

Cancellation of elective surgeries in a Brazilian public hospital: reasons and estimated reduction

Cancelamento de cirurgias eletivas em hospital público brasileiro: motivos e redução estimada
Cancelación de cirugías electivas en un hospital público brasileño: motivos y reducción estimada

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ABSTRACT

Objective: To characterize cancellations of elective surgeries according to clinical and non-clinical reasons, as well as to verify seasonal influence and determine the estimated reduction of the index. **Method:** Quantitative, descriptive and retrospective study with secondary data extracted from the Public Hospital of the State of São Paulo database. **Results:** Out of the 8,443 (100%) elective surgeries scheduled, 7,870 (93.21%) were performed and 573 (6.79%) were canceled. Out of these 573 (100%) people, 48.33% were canceled for clinical reasons and 46.40% were for non-clinical reasons. Among the non-clinical reasons for surgery cancellations, those related to medical reasons stood out: at the request of the surgeon/change of approach (17.93%), followed by non-hospitalized patient (8.96%). There was no indication of seasonality regarding the reasons for cancellation in the assessed period. **Conclusion:** Although the rate of elective surgeries cancellations is lower than that of other hospitals with similar characteristics, it is still possible to reduce it from 6.79% to 1.36%, considering that 80% of the reasons for cancellation are avoidable.

Descriptors: Elective Surgical Procedures; Hospital Surgical Center; Hospital Administration; Public Hospitals; Health Assessment.

RESUMO

Objetivo: Caracterizar cancelamentos cirúrgicos eletivos segundo motivos clínicos e não clínicos, assim como verificar a influência sazonal e a estimativa de redução do índice. **Método:** Estudo quantitativo, descritivo e retrospectivo com dados secundários, extraídos de banco de dados de Hospital Público do Estado de São Paulo. **Resultados:** Das 8.443 (100%) cirurgias eletivas agendadas, realizaram-se 7.870 (93,21%) e suspenderam-se 573 (6,79%). Destas 573 (100%), 48,33% foram por razões clínicas e 46,40% não clínicas. Dentre os motivos não clínicos de cancelamento cirúrgico, preponderaram os relacionados às razões médicas, categorizadas como: a pedido do cirurgião/mudança de conduta (17,93%), seguida por paciente não internou (8,96%). Não houve indicação de sazonalidade quanto à ocorrência de motivos de cancelamento no período analisado. **Conclusão:** Apesar de a taxa de cancelamento cirúrgico eletivo apresentar-se menor que de outros hospitais de características semelhantes, ainda é possível reduzi-la de 6,79% para 1,36%, considerando que 80% das razões de cancelamento são preveníveis.

Descritores: Procedimentos Cirúrgicos Eletivos; Centro Cirúrgico Hospitalar; Administração Hospitalar; Hospitais Públicos; Avaliação em Saúde.

RESUMEN

Objetivo: Caracterizar las cancelaciones quirúrgicas electivas según motivos clínicos y no clínicos y verificar la influencia estacional y la estimativa de reducción del índice. **Método:** Estudio cuantitativo, descriptivo y retrospectivo con datos secundarios, extraídos del banco de datos de un Hospital Público del Estado de São Paulo. **Resultados:** Del 100% (8.443) de las cirugías electivas marcadas, se realizaron 7.870 (93,21%) y se suspendieron 573 (6,79%). Del 100% (573), 48,33% se cancelaron por razones clínicas y el 46,40%, por razones no clínicas. Entre los motivos no clínicos, preponderaron los relacionados a razones médicas, categorizados como: pedido del cirujano/cambio de conducta (17,93%), seguida de no internación del paciente (8,96%). No hubo indicación de influencia estacional para la cancelación durante el período analizado. **Conclusión:** A pesar

de que el porcentaje de cancelación quirúrgica electiva fue menor que la de otros hospitales de características similares, todavía es posible reducirla del 6,79% al 1,36%, considerando que el 80% de los motivos de la cancelación pueden ser prevenidos.

