

Elective Surgery Cancellations During the Time Between Scheduling and Operation

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Purpose: Surgery cancellations cause harm to patients, extra work for preoperative staff, and financial loss for organizations. Day of surgery cancellations are a widely used indicator for operative effectiveness, but there is a lack of knowledge concerning the effects of cancellations during earlier stages of a patient's preoperative waiting period. The purpose of this study was to measure the reasons, frequencies, and timing of elective surgery cancellations after scheduling.

Design: Qualitative prospective follow-up study.

Methods: Data were collected during a 2-month period in 13 operative specialties by a semistructured follow-up form and analyzed by inductive content analyses and statistical methods.

Findings: Most of the cancellations occurred before the day of surgery and appeared because patients were not in a suitable condition for the planned operation or because of lack of organizational resources.

Conclusions: More attention should be focused on patients' suitability and organizational resources in earlier stages of preoperative period.

Keywords: preoperative care, surgery cancellation, elective surgery, operative effectiveness.

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PERIOPERATIVE CARE is an important area of nursing and serves a large number of people, approximately 312.9 million surgical procedures were conducted globally in the year 2012.¹ The hospital sector is the largest component of health

care spending in the Organization for Economic Cooperation and Development and European Union countries.² Surgery cancellations are unfortunate situations that have an emotional and economic impact on patients.³ Cancellations lead to financial loss for organizations and inefficient use of the operation room (OR) time, which is a recognized problem in perioperative care.⁴ The loss to an organization of a single cancellation has been reported as an average of 4,802 US dollars, and the financial loss of a 1.4% cancellation rate was estimated to be more than 32 million US dollars.^{5,6} It is difficult to compare the reasons and financial loss for hospitals with regard to cancellation rates because of differences in health care financial systems and work cultures.⁷ Since 1996, The British National Health Service has kept a nationwide record of canceled operations.⁸ The data show a large variation in cancellation rates between organizations, and the highest rate is over 700 times higher than the lowest.⁹ However, approximately 50% to 65% of the cancellations are potentially avoidable.¹⁰⁻¹²

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Cancellation is one of the widely used nursing-sensitive quality indicators when evaluating and reporting the efficiency and outcomes of preoperative care and measuring the results of developments in the preoperative setting.¹³ The most common way of reporting cancellation rates is to report day of surgery (DOS) cancellations. These cancellations are not necessarily defined in the reports and if they are, there are variations between the definitions. They may be defined as operations canceled within 24 hours of the scheduled time, cancellations occurring on the day before surgery, or on the same DOS.¹⁴⁻¹⁶ Cancellations are also measured between the preoperative evaluation (1 month before surgery) and the DOS.¹⁷ In this study, we examine cancellations after the date for surgery is scheduled. This means that a patient on a waiting list has been given a date for surgery and preoperative assessment and preparing for surgery has started.

The preoperative care process starts when surgical intervention is deemed necessary and ends when a patient is transferred to the surgical suite.¹⁸ Preoperative nurse practitioners are acknowledged as highly qualified, independent health care providers, and the implementation of such models is strongly recommended.¹⁹ Several studies report positive outcomes in reducing cancellations after implementing preoperative care models.^{15,19-21} Preoperative nurses are essential in the preoperative process; they are specialized coordinators of surgical patient care who meet patients' needs individually while working together with patients and their families as well as other health care workers. Preoperative nurses share the responsibility for patients arriving to hospital on time, holistically prepared, and without anxiety or fear, and ensure a safe and effective care process.²²⁻²⁴ Preoperative nurses provide careful patient screening and assessment and enhance communication between professionals impacting last minute cancellations and nonattendance.^{25,26} Preoperative nursing care is cost-effective when the surgical process and patient-specific management are optimized.²⁷

In previous studies, cancellation data have been collected from several different data sources: hospital inpatient inquiry data, OR lists, admission records, patient charts, electronic medical records, administration systems, anesthesia records, elec-

tronic preanesthetic evaluation forms, paper charts, lists for daily preoperational anesthesia clinic appointments, and OR sign-in sheets.^{9,14,15,17,19,28,29} There are studies that are based on manually collected retrospective or prospective data.^{28,30-32} Follow-up periods vary from 5 months to 5 years and two-phase data collections vary from 3 to 6 months.^{19,21,29,30}

