual in the schedule and, consequently, the cancellation[11].

The non-admission of the patient is another factor detected in the hospital in Recife (24.3%). The practice of calling the patients on the day before the surgery was a strategy that reduced the non-admission rate (8.96%), as research conducted in a UH in the inland of São Paulo reveals[12,13].

Cancellations lead to numerous losses for the hospital, since it prepares the logistics of materials, equipment, instruments, and specific teams for the procedure. Public hospitals are reimbursed by the public health system (*Sistema Único de Saúde* – SUS) based on a single table, with values for each procedure performed, and these values do not depend on the patient's length of stay in the hospital or the actual hospital costs[8,17].

A study conducted in a large hospital in São Paulo, approved by the National Accrediting Organization (*Organização Nacional de Acreditação* – ONA) and recognized by the Joint Commission International (JCI), introduced the strategy of schedule review as a quality management tool to reduce surgery cancellations and delays[18].

Besides endangering the safety of the patient, failure in some work processes can lead to surgery delay or even cancellation[16].

This study elaborated an Ishikawa Diagram to map the weaknesses, identifying several factors, among which the main one was the lack of products to meet the demands of elective, urgent, and emergency surgeries[18].

After detecting and analyzing the issues, three action fronts were established to solve the problem. One of them is the schedule review, which corresponds to daily meetings with interdisciplinary members involved in perioperative care, from SC sectors, material center, hospitalization, clinical engineering, and others, to identify and minimize the weaknesses of the service and propose improvements to surgical patient care[18]. The distribution of surgeries by magnitude is important to sizing the nursing staff, since this classification allows the organization of ORs according to the daytime surgery schedule, considering the cleaning time and room preparation between surgeries[1,5].

Most surgeries were of magnitude II (55.9%). This type of surgery lasts from 2 to 4 hours, and most of them were urological, justified by the running of the project. Magnitude III (19.1%) surgeries lasted from 4 to 6 hours[5].

In a study conducted in the UH of Cascavel, Paraná, the rates of magnitude I, II, III, and IV surgeries were 64, 31, 4, and 1%, respectively. The characteristics of hospital care directly interfere in the performance of the procedure and its magnitude, that is, they determine the planning and outcomes achieved[19].

Another important aspect is the evaluation of support processes that influence the SC management quality, taking into consideration critical and restricted areas, as well as their need for integration, in order to promote an organizational dynamic to the surgery schedule[20,21].

Among these services, laparoscopic surgeries – a minimally invasive alternative compared to conventional surgery – had more requests in the analyzed surgery schedule.

This study considered the blood bank, the use of image intensifiers and X-rays, the intensive care unit, and clinical laboratory analysis as facilitators of surgical procedure regarding time optimization for planning the surgery schedule.

Also, the number of urgent requests increased with the substitution of some patients who, due to some factors, were not listed in the schedule.

General surgery was the most frequent specialty among urgent requests during the studied period, a fact justified by the general on-call care. Some patients who needed urgent care after the diurnal period were treated by general surgery, resulting in the data of this study, as well as by the urology service, which has an institutional project.

We underline the lack of participation of nurses in planning the SC, allocating procedures in the OR, providing and estimating materials and equipment, and cooperating with support services aiming at patient safety, better SC efficiency, and practices that express the results of its processes and guide the monitoring, measurement, and evaluation of quality[2].

Nurses are the professionals with autonomy and connection with the teams and services to monitor and carry out the interventions they deem necessary when scheduling surgeries so as to improve management and control of work processes, optimize the ORs, and offer quality care to patients in the perioperative period[8].

The lack of efficiency indicators and SC productivity rate were limitations of the present study, as we had no reference to compare the data collected and the incorrect filling of data in the printed material, hindering their stratification.

CONCLUSION

The management indicators analyzed in this study were surgical productivity and surgery cancellation and its causes, since they stand out as performance indicators. We assessed organizational aspects, such as surgeries per room and specialty, surgical magnitude, and support services requested in the surgery schedule.

The surgical productivity identified corroborates the reality of teaching hospitals regarding the average of treatments performed.

We found a cancellation rate similar to that of other UHs, and the most frequent reasons for cancellation were inherent in the planning, revealing inefficiency.

The surgery schedule lacks information, leading to unpredictability and contributing to the cancellation rate and low production found, considering the rate of 1.3 surgery per working OR.

We could identify and build the care profile of the UH investigated in this study by how it conducts its projects, which determined the prevalence of magnitude II procedures. As a strategy to reduce the surgery cancellation rate and, therefore, increase surgical productivity, we suggest adopting the schedule review as a management tool aimed at identifying potential problems related to surgery suspension, as well as the preoperative visit, the planning according to surgical magnitude, and the control of human resources and materials/equipment for intraoperative care.

We expect that the present study can contribute to the identification and discussion of SC performance indicators, especially in UHs, as a way to stimulate the development of actions targeted at better planning of resources and as optimization strategies in the management of all resources for a quality care provided by both the perioperative nurse and the manager of this service.

We also emphasize that the limiting factors of this study were based on the quality of the completion of forms, the lack of digital data, and the impossibility of checking diagnostic situations in urgent cases, in order to improve the reliability of the conditions presented.

We recommend the development of further studies to obtain SC productivity rates and efficiency indicators, so as to expand the topic by comparing data and results.