Descritores: Procedimientos Quirúrgicos Electivos; Centro Quirúrgico Hospitalario; Administración Hospitalaria; Hospitales Públicos; Evaluación de la Salud.

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INTRODUCTION

Surgery cancellation is an indicator in the assessment of the quality of care provided by the hospital service⁽¹⁾, signaling a deficiency in the administrative plan of the Surgery Center (SC)⁽²⁾. It is, however, an event considered avoidable most of the times, if attended by those responsible for the unit⁽¹⁻³⁾. Therefore, it is an event that must be assessed, considering its negative repercussions involving not only the patient, but also the family⁽⁴⁾, the institution and even the healthcare team⁽⁵⁾.

This event is responsible for breaking the bond of trust between patient and institution⁽¹⁾, causing psychological distress due to the disappointment of not getting the treatment entrusted to the institution⁽⁶⁾. Besides the psychological repercussions caused by the delay in treatment, patients and relatives also complain about financial losses related to the surgery cancellation⁽⁷⁾.

The most affected among the team working in the SC are anesthesiologists and nurses; studies have demonstrated experiences with feelings of shame, sadness and frustration related to the cancellation of procedures⁽⁸⁾, since they are the ones who notify the patients.

However, flaws in the therapeutic engagement between nurses and patients in the preoperative period may lead to surgery cancellations, since the patients, when informed about the reasons for the suspension, report they weren't well oriented about the necessary care, which causes frustration among the nursing team, the patient and their families⁽⁹⁾.

In addition to the repercussions for the patient, the family and the healthcare team, the institution is also hindered by the costs generated with the cancellation of surgical procedures. A study with 249 elective procedures cancelled in a hospital in Ribeirão Preto revealed a direct cost of R\$ 1.713.66¹ in 54 of them. Only medications and supplies consumed of reprocessed were considered for this calculation. The study also found an average cost of R\$ 29.54 per patient and an indirect cost of R\$ 10,782.40 in loss of profit opportunities for the institution, related to the time spent in the unused operating room. The study pointed out that those expenses could be avoidable, as long as the problems regarding flaws in administrative planning and mismanagement of the SC were fixed⁽¹⁾.

Several factors contribute to surgical cancellations: patient absence^(1,10); unfavorable clinical conditions, mainly regarding decompensated chronic diseases, such as systemic arterial hypertension (SAH) and diabetes, in addition to lack of

preoperative clinical exams^(1,10-11); overrun of surgery time⁽¹⁰⁻¹²⁾; non-availability of hospital bed⁽¹⁰⁾; lack of articulation between surgical scheduling and the multipurpose team and a lack of computerization, which may cause errors leading to unnecessary cancellations⁽¹³⁻¹⁴⁾; type of hospital (university hospitals)⁽¹⁵⁾ and of surgery (general surgery)⁽¹⁶⁾.

Among the strategies proposed by the literature to reduce surgery cancellations are: pre-anesthetic or preoperative consultations^(1,17); telephone confirmation of patient attendance two days before the procedure⁽¹⁰⁾; restructuring of the work process, involving healthcare staff, information technology and mid-level professionals⁽¹⁸⁾.

A proper notice of the cancellation is essential so that the managers can deal with it effectively⁽¹⁹⁾. Therefore, the information system represents an important tool to collect data in the surgical unit⁽¹⁸⁾. However, a correct and detailed input of data by the professionals is fundamental^(7,20), along with constant education and awareness activities in these institutions⁽²¹⁾. It is the nurse's responsibility to use the information about the microeconomic features of the process, as well as direct and opportunity costs, in order to manage the SC and develop strategies to solve the problem⁽¹⁾.

