

SUSPENSION OF ORTHOPEDIC SURGERIES FOR EXTRINSIC REASONS IN OLDER PATIENTS

Suspensões de cirurgias ortopédicas por motivos extrínsecos em pacientes idosos

Suspensiones para cirugía ortopédica por razones extrínsecas en pacientes ancianos

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ABSTRACT: Objective: To identify the rates and extrinsic reasons for the suspension of elective orthopedic surgeries in older adults and the course until their performance, according to sex, age group, origin, and type of surgery. **Method:** This is a retrospective descriptive study with a quantitative analytical approach and variable correlation, carried out in a teaching hospital from January to June 2018. The sample consisted of orthopedic surgery patients aged 60 years and older. **Results:** Out of the 543 orthopedic surgeries scheduled for older adults, 93 (17.41%) were suspended. The main reason for suspension was the previous surgery lasting longer than expected (35.48%); the surgery was canceled once and performed 1–2 days after the suspension (91.87%), with statistical significance ($p=0.00$). **Conclusion:** We found that the rate of surgical suspension for extrinsic reasons in orthopedic older patients was 17.41%. Surgical suspension remains a great challenge for professionals and health facilities, showing the significant involvement of nurses in detecting and solving surgical delays in order to decrease their incidence.

Keywords: Aged. Orthopedics. Elective surgical procedures. Health management. Perioperative nursing.

RESUMO: Objetivo: Verificar taxa e motivos extrínsecos de suspensões de cirurgias ortopédicas eletivas em idosos e o percurso até sua realização, reconhecendo sexo biológico, faixa etária, procedência e tipo de cirurgia. **Método:** Estudo retrospectivo, com delineamento descritivo, abordagem quantitativa do tipo analítica, com correlação entre variáveis, realizado em um hospital de ensino no período de janeiro a junho do ano de 2018 com idosos de 60 anos e acima, pacientes de cirurgias ortopédicas. **Resultados:** Das 543 cirurgias ortopédicas de idosos agendadas, 93 (17,41%) foram suspensas. O maior motivo para a suspensão foi extrapolação do tempo da cirurgia anterior (35,48%); a cirurgia foi cancelada uma vez e realizada entre um e dois dias após a suspensão (91,87%), com significância estatística ($p=0,00$). **Conclusão:** Constatou-se que a taxa de suspensão cirúrgica nos idosos ortopédicos, por motivos extrínsecos, foi de 17,41%. A suspensão cirúrgica ainda é um grande desafio aos profissionais e às instituições de saúde, demonstrando grande envolvimento do enfermeiro em detectar e solucionar o atraso cirúrgico, de modo a diminuir sua incidência.

Palavras-chave: Idoso. Ortopedia. Procedimentos cirúrgicos eletivos. Gestão em saúde. Enfermagem perioperatória.

RESUMEN: Objetivo: Verificar la tasa y motivos extrínsecos de las suspensiones electivas de cirugía ortopédica en ancianos y la vía para su realización, reconociendo el sexo biológico, grupo de edad, origen y tipo de cirugía. **Método:** estudio retrospectivo, con diseño descriptivo, abordaje analítico cuantitativo, con correlación entre variables, realizado en un hospital de enseñanza, de enero a junio del año 2018, con ancianos de 60 años y más, sometidos a cirugía ortopédica. **Resultados:** De las 543 cirurgias ortopédicas programadas para ancianos, 93 (17,41%) fueron suspendidas. El mayor motivo de suspensión fue la extrapolação del momento de la cirugía anterior (35,48%); la cirugía se canceló una vez y se realizó entre uno y dos días después de la

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suspensión (91,87%), con significación estadística ($p=0,00$). **Conclusión:** Se encontró que la tasa de suspensión quirúrgica, en el anciano ortopédico por razones extrínsecas, fue del 17,41%. La suspensión quirúrgica sigue siendo un gran desafío para los profesionales y las instituciones de salud, demostrando la gran implicación del enfermero en la detección y resolución del retraso quirúrgico, con el fin de reducir su incidencia.

Palabras clave: Anciano. Ortopedia. Procedimientos quirúrgicos electivos. Gestión en salud. Enfermería perioperatoria.

INTRODUCTION

In recent decades, the fertility rate of the world's population has decreased while life expectancy has increased. This change in the population pyramid brings greater public health problems since it affects a vulnerable group — older adults¹. According to the World Health Organization (WHO), in developing countries, such as Brazil, older adults are individuals aged 60 years or over; in developed countries, this age increases to 65 years¹.

