

Incidence, Reasons and Factors Associated With Day-of-Surgery Cancellations at a Secondary Care Hospital Perspective: A Retrospective Cross-Sectional Study

Amornrat Suttijanuwat¹, Ratikorn Anusornatanawat^{1*} 

¹ Department of Anesthesia, Chaophrayayommarat Hospital, Faculty of Medicine, Kasetsart University, Suphan Buri, Thailand

Abstract

Background: Day-of-surgery cancellations (DOSC) remain a global concern, with a pooled incidence of 18%, exceeding the recommended < 5% benchmark. In Thailand, reported hospital-specific DOSC rates vary widely, ranging from 2% to 18.7%. The evidence from regional secondary care centers is limited, as exemplified by Chaophrayayommarat Hospital (CYH) in Suphan Buri province.

Objectives: To investigate the incidence, reasons, and factors associated with DOSC at CYH.

Methods: This retrospective cross-sectional study was conducted. Data were obtained from 7115 scheduled elective surgical cases from 1 January 2025 to 30 June 2025. DOSC were classified into patient-related, surgeon-related, hospital/system-related and anesthesia-related factors. Variables available in the hospital database, including age, gender, weight, and surgical department, were evaluated for their association with DOSC using multivariable logistic regression analysis.

Results: DOSC incidence was 3.3% (95% CI, 3.0%-4.0%). Patient-related (51.9%) and surgeon-related (29.5%) factors were predominant. Of patients deemed ineligible for surgery, 20.6% were already in the operating room. Compared with General Surgery, higher adjusted odds ratios (aORs) of DOSC were observed in Medicine (50%; aOR, 22.61; 95% CI, 3.10-164.73; $P = .002$), Vascular Surgery (39.5%; aOR, 15.19; 95% CI, 7.38-31.23; $P < .001$), Neurosurgery (7.9%; aOR, 1.95; 95% CI, 1.09-3.50; $P = .02$), Plastic and Reconstructive Surgery (6.7%; aOR, 1.71; 95% CI, 0.84-3.48; $P = .14$), Orthopedic Surgery (6.3%; aOR, 1.56; 95% CI, 1.05-2.32; $P = .03$), and Pediatric Surgery (6.0%; aOR, 1.44; 95% CI, 0.60-3.49; $P = .42$).

Conclusions: Overall DOSC rate was below the recommended benchmark, variation across surgical departments persisted. Patient-related medical issues and surgeon-related factors predominated, with late identification of ineligible patients contributing to DOSC. Differences in DOSC occurrence were observed across surgical departments. Further prospective studies incorporating patient-level and system-level variables are needed to identify potentially modifiable predictors of DOSC.

Keywords: Day-of-surgery cancellations, Factors, Incidence, Secondary care hospital

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*Corresponding Author:
netanesth@hotmail.com

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Introduction

Day-of-surgery cancellations (DOSC), which refer to the cancellation of a scheduled surgical procedure on the actual day it was planned to be performed, remain a major

global concern. A systematic review and meta-analysis reported an average cancellation rate of 18% (95% CI, 16%-20%) of scheduled surgeries on the day of the operation.¹ This exceeded the recommended benchmark of under 5% for efficient surgical systems.^{1, 2} In low- and middle-income countries (LMICs), cancellation rates range from 20% to 40%, such as in Ethiopia and South Africa.^{2, 3} In contrast, India reports a rate of approximately 9.7%,⁴ while a university-affiliated hospital network in the US reported a rate of 8.7%.⁵