Considering that:

- a) a low rate of surgical cancellations is one of the indications of quality and, consequently, of management efficiency and, therefore, cancelling surgeries implies in underuse of operating rooms and increase of the waiting list and institutional cost⁽²²⁾;
- b) the actors involved in the surgery itinerary, responsible for assistance or management, must be aware that the underuse of public structure raises the cost of the services, which will be reflected upon users, family members and themselves, not only financially but also psychologically;
- c) the misuse of public resources does not contribute to investments in working conditions and to the quality of the service offered to citizens;

Question: What are the clinical and non-clinical reasons that contribute to the cancellation of elective surgeries in a Public Hospital of the State of São Paulo? Do these cancellations suffer seasonal influence? What is the estimation of reduction of these cancellations in a public hospital that already has low rates?

1 Real (R\$) is the Brazilian currency used in Brazil. One real corresponds to U\$ 0.32 cents of a dollar, according to the central Bank of Brazil (access on March 14th, 2017)

Therefore, the objective of this study was to characterize elective surgery cancellations, regarding clinical and non-clinical reasons, as well as to verify the seasonal influence and the estimation of reduction of the index.

METHOD

Ethical aspects

Study conducted after approval from the Committee of Ethics in Research and signature of the Consent Form by institutional leaders.

Design, place of study and period

Retrospective and descriptive study, conducted in 2014, with secondary data regarding surgery cancellations in a Public Hospital of the State of São Paulo.

This is a hospital of tertiary complexity, a reference for exclusive medical care for the population of the Unified Health System (SUS). It is part of one of the Regional Healthcare Boards (*Diretorias Regionais de Saúde - DRS*) from the State of São Paulo. It counts with 318 operational beds; currently, the general surgery center performs around 600 elective procedures per month, with 12 operating rooms, four preoperative beds and eight beds in the Post Anesthetic Recovery Room (PARR).

This public hospital in the State of São Paulo employs more than 1,000 people, including: 200 physicians, 93 nurses, 345 nursing technicians and assistants, and 50 other health professionals, as well as technical, administrative and general services personnel. Since it is a teaching hospital, there are also resident doctors and students who are finishing their undergraduate courses in Medicine and Nursing.

Sample, inclusion and exclusion criteria

To assess the influence of seasonality on surgery cancellations, the database was used, covering all elective surgeries canceled in a period of four years (01/01/2010 to 12/31/2013). However, since a new data collection instrument including reasons for cancellation has been implemented since 2013, data from 12 months (01/01/2013 a 12/31/2013) were analyzed to characterize elective surgery cancellations regarding their clinical or non-clinical reasons.

Study variables

The variables to characterize the surgery cancellations were:

- age of the patients, classified according to the Child and Adolescent Statute (ECA) and the Statute of the Elderly as: child (≤ 12), adolescent (≥ 14 to ≤ 18), adult (≥ 19 to ≤ 59) and older adult (≥ 60)⁽²³⁻²⁴⁾;
- Surgery cancellation hours: morning (7:00 a.m. to 1:00 p.m.), afternoon (1:00 p.m. to 7:00 p.m.) and "following" (subsequent surgeries to be performed in an operating room by the same surgeon or specialist);
- clinical reasons: Upper Respiratory Tract Infection (URI); pneumonia, productive cough and O₂ saturation decrease, Urinary Tract Infection (UTI) and others (as standardized by the Institution);

- non-clinical reasons: fasting; denial from the patient or guardian; lack of preoperative clinical exam (lack of laboratory tests or medical imaging); lack of equipment; lack of material (Sterile Material Center (SMC), orthoses and prostheses, material/medicine); surgical scheduling error (surgical scheduling/elective, scheduling/patient hospitalized); medical criteria (medical delay to release the room, change of medical approach).

Analysis of results and statistics

The data were typed in an Excel spreadsheet and analyzed using Statistical Analysis Software, SAS for Windows, V.9.3. Descriptive analysis was used, with percentage frequencies for the demographic variables and indicators of surgical cancellation. For the analysis of seasonal trends regarding the number of surgical cancellations, a Poisson regression model adjusted to identify the monthly differences was used.