With advancing age, hospitalizations also increase, and several functional and structural changes occur, including reduced body mass, natural loss of bone density, degenerative diseases, and hearing and visual impairment^{2,3}. Fall is one of the main reasons for hospitalization among older adults. It is characterized by an involuntary event that results in a change from the initial position to the same or a lower level, causing one or more lesions². Older adults are the group most affected by this accident, which has a high recurrence and represents an important factor for the development of chronic complications².

Some age-related changes directly interfere with the surgical process, including the decrease in lean mass and total water, which are predisposing factors for higher drug toxicity and greater risk of hypothermia³. Natural physiological changes, associated with comorbidities, predispose individuals to falls, which are the leading causes of bone fractures and sometimes require surgical treatment⁴. Given the vulnerability of this group, the surgical procedure is a source of great concern for the multidisciplinary team and demands more caution in the perioperative period³.

Surgical procedures involve several factors, which can be intrinsic — related to the patient — or extrinsic — related to the environment and the team⁴. Issues in these factors may lead to surgical suspension and postponement. This scenario has consequences for the patient, who will not be free from this invasive act but will remain hospitalized and exposed to infectious agents, often restricted to their bed and subjected to muscle atrophy, pressure ulcers, osteopenia, pneumonia,

pulmonary embolism, and fat embolism^{5,6}. In addition, this situation results in losses to the facility due to the increase in costs with hospitalization, medication, food (patient and companion), materials, and professionals⁴.

According to a study carried out in a public teaching hospital in the state of Minas Gerais, the rate of surgical suspension was 14.14%, and most of them (63.78%) had no records of the reason. Among the justified suspensions, 8.82% corresponded to the patient not being admitted, 8.30% to the lack of appropriate clinical conditions, and 8.14% to administrative issues. Out of 15 specialties, urology and orthopedics had the highest number of suspended surgeries⁷.

Considering these findings, the present study is justified, as it focuses on the suspension of orthopedic surgeries in the older population.

OBJECTIVE

To identify the rates and extrinsic reasons for the suspension of elective orthopedic surgeries in older adults and the course until their performance, according to sex, age group, origin, and type of surgery.

METHOD

This is a retrospective descriptive study with a quantitative analytical approach and variable correlation, carried out between January and June 2018.

The study site was a large teaching hospital with extra capacity (708 beds), located in the Southeastern region of Brazil. The facility provides care to 2 million inhabitants, patients of the public and private health systems, from 102 municipalities in the Rio Preto Regional Health Division (DRS 15). It serves users of the public health system (*Sistema Único de Saúde* — SUS) and beneficiaries of the private health system (*Sistema de Saúde Suplementar* — SSS), composed of several health providers and insurance companies accredited by the hospital, in addition to self-pay patients.

The study was conducted in the surgical center (SC), which consists of 28 operating rooms (OR), with an average of 31,714 surgeries/year, mostly performed by SUS.

In order to meet the objectives of this study, we analyzed the electronic medical records of patients aged 60 years or older submitted to elective orthopedic surgeries. Patients who had their surgery canceled for intrinsic reasons were excluded. We collected information from 93 records.

After tabulation of the collected data, two statistical analysis functions were performed: descriptive and inferential. The descriptive part involved building up the profile of the studied sample, considering the variables analyzed and their repercussions. Data were fully and relatively replicated in this first stage.

In the inferential domain, the statistical objective was to analyze independence and prediction among the variables proposed in the work scope. To that end, we used the Mann-Whitney U test within the expected standards. Results related to the dependence between the proposed variables were obtained by analyzing the p-values. A p-value lower than 0.05 was considered statistically significant.

All analyses were performed with the software Statistical Package for the Social Sciences (SPSS Statistics), version 23, coupled with tools from Excel®, version 2016.

We calculated the surgical suspension rate using the commitment to hospital quality (*compromisso com a qualidade hospitalar* — CQH) formula, which comprises the number of surgeries suspended for extrinsic factors multiplied by 100 and divided by the total number of surgeries scheduled^{8,9}.

