

# PREVALENCE OF SUSPENSION OF ELECTIVE SURGERIES IN A PUBLIC HOSPITAL IN SOUTH BRAZIL

*Prevalência de suspensões cirúrgicas eletivas em um hospital público do sul do Brasil*

*Prevalencia de suspensiones quirúrgicas electivas en un hospital público del sur de Brasil*

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**ABSTRACT: Objective:** To characterize the prevalence and causes of suspension of elective surgeries considering clinical and non-clinical factors. **Method:** Exploratory, retrospective, quantitative study. Data were collected in the electronic database of a public hospital in southern Brazil between January 2018 and December 2019. The variables gender, age group, number of surgeries, medical specialty and reasons for suspending surgeries were assessed, and a descriptive statistical analysis was performed. **Results:** Of the 11,792 (100.0%) scheduled surgeries, 2,170 (18.4%) were suspended. The surgical specialties that most suspended surgeries were orthopedics (32.6%) and general surgery (19.0%), the main non-clinical factors being: priority for urgency (21.5%), lack of vacancy in the intensive care unit (15.6%) and no attendance of the patient (13.6%). The main clinical reason for surgical suspension was clinical unfavorable condition (8.7%). **Conclusion:** This study contributed to the assessment of quality indicators related to the scheduling and suspension of surgical procedures in the Surgical Center, in addition to providing opportunities for the creation of clinic continuous improvement.

**Keywords:** Elective surgical procedures. Surgery department, hospital. Hospitals, public. Health evaluation. Surgicenters.

**RESUMO: Objetivo:** Caracterizar a prevalência e as causas de suspensão das cirurgias eletivas considerando determinantes clínicos e não clínicos. **Método:** Estudo exploratório, retrospectivo, quantitativo. A coleta de dados foi realizada no banco eletrônico de um hospital público do Sul do Brasil, no período entre janeiro de 2018 e dezembro de 2019. Consideraram-se as variáveis sexo, faixa etária, quantitativo de cirurgias, especialidade médica e motivos da suspensão das cirurgias e realizou-se análise estatística descritiva. **Resultados:** Das 11.792 (100,0%) cirurgias programadas, 2.170 (18,4%) foram suspensas. As especialidades cirúrgicas com maior taxa de suspensão foram ortopedia (32,6%) e cirurgia geral (19,0%), tendo como principais motivos não clínicos: prioridade para urgência (21,5%), falta de vaga em unidade terapia intensiva (15,6%) e não comparecimento do paciente (13,6%). O principal motivo clínico de suspensão cirúrgica foi condição clínica desfavorável (8,7%). **Conclusão:** O estudo contribuiu para a avaliação dos indicadores de qualidade relacionados aos agendamentos e às suspensões cirúrgicas no Centro Cirúrgico, além de oportunizar a criação de estratégias de melhoria contínua.

**Palavras-chave:** Procedimentos cirúrgicos eletivos. Centro cirúrgico hospitalar. Hospitais públicos. Avaliação em saúde. Centros cirúrgicos.

**RESUMEN: Objetivo:** Caracterizar la prevalencia y causas de suspensión de cirugías electivas considerando determinantes clínicos y no clínicos. **Método:** Estudio exploratorio, retrospectivo, cuantitativo. La recolección de datos se realizó en la base de datos electrónica de un hospital público del sur de Brasil, de enero de 2018 a diciembre de 2019. Se realizaron las variables sexo, edad, número de cirugías, especialidad médica y motivos de suspensión de cirugías y análisis estadístico descriptivo. **Resultados:** De las 11.792 (100,0%) cirugías programadas, 2.170 (18,4%) fueron suspendidas.

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Las especialidades quirúrgicas con mayor tasa de suspensión fueron Ortopedia (32,6%) y Cirugía general (19,0%), con las principales razones no clínicas: prioridad por urgencia (21,5%), falta de espacio en la unidad de cuidados intensivos (15,6%) y no asistencia de pacientes (13,6%). El principal motivo clínico de la interrupción quirúrgica fue una situación clínica desfavorable (8,7%). **Conclusión:** El estudio contribuyó a la evaluación de indicadores de calidad relacionados con la programación y suspensiones quirúrgicas en el Centro Quirúrgico, además de brindar oportunidades para la creación de estrategias de mejora continua.

**Palabras clave:** Procedimientos quirúrgicos electivos. Servicio de cirugía en hospital. Hospitales públicos. Evaluación en salud. Centros quirúrgicos.