RESULTS

Out of the 8,443 (100%) elective surgeries scheduled in 2013 in a Public Hospital of the State of São Paulo, 7,870 (93.21%) were performed and 573 (6.79%) were cancelled. Of these, 275 (3.26%) were canceled due to alterations of the patient's clinical conditions; 264 (3.13%) were canceled for non-clinical reasons; 30 (0.36%) for reasons that were not reported; and four (0.05%) were canceled due to deaths (Table 1).

Table 1 – Absolute and relative number of scheduled elective surgeries, distributed in performed and canceled for reasons, Public Hospital of the State of São Paulo, Brazil, 2013

Elective surgeries	n	%
Performed	7.870	93.21
Canceled:	573	6.79
Due to clinical reasons	275	3.26
For non-clinical reasons	264	3.13
Reason not informed	30	0.36
Due to death	4	0.05
Scheduled	8.443	100.00

The institution under study classifies as clinical reasons all events involving Upper Respiratory Tract Infection (URI), pneumonia, productive cough and O₂ saturation decrease, Urinary Tract Infection (UTI) and others, which precludes characterizing them.

Among the main non-clinical reasons, "at the request of the surgeon/change of approach" stands out as the most frequent (17.93%), followed by "patient not hospitalized" (8.96%), "lack of material" (6.50%), "not informed" (5.27%) and "inclusion of emergency surgery" (4.04%) (Table 2).

Table 3 shows that the users in the extremities of the age groups (children and older adults) correspond to 61.86%

Table 2 – Absolute and relative number of elective surgery cancellations according to reasons for cancellation categorized by the Public Hospital of the State of São Paulo, Brazil, 2013

Reasons for elective surgery cancellations	n	%
Clinical (unfavorable conditions)	275	48.33
Non-clinical	264	46.40
At the request of the surgeon/change of approach	102	17.93
Patient not hospitalized	51	8.96
Lack of material	37	6.50
Inclusion of emergency surgery	23	4.04
Patient withdrawal	18	3.16
Non-availability of operating room time	13	2.28
Lack of preoperative preparation	11	1.93
Exceeded surgical quota	2	0.35
Lack of anesthesiologist	2	0.35
Lack of preoperative consultation	2	0.35
Adolescent without guardian	1	0.18
Patient without preoperative exams	1	0.18
Patient has already undergone surgery	1	0.18
Not informed	30	5.27
Total	569	100.00

of the surgery cancellations. The most affected by “clinical reasons” are children (23.37%) followed by the older adults (13.18%) and the most affected by “non-clinical reasons” are adults (20.04%) followed by the older adults (15.64%) (Table 3).

Table 4 shows that surgery cancellations for “non-clinical reasons” (56.06%), “clinical reasons” (54.18%) and “not informed” (36.67%) occur mainly in the morning period and in the first hour (7:00 a.m.). In the afternoon period (1:30 p.m.) the distribution is “non-clinical reasons” (19.70%), “clinical reasons” (21.09%) and “not informed” (23.33%).

Regarding the 138 (100%) surgeries cancelled at 7:00 a.m. in 2013, the main reason for cancellation was “unfavorable clinical conditions” (50.72%), followed by “at the request of the surgeon/change of approach” (14.49%), “lack of material” (9.42%) and “patient not hospitalized” (7.97%). In the afternoon period, regarding the 117 surgeries cancelled at 1:30 p.m., the main reason was “unfavorable clinical conditions” (49.57%), followed by “at the request of the surgeon/change of approach” (30.51%) and “patient not hospitalized” (7.69%).

The specialty that most canceled surgeries in 2013 was “Pediatric Surgery” (19.85%), followed by “Orthopedics” (19.51%), “General Surgery” (17.05%), “Otorhinolaryngology” (14.94%) and “Vascular” (9.14%). These cancellations had higher incidence in the surgeries planned for the morning (54.13%), distributed in: Pediatric Surgery (11.42%), Orthopedics (10.37%) and Otorhinolaryngology (10.54%) (Table 4).