This study complied with the ethical procedures that govern the research with human beings, established by Resolution no. 466/2012 of the National Health Council. It was submitted to the Research Ethics Committee (REC) of the Faculdade de Medicina de São José do Rio Preto (FAMERP) and approved as an amendment, opinion no. 2,748,090, on March 2, 2018, as part of the parent project “*Estudo da Qualidade de Vida de Idosos*” (Study on the Quality of Life of Older Adults), REC-FAMERP, opinion no. 1,508,014.

RESULTS

In the period analyzed (January to June 2018), the SC had 11,511 surgeries scheduled, considering all surgical specialties of the hospital. Among them, 1,117 (9.70%) were orthopedic surgeries, of which 543 (48.61%) were performed in older patients. During the study interval, 1,185 procedures

were canceled — 394 (33.24%) were orthopedic surgeries, 125 (31.72%) in older patients. However, when considering extrinsic and intrinsic reasons for cancellation, 93 (74.4%) older adults had their surgery canceled for extrinsic reasons, that is, for reasons related to the SC of the hospital. Applying the CQH formula to the data collected, we found a surgical suspension rate of 17.41%.

According to the descriptive sample analysis, out of the 93 surgeries suspended for older patients, 22 (23.66%) occurred in March, 67 (72.04%) in women, 63 (67.74%) in patients from other cities, 38 (40.86%) in those aged 60 to 69 years, 55 (59.14%) occurred once, 24 (25.80%) had a waiting time of 1 to 2 days, and 33 (35.48%) were caused by the previous surgery lasting longer than expected. Also, 29 (31.18%) surgeries were performed due to femoral fracture and 11 (11.83%) to tibial fracture.

The study found a statistically significant correlation in the inferential statistical analysis when comparing age group × waiting time for surgery ($p=0.004$); number of suspensions × waiting time for surgery ($p=0.000$); number of suspensions × reason for suspension ($p=0.015$); month × reason for suspension ($p=0.014$); and month × type of surgery ($p=0.027$). We performed hypothesis tests using the Mann-Whitney U test and analyzing the behavior of the correlations among the variables studied and the level of explanation of the dependent variable in relation to the independent variables of the sample.

When comparing month × type of surgery, we found 19 types of surgeries, with the most frequent being femoral fracture (29/31.18%), followed by tibial fracture (11/11.83%); others had a rate lower than 10% ($p=0.027$).

The correlation between age group and waiting time for surgery showed statistical evidence; most older adults aged 60–69 years waited 1–2 days to have surgery, but a high number of them waited more than 30 days (87.50%), followed by those aged 80–89 years who waited 21–30 days (66.67%) when compared to other age groups ($p=0.004$), as shown in Table 1.

Another significant factor was the waiting time and the number of suspensions ($p=0.00$). A total of 91.67% of surgeries were suspended once and performed 1–2 days later, while 88.24% occurred 3–5 days later; the others waited up to more than 30 days to be performed (Table 2).

Among the main reasons for surgical suspension, we have the previous surgery lasting longer than expected (35.48%), which was correlated with the months studied ($p=0.014$), such as January, with 69.23% of suspensions (Table 3). A significant percentage of surgeries (50%) was canceled twice, showing a correlation with the reason for cancellation ($p=0.014$), as presented in Table 4.

Table 1. Waiting time for surgeries according to the patients' age group.

Age group (years)	Not performed		1 to 2 days		3 to 5 days		6 to 8 days		9 to 10 days		11 to 20 days		21 to 30 days		>30 days		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
60 to 69	3	21.43	10	41.67	8	47.06	7	36.84	1	50	2	33.33	-	-	7	87.50	38	40.86
70 to 79	4	28.57	10	41.67	6	35.29	5	26.32	-	-	2	33.33	1	33.33	1	12.50	29	31.18
80 to 89	5	35.71	3	12.50	2	11.76	7	36.84	1	50	2	33.33	2	66.67	-	-	22	23.66
>90	2	14.29	1	4.17	1	5.88	-	-	-	-	-	-	-	-	-	-	4	4.30
Total	14	100	24	100	17	100	19	100	2	100	6	100	3	100	8	100	93	100

*Significant value; Mann-Whitney U test.

Table 2. Waiting time for surgery according to how many times the procedure was suspended.