## INTRODUCTION

Organization and planning are essential steps to ensure the proper functioning of a surgical center (SC), since it involves a large number of professionals, materials and equipment. In general, the number of scheduled and suspended surgeries is related to productivity and patient safety, and constitutes an important quality indicator<sup>1</sup>. Surgical suspension refers to any surgical procedure scheduled in the SC's elective surgery list on the day before, but not performed according to the schedule<sup>2</sup>.

The costs of surgical procedures correspond to 40% of the total expenses of a hospital<sup>3</sup>, and surgical suspension reduces the efficiency of the SC, incurring in significant financial losses with an impact on the patient and on team management<sup>2,4</sup>. Due to the high costs of the SC when performing surgical procedures, hospital managers have been paying greater attention to surgery suspension rates with the objective to reduce them, considering that 60 to 80% of suspensions have avoidable causes<sup>3,5-7</sup>.

In order for the rate of suspension of elective surgeries to be reliable, one must correctly notify the cause with view to the involvement and awareness of the teams in reducing rates and assisting managers in planning strategies to improve the indicator to achieve ever lower rates, with a focus on improving quality of patient care<sup>6,8</sup>.

Among the recommendations proposed to reduce surgical suspensions, we highlight the tracking and investigation of reasons for suspension, improvements in the planning of future surgeries and communication between the institution and patients, in addition to monitoring indicators<sup>8,9</sup>. The detailed record by professionals involved in the suspension is essential, as well as constant awareness and continuing education activities<sup>1,4,8,9</sup>.

In this scenario, the nurse, a protagonist in the SC, has been instrumentalized in structural organizations to organize and plan such work environments, committed to keeping the team always aware of the importance of reducing

suspension rates<sup>8</sup>. It is up to the nurse to use the information about indicators and the relation of direct costs to manage the SC and develop strategies to solve the problem<sup>3,5</sup>.

## OBJECTIVE

To characterize the prevalence and causes of suspension of elective surgeries, considering clinical and non-clinical determinants.

## METHOD

Retrospective, descriptive study with a quantitative approach, carried out in a public hospital in Florianópolis, state of Santa Catarina, southern Brazil.

The hospital provides tertiary care to users of the Brazilian Unified Health System, directed to surgeries. The hospital has 224 beds, the SC has seven operating rooms (OR) and eight post-anesthetic recovery rooms (PAR), in which an average of 400 surgeries/month are performed.

Data collection took place from February to April 2020, using secondary data obtained from the Micromed<sup>®</sup> database, a system used by the State Health Department to keep the record of elective surgeries and suspensions in the studied period: January 1, 2018 to December 31, 2019.

The criteria for inclusion of records were elective surgeries scheduled and/or canceled in the Micromed<sup>®</sup> database in the period studied. Urgency and emergency surgery records were excluded.

Data was collected by the researchers from February to April 2020, with their own instruments addressing the variables: quantity of scheduled, performed and suspended surgeries, date of suspension, patient age and gender, medical specialty, determinants of cancellation for clinical and non-clinical reasons, and professional responsible for cancellation.

Among the clinical reasons, we had: upper airway infection, hyperthermia, pneumonia, productive cough, drop in oxygen saturation, urinary tract infection, fasting, lack of preoperative examination (laboratory, imaging), among others. Non-clinical reasons included: refusal by the patient or guardian, lack of equipment or material, instruments, medication, orthosis and prosthesis, error in surgical programming, medical criteria, delay in releasing the operating room and change of medical conduct<sup>8</sup>.

To organize data, a spreadsheet was created in the Excel<sup>®</sup> software for tabulation and simple descriptive analysis of variables (frequencies, percentages) and the results were presented in tables.

The study complied with Resolution n° 466/2012 and was approved by the Ethics Committee for Research on Human Beings of Universidade Federal de Santa Catarina, under opinion 3.701.031 and Certificate of Presentation for Ethical Appreciation (CAAE) 96646018.0.0000.0121.

## RESULTS

Of the total 11,792 elective surgeries scheduled in the study period, 9,622 (81.6%) were performed and 2,170 (18.4%) were suspended. Of suspensions, 189 (8.7%) occurred for patient's clinical reasons and 1,981 (91.3%) for non-clinical reasons.

Regarding gender, the distribution of suspensions was 1,313 (60.5%) for male patients and 857 (39.5%) for females.