Table 3 – Distribution of reasons for surgery cancellations by age group, Public Hospital of the State of São Paulo, Brazil, 2013

Reasons	Non-clinical		Clinical		Not informed		Total	
	n	%	n	%	n	%	n	%
Adolescents (≥ 14 a ≤ 18)	21	3.69	5	0.88	1	0.18	27	4.75
Adults (≥ 19 a ≤ 59)	114	20.04	62	10.90	14	2.46	190	33.39
Children (≤ 12)	40	7.03	133	23.37	5	0.88	178	31.28
Older adults (≥ 60)	89	15.64	75	13.18	10	1.76	174	30.58
Total	264	46.40	275	48.33	30	5.27	569	100.00

Note: ^(*)As determined by the Child and Adolescent Statute and the Statute of the Elderly⁽²³⁻²⁴⁾.

Table 4 – Absolute and relative distribution of canceled surgeries, according to specialties and surgical scheduling, Public Hospital of the State of São Paulo, Brazil, 2013

Specialty	Following		Morning		Afternoon		Total	
	n	%	n	%	n	%	n	%
Pediatric Surgery	1	0.17	65	11.42	47	8.26	113	19.85
Orthopedics	7	1.23	59	10.37	45	7.91	111	19.51
General Surgery	0	0.00	44	7.73	53	9.31	97	17.05
Otorhinolaryngology	2	0.35	60	10.54	23	4.04	85	14.94
Vascular	3	0.53	39	6.85	10	1.76	52	9.14
Others	3	0.53	41	7.21	67	11.78	111	19.51
Total	16	2.81	308	54.13	245	43.06	569	100.00

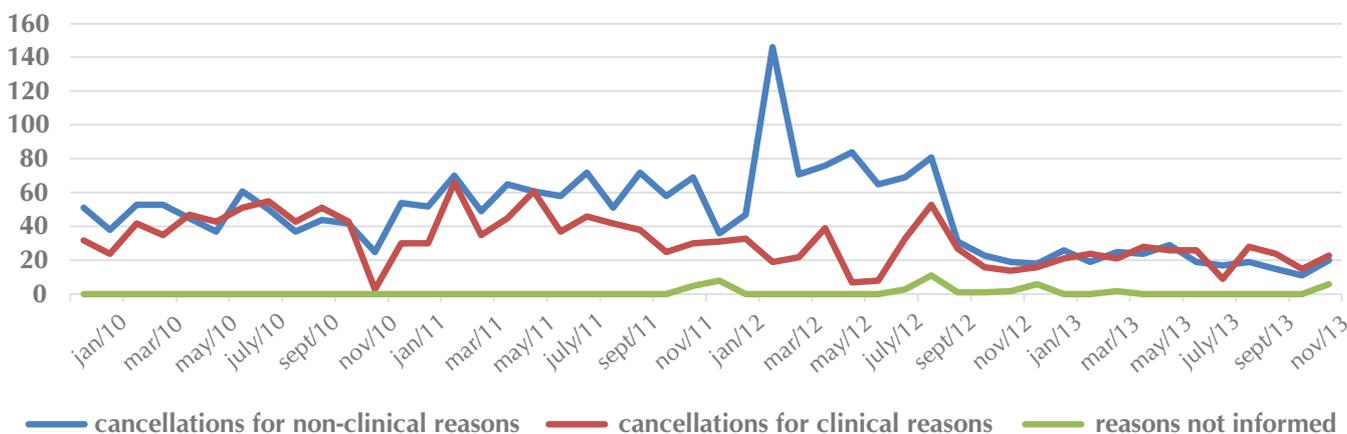


Figure 1 – Analysis of the seasonality of elective surgery cancellations, for non-clinical, clinical and non-informed reasons, from 2010 to 2013, Public Hospital of the State of São Paulo, Brazil

The statistical analysis of time series by autoregressive moving-average models did not indicate seasonality; it showed, however, a decreasing trend of surgery cancellations for non-clinical reasons starting September 2012. Regarding clinical reasons, a decrease occurred as of October of the same year (Figure 1).