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IMMEDIATE POSTOPERATIVE COMPLICATIONS OF MYOCARDIO REVASCULARIZATION

Complicações no pós-operatório imediato de revascularização do miocárdio

Complicaciones en el postoperatorio inmediato de revascularización miocárdica

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ABSTRACT: Objective: To verify the main complications of myocardial revascularization (MR) with cardiopulmonary bypass (CPB) and its association with modifiable and non-modifiable risk factors, nursing diagnoses, CPB time and nursing workload. **Method:** Retrospective cohort through analysis of 50 medical records of adult patients undergoing MR with CPB between 2012 and 2017. Project approved by the Research Ethics Committee Report No. 1969823. **Results:** The sample was predominantly male (70%), with a mean age of 62.1 years (standard deviation - SD ± 9.98). The mean CPB time was 124 minutes (SD ± 0.46). Postoperative complications occurred in 52% of the 50 patients analyzed, with bleeding being the most frequent (16%). The most frequent nursing diagnosis was risk of infection (92%). It was found that nursing staff care was most needed by patients with postoperative hypotension (p = 0.003) and arrhythmia (p = 0.000). **Conclusion:** Knowledge of postoperative complications associated with the patients helps develop more appropriate care plans.
Keywords: Nursing. Thoracic surgery. Nursing care.

RESUMO: Objetivo: Verificar as principais complicações da cirurgia de revascularização do miocárdio (RM) com circulação extracorpórea (CEC) e sua associação com os fatores de risco modificáveis e não modificáveis, diagnósticos de enfermagem, tempo de CEC e carga horária de enfermagem. **Método:** Coorte retrospectiva por meio da análise de 50 prontuários de pacientes adultos submetidos à RM com CEC, entre 2012 e 2017. Projeto aprovado pelo Comitê de Ética em Pesquisa parecer nº 1969823. **Resultados:** A amostra foi predominantemente masculina (70%), com idade média de 62,1 anos (desvio padrão — DP±9,98). O tempo médio de CEC foi de 124 minutos (DP±0,46). Complicações pós-operatórias ocorreram em 52% dos 50 pacientes analisados, sendo a mais frequente o sangramento (16%). O diagnóstico de enfermagem mais frequente foi risco de infecção (92%). Constatou-se que os cuidados pela equipe de enfermagem foram mais requeridos por pacientes que apresentaram hipotensão (p=0,003) e arritmia (p=0,000) no pós-operatório. **Conclusão:** O conhecimento das complicações pós-operatórias associadas ao perfil dos pacientes atendidos colabora para a elaboração de planos de cuidados mais adequados.
Palavras-chave: Enfermagem. Cirurgia torácica. Cuidados de enfermagem.

RESUMEN: Objetivo: Verificar las principales complicaciones de la cirugía de revascularización miocárdica (RM) con *bypass* cardiopulmonar (BCP) y su asociación con factores de riesgo modificables y no modificables, diagnósticos de enfermería, tiempo de BCP y carga de trabajo de enfermería. **Método:** Cohorte retrospectiva mediante el análisis de 50 registros médicos de pacientes adultos sometidos a RM con BCP entre 2012 y 2017. Proyecto aprobado por el Comité de Ética de Investigación Opinión 1969823. **Resultados:** La muestra fue predominantemente masculina (70%), con edad media de 62,1 años (DE±9,98). El tiempo medio de BCP fue de 124 minutos (DE±0,46). Las complicaciones postoperatorias ocurrieron en el 52% de los 50 pacientes analizados, siendo el sangrado el más frecuente (16%). El diagnóstico de enfermería más frecuente fue el riesgo de infección (92%). Se encontró que la atención por parte del personal de enfermería era más necesaria para los pacientes que presentaban hipotensión (p=0,003) y arritmia (p=0,000) después de la operación. **Conclusión:** El conocimiento de las complicaciones postoperatorias asociadas con el perfil de los pacientes ayudó en la elaboración de planes de atención más apropriados.
Palabras clave: Enfermería. Cirugía torácica. Atención de enfermería.

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INTRODUCTION

Nowadays, noncommunicable chronic diseases (NCDs) are responsible for high morbidity and mortality rates in Brazil[1]. Among them, cardiovascular diseases stand out[2]. The occurrence of cardiovascular diseases is related to several risk factors for illness caused by these diseases, such as harmful lifestyle habits, like smoking, inadequate diet, physical inactivity and alcohol consumption[3].

Thus, the treatment of these cardiac disorders can occur either pharmacologically, percutaneously or surgically, through myocardial revascularization (MR)[4].

MR is often performed through cardiopulmonary bypass (CPB). This technique, applied to heart surgeries, provided a clean and safe surgical field for the team, and preserved the functional characteristics of the cardiac apparatus[5].

However, despite the benefits of performing CPB, its use may also be related to potential immediate postoperative period (IPO) in elderly patients and infants younger than 3 months old, especially over prolonged periods of time[5].

Complications related to the use of CPB are associated with the induction of the organic systemic inflammatory response, with impairment of coagulation and immune response; increased venous tone; increased catecholamine release; changes in electrolyte state; myocardial cell dysfunction, injury or necrosis; and mild pulmonary dysfunction, which causes complications in the cardiovascular, respiratory, renal, gastrointestinal, and nervous systems[5].

Considering that nurses are some of the main care takes, they need to be aware of the risks and problems that affect the patients under their care, so that they can provide quality, and whenever possible, risk-free care[4]. From the nursing history survey to the treatment of possible postoperative complications, it is important to know how these personal antecedents are related to the main complications in the IPO of patients who underwent the MR procedure with CPB.