The summary of data related to surgical suspension is presented by medical specialty and patient gender in Table 1. It is noteworthy that the medical specialties of orthopedics, general surgery, urology and neurology account for more than half the proportion of suspensions.

There was a predominance of surgical suspensions in the age group between 19 and 59 years (1,452/ 66.9%), followed by 60 years or more (695/ 32.0%) and 15 to 18 years (23/ 1.1%). Table 2 shows the distribution of age groups in the four medical specialties that prevailed in surgical suspensions.

Findings relating to the causes of surgical suspension, according to clinical (representing unfavorable clinical conditions) and non-clinical reasons, are presented in Table 3.

Regarding the frequency distribution of surgical suspensions per month and year, a higher incidence was identified in planned surgeries in April (194/ 17.0%), May (182/ 16.0%) and June (115/ 10.1%) of 2018, and in September (122/ 11.8%), May (116/ 11.3%) and October (107/ 10.4%) of 2019.

The professionals responsible for the suspensions, keeping record of justification, were surgeons (939/ 43.3%), nurses (192/ 8.9%) and anesthesiologists (140/ 6.5%). In 487 (22.4%) suspensions, the professional responsible for it was not specified.

**Table 1.** Suspension of elective surgeries according to medical specialty and patient gender.

Medical specialty	Female n	%	Male n	%	Total n	%
Orthopedics	241	11.1	467	21.5	708	32.6
General surgery	238	10.9	175	8.1	413	19.0
Urology	72	3.3	264	12.2	336	15.5
Neurology	169	7.8	148	6.9	317	14.6
Spine	21	01	78	3.6	99	4.6
Otolaryngology	40	1.8	45	2.1	85	3.9
Plastic surgery	13	0.6	47	2.1	60	2.8
Bucco maxillary	16	0.7	28	1.3	44	2.0
Vascular	17	0.8	26	1.2	43	2.0
Head and neck	19	0.9	19	0.9	38	1.7
Thoracic surgery	09	0.4	14	0.6	23	1.0
Anesthesiology	01	0.05	01	0.05	02	0.1
Ophthalmology	-	-	01	0.05	01	0.05
Proctology	01	0.05	-	-	01	0.05
<b>Total</b>	<b>857</b>	<b>39.5</b>	<b>1,313</b>	<b>60.5</b>	<b>2,170</b>	<b>100</b>

## DISCUSSION

According to national studies<sup>5,8</sup>, surgical suspension rates range from 6.8 to 33.8%, while international rates<sup>4,10,11</sup> range from 3.5 to 31.6%, being higher in developing countries. The study found a rate of suspension of elective surgeries of 18.4%. This data alone has great value for the institution's managers, enabling an analysis of surgical cancellation indicators followed by strategic planning for improvements.

Suspensions occurring on the date of the surgical intervention generate hospital expenses, a problem reflected by the waste of human and instrumental resources and specific surgical materials, among others, causing a deficiency in the process and affecting the management of the SC. They also result in the need for overtime and expansion of teams, delays in other surgeries, increased patient stay rate, increased risk of infection, among others<sup>5,12</sup>.

In the present study, the specialties that most contributed to the increase in surgical suspension were orthopedics, general surgery and urology, similar to the findings of a study also carried out in the South of the country<sup>6</sup>. These data refer to the profile of the institution being studied, a reference in trauma care where patients are often referred for orthopedic surgical interventions.

A study carried out in a teaching hospital in northeastern Brazil, in Aracaju (Sergipe)<sup>3</sup>, had a suspension rate of 19.5%, with pediatrics (26.8%) and oncology (14.4%) and general surgery (13.1%) as the specialties that most suspended procedures. The reasons for suspensions were related to institutional conditions (50.8%), the patient (22.4%) and clinical conditions (20.8%). In Beirut, Lebanon, the surgical suspension rate in a university hospital was 4.4%, and, of these suspensions, 71.6% would be preventable<sup>13</sup>, the causes being related to lack of medical examinations (32.6%), resource/facility (19.9%), admission (19.2%), reasons related to the patient (17.6%), availability of bed (8%) and decision of the team/surgeon (2.7%)<sup>13</sup>.