These decreasing trends of surgery cancellations coincided with the change of manager of the Surgical Center.

The peak of surgery cancellations for non-clinical reasons, in May 2012, is related to the Institution's employees strike (Figure 1).

DISCUSSION

From the analysis of the results emerged the percentage of surgery cancellations in the service under study (6.79%), considerably lower than that presented by German hospitals (12.4%)⁽¹⁵⁾ and Brazilian hospitals (16.1%⁽²⁵⁾ a 17.3%⁽⁷⁾) with the same university hospitals characteristics.

A priori, the efficiency of the management of this service is presumed, considering it is a large university hospital. This type of health institution was indicated by a study as having a 2.23 times higher percentage of surgical cancellations when compared to medium and small community hospitals (5.0%)⁽¹⁵⁾.

However, this study indicates the need for the manager to remain motivated to reduce the rate of surgical cancellations, even though it is below the parameters of other national and international institutions. This recommendation is based on the estimate of a reduction of 5.43%, with a prospect of a decrease from 6.79% to 1.36%. This assumption is based on two premises: (a) most reasons (80%) for surgical cancellations are avoidable, including clinical reasons, such as uncontrolled systemic arterial hypertension or *diabetes mellitus* on the day of surgery⁽²⁶⁾. These alterations are considered the main reasons for surgery cancellations^(22,26); (b) out of 6.79% of elective surgeries canceled in the institution under study, 3.13% occurred for "non-clinical reasons" and 3.26% for "clinical reasons".

Furthermore, the main reasons for surgical cancellations at the institution under study are not different from those found in hospital services in developed countries.

Out of the 569 (100%) surgeries cancelled 48.33% were for "clinical reasons" and 46.40% for "non-clinical reasons". Among the "non-clinical reasons" stood out "at the request of the surgeon/change of approach" (17.93%); followed by "patient not hospitalized" (8.96%); "lack of material" (6.50%); "not informed" (5.27%); and "inclusion of emergency surgery" (4.04%) (Table 2).

These results are corroborated by a multicenter study carried out in 81 German university hospitals, which found among the "non-clinical reasons" a prevalence of medical reasons (43.4%), as well as percentage similarities regarding the reason "patient not hospitalized" (8.2%). However, while "lack of material" was not a reason for surgery cancellations in German university hospitals⁽¹⁵⁾, in this study this reason represented 6.50% of the cancellations. This probably occurs because of the difficulties the country has been facing in health financing as a right of the Brazilian citizen.

The first surgery hours, specifically at 7:00 a.m. and 1:30 p.m., at the beginning of shifts, had a higher incidence of surgery cancellations (Table 4), which was corroborated by another research carried out in a hospital with the same characteristics⁽¹⁾.

Users in the extremities of the age groups (children and older adults) have been pointed out by other investigations as the most affected by surgery cancellations^(1,7). In this research they stand for 61.86% of the cancellations. The children were the most affected by "clinical reasons" (23.37%), followed by older adults (13.18%); however, cancellations for "non-clinical reasons" affected mostly adults (20.04%), followed by older adults (15.64%) (Table 3).

The two specialties that most canceled surgeries in the present study were: "Pediatric Surgery" (19.85%) and "Orthopedics" (19.51%), with a higher incidence in the morning period of 11.42% for Pediatric Surgery e 10.37% for Orthopedics.

In the present study, Pediatric Surgery was the specialty with the highest percentage of surgery cancellations, probably a peculiarity of the institution. Orthopedics has been pointed out by other studies as having cancellation percentages close to the ones found in this study, such as: 17.85%⁽²⁷⁾ and 18.4%⁽⁷⁾.

Studies have indicated seasonality of surgical cancellations, such as winter months having higher rates of surgery cancellations. However, this research did not find indication of seasonality, according to the statistical analysis described in the method. There were decreasing trends, both for non-clinical reasons (as of September 2012) and clinical reasons (as of October 2012), which coincided with the change in management in the Surgical Center Unit.