Several studies include a wide range of operative specialties but some specific specialties such as pediatrics, certain procedures, or minor day surgery cases are excluded.^{14,15,19-21,28,30,32-34} However, there is also research that only focuses on pediatric surgery, gastrointestinal endoscopy outpatients, orthopaedics, ambulatory surgery, or the American Society of Anesthesiologists physical status classification for 1 to 2 adult patients.^{16,17,19,29,31,34} Usually outcomes have been reported as total cancellation rates.^{15-17,21,28-30,32,34} Several systems for categorizing the reasons for cancellations have been used, and most of them include variations of different reasons.^{14,15,17,19-21,28,31} Reasons have also been categorized as preventable by preoperative preparation or appointments.^{20,31,32}

To sum up, total cancellation rate is commonly used when reporting outcomes of remodeling preoperative care, and several structured categorizing systems are widely used. Previous research focuses strongly on DOS cancellations, as those have an instant effect on costs and optimal use of OR time. However, it is also necessary to measure cancellations that occur earlier in the preoperative period after patients are scheduled for surgery. Earlier cancellations may cause waste of resources, extra work for preoperative nurses and other preoperative staff, financial loss for the organization, and unnecessary stress for the patients. To the best of our knowledge this is the first study to measure reasons, frequencies, and timing of elective surgery cancellations during the time between scheduling and the operation by quantitative and qualitative methods.

Purpose

The purpose of this study was to measure reasons, frequencies, and timing of surgery cancellations after a patient is scheduled for elective surgery and also compare those findings with background characteristics of operative specialties. Minor surgeries that are conducted at outpatient clinics are

not included in this study. Research questions are as follows: What are the main reasons for cancellations? What is the total frequency of elective surgery cancellations after scheduling? When do cancellations typically occur?

Methods

Research Site

We conducted the study in a Finnish university hospital with 13 operative specialties. The hospital cares for 17,000 elective and 5,000 emergency surgical patients in 26 operating theaters annually. In our 2-month follow-up period 2,755 operations were performed. The hospital reorganized patients' preoperative pathway and implemented a structured preoperative process in practice in May 2015. Preoperative nurses coordinate elective patients' preoperative care and prepare patients for surgeries by following a structured preoperative nursing care protocol in all 13 operative specialties.³⁵ All elective surgery patients go through the same preoperative process as they are all contacted preoperatively either by telephone or face to face at outpatient clinics.³⁵

Design

This is a qualitative prospective 2-month follow-up study. The University Committee on Research Ethics has evaluated the ethical aspects of the research and stated that the research is scientifically justified. The university hospital has given permission for undertaking the research.

Data Collection

We collected the data between October and December 2015. A semistructured follow-up form was developed for data collection, based on clinical experience. Physicians and nurse managers in operative care and two experienced preoperative nurses from two different operative specialties conducted a pilot evaluation of the form.

After the pilot study, the final version of the form was sent to 13 operative specialties with an information letter about the study and data collection by e-mail. Preoperative nurses were asked to record on a paper or on an electronic follow-up

form all the cancellations that occurred after patients were scheduled for elective surgery. Before data collection nurses were met face to face or contacted by phone for ensuring they were familiar with data collection form and understood the importance of recording canceled operations. Nurses were able to contact corresponding researcher with any questions. Preoperative nurses sent follow-up forms back to the corresponding researcher by mail or e-mail after data collection ended. Paper data were held in locked filing cabinet and electronic data were protected by password. Data were available only for this research.

The form included questions about canceled operations: what the scheduled operation was (eg, bypass, transurethral resection of the prostate), what kind of operation it was (eg, day surgery, 23-hour surgery), when the operation was scheduled, the reason the operation was canceled, the date when the cancellation occurred, whether the patient was replaced with another patient, and how many patients refused from offered sudden available operation time. We did not collect patient demographics to ensure patients' anonymity. An example of the form is presented in [Figure 1](#).

We collected the data of operations performed during the study period from the hospital's administration system. Background information about the operative specialties (from home to operation [FHTO] share and frequency of elective operations) was collected from the hospital's administration system over a 9-month period from September 1, 2015 to May 31, 2016 with assistance of a clinical information system specialist. Nurse managers in operative specialties provided information about preoperative nurses' location and nurse ratios. Compliance with a structured preoperative protocol was evaluated in operative specialties by preoperative multiprofessional teams between March and June 2016 by a structured evaluation form with visual analog scale questions.³⁵

Data Analyses

Eleven (85%) of 13 specialties returned the form adequately completed. We analyzed the data by qualitative and quantitative methods. We used qualitative inductive content analysis when discovering actual reasons for cancellations. A total of 279

Scheduled operation?	Day surgery	23H surgery	FHTO	Traditional surgery	Scheduled date?	Description why the operation was cancelled?	Cancellation date?	Was there a replacement patient?	How many patients refused from offered sudden available operation time?
	x					No need for operation. No longer a problem.			
			x			Uncompleted preoperative examinations, more testing is needed.			
		x				Lack of OR staff.			