Number of suspensions	Not performed		1 to 2 days		3 to 5 days		6 to 8 days		9 to 10 days		11 to 20 days		21 to 30 days		>30 days		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Not performed	14	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	15.05
1	-	-	22	91.67	15	88.24	7	36.84	1	50	4	66.67	2	66.67	4	50	55	59.14
2	-	-	2	8.33	1	5.88	9	47.37	1	50	1	16.67	-	-	4	50	18	19.35
3	-	-	-	-	1	5.88	3	15.79	-	-	1	16.67	1	33.33	-	-	6	6.45
TOTAL	14	100	24	100	17	100	19	100	2	100	6	100	3	100	8	100	93	100

*Significant value; Mann-Whitney U test.

Table 3. Reasons for surgery suspension according to month.

Reason for suspension	January		February		March		April		May		June		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Previous surgery lasted longer than expected	9	69.23	3	42.86	8	36.36	4	28.57	5	29.41	4	20	33	35.48
The team chose to operate another emergency/urgent patient	-	-	1	14.29	2	9.09	5	35.71	4	23.53	1	5	13	13.98
The team chose to perform another surgical procedure	-	-	2	28.57	3	13.64	-	-	2	11.76	9	45	16	17.20
Death	-	-	-	-	-	-	-	7.14	-	-	1	5	2	2.15
TOTAL	13	100	7	100	22	100	14	100	17	100	20	100	93	100

*Significant value; Mann-Whitney U test. Reasons for suspension with a percentage lower than 10% were excluded. The total values correspond to all reasons for suspension.

Table 4. Reasons for surgical suspension according to how many times the procedure was suspended.

Reason for suspension	Not performed		1 time		2 times		3 times		Total	
	n	%	n	%	n	%	n	%	n	%
Previous surgery lasted longer than expected	-	0	22	40	9	50	2	33.33	33	35.48
Emergency surgery took precedence	-	0	12	21.82	1	5.56	-	-	13	13.98
Another surgical procedure took precedence	2	14.29	7	12.73	5	27.78	2	33.33	16	17.20
Total	14	100	55	100	18	100	6	100	93	100

*Significant value; Mann-Whitney U test. Reasons for suspension with a percentage lower than 10% were excluded. The total values correspond to all reasons for suspension.

DISCUSSION

Studies have indicated that the suspension rate of elective surgeries in university hospitals ranges from 17 to 33%^{10,11}. An international investigation¹¹ found a cancellation rate varying between 1 and 23%, corroborating our results — 10.29% of the total number of surgeries suspended. In the East African country of Malawi, a study found differences between the surgical suspension rates of underdeveloped countries, such as South Africa (44.5%) and Malawi (44.2%), and developed countries, such as the United Kingdom (0.7–1.1%) and Australia (7.2%). This finding reveals that the staff size, surgical volume, available resources, and demand are predisposing factors for the increase in suspensions¹².

In a document analysis of 1,449 canceled surgeries, the surgical specialty with the highest frequency of cancellation was orthopedics, and the main extrinsic reasons for suspension included the change in approach of the surgical team and the elective surgery lasting longer than expected¹³. The study also identified that the main causes for surgical suspension involved decisions made by the surgeon, the anesthesiologist, and the nurse, considering both intrinsic and extrinsic reasons¹³.

In another investigation carried out in the state of Paraná¹⁴, cancellations of general surgery and orthopedic surgery stood out; orthopedics had a rate of 23.57%, a value close to that of our research.

A study in a teaching hospital in Paraná reported a suspension rate of 26.2% for orthopedic surgeries, which was the specialty with the second-highest suspension rate, following only thoracic surgery¹⁵. In this study, the reasons were divided into extrinsic and intrinsic to the patient. Only 22% of suspensions occurred for intrinsic reasons, while the remainder (78%) was attributed to extrinsic factors, showing that the main causes for suspensions were actually related to the SC¹⁵.

In a hospital in Belo Horizonte, capital of Minas Gerais,¹⁶ researchers assessed the surgical suspension rate from July to December 2013, including intrinsic and extrinsic reasons. The suspension rate of orthopedic surgeries was 22.1%, corresponding to second place. This information confirms the finding of the current research, evidencing the high suspension rate of orthopedic surgeries. Among the extrinsic reasons for suspension, those authors identified a high incidence of non-authorization from the patient's insurance provider (31.5%)¹⁶, contrary to the results obtained in the present study, whose highest suspension rate was the previous surgery lasting

longer than expected (35.48%). In our research, the rate of surgical suspension for extrinsic reasons in older patients was 17.12% after applying the CQH formula, while a study conducted in a hospital in Belo Horizonte, with patients of all age groups and that included intrinsic and extrinsic reasons, detected a rate of 5.2% in a 6-month period¹⁶.