In Thailand, studies have reported varying rates of elective surgical case cancellations across different hospitals. At Srinagarind Hospital, a retrospective study in 2012⁶ reported a cancellation rate of 2.02%, with list overruns being the primary reason. Similarly, Songklanagarind Hospital observed a cancellation rate of 6.4%,⁷ while Ratchaburi Hospital reported a higher rate of 18.7%, mainly due to patient no-shows and scheduling conflicts.⁸ More recently, Chiang Rai Prachanukroh Hospital implemented a Preanesthesia Assessment Clinic (PAC), one of the key modifiable system-level interventions, which effectively reduced the DOSC rate to below 2%, demonstrating that such interventions could significantly minimize avoidable cancellations.⁹ Previous studies have shown that many DOSCs are potentially preventable. Systematic reviews have identified several modifiable risk factors, including inadequate patient preparation, deficiencies in preoperative evaluation (such as the absence of structured PAC assessment), organizational factors, and communication problems as common avoidable causes of cancellation.^{1, 2} In addition, patient-related modifiable risk factors, including poor optimization of comorbidities, have been associated with DOSC, hypertension has been reported as an independent factor associated with DOSC in a recent cohort study,³ while a higher American Society of Anesthesiologists (ASA) physical status has also been associated with an increased risk of DOSC.⁴ Withdrawing patients from elective surgery on the day of operation increased costs, reduced efficiency, doubled the workload, and wasted valuable resources. Such cancellations also resulted in underutilization of human and hospital resources, causing prolonged hospital stays and increasing patient care costs.³ In addition, DOSC was associated with negative emotional experiences among patients, including psychological distress and prolonged uncertainty.¹⁰ Studies published over the past 5 years have consistently reported that elective surgery cancellations can be categorized into patient-related, surgeon-related, hospital/system-related, and anesthesia-related factors.^{11, 12} Several reports have suggested that many cancellations may be preventable through improved preoperative assessment, patient preparation, scheduling practices, and resource management. However, the relative contribution of these factors may vary considerably across institutions depending on local patient characteristics, clinical workflows, and healthcare resources.

Although DOSC are acknowledged as a significant global issue, there remains a paucity of comprehensive data specific to Thailand, particularly within regional healthcare facilities such as Chaophrayayommarat Hospital (CYH) in Suphan Buri province. This institution is designated as a secondary care hospital, referring to healthcare facilities that provide specialized medical services beyond the scope of primary care but do not function as tertiary referral or academic centers. Furthermore, information regarding the distribution of DOSC causes and associated factors in secondary care hospitals remains limited.

This study aimed to investigate the incidence, reasons, and other factors associated with DOSC, both hospital-wide and by department, at CYH, Suphan Buri province. The findings may help identify patterns of surgical cancellations and provide information for future quality-improvement initiatives aimed at improving surgical efficiency and patient care within secondary care settings in Thailand.

Methods

Study Design, Setting, and Participants

A retrospective cross-sectional study was conducted at CYH, a secondary care hospital located in Suphan Buri province, in the central region of Thailand. According to 2024 statistics, the province had a population of 846 043.¹³ The hospital has 738 inpatient beds¹⁴ and 12 operating rooms serving 14 departments. The regular operating room hours are from 8:00 AM to 4:00 PM on weekdays, excluding public holidays.

A total of 7115 patients were scheduled for surgery according to the planned surgical timetable from 1 January 2025 to 30 June 2025. Data collection was performed after obtaining approval from the Research Ethics Committee of Chaophrayayommarat Hospital. The inclusion criterion was patients scheduled for elective surgery, whereas the exclusion criterion was patients scheduled for surgery beyond official working hours.

Interventions and Methods of Analysis

The data on patients scheduled for elective surgery (including those who underwent surgery as planned and those with DOSC) were retrieved from the HOSxP hospital information system and the official website of CYH. The study included both inpatient surgery and one day surgery (ODS) cases scheduled according to the official operating room timetable. Procedures performed under local anesthesia without the standard preoperative assessment pathway were excluded. The preoperative assessment system consisted of 2 approaches: 1) evaluation before hospital admission for patients with known or potential issues identified by the surgeon, coordinated through consultations with relevant specialties such as internal medicine and subspecialty departments, as well as for patients scheduled for minimally invasive surgery (MIS) or ODS. The PAC operated Monday through Friday during official working hours; and 2) evaluation after hospital admission, conducted one day prior to surgery by nurse anesthetists for cases scheduled before 3:00 PM. If any abnormalities were detected, they were reported to the anesthesiologist responsible for the surgical list on the following day. However, certain patients scheduled for surgery after 3:00 PM might have experienced clinical changes or abnormal laboratory results and did not undergo preanesthetic assessment by a nurse anesthetist. In such cases, the responsible surgeon could assess the patient and consult the on-call anesthesiologist for further evaluation and management.