As such, following through with nursing diagnoses is essential, since they provide care that meet the individual needs of each patient, by choosing an ideal intervention and allowing for it to be further evaluated.

OBJECTIVE

To verify the main complications of MR with CPB and its association with modifiable and non-modifiable risk factors, nursing diagnoses, time performing the cardiopulmonary bypass, and the nurses' workload.

METHOD

Descriptive and exploratory retrospective study developed by analyzing medical records of patients undergoing cardiac surgery performed between 2012 and 2017.

For this purpose, a convenience sample consisting of 50 medical records of patients older than 18 years old, who had undergone cardiopulmonary bypass surgery and had survived the first 72 postoperative hours was used. Patients who had undergone other surgical procedures of any nature, performed within 30 days prior to the MR procedure, those undergoing hemodialysis treatment prior to the surgical procedure analyzed, MR surgeries without CPB, and urgent and emergency surgeries were excluded.

Data collection was performed by one of the researchers using an instrument that contained sociodemographic identification data, clinical and surgical personal history, continuous use medications, vital signs, invasive devices used before and after surgery, the duration of the surgery, CPB time, length of stay in the intensive care unit (ICU), surgical complications, nursing diagnoses and number of procedures performed or assisted by the nursing staff during the IPO.

The list of patients undergoing MR procedures between 2012 and 2017 was provided by the medical records service of the hospital selected for the study. Based on this list and by applying the inclusion and exclusion criteria, the medical records were read in full.

For this study, we followed the guidelines and regulatory standards for research involving human beings, emanating from Resolution No. 466 of 2012 of the National Health Council[6]. The project was submitted to the Research Ethics Committee of the School of Nursing at the Universidade de São Paulo and received approval under protocol number 1969823.

The results were analyzed using the Statistical Package for Social Sciences (SPSS) program, utilizing the Yates-corrected χ^2 tests or Fisher's exact test for dichotomous variables. For continuous variables, Student's t or Mann-Whitney's tests were performed. The delimited significance level was α=0.05.

To estimate the workload spent by the nursing staff, we used the nursing activities score (NAS), which considers basic activities, ventilatory, cardiovascular, renal, neurological and metabolic supports, and specific interventions. Each item

has a score, and the patient score is the sum of all of the items' scores. This percentage represents, in percentage, how much time of assistance the patient required within 24 hours, with a maximum total of 176.8%. According to the definition, 100 NAS points equals 100% of a nursing professional's time within 24 hours, and each NAS point corresponds to 14.4 minutes[7].

RESULTS

The sample consisted of 50 records of patients aged between 32 and 77 years old, with a mean of 62.1 years (SD±9.98), mostly male (70%), smokers (20%) or former smokers (32%) and with a varied personal history (100%) (Table 1).

Among the 50 patients, 70% were taking medication at home, especially antihypertensive drugs (56%), statins (46%), antiplatelet drugs (38%) and oral hypoglycemic drugs (18%).

Eight (16%) had undergone some previous surgery, primarily surgeries for partial or total (75%), orthopedic (25%), vascular (25%) and abdominal (25%) organ removal. There were no records of complications from these procedures.

Regarding medications, 20% received vasoactive drugs in the preoperative period, mainly nitroglycerin (12%) and dobutamine (6%), and 40% of the patients had a preoperative device, especially a delayed bladder catheter (84%) and peripheral venous accesses (36%).

Surgical time ranged from 4 to 16 hours, with an average of 9 hours and 20 minutes (standard deviation - SD±2.52h). The mean CPB time of the procedures performed was 2 hours and 4 minutes (SD ± 0.46h), with a minimum and maximum of 39 minutes and 3 hours and 40 minutes, respectively. Regarding the aortic clamping time, the average was 1 hour and 17 minutes (SD ± 0.41h), ranging from 25 minutes to 2 hours and 23 minutes.

During the procedure, 20% of the patients received packed red blood cells and 24% exhibited surgical complications. The main complication described was the difficulty in removing the patient from CPB (50%), followed by bleeding (40%) and hemodynamic instability (30%).

POI complications occurred in 26 (52%) patients, but only one (2%) required surgical reoperation due to hemorrhage, and two (4%) died, one due to cardiogenic shock and the other due to unspecified cardiac problems (Table 2).

The most frequent postoperative complications were heart related, represented by arrhythmias (14%), hypotension (10%), atrial fibrillation (6%), low cardiac output syndrome (4%) and cardiopulmonary arrest (2%); hematologic, represented by bleeding (8.16%) and hemodynamic instability (4%); and the respiratory system, especially hypoxemia (2%) and pneumothorax (2%).

Postoperatively, more invasive devices (96%) and new devices were required, including invasive blood pressure monitoring (90%), a pacemaker wire (80%), a Swan-Ganz catheter (12%) and an intra-aortic balloon (6%).

Table 3 describes the nursing diagnoses found according to the North American Nursing Diagnosis Association (NANDA)[8] taxonomy.

Postoperative complications that showed a significant statistical relationship with modifiable and non-modifiable risk factors included: family history of heart disease, correlated with cardiac complications ($p = 0.050$); and dyslipidemia, linked to impaired skin integrity ($p = 0.029$).

There was an association between CPB time ($p = 0.035$) and aortic clamping time ($p=0.039$), with the probability that the patient exhibited postoperative bleeding, and an association between anesthesia time and the risk of decreased cardiac output ($p = 0.013$).