Figure 1. Data collection form, example from gynecology department. FHTO, from home to operation; OR, operating room. This figure is available in color online at www.jopan.org.

documentations included correct information about timing of cancellations and of those 233 (83.5%) cancellations occurred within 13 days before surgery. All the cancellations that occurred earlier were allocated to one category, 14 days before surgery. As there were several missing data in the data collection form according to the questions “was there a replaced patient” and “how many patients refused to take an offered sudden available operation time” this material was not included in the analysis. Because of the limited sample size, we are not reporting the type of scheduled procedures for ensuring canceled patients’ anonymity.

We used qualitative inductive content analysis to analyze the reasons for cancellations by using Microsoft Excel for Mac 2011. First, we read through the data to gain an overall understanding of the content. Second, we abstracted the descriptions of the cancellation reasons. Third, we categorized the reasons by frequencies into subcategories and further into main categories.³⁶

For statistical analyses, we used SPSS software 22.0 when we searched for frequencies, timing, and correlations with cancellations and background characteristics of operative specialties. Cancellation rates were calculated from all the scheduled procedures. We tested associations with cancellations and background characteristics by using the χ^2 test (cancellations and specialty), Kruskal-Wallis test (cancellations and the location of the preoperative nurse), and Spearman’s correlation (cancellations and patient per nurse ratio, scheduled procedures, FHTO rate, and compliance rate). Because of the skewed nature of the distribution of cancellation timings, logarithmic transformation was provided

as the data included null observations. By transformation, the data appeared to have Gaussian distribution, and we were able to use a linear mixed model for testing.

Findings

A total of 11 operative specialties returned the follow-up forms adequately completed. We were unable to get data from two specialties: neurosurgery and dental surgery. Neurosurgery is commonly considered a busy unit, which might be the reason for not returning the data for this study; however, we highly recommend investigating the reasons for feelings of not having sufficient time. Dental surgery is a minor specialty at the study hospital and therefore cancellations might not be considered a major problem.

Background Characteristics of Operative Specialties

More than 80% of patients arrived on the same day in 8 of 11 specialties, one specialty had an FHTO rate of less than 10% on the same day. The frequency of patients per preoperative nurse varied between specialties. In orthopaedics one preoperative nurse had an average of 143 patients per month, but in urology a preoperative nurse had only 56 patients per month. The average number of patients per preoperative nurse per month was 83 (Table 1).

Preoperative nurses were located at their own outpatient clinics ($n = 4$), wards ($n = 2$), or at the preoperative nursing center ($n = 5$), which was located next to the anesthesia pre-evaluation clinic. Operative specialties have evaluated their

Table 1. Background Characteristics of the Operative Specialties³⁵

Medical Specialty	FHTO Share of all Operations (%)	Frequency of Elective Operations/Month/Preoperative Nurse (Average)	Preoperative Nurse Location	Compliance With a Structured Preoperative Protocol (%)
Gastrointestinal surgery	93	113	Center	91.8
Pediatrics	64	73	Outpatient clinic	74.3
Hand surgery	99	72	Outpatient clinic	85.9
Cardiac and thoracic	8	64	Ward	61.5
Urology	97	56	Center	85.8
Vascular surgery	61	62	Ward	70.3
Gynecology	81	58	Center	91.1
Ophthalmology	92	118	Outpatient clinic	77.2
Ear, nose, and throat	89	71	Outpatient clinic	85.0
Orthopaedics	89	143	Center	83.9
Plastic surgery	91	86	Center	85.3

FHTO, from home to operation.

compliance with a hospital's structured preoperative protocol. The compliance rate (0% to 100%) varied between specialties from 61.5% to 91.8%, and the mean was 81.1% (Table 1).

Surgery Cancellations: Reasons and Timing

There were 3,045 operations scheduled during the study period of which 290 were canceled, leading to a hospital cancellation rate of 9.5%. The cardiac and thoracic department had the lowest cancellation rate (3.6%), and the highest rate was in pediatrics where every fourth scheduled operation was canceled. However, the largest share of all canceled operations at the hospital level occurred in the orthopaedic department (24.8%) (Table 2).