At the scheduled time of surgery, operating room staff notified the ward to transfer patients following a brief general clinical assessment, primarily limited to basic vital signs such as blood pressure and heart rate. Under this workflow, DOSC could occur at 2 critical points: 1) before patient transfer to the operating room; and 2) after the patient had already been transferred, when surgery was cancelled due to late identification of clinical or system-related issues.

The variables available for analysis in the hospital database included age, weight, gender, and surgical department. Because of the retrospective nature of the study, several potentially important patient-level and system-level variables, including comorbidities, preoperative laboratory findings, PAC attendance, timing of assessment, and scheduling-related factors, were not consistently available for all patients and therefore could not be included in the analysis. In the subgroup analysis of patients with DOSC by department, additional variables were examined, including operating room presentation status, ASA physical status classification, and related causes, which were categorized into 4 groups: patient-related, surgeon-related, hospital/system-related, and anesthesia-related factors.

Statistical Analysis

The primary outcome was the incidence of DOSC. All eligible patients scheduled for elective surgery during the study period (including those who underwent surgery as planned and those with DOSC) were included by retrieving data from the HOSxP hospital information system and the official website of CYH.

Continuous variables, including age and weight, were presented as mean (SD) for normally distributed data and compared between the 2 groups using independent-samples *t* tests. Categorical variables available for the entire study population, including gender and surgical department, were presented as frequency and percentage and compared between patients with and without DOSC using the chi-square test or Fisher exact test, as appropriate. Variables available only among patients with DOSC, including ASA physical status, operating room presentation status, and causes of cancellation, were analyzed descriptively.

Univariate analyses were performed to evaluate the association between each independent variable and the primary binary outcome (DOSC: yes/no). Variables with a *P* value < .20 in the univariate analysis, no multicollinearity (ie, no strong correlation among independent variables), or deemed clinical relevance were entered into the multivariable logistic regression model using the enter method. Gender was retained as demographic covariates for adjustment purposes despite not meeting the univariable screening criterion. Adjusted odds ratios (ORs) with 95% CIs were reported. Missing data were not imputed. Available data were analyzed using a complete-case approach for each variable. The data were analyzed using the SPSS, version 22.0 (IBM Corp). A *P* value < .05 was considered to indicate a statistically significant difference.

Results

Total sample collection was performed by retrieving all patients scheduled for elective surgery during the study period (including those who underwent surgery as planned and those with DOSC) from the HOSxP hospital information system and the official website of CYH. The overall incidence of DOSC was 3.3% (95% CI, 3.0%-4.0%), with 237 cases out of 7115 patients. Baseline characteristics and demographic data were presented. There were no statistically significant differences in any of the variables between the 2 groups. The departments with the highest incidence of DOSC were Orthopedic Surgery (65 cases, 27.4%) and General Surgery (43 cases, 18.1%) (Table 1).

Data on DOSC were analyzed both hospital-wide and stratified by department, and included information on operating room presentation status (Presented at operating room: yes/no), ASA physical status classification (I-IV), and related causes categorized as patient-related, surgeon-related, hospital/system-related, and anesthesia-related factors. Among departments with a DOSC incidence exceeding 5%, the 6 with the highest rates were Medicine (50%), the 'Medicine' department here referred to cases where the patient was admitted to the Internal Medicine ward (and remained there for postoperative care), pending consultation and eventual elective surgery. Vascular Surgery (39.5%), Neurosurgery (7.9%), Plastic and Reconstructive Surgery (6.7%), Orthopedic Surgery (6.3%), and Pediatric Surgery (6.0%). When patient ineligibility for surgery was identified in the ward prior to transfer to the operating room, 20.6% of patients had already been transferred. Patient-related (51.9%) and surgeon-related (29.5%) factors were the most frequent causes, collectively accounting for the majority of DOSC cases. The majority of patients with DOSC

were classified as ASA physical status III (49.8%). Missing data were not imputed because of the retrospective nature of the study; available data were analyzed using a complete-case approach for each variable (Table 2).