Study limitations

The limitations of this research were related to the use of secondary data, extracted from the database of the institution under study, a fact that restricts analyzes to the information available in the instrument. This made it difficult to obtain data related to the causes of the deaths and the main clinic alterations responsible for surgery cancellations, since the instrument does not allow the professionals to specify them. This might as well have interfered in the analysis and indication of seasonality regarding the occurrence of these reasons.

Furthermore, regarding the "non-clinical reasons" in this same instrument, even though there is a list of items to allow professionals to categorize surgery cancellations, some of them did not favor expressing the specificity of the cancellation, hindering a more accurate interpretation of the data.

This fact can be observed through the data: 23.20% of the 46.40% of surgery cancellations for "non-clinical reasons" cannot be accurately interpreted due to unclear motives or lack of justification, represented by the reasons "at the request of the surgeon/change of approach" (17.93%), and "not informed" (5,27%).

A reconstruction of the data collection instrument used by the institution under study is recommended, in order to make the items that categorize the reasons for surgery cancellations clearer.

It is important to note that, in order to properly manage the surgical cancellation indicator, adjusting the data collection instrument is not enough, as having a surgical team aware of its importance in collaborating in the elaboration of clear and pertinent justifications about the reasons for surgery cancellations^(7,19).

Contributions to the area of nursing, health or public policy

This contribution may be considered challenging, since there is a study reporting 69.9% of the surgery cancellations presented no justification, which is considered by the authors as concerning because it restricts the managers' knowledge about the reasons for cancellations and, consequently, also restricts the possibility of investments in appropriate solutions⁽²¹⁾.

The main contribution of this study is the demonstration that, even if the institution has a rate of surgery cancellations lower than

expected, it is still possible to reduce it in order to increase the users' access to treatment, improving the use of public resources.

Finally, a qualitative study is recommended to understand the experience of the actors involved in the itinerary of the canceled elective surgery, regarding surgical scheduling, ambulatory care, inpatient care, hospitalization units, SMC and SC. This might apprehend the interactive process of the actors involved, revealing to them and to the managers the challenges and the recommendations for the reduction of the percentage of surgery cancellations in the institution.

CONCLUSION

In this research, carried out in a public hospital in the State of São Paulo, aiming to characterize elective surgery cancellations regarding their clinical and non-clinical reasons, as well as to indicate if there is influence of seasonality and determine the estimation of reduction of the index, it was verified that:

- the rate of elective surgery cancellation was lower than those of other national and international hospitals, with similar characteristics, with a reduction estimate of 6.79% to 1.36%;
- 48.33% of these cancellations were made due to "clinical reasons" and 46.40% for "non-clinical reasons"; however, it was not possible to precisely know what the clinical reasons were, due to limitations of the data offered by the institution under study;
- among the non-clinical reasons for surgery cancellations, those related to medical reasons stood out, represented by "at the request of the surgeon/change of approach", followed by "patient not hospitalized" and "lack of material";
- 50% of the surgery cancellations for non-clinical reasons did not allow an accurate interpretation, due to unclear motives or lack of justification, represented by the reasons "at the request of the surgeon/change of approach" and "not informed";
- two hours arose as cancellation peaks, 7:00 a.m. and 1:30 p.m., first due to "unfavorable clinical conditions" followed by "at the request of the surgeon/change of approach"
- children and older adults, in the extremities of the age groups, represented 61.86% of the surgery cancellations. The most affected by "clinical reasons" were the children, followed by older adults, while regarding "non-clinical reasons", the most affected were adults followed by older adults;
- "Pediatric Surgery" followed by "Orthopedics" were the specialties that most canceled surgeries;
- there was no indication of seasonality regarding the reasons for cancellation in the period from 2010 to 2012; there were only decreasing trends, as of the second half of 2012.

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