The sample of 290 cancellations was divided into 7 main categories by reasons. Approximately 50% of all the reasons were because patients were not in a suitable condition for the operation or because of organizational factors such as lack of resources. The condition of the patient was the largest single category, as 34.2% of all cancellations were because patients were sick, had teeth or skin problems, or for some other health reason. Resource-related reasons were the second largest category (23.3%), approximately half of these were because surgeons were not available, there were more urgent cases, or the OR was too busy (Table 3).

In addition, every sixth scheduled operation was canceled because there was no longer a need for the operation; the procedure had been already performed or there was no diagnostic need for the surgery, and 11.4% of cancellations were because the scheduled time did not suit the schedule of the patient or the child's parents. In 5.9% of cancellation cases patients no longer wanted the scheduled operation, and in 3.8% of cases there was a lack of important information regarding the operation or the patient's health. Finally, 5.5% of the cancellations occurred for other nonspecific reasons (Table 3).

According to the results, 60% of all elective surgery cancellations occurred on the same day of an operation or 1, 3, or 14 days before surgery. The proportion of DOS cancellations at the hospital level was 19.7%, and the variation by specialties was between 9.1% (plastic surgery) and 44.8% (ophthalmology) (Table 4).

Background Characteristics and Their Influence on Cancellations

We recognized statistical differences between specialties according to the cancellation rates and the timing of cancellations. The location of preoperative nurses did not explain the differences, but we found a connection between the preoperative nurse staffing level and the number of cancellations, because a larger patient volume per

Table 2. Frequency of Scheduled Procedures and Surgery Cancellations

Medical Specialty	Scheduled Procedures	Frequency of Cancellations	Cancellation Rate (%)	Share of Total Hospital Cancellations (%) (n = 290)	FHTO Share of Cancellations (%)
Gastrointestinal surgery	358	23	6.0	7.6	100
Pediatrics	107	36	25.2	12.4	68.6
Hand surgery	148	17	10.3	5.9	82.4
Cardiac and thoracic	160	6	3.6	3.4	0
Urology	158	18	10.2	6.2	100
Vascular surgery	150	17	8.0	4.5	58.8
Gynecology	290	14	4.6	4.8	100
Ophthalmology	480	29	5.7	10	93.1
Ear, nose, and throat	243	46	15.9	16.2	88.4
Orthopaedics	741	72	8.9	24.8	96.6
Plastic surgery	206	12	5.5	4.1	100
<i>Total hospital</i>	3,045	290	9.5	100	86.8

FHTO, from home to operation.

preoperative nurse seemed to associate with cancellation rates (Table 5).

The frequency of scheduled procedures was not associated with the timing of cancellations, but there was a negative correlation between the frequency of procedures and the number of cancellations; procedures which were scheduled less often led to an increase in cancellations (Table 5).

We did not find a connection between the proportion of FHTO procedures and the timing of cancellations, but we did find that a larger FHTO share led to a higher cancellation rate. We compared the compliance rate of the operative specialties with the hospital's structured preoperative protocol and the number and the timing of cancellations; however, we did not find any meaningful associations (Table 5).

Discussion

The purpose of our study was to measure the reasons, frequencies, and timing of cancellations after a patient was scheduled for elective surgery. We then compared those findings with the background characteristics of operative specialties.

According to our results, the frequencies and timing of cancellations vary between the 11 operative specialties, but planned operations were typically canceled on the day of an operation or 1, 3, or

14 days before surgery. The timing of cancellations could be explained by a structured preoperative protocol and the contacts between nurses and patients; however, we did not find any association with the compliance rate of the preoperative protocol.

DOS cancellations are harmful for patients and they are one of the nursing quality indicators for evaluating efficiency, patient safety, and crisis event management in perioperative care.^{3,13} According to our results, the share of DOS cancellations was only 20% of all cancellations; however, it is essential also to recognize cancellations in the earlier stages of perioperative care because they cause extra work for preoperative nurses and other perioperative staff, which leads to work overload, dissatisfaction, and financial loss for the organization. Resources are often focused on a certain number of surgeries, and those resources may not be used for other purposes. Moreover, cancellations may also have a negative effect on a hospital's image.