Table 1. Baseline Characteristics and Demographic Data

Variable	No. (%)		P Value
	Non DOSC (n = 6878)	DOSC (n = 237)	
Age, mean (SD), y	56.1 (19.7)	54.5 (21.5)	.28 ^a
Weight, mean (SD), kg	64.7 (16.7)	62.3 (19.4)	.67 ^a
Gender			
Total, No.	6766	237	.28 ^b
Male	2778 (41.1)	106 (44.7)	NA
Female	3988 (58.9)	131 (55.3)	NA
Missing data, No.	112	0	NA
Department			
Total, No.	6872	237	NA
General surgery	980 (14.3)	43 (18.1)	NA
Neurosurgery	199 (2.9)	17 (7.2)	NA
Obstetric and surgery	492 (7.2)	10 (4.2)	NA
Gynecologic	402 (5.8)	15 (6.3)	NA
Orthopedic surgery	974 (14.2)	65 (27.4)	NA
Urological surgery	611 (8.9)	12 (5.1)	NA
Pediatric surgery	94 (1.4)	6 (2.5)	NA
Vascular surgery	23 (0.3)	15 (6.3)	NA
Plastic and reconstructive surgery	139 (2.0)	10 (4.2)	NA
ENT surgery	488 (7.1)	12 (5.1)	NA
Eye surgery	2090 (30.4)	19 (8.0)	NA
Cardiothoracic surgery	322 (4.7)	10 (4.2)	NA
Maxillofacial surgery	56 (0.8)	1 (0.4)	NA
Medicine	2 (0.03)	2 (0.8)	NA
Missing data, No.	6	0	NA

Abbreviations: DOSC, day-of-surgery cancellations; ENT, ear, nose, and throat; NA, not applicable.

^a Independent sample *t* test.

^b Chi-square test.

Table 2. Subgroup Analysis by Departments

Variable	No. (%)														
	Overall (n = 7115)	General Surgery (n = 1023)	Neurosurgery (n = 216)	Obstetric and Surgery (n = 502)	Gynecologic (n = 417)	Orthopedic Surgery (n = 1039)	Urological Surgery (n = 623)	Pediatric Surgery (n = 100)	Vascular Surgery (n = 38)	Plastic and Reconstructive Surgery (n = 149)	ENT Surgery (n = 500)	Eye Surgery (n = 2109)	Cardiothoracic Surgery (n = 332)	Maxillofacial Surgery (n = 57)	Medicine (n = 4)
DOSC	237 (3.3)	43 (4.2)	17 (7.9)	10 (2.0)	15 (3.6)	65 (6.3)	12 (1.9)	6 (6.0)	15 (39.5)	10 (6.7)	12 (2.4)	19 (0.9)	10 (3.0)	1 (1.8)	2 (50.0)
Presented at operating room															
Yes	46 (20.6)	12 (28.6)	3 (17.6)	3 (30.0)	2 (14.3)	8 (12.9)	2 (16.7)	2 (40.0)	2 (16.7)	2 (20.0)	3 (25.0)	7 (43.8)	0	0	0
No	177 (79.4)	30 (71.4)	14 (82.4)	7 (70.0)	12 (85.7)	54 (87.1)	10 (83.3)	3 (60.0)	10 (83.3)	8 (80.0)	9 (75.0)	9 (56.3)	9 (100.0)	1 (100.0)	1 (100.0)
Missing data, No.	14	1	0	0	1	3	0	1	3	0	0	3	1	0	1
ASA															
I	33 (13.9)	4 (9.3)	0	1 (10.0)	6 (40.0)	10 (15.4)	0	4 (66.7)	0	3 (30.0)	2 (16.7)	1 (5.3)	1 (10.0)	0	0
II	51 (21.5)	8 (18.6)	5 (29.4)	8 (80.0)	2 (13.3)	11 (16.9)	3 (25.0)	1 (16.7)	1 (6.7)	3 (40.0)	1 (8.3)	9 (47.4)	0	0	0
III	118 (49.8)	23 (53.5)	8 (47.1)	1 (10.0)	7 (46.7)	37 (56.9)	6 (50.0)	1 (16.7)	11 (73.3)	4 (40.0)	5 (41.7)	7 (36.8)	7 (70.0)	1 (100.0)	0
IV	35 (14.8)	8 (18.6)	4 (23.5)	0	0	7 (10.8)	3 (25.0)	0	3 (20.0)	0	4 (33.3)	2 (10.5)	2 (20.0)	0	2 (100.0)
Causes															
Patient-related	93 (39.2)	12 (27.9)	5 (29.4)	8 (80.0)	5 (33.3)	15 (23.1)	5 (41.7)	6 (100.0)	8 (53.3)	4 (40.0)	5 (41.7)	14 (73.7)	3 (30.0)	1 (100.0)	2 (100.0)
Surgeon-related	71 (30.0)	11 (25.6)	9 (52.9)	2 (20.0)	7 (46.7)	25 (38.5)	4 (33.3)	0	5 (33.3)	3 (30.0)	1 (8.3)	0	4 (40.0)	0	0
Hospital/ system-related	33 (13.9)	10 (23.3)	2 (11.8)	0	0	16 (24.6)	1 (8.3)	0	0	1 (10.0)	1 (8.3)	0	2 (20.0)	0	0
Anesthesia-related	40 (16.9)	10 (23.3)	1 (5.9)	0	3 (20.0)	9 (13.8)	2 (16.7)	0	2 (13.3)	2 (20.0)	5 (41.7)	5 (26.3)	1 (10.0)	0	0