An investigation carried out in a Chinese university hospital revealed that the female sex presented significant differences compared to the male sex, which might be justified by women's higher demand for health services¹¹. This result corroborates our research since the highest percentage of surgical suspensions was detected among female patients (72.04%).

Research conducted in a hospital in São Paulo demonstrated that older patients are the most affected, reporting that suspensions for clinical and non-clinical reasons held the second place¹⁷. This finding agrees with our study, which evidenced that 31.72% of suspensions occurred among older adults due to intrinsic and extrinsic reasons.

As to the types of orthopedic surgery with the most suspensions, femoral fracture had the highest incidence (31.18%) and was predominant throughout the period studied. This kind of fracture is more frequent among older adults due to falls. A study evaluating femoral fractures from 2008 to 2012 confirmed that, in line with other countries, Brazil presents a high number of cases — approximately 36,200/year —, which results from the significant number of surgeries scheduled for this specialty¹⁸.

In agreement with our results regarding the previous surgery lasting longer than expected (35.48%), a study conducted in the university hospital of the Universidade Federal de Santa Catarina (UFSC) identified the lack of enough time for the procedure (24%) as one of the main reasons for surgical suspensions, followed by the lack of beds in the intensive care unit (ICU) (12%)¹⁹. A study performed in São Paulo showed that the main extrinsic reasons for suspension were the delay in the previous surgery and the lack of ICU beds, equipment, and materials, such as orthotics, prosthetics, and special materials (OPSM)¹⁷. Time delay may result from complications or changes in techniques and approaches during the surgical procedure, the presence or absence of resident physicians in the OR, as well as the surgical complexity of the following operation¹¹.

Another cause for surgery delay is the failure in planning and checking the surgery schedule board — directly linked to the nurse's team management skills —, as well as the assertive communication among those involved and the previous knowledge of hospital materials and equipment.

The surgical cancellation rate evidences the need for its reduction. To that end, we must continuously monitor this indicator and implement strategies aimed at decreasing it. Good process management and strategies are necessary for nurses to detect and solve surgery delays, which demands a proactive attitude and the empowerment of this professional so as to benefit as many patients as possible^{20,21}.

The use of management tools, such as the gravity, urgency, and tendency (GUT) matrix and the Ishikawa diagram, can be a strong contributor to solving challenges in the SC, since ineffective planning is among 21% of causes for suspension²¹.

According to a study carried out in a public referral hospital in the state of Pernambuco from February 2015 to February 2016, the specialties most prone to suspension were general surgery, orthopedics, and urology, in this order. Among the extrinsic reasons, the ones that stood out were the delay in the previous surgery (16.8%), the addition of an emergency surgery (14.1%), and the delay of the surgical team (8.4%), with the female sex being the most frequent (56%)²², corroborating the findings of the present study. We emphasize that this scenario affects patients and their families, generating stress, distress, and dissatisfaction with the situation and the facility, as well as the facility itself, with increased expenses and stress for the team^{22,23}.

The nurse is responsible for planning and managing the SC routine, having to adapt every day to the constant changes in the surgical schedule. A study evaluating the implications of surgical cancellation from the perspective of nurses showed that this professional feels responsible and concerned with the waste it causes and with its consequences. Despite the differences between the main reasons for suspension, we found common data and issues when comparing our results to those of studies conducted in other facilities and that users experience great emotional, financial, and health loss^{22,23}.

An integrative review reported that the main stress-generating factor for patients after the suspension of their surgery was the failure in communication between the professional

and the patient. The patient's lack of clinical conditions was the main reason for cancellation, and orthopedic surgery was the specialty with the most procedures suspended²⁴. The nurse has an important role in this process because, in addition to providing care to the individual who will undergo the surgical procedure, they must guide and address the doubts that arise so the patient can feel safe²⁴. In this scenario, the Perioperative Nursing Care Systematization (*Sistematização da Assistência de Enfermagem Perioperatória* — SAEP) is a support tool used to evaluate the patient and the communication within the nursing team, ensuring the continuity of care²⁴.

The limitations of the study included the poor completeness and correctness in the filling of all procedure data and of the justifications for cancellation in the patient's electronic medical record, in addition to the excessive scheduling and changes that occur and that hinder the research performance and validation.