Our study results show that most of the cancellations were related to patient factors rather than to the organization. Knox et al¹⁴ reported opposite results using data where the pediatric department was excluded. According to our results, every fourth scheduled operation for a pediatric patient was canceled, the cancellation rate was the highest compared with other specialties, and the

Table 3. Reasons for Elective Surgery Cancellations by Specialties After Scheduling (N = 290)

Main Reasons (%)	Reasons for Cancellations (N = 290)	Share of all Cancellations (Total 100%)	Gastrointestinal Surgery	Pediatrics	Hand Surgery	Cardiac and Thoracic	Urology	Vascular Surgery	Gynecology	Ophthalmology	Ear, Nose, and Throat	Orthopaedics	Plastic Surgery
Patient's opinion (5.9)	Patient does not want the operation (n = 17)	5.9		3			1			1	4	8	
Patient's schedule (11.4)	Patient is prevented (n = 33)	11.4	1	3	6		4		2	1	9	4	3
No need (15.6)	Procedure is already done (n = 8)	2.8	1	3			2				1	1	
	No need for operation (n = 37)	12.8	5	3	7		1	1	4	1	6	9	
Patients' suitability (34.2)	Patient is not suitable for operation (n = 19)	6.6	2	1				3	2	7	2	1	1
	Patient is sick (n = 68)	23.1		17		3	4	2	2	3	20	13	3
	Teeth problem (n = 5)	1.7										5	
	Skin problem (n = 8)	2.8			1			1				6	
Resource-related reasons (23.3)	No surgeon available (n = 28)	9.7	8	1	1	1	2			5		8	2
	No equipment available (n = 10)	3.4					3	1		4	1	1	
	More urgent case (n = 22)	7.6				4		4	1	5	3	4	1
	Rush in the operating room (n = 9)	3.1	3	1			1	1	1	2			
A lack of information (3.8)	Incomplete preoperative patient information (n = 11)	3.8	2		1				2			5	1
Other (5.5)	Other (n = 16)	5.5		4	1	2					1	7	1

Table 4. Timing of Cancellations' Occurrences 14 days Before Surgery (N = 279)

Days Before Surgery (N = 279)	Total (%)	Gastrointestinal Surgery (%) (n = 27)	Pediatrics (%) (n = 27)	Hand Surgery (%) (n = 20)	Cardiac	Urology (%) (n = 18)	Vascular	Gynecology (%) (n = 14)	Ophthalmology (%) (n = 29)	Ear, Nose, and	Orthopaedics (%) (n = 70)	Plastic
					Thoracic (%) (n = 10)		Surgery (%) (n = 13)			Throat (%) (n = 46)		Surgery (%) (n = 12)
0	19.7	34.6	16	15.8	10.0	12.5	15.4	21.4	44.8	21.7	12.9	9.1
1	14.5		32	5.3	40.0	12.5	23.1		24.1	21.7	5.7	27.3
2	2.8	3.8						7.1	3.4	4.3	4.3	
3	10.0	3.8	4	5.3	20.0	6.3	15.4	14.3	6.9	15.2	7.1	45.5
4	7.2	7.7				12.5	23.1	14.3	3.4	8.7	7.1	9.1
5	3.4	3.8					7.7	7.1		6.5	5.7	
6	2.4		8.0			6.3	7.7	7.1			2.9	
7	7.9	23.1	4.0		10.0	6.3		7.1	10.3	6.5	10.0	
8	1.4		8.0								2.9	
9	2.4	3.8	4.0	10.5		12.5					10.0	
10	2.8			21.1		12.5	7.7		3.4			
11	1.4	7.7									2.9	
12	2.1			5.3		12.5		7.1		2.2	1.4	
13	2.4								3.4	4.3	5.7	
14 or more	15.9	11.5	24	31.6	20.0	6.3		14.3		8.7	30.0	9.1

Table 5. Associations With Cancellations and Background Characteristics

	Operative Specialty	Preoperative Nurse's Location	Patient per Preoperative Nurse Ratio	Scheduled Procedures	FHTO Share	Compliance Rate
Cancellations	$P = .000^*$	$P = .145$	$r = 0.045$ $P = .894$	$r = -0.418$ $P = .201$	$r = 0.245$ $P = .467$	$r = 0.018$ $P = .958$
Timing of cancellations	$P = .000^*$	$P = .657$	$P = .986$	$P = .885$	$P = .921$	$P = .550$

FHTO, from home to operation.

*Significance ($P < .05$).

most typical reason was patient's ill health. This may explain the difference between the results. The high volume of cancellations related to children may also explain the slight correlation with lower patient volume and the frequency of cancellations because pediatrics was the smallest specialty participating in the study.