**Table 3.** Reasons for suspension of elective surgeries.

Reasons for suspension of elective surgeries	n	%
Clinical reasons		
Unfavorable clinical condition	139	6.4
Lack of preoperative exams	34	1.6
Incomplete fasting	16	0.7
Non-clinical reasons		
Priority for urgency	467	21.5
No vacancy in the intensive care unit	339	15.6
Others or unspecified	304	14.0
Patient did not attend	296	13.6
Delay in previous surgery	114	5.2
Surgery dependent of time or room	91	4.2
Surgery performed previously	85	3.9
Lack of materials	51	2.3
No hospital bed	35	1.6
Problem or defect in hospital infrastructure	31	1.4
No operating room available	29	1.3
Transfer to another hospital	28	1.3
Problem or defect in surgical material	25	1.1
Patient not found	24	1.1
Problem or defect in equipment	14	0.6
Surgeon could not be at the SC	13	0.6
Transfer of date upon medical request	11	0.5
Lack of other professionals	8	0.4
Duplicate patient record	4	0.2
Obit	4	0.2
Inadequate or incomplete surgical preparation	3	0.1
Lack of blood products	2	0.1
Patient does not accept blood reserve	2	0.1
Refusal by the patient or family member	1	0.05
<b>Total</b>	<b>2,170</b>	<b>100</b>

**Table 2.** Surgery suspensions by patient age\* in the four predominant medical specialties.

Medical specialty	Age group					
	15-18 years		19-59 years		60 or more	
	n	%	n	%	n	%
Orthopedics	8	0.4	550	25.3	150	6.9
General surgery	1	0.05	262	12.1	150	6.9
Urology	4	0.2	172	7.9	160	7.4
Neurology	3	0.1	212	9.8	102	4.7

\*Categorization of age group according to the Child and Adolescent Statute and the Elderly Statute.

Suspension rates and their causes are usually different between hospitals both nationally and internationally, and are considered undesirable effects of underlying reasons, generating limitation in the surgical service, planning failures in administration and ineffective SC management<sup>9,14</sup>. As for hospital management, especially the SC units, corrective actions dedicated to reducing surgical suspension rates, in addition to serving as a theoretical support for the construction of more solid parameters for the interpretation of indicators in question, can most often avoid the suspensions<sup>6,9,14</sup>.

With regard to gender, there was a predominance of surgical suspensions among male patients. This finding is similar to that of two international studies, in which surgical cancellations had a higher incidence among men, with percentages of 56.8<sup>10</sup> and 75.1%<sup>14</sup>. Adults aged 19 to 59 years were the most affected by surgical suspensions, followed by the elderly. These results are in agreement with the study carried out in Bogotá, Colombia<sup>15</sup>, in which the most affected age group was 21 to 45 years old (46%). However, other studies<sup>8,16</sup> indicate different results, with patients of all age groups (children and the elderly) identified as the most affected by surgical suspensions, depending on the stratification of the study or the profile of the operating room.

The main determinants of surgical suspensions do not differ from those found in other hospital services in emerging countries. Most suspensions occurred for reasons unrelated to the patient, that is, linked to the organization and surgical planning, which contributes to a negative assessment of this quality indicator<sup>13</sup>.

Of suspended surgeries, in the surgical unit locus of the study, cancellations for non-clinical reasons prevailed, justified by the priority given to urgencies and the lack of vacancies in intensive care. This hospital performs a significant number of surgeries involving multisystem trauma, as it is one of the largest units in the public health network in Santa Catarina and because it offers a complex urgent/emergency service considered reference in the care of multiple trauma patients and in neurosurgery. For this reason, there is a strong justification for surgical suspension to prioritize urgency surgeries.

Regarding suspensions due to no vacancy in the intensive care unit, this unit receives patients with continuous monitoring needs for early identification of complications and adoption of necessary support measures to preserve their lives<sup>17</sup>. For this reason, unavailability in intensive care is an important factor for patient safety and justifies surgical cancellation. However, this must be previously evaluated to avoid routine suspensions. That is, the absence of beds for critically ill patients requires an investigation of demand, better sizing and turnover in bed management.

Corroborating the findings of our study, a survey carried out in Recife, capital of Pernambuco<sup>18</sup>, pointed out among the main causes of surgical suspensions for non-clinical reasons the lack of human resources (63.5%), specifically anesthesiologists and surgeons, and the organization of the unit (11.3%), highlighting errors in surgical programming (31%) and lack of beds available in intensive care (26.7%). Problems related to the patient (16.5%) also led to a significant portion of cancellations, including unfavorable clinical conditions (57.1%) and non-attendance (26.3%). A cohort study performed in the United Kingdom with 245 hospitals analyzed data from 14,936 patients undergoing elective surgery and reported 33.3% of suspensions due to patient-related factors such as change in clinical condition and unavailability of beds<sup>19</sup>.