CONCLUSION

This study identified that the suspension rate of orthopedic surgeries among older patients due to extrinsic reasons was 17.41%, which corroborates data from studies conducted in university hospitals. Most surgeries occurred in March, among females, in patients from other cities, and in those aged 60–69 years; the main surgery category was femoral fracture. The majority of the surgical procedures were suspended only once and performed 1–2 days later, with the main reason being the previous surgery lasting longer than expected and thus exceeding the SC working hours.

Surgical suspension remains a great challenge for professionals and health facilities. We noted the great involvement of nurses in managing and minimizing the suspension; however, this is not their exclusive role. Involvement in the preoperative organization is essential, including from surgical team members.

REFERENCES

- Oliveira RCS. O processo histórico do estatuto do idoso e a inserção pedagógica na universidade aberta. Rev HISTEDBR [Internet]. 2007 [accessed on May 20, 2020];(28):278-86. Available at: https://www.fe.unicamp.br/pf-fe/publicacao/5036/art18_28.pdf
- Gasparotto L, Falsarella G, Coimbra A. As quedas no cenário da velhice: conceitos básicos e atualidades da pesquisa em saúde. Rev Bras Geriatr Gerontol. 2014 [accessed on May 20, 2020];17(1):201-9. Available at: <https://doi.org/10.1590/S1809-98232014000100019>