Some patient-related reasons, such as sudden sickness, are not preventable, but in many cases, cancellations might be prevented if a patient's suitability for an operation was carefully assessed, discussed, and evaluated. This assessment needs to be done together with the patient, and in addition, adequate patient education should be given at the time of the decision. As many as 15% of scheduled operations were canceled because there was no longer a need for the planned operation (operation was conducted by other health care provider or a patient did not have symptoms any longer). Preoperative assessment should be structured, and the need for the operation should be carefully evaluated both by medical professionals and the patient. At the same time, enough information should be shared for an informed decision to be made.^{18,23}

Our study results show that higher FHTO share may lead to a higher cancellation rate. Patient-centered preoperative care and cooperation is essential for a successful operative process. Most surgical patients arrive at the hospital on the day of their operation, and they have considerable responsibility for their preoperative preparedness and timely arrival.

Every tenth cancellation was caused because of patient schedules. Previous studies have recommended that early scheduling together with patient participation might reduce these unnecessary can-

cellations.^{15,37} Every fourth cancellation occurred because of lack of organizational resources. The correct timing and scheduling of operations is a complicated puzzle and is essential in reducing resource-related cancellations. Preoperative clinics have been reported to provide cost effectiveness by optimizing patients' surgical pathway.²⁷ Centralizing scheduling and strengthening multiprofessional cooperation with perioperative staff could promote successful scheduling, and there are several components to be considered such as staff resources, equipment and OR availability, and the possible arrival of urgent cases. The study hospital has developed patient processes by improving performance according to the principles of lean management.³⁸ Continuous assessment and follow-up is necessary to achieve an optimal patient-centered waste-free process.

According to our results, low preoperative nursing levels may lead to an increase in surgery cancellations. To the best of our knowledge, there is no scientific research about the phenomenon, but the association has been recognized.³⁹ There is previous evidence concerning the influence of low staffing levels on patient and staff-related outcomes.⁴⁰ Low staffing levels lead to a decrease in quality of care and may lead to an increase in mortality, infections, readmissions, hospital stays, probability of leaving the hospital undetected, and pressure ulcers. There may also be an effect on the survival of critically ill patients.⁴¹⁻⁴³

Our study provides information for nursing staff concerning reasons that lead to elective surgery cancellations. Cancellations can lead to wastage because they cause extra work for preoperative staff, harm to patients, and decrease the use of OR time. Cancellations may have a negative effect on

job satisfaction for staff, patients' experiences, and the hospital's financial budget. Our study results can be used for developing smooth and efficient preoperative processes as it provides knowledge for preventing unnecessary cancellations.

We recommend a systematic recording protocol for all surgery cancellations. Cancellations should be handled as process mistakes and organizational learning experiences to achieve an efficient, effective, safe, and high-quality perioperative process. Surgical patients should be carefully assessed, and a structured preoperative protocol should be followed. Scheduling and coordination of preoperative care should be centralized not only for high quality and patient-centered care but also for ensuring adequate resources and equipment availability. Patient participation in the scheduling process is also recommended. We measured cancellations from an organizational perspective, but for gathering a more thorough understanding of causes and costs, cancellations should be measured also from the patients' and economic point of views.

Limitations of the Study

We have identified several limitations in our study. Inductive data analyses were provided by an individual researcher, and results may be related to the local preoperative process; therefore, they are locally valid but are limited in the sense of generalization. The sample size was small as it was collected only during a 2-month period. Preoperative nurses recorded the data manually, and some

information about cancellations may have been missed, or deciphered or interpreted incorrectly.

Some surgical specialties provided ward care in combination with other units, for example, heart and thoracic, and vascular surgery patients were located in the same ward area, which may have caused confusion with the recording of patients under the correct specialty in cases of cancellation. It is also worth noting that children are sometimes taken care of in some other specialties outside the pediatric ward; for example, in ear, nose, and throat and ophthalmologic wards. Despite these limitations, the data provided valuable retrospective collected information about the root causes of elective surgery cancellations.

Conclusions

Surgery cancellations were typically found on the same day and 1, 3, and 14 days before surgery. Most cancellations have already occurred before the day of scheduled surgery. The main reasons for cancellations are related to the suitability of the patients' condition and organizational resources. Cancellations are more common with pediatric patients. Low staffing level may lead to a higher cancellation rate.

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