Abbreviations: ASA, American Society of Anesthesiologists; DOSC, day-of-surgery cancellations; ENT, ear, nose, and throat.

The causes of DOSC categorized into patient-related, surgeon-related, hospital/system-related, and anesthesia-related factors were summarized (Table 3). Patient-related (51.9%) and surgeon-related (29.5%) factors were the 2 most frequent categories. Among patient-related causes, approximately 51.9% were attributable to acute medical conditions rendering the patient unfit for surgery, including upper respiratory tract infections, pneumonia, tuberculosis, urinary tract infections, fever, dyspnea with ascites, rhonchi in both lungs, uncontrolled hypertension, seizure, cough, vomiting, diarrhea, allergies to anesthetic agents, COVID-19 infection, and other acute clinical conditions. The remaining 30% of patient-related cancellations were due to patient refusal, resolved indications for surgery, failure to discontinue antiplatelet therapy such as aspirin, inability to properly drape the patient, and no resuscitation status.

Among surgeon-related causes, the predominant factor was previous surgery overrunning, accounting for 61 cases (87.1%). Less frequent contributors included wrong-day surgery scheduling (2 cases, 2.9%), presence of visiting personnel (2 cases, 2.9%), surgery already performed (2 cases, 2.9%), and surgeon occupied with an emergency case (2 cases, 2.9%). Repeat investigations accounted for one case (1.4%).

Awaiting consultation was classified as an anesthesia-related factor when the consultation was requested as part of the preoperative anesthesia evaluation process for assessment of anesthetic fitness or perioperative optimization.

Table 3. Subgroup Analysis of Related Causes of Day-of-Surgery Cancellations

Variable	No. (%) (n = 237)
Patient-related	123 (51.9)
Unknown	2 (1.6)
Upper respiratory tract infection	6 (4.9)
Refusal	17 (13.8)
Pneumonia	1 (0.8)
No npo	7 (5.7)
Active TB infection	1 (0.8)
Urinary tract infection	1 (0.8)
No indication for surgery	12 (9.8)
Fever	13 (10.6)
Dyspnea with ascites	4 (3.3)
Rhonchi both lung	1 (0.8)
No show	1 (0.8)
High blood pressure	5 (4.1)
Cough	4 (3.3)
Blood pressure drop	3 (2.4)
Vomiting	1 (0.8)
Diarrhea	2 (1.6)
Allergy to local anesthetic agent	1 (0.8)
Noncompliance with aspirin discontinuation instructions	3 (2.4)
COVID-19 infection	1 (0.8)
Patient refusal/intolerance of facial surgical draping (eg, anxiety or claustrophobic symptoms) during cataract surgery	3 (2.4)

Table 3. Subgroup Analysis of Related Causes of Day-of-Surgery Cancellations (Continued)