3. Monteiro C, Faro A. O cuidador do idoso e sua compreensão sobre a prevenção e o tratamento cirúrgico das fraturas de fêmur. *Estud Interdiscip Envelhec* [Internet]. 2006 [accessed on May 20, 2020];10:105-21. Available at: <https://seer.ufrgs.br/RevEnvelhecer/article/view/4800/2705>
4. Camilo M, Campos L, Viana S, Camargos M, Villa E, Zocrato K. Motivos de cancelamentos, substituição e atrasos de cirurgias eletivas realizadas em um hospital universitário em Minas Gerais. *Rev Acred* [Internet]. 2017 [accessed on May 20, 2020];7(13):1-11. Available at: <https://dialnet.unirioja.es/descarga/articulo/6130781.pdf>
5. Leme L, Sitta M, Toledo M, Henriques S. Orthopedic surgery among the elderly: clinical characteristics. *Rev Bras Ortop*. 2011;46(3):238-46. <https://doi.org/10.1590/S0102-36162011000300002>
6. Santos G, Bocchi S. Cancellation of elective surgeries in a Brazilian public hospital: reasons and estimated reduction. *Rev Bras Enferm*. 2017;70(3):535-5. <https://doi.org/10.1590/0034-7167-2016-0084>
7. Barbosa MH, Goulart DMM, Andrade EV, Mattia AL. Análisis de la suspensión de cirugía en un hospital docente. *Enferm Glob* [Internet]. 2012 [acessdao em 21 abr. 2020];11(26):164-73. Available at: <http://dx.doi.org/10.4321/S1695-61412012000200011>
8. Gouveia JL, Vilela RP, Ruiz PB, Jericó MC, Ruiz PBO. Cancelamento de cirurgias eletivas: indicador de qualidade em hospital de ensino [Internet]. São José do Rio Preto: Faculdade de Medicina de São José do Rio Preto; 2017 [accessed on May 20, 2020]. Available at: http://sobecc.tmeventos.com.br/anais2017/pdfs/trabalho_2353.pdf
9. Compromisso com a Qualidade Hospitalar. 3º Caderno de Indicadores CQH [Internet]. São Paulo: Van Moorsel; 2009 [accessed on May 20, 2020]. 96 p. Available at: http://www.cqh.org.br/portal/pag/doc.php?p_ndoc=127
10. Lobo LC, Brito CF, Sabino AS, Almeida MC. Taxa de suspensão de cirurgias no Brasil: uma revisão integrativa. *REAC* [Internet]. 2019 [accessed on May 2, 2020];4:e497. Available at: <https://www.acervomais.com.br/index.php/cientifico/article/view/497>
11. Yu K, Xie X, Luo L, Gong R. Contributing factors of elective surgical case cancellation: a retrospective cross-sectional study at a single-site hospital. *BMC Surgery* [Internet]. 2017 [accessed on May 20, 2020];17:100. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5594612/pdf/12893_2017_Article_296.pdf <https://doi.org/10.1186/s12893-017-0296-9>
12. Prin M, Eaton J, Mtalimanja O, Charles A. High elective surgery cancellation rate in malawi primarily due to infrastructural limitations. *World J Surg*. 2018 [accessed on May 2, 2020];42(6):1597-602. Available at: <https://doi.org/10.1007/s00268-017-4356-1>
13. Macedo J, Kano J, Braga E, Ávila MAG, Caldeira SM. Cancelamento de cirurgias em um hospital universitário: causas e tempo de espera para novo procedimento. *Rev SOBECC*. 2013;18(1):26-34.
14. Pinheiro S, Vasconcelos R, Oliveira J, Matos F, Tonini N, Alves D. Surgical cancellation rate: quality indicator at a public university hospital. *REME Rev Min Enferm*. 2017 [accessed on May 20, 2020];21:e1014. Available at: <https://doi.org/10.5935/1415-2762.20170024>
15. Nascimento L, Tillvitz L, Fonseca L. Suspensão cirúrgica: o ângulo estatístico de um problema de repercussões humanas. *Rev Enferm UFPE on line* [Internet]. 2013 [accessed on May 20, 2020];7(Núm. Esp.):6592-600. Available at: <https://periodicos.ufpe.br/revistas/revistaenfermagem/article/download/12313/15001> <https://doi.org/10.5205/reuol.5058-41233-3-SM.0711esp201305>
16. Moreira L, Xavier A, Moreira F, Souza L, Araujo O, Santos T, et al. Avaliação os motivos de cancelamento de cirurgias eletivas. *Enferm Rev* [Internet]. 2016 [accessed on May 20, 2020];19(2):212-25. Available at: <http://periodicos.pucminas.br/index.php/enfermagemrevista/article/view/13156>
17. Sodré R, Fahl M. Surgeries cancellation in a public hospital at São Paulo city. *Rev Adm Saúde* [Internet]. 2014 [accessed on May 20, 2020];16(63):67-70. Available at: <https://doi.org/10.5327/Z1519-1672201400630005>
18. Soares DS, Mello LM, Silva AS, Martinez EZ, Nunes AA. Fraturas de fêmur em idosos no Brasil: análise espaço-temporal de 2008 a 2012. *Cad Saúde Pública*. 2014 [accessed on May 20, 2020];30(12):2669-78. Available at: <https://doi.org/10.1590/0102-311x00218113>
19. Torri A. Estratégias para minimizar o cancelamento de cirurgias em um hospital escola [Internet]. Florianópolis: Universidade Federal de Santa Catarina; 2019 [accessed on May 20, 2020]. 117 p. Available at: <https://repositorio.ufsc.br/bitstream/handle/123456789/198129/PGCF0100-D.pdf?sequence=-1&isAllowed=y>
20. Carvalho TA, Sobral CB, Marinho PML, Llapa-Rodríguez EOO, Campos MPA. Suspension of surgery at a university hospital. *Rev SOBECC*. 2016;21(4):186-91. <https://doi.org/10.5327/Z1414-4425201600040002>
21. Gouveia Y. Revisão integrativa como estratégia para descrever os principais motivos que levam a suspensão de cirurgias eletivas [Internet]. Uberlândia: Universidade Federal de Uberlândia; 2018 [accessed on May 20, 2020]. 37 p. Available at: <https://repositorio.ufu.br/bitstream/123456789/24236/1/Revis%C3%A3oIntegrativaEstrategica.pdf>
22. Moraes PGS, Pachêco NMD, Souza e Silva RG, Silva PCV. Clinical and organizational factors related to cancellation of surgical procedures. *J Nurs UFPE on line* [Internet]. 2017 [accessed on May 20, 2020];11(7):2645-53. Available at: <https://periodicos.ufpe.br/revistas/revistaenfermagem/article/view/23436/19133> <https://doi.org/10.5205/reuol.10939-97553-1-RV.1107201701>
23. Morgan W, Bernardino E, Wolff LDG. Implications of cancellation of surgery in a surgery department: a descriptive-exploratory study. *Online Braz J Nurs* [Internet]. 2019 [accessed on May 20, 2020];9(1). Available at: <http://www.objnursing.uff.br/index.php/nursing/article/view/j.1676-4285.2010.2591/585>
24. Santos AL, Fonseca GG. Impact of suspension of surgery: an integrating review. *J Health Connections* [Internet]. 2019 [accessed on May 20, 2020];7(1):46-57. Available at: <http://revistaadmmade.estacio.br/index.php/journalhc/article/view/5495/4796583>