The CPB time is also pertinent with regard to the onset of atrial fibrillation during the POI ($p = 0.011$), to the risk of a bleeding diagnosis regarding hematological

Table 1. Clinical and sociodemographic variables of the patients included in the investigation.

Variables	n	%
Unmodifiable Risk Factors		
Sex		
Male	35	70
Female	15	30
Family history of heart disease	17	34
Modifiable Risk Factors		
Smoking		
Smoker	10	20
Former smoker	16	32
Alcoholism		
Alcoholic	2	4
Former Alcoholic	2	4
Systemic arterial hypertension	36	72
Dyslipidemia	20	40
Coronary Artery Disease	16	32
Obesity	2	4

Table 2. Distribution of clinical and surgical variables of patients included in the investigation.

Variables	n	%
Physical State		
ASA 2	1	2
ASA 3	28	49
ASA 4	21	42
Surgical complications		
Intraoperative Complications		
Difficulty in removing the patient from CPB	6	12
Bleeding	4	8
Hemodynamic instability	3	3
Postoperative complications		
Heart	17	34
Hematological	10	20
Respiratory	2	4
Renal	2	4
Neurological	2	4
Surgical approach	1	2
Death	2	4

ASA: American Society of Anesthesiologists; CPB: cardiopulmonary bypass.

Table 3. Distribution of the nursing diagnoses of patients included in the investigation.

Nursing diagnoses*	n	%
Risk of infection	46	92
Risk of decreased cardiac tissue perfusion	30	60
Decreased cardiac output	25	50
Shock risk	18	36
Bleeding risk	17	34
Sharp pain	15	30
Risk of unstable blood glucose	11	22
Impaired skin integrity	10	20
Anxiety	9	18
Risk of slipping, tripping or falling	8	16
Ineffective breathing pattern	6	12
Unable to bathe themselves	5	10
Impaired Physical Mobility	5	10
Ineffective peripheral tissue perfusion	5	10
Risk of constipation	4	8
Imbalanced nutrition; less than needed	2	4

*The number of nursing diagnoses is higher than the number of patients, as each patient had several diagnoses.

complications (p=0.025) and to the occurrence of bleeding (p = 0.038). The use of a pacemaker wire was associated with a diagnosis of acute pain (p = 0.026). The other statistically significant correlations identified in this study are described in Chart 1.

Regarding the average workload spent by the nursing staff in the care of postoperative patients, the average values were 28.7 (SD±6.0), with a minimum of 25.7 and a maximum of 42.5. That is, on average each patient required 28.7% of the time of the nursing staff or 7 hours and 28 minutes. Patients who presented hypotension (p=0.003) and arrhythmia (p=0.000) postoperatively needed more care provided by the nursing staff.

Chart 1. Correlation between nursing diagnoses, postoperative complications and personal and clinical-surgical antecedents.

Nursing diagnoses	Variables	p*
Bleeding risk	CPB time	0.035
	Aortic clamping time	0.039
	Hematologic complication	0.025
	Bleeding in the immediate postoperative period	0.038
Impaired skin integrity	Vasoactive drug	0.029
	Respiratory frequency	0.038
	Dyslipidemia	0.029
	Cardiopathies	0.023
Unable to bathe themselves	CPB time	0.028
	Anesthesia time	0.006
Risk of unstable blood glucose	Diabetes *mellitus*	0.004
	ASA 3	0.029
	ASA 4	0.014
Decreased cardiac output	Anesthesia time	0.013
Sharp pain	Diabetes *mellitus*	0.052
Ineffective breathing pattern	Length of hospitalization	0.032
Imbalanced nutrition; less than needed	Angina	0.043
Acute confusion	Neoplasms	0.043
Risk of slipping, tripping or falling	Diastolic blood pressure	0.046
Shock risk	Diastolic blood pressure	0.034

*Fisher's exact test; CPB: cardiopulmonary bypass; ASA: American Society of Anesthesiologists.

DISCUSSION

The scientific literature indicates that the main risk factors for the appearance of changes in the postoperative period of cardiac surgeries are associated with the patient's age, sex, hypertension, diabetes, high cholesterol levels, low density lipoproteins (LDL) and low cholesterol high density lipoprotein (HDL) cholesterol, smoking, obesity, physical inactivity, family history[2], type of preoperative medication, and intraoperative risk factors (type of surgery, length of time in CPB, length of stay in the hospital and the use of a specific medication)[9]. However, in the present study,[10] the main complications identified in the POI were of cardiac or hematologic origin. Only the unmodifiable risk factor family history of heart disease showed a statistical correlation with cardiologic complications, and the modifiable risk factor dyslipidemia, with the nursing diagnosis of impaired skin integrity.

Systemic arterial hypertension (SAH) is considered to be the main risk factor for coronary artery disease and is markedly related to heredity[10,11] and death in patients undergoing MR[3]. However, although hypertension was the most recurrent personal antecedent in the present study, there was no statistical correlation with death and postoperative complications.

Currently, MR has survival rates of 97% in one year and 81% after ten years postoperatively[12]. Such prognosis can be attributed to the technique employed for aortic clamping and CPB time[12].

Nevertheless, it is believed that the use of CPB causes the body to undergo a systemic inflammatory response caused by blood circulation through the extracorporeal circuit and the formation of microemboli[13]. However, the pathophysiological mechanism of organ damage after CPB remains unclear[14].