Variable	No. (%) (n = 237)
Seizure	1 (0.8)
Air hunger	2 (1.6)
Hiccup	1 (0.8)
Eyelid infection	1 (0.8)
No resuscitation	1 (0.8)
Abnormal laboratory results	26 (21.1)
Abnormal ECG	2 (1.6)
Surgeon-related	70 (29.5)
Wrong-day surgery scheduling	2 (2.9)
Repeat investigation	1 (1.4)
Previous surgery overrunning	61 (87.1)
Surgeon occupied with visitors	2 (2.9)
Surgery already performed	2 (2.9)
Surgeon occupied with emergency case	2 (2.9)
Hospital/system-related	33 (13.9)
Limited operating room availability	29 (87.9)
Earthquake	2 (6.1)
Equipment unavailability	1 (3.0)
Intensive care unit bed shortage	1 (3.0)
Anesthesia-related	11 (4.6)
Awaiting consultation medicine	6 (54.5)
Awaiting consultation with ENT	1 (9.1)
Awaiting consultation with cardiology (CVT)	1 (9.1)
Awaiting consultation with pathology	1 (9.1)
Awaiting consultation with dentistry	2 (18.2)

Abbreviations: CVT, cardiovascular and thoracic; ECG, electrocardiogram; ENT, ear, nose, and throat; npo, nothing per oral.

Factors associated with DOSC were presented. Variables available for the entire study population, including age, weight, gender, and surgical department, were explored using univariable logistic regression. Clinically relevant demographic variables were considered for inclusion in the multivariable model regardless of univariable statistical significance. The results were presented as adjusted ORs with 95% CIs and *P* values. Among departments with an adjusted OR greater than one, the General Surgery Department was used as the reference. The observed DOSC percentages exceeding 5% were consistent with the accepted threshold. Departments with DOSC rates above 5%, listed in descending order, were Medicine (50%), Vascular Surgery (39.5%), Neurosurgery (7.9%), Plastic and Reconstructive Surgery (6.7%), Orthopedic Surgery (6.3%), and Pediatric Surgery (6.0%). Because several departments had a limited number of patients, particularly Medicine and Vascular Surgery, the estimated ORs should be interpreted cautiously due to possible instability and wide confidence intervals (Table 4).

Table 4. Exploratory Analysis of Factors Associated With Day-of-Surgery Cancellations

Variable	Crude OR	95% CI	P Value	Adjusted OR	95% CI	P Value
Age	0.99	0.99-1.00	.25	NA	NA	NA
Weight	0.99	0.99-1.00	.62	NA	NA	NA
Gender						
Male	1 [Reference]	NA	NA	NA	NA	NA
Female	0.86	0.66-1.12	.26	0.83	0.62-1.10	.19
Department						
General surgery	1 [Reference]	NA	NA	NA	NA	NA
Neurosurgery	1.95	1.09-3.48	.03	1.95	1.09-3.50	.02
Obstetric and gynecologic surgery	0.46	0.23-0.93	.03	0.51	0.25-1.05	.07
Gynecologic	0.85	0.47-1.55	.60	0.94	0.51-1.74	.84
Orthopedic Surgery	1.52	1.02-2.26	.04	1.56	1.05-2.32	.03
Urological Surgery	0.49	0.23-0.86	.02	0.43	0.23-0.83	.01
Pediatric Surgery	1.46	0.60-3.51	.40	1.44	0.60-3.49	.42
Vascular Surgery	14.86	7.25-30.49	< .001	15.19	7.38-31.23	< .001
Plastic and Reconstructive Surgery	1.64	0.81-3.34	.17	1.71	0.84-3.48	.14
ENT surgery	0.56	0.29-1.07	.08	0.57	0.30-1.09	.09
Eye surgery	0.21	0.12-0.36	< .001	0.21	0.12-0.37	< .001
Cardiothoracic surgery	0.71	0.35-1.43	.33	0.71	0.35-1.43	.34
Maxillofacial surgery	0.41	0.06-3.01	.38	0.40	0.05-2.94	.37
Medicine	22.79	3.14-165.66	.002	22.61	3.10-164.73	.002

Abbreviations: ENT, ear, nose, and throat; NA, not applicable; OR, odds ratio.