In national studies<sup>5,6,8</sup>, there is a predominance of non-clinical reasons for the suspension of surgeries related to the institution, administration and/or professionals, while international studies indicate reasons related to the patient and their unfavorable clinic condition as the main cause of suspensions<sup>11-13</sup>.

Regarding seasonality, the frequency of suspension was higher between April, May and June 2018 and in May, September and October 2019. The year 2018 had higher suspension rates. This scenario may be associated with the recent deployment of the system used: Micromed. Other points that influence the increase in surgical suspensions are employee strikes, lack of human resources and changes in the SC<sup>3</sup> management. However, seasonality did not interfere with surgical suspensions, as there was no trend of decreasing suspensions related to variations at regular and specific intervals.

The professionals who most suspended surgeries were surgeons, followed by nurses and anesthesiologists. This result is similar to that of a study carried out in a public university hospital located in the countryside of São Paulo<sup>16</sup>, which had surgeons (39.7%) as responsible for suspensions, followed by anesthesiologists (22.0%) and nurses (4.6%). Professionals responsible for surgical suspension may be surgeons (change of conduct and a more severe patient in need of a surgery), anesthesiologists (lack of exams and clinical change), nurses (lack of materials or personnel, or a situation exceeding pre-established time), or the patient, when they give up on the surgery<sup>16,20</sup>.

The suspension of elective surgeries in a hospital institution acts as an indicator of the quality and productivity of the actions developed by the SC, reinforcing the need for planning and reducing avoidable costs<sup>6,9</sup>. Although the causes of surgical cancellation are varied, this is frequently experienced in hospitals, especially in public institutions, due to deficiencies in their physical structure<sup>16,21</sup>. Nevertheless, it is important to

state that the causes related to lack of time, no vacancy in the intensive care unit, inversion of order of surgeries, error in surgical schedule, lack of exams and/or documents and lack of equipment are very likely products of the troubled dynamics commonly experienced in public hospitals<sup>6</sup>.

The absence of justification for canceling the surgery due to incomplete registration, as well as the use of secondary data, makes it difficult to analyze the context, as unavailability of information is one of the limitations of this study and suggest the need for training and awareness of professionals about a comprehensive filling in the system. It is important that prospective studies addressing this issue are carried out, as well as research and interventions that assess measures adopted and their impact on the percentages of suspensions.

The main contribution of this study was to show that most determinants of surgical suspensions are considered avoidable, so reducing them for a better use of public resources is possible. This includes improvements to the SC infrastructure, protocols for preoperative assessment and preparation, communication with the patient, professionals and across health care sectors. Given the scenario presented, the role of the nurse, as a unit manager, is to develop strategies with their work team to improve this picture, given that the suspension of surgeries, in addition to burdening the health system, causes stress, anxiety and discomfort especially for the patient and their family members, who are awaiting the procedure.

Thus, it is recommended that nurse managers of the SC outline improvement strategies based on quality standards, such as conducting a preoperative visit by the nurse, improving communication between patients and professionals (fasting guidelines, preparation and preoperative exams), in addition to establishing measures to reduce the causes of surgical suspension

related to the organization of the unit, human resources, materials and equipment, outlining goals to be achieved.

Considering that many of surgical suspensions are related to structural problems and situations that involve the team, the nurse as a manager of the surgical environment should carefully assess each situation and identify opportunities for improvement in each situation presented.

Based on these data, a possible strategy would be to include measures to strengthen the patient safety culture among the hospital's management team to encourage changes in group and individual values, attitudes, perceptions and competencies, involving the whole team and hospital management while providing opportunities for behavioral changes and adjustments in work processes with focus on quality of care.

## CONCLUSION

The research allowed for a situation analysis of the main factors leading to suspension of surgeries in a public hospital, most of them being related to administrative problems. In this way, it was possible to evaluate the assistance provided and adapt the work process to the needs of patients and the SC.

The overall suspension rate found in the study (18.4%) had, among the main determinants, the priority of other more urgent surgeries, lack of intensive care beds and patient absence, being more frequently determined by orthopedics and general surgery surgeons.

Identifying the prevalence and determinants of surgery suspensions in a state public hospital contributed to assessing the quality indicators of appointments and suspension of elective surgeries and to the establishment of continuous improvement actions.

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