The use of CPB can lead to complications, including: renal dysfunction, acute myocardial infarction, neurological impairment, cognitive dysfunction, atrial fibrillation and ventricular dysfunction[11], risk of intraoperative stroke associated with the manipulation of the ascending aorta and arrhythmias. Additionally, it is also related to the risk of postoperative hemorrhage, low cardiac output, pleural effusion, cardiac tamponade, and coagulopathy.[2,10].

The present prospective study analyzed the medical records of 72 patients who had undergone MR and identified that the largest number of complications was linked to hydroelectrolytic (61%), acidobasic (35%), glycemic (32%), cardiac (13%) and pulmonary disorders (10%). Other complications were renal (7%), neurological (6%), infectious (3%) and hepatic (1%) in nature.[11]

Another analysis of 145 adult patients undergoing cardiac surgery (45% MR, 26% valve surgery, 18% combined surgery and 11% other types of cardiac surgery) found that the main postoperative complications within the first 24 hours included loss of blood (58%), pulmonary dysfunction (34%), arrhythmias (6%) and need for reintubation (3%)[15].

In contrast, the present study identified the main hematological complications, represented by bleeding and hemodynamic instability, followed by cardiac complications, such as arrhythmias, hypotension, atrial fibrillation and low cardiac output syndrome. It was also identified that insufficient nutrient intake is a risk factor for angina incidence in the MR POI.

Low diastolic pressure increases the risk of shock, as insufficient perfusion induces cell and tissue hypoxia and may eventually lead to organ and system failure. It is also worth noting that the risk of falling is increased in patients with orthostatic hypotension[16].

Another aspect that deserves attention in the postoperative period of cardiac surgery is the fact that patients have impaired physical mobility for prolonged periods, hampering the action of calf muscles and therefore impairing venous return. In addition, anesthetic agents interfere with vasodilation and normal constriction, reducing perfusion to bony prominences and regions under pressure. Thus, the nursing diagnosis of impaired skin integrity is frequent and may be the result of intense and/or prolonged pressure in combination with shearing, which result from mechanical actions like the surgical incision itself, and factors such as microclimate, nutrition, perfusion, comorbidities, and clinical condition[17,18].

Therefore, due to the metabolic change caused by MR surgeries[14], patients who perform the procedure and who have a family history of heart disease and comorbidities, such as dyslipidemia, are more likely to develop cardiac complications and present skin lesions, increasing the work of the nursing staff.

Nursing diagnoses indicated statistically significant associations with several clinical variables and associations related to the anesthetic-surgical procedure. Thus, this complexity attributed to the care of patients undergoing cardiac surgery requires special attention throughout the perioperative period, especially the postoperative period.

Currently, in the ICU, the degree of patient dependence, the complexity of the disease, the characteristics of the institution, the work processes, the physical plan and the profile of the team professionals determine the nursing workload[19]. Estimating care demand is necessary to ensure quality of care and to subsidize staff size in different hospital units, since too

many staff people entails high costs, and a reduced staff can lead to a decline in patients' quality of care[7].

Thus, there are instruments that contribute to this evaluation, among them the therapeutic intervention scoring system-28 (TISS-28) and the NAS. For the development of the present study, the NAS indicator was chosen. Although the TISS-28 has an extensive approach in the scientific literature, its practical application showed structural flaws for the total measurement of nursing workload, since activities concerning indirect patient care, such as organizational tasks, were not included in the study[7].

NAS, in turn, has been increasingly used in the ICU and takes into account basic activities, ventilatory support, cardiovascular support, renal support, neurological support, metabolic support and specific interventions. In this study, it was found that, on average, each patient required 28.7% of the nursing staff time or 7 hours and 28 minutes.

However, it is believed that this number may be underestimated, given the characteristic associated with the retrospective collection of information, which may have been impaired by the absence of adequate records. Thus, for a better estimate, professionals should be advised on how the instrument works so that the activities are recorded correctly. In the future, further studies will be able to more accurately determine the workload associated with postoperative care in patients undergoing cardiac surgery.

CONCLUSION

In the present study, it was found that the main postoperative complications were heart-related and connected to a family history of heart disease. The CPB time was associated with the appearance of atrial fibrillation in the IPO, the nursing diagnoses, the risk of bleeding and the self-care deficit.

Finally, the most frequent nursing diagnosis was the risk of infection. Patients with postoperative hypotension ($p = 0.003$) and arrhythmia ($p = 0.000$) required the most care from the nursing staff postoperatively.

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KNOWLEDGE OF NURSING STUDENTS ABOUT NURSING CARE FOR PATIENTS RECOVERING FROM ANESTHESIA

Conhecimento de acadêmicos de enfermagem sobre os cuidados do enfermeiro ao paciente em recuperação anestésica

Conocimiento de estudiantes de enfermería sobre la atención de enfermeras para pacientes sometidos a recuperación anestésica

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ABSTRACT: Objective: To identify the knowledge of nursing students about nursing care and actions in the post-anesthesia care unit regarding patient safety. **Method:** This is an exploratory descriptive study with a qualitative approach, conducted with 30 nursing students from a private higher education institution in Southern Brazil. Data were collected by administering a semi-structured questionnaire in October 2018. We adopted Bardin's content analysis for data processing. **Results:** The following category emerged based on the interviewees' statements: Nursing care and actions in the post-anesthesia care unit regarding patient safety, perceived by nursing students. The students acknowledge routine and mechanistic care, communication, leadership, nursing process application, and use of protocols and scales as fundamental for patient safety when recovering. **Conclusion:** Nursing students identified safe care elements related to nursing care in anesthesia recovery.