Discussion

This study evaluated DOSC at CYH, a secondary care facility in Suphan Buri province, Thailand, with 12 operating rooms serving 14 departments. Among 7115 scheduled elective surgeries in the first half of 2025, the overall DOSC rate was 3.3% (95% CI, 3.0%-4.0%), considerably lower than the approximately 18% global prevalence reported in a systematic review and meta-analysis from 2010 to 2020¹ and below the recommended benchmark of 5%. The relatively low DOSC rate observed in this study may reflect differences in institutional workflows, healthcare resources, and preoperative assessment practices compared with other settings. However, the effectiveness of the preoperative assessment system could not be directly evaluated because data regarding preoperative anesthetic visits and consultation processes were not consistently available in the retrospective database. This discrepancy also might be attributed to differences in healthcare settings, resource availability, and preoperative assessment protocols. The CYH preoperative system relied on a dual approach: 1) evaluation before hospital admission for high-risk, MIS, or ODS patients, and 2) evaluation after hospital admission by nurse anesthetists one day prior to surgery. However, due to the retrospective nature of this study, detailed patient-level and system-level variables related to modifiable risk factors were not consistently available and could not be evaluated as independent predictors. Therefore, the findings should be interpreted primarily as describing the incidence, distribution, and reasons of DOSC within this secondary care setting.

These findings indicated that patient-related factors (51.9% and surgeon-related factors (29.5%) were the primary drivers of cancellations, accounting for the majority of all disrupted cases. This pattern was consistent with previous findings by Desta et al,¹⁵ who reported similar trends in a tertiary referral hospital in Ethiopia. Among patient-related causes, the most common were changes in clinical condition — such as uncontrolled hypertension, acute infection, or other medical illnesses — rendering patients unfit for surgery on the scheduled day. Ayalew et al³ also reported comparable causes in South Ethiopian hospitals. Some patient-related cancellations may have been potentially preventable through earlier identification and optimization, whereas others, such as acute illness developing close to the operative date, may not have been avoidable. However, this classification could not be formally performed because the database did not contain sufficient information regarding the timing of clinical deterioration or previous assessment findings.

Critically, the hospital's current assessment structure contains inherent vulnerabilities. The 2 points of cancellation (before transfer and after transfer to the operating room) highlight where these issues manifest. The fact that 20.6% of patients deemed ineligible for surgery had already been transferred to the operating room underscores a system failure in late-stage risk identification. This finding suggests that strengthening preoperative assessment processes and communication pathways may reduce late cancellation; however, the current study was unable to determine whether PAC attendance, timing of assessment, or specific workflow factors independently influenced DOSC because these variables were not available for all scheduled patients.

Improving the systems for checking patients' medical problems and performing preoperative evaluations can reduce the number of cancellations after the patient has entered the operating room.¹⁶ One possible explanation for late-stage cancellations may be structural limitations within the existing preoperative assessment process. However, because information regarding PAC attendance, preoperative anesthetic nursing visits, and consultations by on-call anesthesiologists was not consistently available, the relationship between these factors and DOSC could not be formally evaluated in the present study. One limitation of this study is the incomplete availability of data regarding preoperative anesthetic visits. Specifically, the percentage of patients who received a preoperative anesthetic evaluation was not recorded in the database. Future prospective studies incorporating ASA status, comorbidities, preoperative laboratory abnormalities, PAC attendance, scheduling characteristics, and other system-level variables may facilitate the development of more robust multivariable models capable of identifying potentially modifiable predictors of DOSC.

Consequently, late-stage reporting increased the risk that evolving clinical conditions or abnormal laboratory findings were overlooked, ultimately necessitating cancellation after the patient had already entered the high-cost, high-emotion operating room environment. Recent studies have further reinforced that improving surgical team awareness and strengthening communication with patients regarding medical readiness were critical for reducing cancellations occurring after patients were awaiting surgery in the ward or had been transferred to the operating room.¹¹ These findings highlighted the necessity of optimized and robust PACs, which had been shown to effectively reduce surgical cancellation rates by proactively identifying and addressing underlying medical issues.¹⁷

Among surgeon-related causes, the predominant factor was previous surgery overrunning, accounting for 61 cases (87.1%). This delay commonly occurred because the surgical schedule contained too many cases for a single day (overscheduling) or because

earlier procedures were more complex and time-consuming than anticipated, resulting in subsequent cases being delayed. However, detailed information regarding scheduled operative time, actual operative duration of preceding cases, surgical list position, and surgeon workload was not available in this retrospective dataset. Therefore, these potential contributors could not be quantitatively evaluated. Less frequent contributors included wrong-day surgery scheduling (2.9%), the presence of visiting personnel (2.9%), surgery already performed (2.9%), and the surgeon being occupied with an emergency case (2.9%). The persistent contribution of surgeon-related causes often reflected systemic resource constraints, such as limited operating room time due to the primary issue of overrunning lists. Studies confirmed that operative delay and list overrunning were significant administrative/structural factors contributing to cancellations.¹⁸ Implementing effective administrative and management strategies — such as improved bed utilization and more accurate surgical scheduling — might help mitigate these causes, thereby enhancing operational efficiency and strengthening patient trust in the healthcare delivery system.¹⁹