Keywords: Education, nursing. Nursing care. Nurses. Anesthesia recovery period. Patient safety.

RESUMO: Objetivo: Identificar o conhecimento de acadêmicos de enfermagem relacionado aos cuidados e às ações desenvolvidas pelo enfermeiro em sala de recuperação pós-anestésica com vistas à segurança do paciente. **Método:** Estudo descritivo-exploratório, de abordagem qualitativa, realizado com 30 acadêmicos de enfermagem de uma instituição privada de ensino superior da Região Sul do Brasil. A coleta de dados ocorreu no mês de outubro de 2018, mediante aplicação de questionário semiestruturado. Empregou-se a análise de conteúdo de Bardin para tratamento dos dados. **Resultados:** Com base nos depoimentos dos entrevistados, emergiu a seguinte categoria: Cuidados e ações do enfermeiro para segurança do paciente, em sala de recuperação pós-anestésica, percebidos pelos acadêmicos de enfermagem. Cuidados rotineiros e mecanicistas, comunicação, liderança, aplicação do processo de enfermagem e uso de protocolos e escalas foram reconhecidos pelos acadêmicos como fundamentais para a segurança do paciente na recuperação. **Conclusão:** Os acadêmicos de enfermagem reconheceram elementos promotores do cuidado seguro relacionados à assistência de enfermagem na recuperação anestésica.

Palavras-chave: Educação em enfermagem. Cuidados de enfermagem. Enfermeiras e enfermeiros. Período de recuperação da anestesia. Segurança do paciente.

RESUMEN: Objetivo: identificar el conocimiento de los estudiantes de enfermería relacionados con la atención y las acciones desarrolladas por las enfermeras en la sala de recuperación postanestésica, con miras a la seguridad del paciente. **Método:** Este es un estudio descriptivo y exploratorio con un enfoque cualitativo, realizado con 30 estudiantes de enfermería de una institución privada de educación superior en el sur de Brasil. La recopilación de

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datos tuvo lugar en octubre de 2018, mediante la aplicación de un cuestionario semiestructurado. El análisis de contenido temático de Bardin se utilizó para el procesamiento de datos. **Resultados:** surgió la siguiente categoría: Atención de enfermería y acciones para la seguridad del paciente en una sala de recuperación postanestésica, según lo perciben los estudiantes de enfermería. Los cuidados académicos y de rutina, la comunicación, el liderazgo, la aplicación del proceso de enfermería y el uso de protocolos y escalas fueron reconocidos por los académicos como críticos para la seguridad del paciente en la recuperación. **Conclusión:** los estudiantes de enfermería reconocieron elementos que promueven la atención segura, relacionados con la atención de enfermería en la recuperación anestésica.

Palabras-clave: Educación en enfermería. Atención de enfermería. Enfermeras y enfermeros. Periodo de recuperación de la anestesia. Seguridad del paciente.

INTRODUCTION

The Safe Surgery Saves Lives initiative, launched by the World Health Organization (WHO), is in its second global challenge for patient safety, aiming to reinforce safe surgical practices to reduce unsafe actions, including those related to the post-anesthesia care unit (PACU)[1].

PACU is the place that receives patients after anesthesia and surgical procedures. In this environment, safety concerns include issues associated with work overload and patient identification, assessment, and transfer, as well as the use of equipment and analgesics that enhance care risks and demand actions to prevent nursing professionals from causing accidents[2].

Given the occurrence of technical and/or non-technical failures that contribute to adverse events in anesthesia[3], in addition to patient systemic changes in the postoperative period, which predispose to circulatory, respiratory, and gastrointestinal complications[4], the health-care team, especially nursing professionals, needs to be precise in the clinical assessment to identify hemodynamic changes and improve care quality and safety[5].

A study conducted with accident reports from United States hospitals identified that, in the root cause analysis of 36 adverse events, mistakes were made by failure in standardization and/or policy for safe anesthesia administration procedures[3]. These factors may maximize the frequency of complications, such as hypothermia, hypoxemia, apnea, shaking, nausea, vomit, cardiac arrhythmia, and urinary retention. Similarly, they may raise the level of care dependency[6], which, if not managed, predispose to severe and preventable adverse events.

In the postoperative period in PACU, the safe recovery of the patient depends on the use of monitoring resources and equipment combined with nursing care, which must be based on scientific knowledge and technical skills so as to perform safe interventions related to the anesthesia and surgical procedures[4]. We highlight that, to implement a systematization of perioperative nursing care (SPNC) effectively as a methodological instrument to treat the patient thoroughly, continuously, and safely, the nurse must know about the applicability of nursing diagnosis, as well as its interventions and expected results[7].

Therefore, investigating nursing students' knowledge about nursing care for patients during anesthesia recovery is a tool for future improvements in the teaching-learning process, which reflects in the care practice. Considering the above, the guiding question is: what do nursing students know about nursing care and actions in the PACU?

OBJECTIVE

To identify the knowledge of nursing students about nursing care and actions in the PACU regarding patient safety.

METHOD

This is an exploratory descriptive study, with a qualitative approach, conducted with undergraduate nursing students from a private higher education institution in Southern Brazil. The target-population comprised 68 students, approved in the theoretical subject of Surgical Center, Material Center, and PACU taught in the 3rd year of the course (5th semester).

The inclusion criteria were: being an undergraduate nursing student; being properly enrolled (attending the 6th, 7th, or 8th semester); and being at least 18 years old. Blank questionnaires were excluded. After individual invitation and

explanation about the study objectives, 30 students accepted to participate in the research. There were no withdrawals or exclusions. The questionnaire and the informed consent form (ICF) were given to the students and, then, returned to the researchers.

Data were collected in October 2018, using a semi-structured questionnaire, made by the researchers, with questions that aimed to identify sociodemographic information and the knowledge of students about the care provided in PACU:

1. What do you know about PACU?
2. What is the importance of the nurse in PACU?
3. What are the main types of care that you consider necessary for patients in the immediate postoperative period in PACU?
4. How does nursing care in PACU assist in surgical patient safety?

We adopted a thematic content analysis to assess the data[8]. In the pre-analysis phase, we read the interviews carefully to identify the main ideas. The empirical material was investigated to summarize the information and, then, elaborate the initial and intermediary categories. These categories were thematically grouped, creating a single final category and conceiving the interpretation of the object of study.

The participants were identified with the letter A followed by the number corresponding to the order of return of questionnaires (A1, A2, ..., A30) to keep the anonymity. The Research Ethics Committee of the proposing institution approved this study, under the Certificate of Presentation for Ethical Consideration (*Certificado de Apresentação para Apreciação Ética* – CAAE) no. 95955118.3.0000.5529 and report no. 2,961,674. The project complied with the ethical and legal principles of Resolution no. 466/2012 of the National Health Council.

RESULTS

Out of the 30 participating students, 26 were female. The mean age was 28 years, ranging from 19 to 43 years. The sample consisted of 12 students from the 6th semester, 2 from the 7th, and 16 from the 8th. The following thematic category was listed based on the data collected: Nursing care and actions in the PACU regarding patient safety, perceived by nursing students.

The nursing students stated that nursing care in PACU includes technical and routine care, such as measuring vital signs and evaluating pain intensity and neurological level. They also considered comfort actions and assessment of dressings and devices used in interventional and surgical procedures, aiming to control physiological functions. These types of care are present in the following statements:

> "Controlling vital signs, keeping the patient warm, checking and recording pain intensity, and checking for signs of hypoxia, respiratory effort, and/or cyanosis" (A30).

> "Assessing the level of consciousness, motor activity, the presence of bleeding, paying attention to patient complaints, and offering comfort actions" (A10).

> "Checking the surgery dressing, checking for hemorrhage, evaluating the pain reported by the patient, [...] checking all devices and their proper care, like nasogastric tube, indwelling urinary catheter, suction and thorax drain, and others" (A19).

> "Always informing the patient about time and space due to the anesthesia and paying attention to prevent bronchoaspiration" (A28).

> "Continuously monitoring saturation, blood pressure, temperature, and heart rate" (A27).

According to the students, the mechanistic care should combine theoretical-practical knowledge with the use of standardized protocols and scales. The participants also highlighted the importance of identifying acute complications, which need immediate intervention by the healthcare team:

> "Monitoring vital signs according to protocols, in addition to vital signs and symptoms that the patient declares or seems to feel, such as pain or cyanosis. Changing the dressing, if needed, and providing hydration and medicines following the medical prescription" (A8).

"Monitoring vital signs, like blood pressure, heart rate, oxygen saturation, measuring every 15 minutes according to the Aldrete-Kroulik scale" (A10).

"Technical and theoretical knowledge is extremely important for the nursing staff, helping them to identify signs and symptoms of a possible complication, as, for example, hypovolemic shock. [...] The nurse must be alert to any change to recognize the risk of falling, agitation, and allergic reaction to medicines or anesthesia" (A9).

In this perspective, the students emphasized many activities done by nurses in their professional practice in PACU. They cited the interpersonal communication with the patient and the working team and the professional practice based on competences as relevant elements for the patient's safe recovery:

"The nurse must pay attention to the patient's recovery and communicate with the team" (A16).

"Evaluating the risk of infection, [...] giving the patient necessary information for better recovery" (A24).

"The nurse is essential because they have the scientific knowledge to act during emergencies, and the leadership on this sector gives quality to the care" (A8).

"As managing PACU is not the doctor's responsibility, the nurse is the most qualified for the job" (A7).

"Knowing if there are beds available for patients who had surgery and will be discharged at different times and those who will remain in PACU for longer periods. The nurse is responsible for managing employees and the supplies needed" (A1).

In parallel, the students positively indicated the implementation of the nursing process to ensure patient safety and quality in the care given by the nurse in PACU.

"The nurse has the role of caring/prescribing and guiding the team on procedures and care needed by the patients" (A18).

"Performing physical examinations and [systematization of nursing care] SNC" (A21).

DISCUSSION

PACU demands that the health-care team, particularly the nurses, undertakes specific care and actions, given the complexity and dynamic nature of factors that intensify patient (in)security in this surgical phase[2]. The nursing students reinforce that routine procedures and actions are primordial for the patient's safe care. This fact corroborates the experience report of a nursing student regarding activities done in the PACU of a university hospital from Rio Grande do Sul[9]. Another study conducted with nursing professionals acting in the PACU of a private hospital in western Paraná reported the assessment of vital signs, pain, and specific care with the surgical wound as means for early identification of possible adverse events[5].

The study mentioned above revealed that the nursing team focused mainly on evaluating the respiratory, circulatory, and neurological systems by assessing the level of consciousness[5], confirming the results of the present study. The care described by the nursing students aims at the systematic and full service, paying attention to possible complications deriving from the anesthesia and surgical procedures. In this way, they contribute to providing safer postoperative care.

The students affirmed they associate technical care with the use of protocols and scales, whose purpose is to systematize patient care to prevent possible accidents and to support actions taken by the professionals. The measurement of vital signs and the nursing assessment must be precise to identify signs and symptoms of complications caused by anesthesia and surgical procedures and, consequently, to take assertive actions. The Aldrete-Kroulik scale, mentioned by the students, is an easy-to-use tool commonly adopted in PACUs. Its function is to assess the patient's progress in the post-anesthetic period by analyzing muscle activity, breathing, circulation, consciousness, and oxygen saturation[10].

In this perspective, an investigation conducted with eight technicians and a nurse working in the PACU of a medium-sized hospital in Southern Brazil indicated the use of this scale as a way to assess the surgical patient in anesthesia recovery[4]. However, we highlight that the Aldrete-Kroulik scale assesses five parameters separately, and must not replace the careful evaluation of a professional[10], especially because it does not include a systematic analysis of other clinical data, such as temperature and pain.

Thus, the students reported that the control of acute postoperative pain is a symptom that predisposes the patient to severe events. For this reason, the use of scales needs to be implemented to reduce subjectivity in the professional assessment. They also should be included as one of the parameters for discharging the patient from PACU[4]. Nevertheless, due to the subjectivity of the evaluation, scientific evidence pointed that the nurse considers pain as only a symptom, neglecting to classify it as the 5th vital sign. Moreover, this evidence shows that when students graduate, they become professionals unqualified to assess pain subjectivity[11]. This circumstance partly explains the low number of reports on the use of scales to assess pain by the students of this research.

Another finding from the students' statements relates to nursing care regarding body temperature maintenance. Sedative and anesthetic administration interferes in the ability of the hypothalamus to regulate central temperature, leading to undesirable hypothermia during the intraoperative period and the post-anesthesia recovery[12]. Other factors, such as the operating room temperature, infusion of cold solutions, and age, cause instability on body thermoregulation[11].

Perioperative hypothermia is linked to many adverse events, including the increase in: postoperative discomfort, post-anesthesia recovery time, cardiac complications, hemorrhagic events, surgical site infection, and more[12]. Stratification of hypothermia risk by the nurse since the preoperative period contributes to patient safety[13]. Thus, emphasizing the importance of risk assessment and the adoption of warming methods is crucial during professional qualification for safe care, especially in the anesthesia recovery phase.

In this study, out of the six goals established by WHO and recommended by the Joint Commission International, only three were mentioned by the students: effective communication, reduction in infection risk associated with health care, and prevention of injuries caused by falls[14]. A possible justification for this result is the fact that the disciplines on patient safety taught in undergraduate health courses are still fragmented and need conceptual depth and breadth[15]. Furthermore, nurses may not be aware of how their routine practices contribute to manage risks and keep patients safe[16]. This impression might be present since the qualification period, which, in turn, prevents the students from understanding the association between their actions/care and the safety goals globally recognized. Consequently, this topic must be expanded during the qualification of nursing students, including those who participated in this research.

The objective of the surgical safety checklist, elaborated by WHO, is to support safe practices and promote communication between teams to minimize surgical errors[1]. Despite the checklist being filled in the operating room, its effective use reflects positively in the patient progress and the care transition to the postoperative period, since before anesthetic induction. On the other hand, communication of surgical errors, which has the purpose of listing actions to avoid the recurrence of cases, is still fragile, according to the health-care team, even after the implementation of the safe surgery protocol[17]. This scenario highlights the importance of promoting communication and patient safety culture in academic qualification.

Effective communication is related to error prevention[1], besides being one of the abilities required from nurses in their professional practice[18]. Given its relevance, North-American researchers developed a medium-range theory to enhance communication in patient safety culture[16]. This theory may guide the teaching-learning method to improve the working process continuously.

According to the participants, leadership and management promote patient safety. Leadership requires commitment, responsibility, empathy, decision-making skills, communication, and efficient and effective management[18]. Additionally, scientific evidence shows that transformational leadership plays an active role in creating an environment in which employees feel comfortable to express their safety concerns in order to ensure and implement safe and quality practices[19]. Having this in mind, we underline the need to improve practices that promote nursing qualification for management areas due to the importance of this professional in implementing actions in PACU aiming at safe care.

Among the resources needed for patient care in surgical and anesthesia recovery, the nursing students mentioned that, in addition to providing and managing human resources, the nurse must plan and prescribe actions during the patient stay in PACU, following nursing procedures. These procedures represent a stage to operationalize the systematization of nursing care, which guides the continuity

and quality of nursing care[7]. In the surgical environment, a nursing student underscored SPNC as one of the responsibilities of the nurse in PACU[9], corroborating the findings of this study.

In order to improve and help students during internships, Brazilian researchers elaborated and validated a tool to record SPNC, including specific items for PACU[20]. Innovative practices may contribute to promote care for patients in anesthesia and surgical recovery, as well as enhance the qualification process of future professional nurses, focusing on quality and patient safety in PACU.

FINAL CONSIDERATIONS

Nursing students recognized actions needed to perform safe nursing care in PACU, such as: checking vital signs, monitoring signs and symptoms, using the Aldrete-Kroulik scale, evaluating the risk of falling and agitation, and following nursing procedures.

A limitation of this study is the lack of studies conducted with nursing students about PACU to discuss the results found. This research may contribute to teaching patient safety in PACU, and, consequently, to the professional nursing practice.

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Where it reads:

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It should read:

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