An association was observed between surgical department and DOSC occurrence; however, department should be interpreted as a structural characteristic rather than a modifiable risk factor. Differences among departments may reflect variations in patient complexity, case type, workflow, and resource requirements. The highest observed DOSC proportions were found in Medicine (50.0%) and Vascular Surgery (39.5%). However, these findings should be interpreted cautiously because the number of scheduled cases in these departments was relatively small. The higher cancellation proportions may reflect the complexity and clinical characteristics of patients managed in these specialties; nevertheless, patient-level factors such as comorbidities, laboratory abnormalities, preoperative optimization status, and preoperative anesthetic assessment variables were not available for the entire cohort and could not be evaluated. Therefore, although differences in DOSC rates were observed across departments, the present study could not determine which underlying patient-level or system-level factors contributed to these differences.

Furthermore, several other major surgical specialties reported DOSC rates exceeding the accepted threshold of 5%,¹⁸ indicating significant operational challenges across the institution. Specialties such as Neurosurgery (7.9%), Plastic and Reconstructive Surgery (6.7%), Orthopedic Surgery (6.3%), and Pediatric Surgery (6.0%) also demonstrated DOSC rates above the commonly cited 5% benchmark. While lower than the high-acuity departments, these rates pointed toward issues that were often managerial or process-related, such as equipment unavailability, inadequate preoperative documentation, or insufficient operating room time.¹⁵ These findings highlight potential areas for future quality improvement, including strengthening preoperative assessment pathways, improving communication between surgical and anesthesia teams, and optimizing scheduling practices. Previous studies have suggested that structured preoperative anaesthesia assessment clinics may improve perioperative preparation and reduce avoidable cancellations.¹⁷ In addition, addressing operational factors such as scheduling processes and resource allocation may help improve operating room efficiency and decrease same-day cancellation rates.¹⁸ However, further prospective studies are required to evaluate which modifiable factors contribute most strongly to DOSC risk and whether these interventions are effective in different healthcare settings. These potential strategies should be interpreted as hypotheses for quality improvement rather than conclusions directly supported by the present study. Reducing avoidable cancellations may help decrease resource waste and lessen the

emotional and psychological burden experienced by patients whose surgeries are cancelled. DOSC could be conceptualized as a “butterfly effect”, whereby an initial disruptive event precipitated a cascade of both anticipated and unanticipated consequences. Following cancellation, patients commonly experienced emotional distress, frustration, and reduced psychological resilience. Timely, empathic communication and transparent information at the point of cancellation were therefore critical to lessen psychological harm. Moreover, prolonged uncertainty related to rescheduling often left patients in a state of limbo, disrupted personal and occupational planning, and potentially eroded trust in the healthcare system.¹⁰

The timing of cancellation relative to the scheduled operation was not available in the current database. Therefore, this study could not determine whether cancellations occurred several hours before surgery or immediately before the scheduled time. Future studies should incorporate the timing of cancellation to better evaluate operational delays and preventable cancellations.

Strengths and Limitations

This study has several strengths. It included all elective surgical cases scheduled during the study period and provided contemporary data regarding DOSC across multiple surgical specialties in a secondary care hospital setting. The findings contribute additional information from a healthcare setting that has been underrepresented in the existing literature.

Several limitations should also be acknowledged. First, the retrospective design limited the availability of potentially important patient-level and system-level variables, including comorbidities, preoperative laboratory findings, PAC attendance, timing of preoperative assessment, scheduling characteristics, and consultations by on-call anesthesiologists. Second, data regarding the exact timing of cancellation were not available. Third, several department-specific analyses involved small sample sizes and should therefore be interpreted with caution. Finally, the study was conducted at a single center, which may limit the generalizability of the findings to other healthcare settings.

Conclusions

Although the overall DOSC rate at CYH was below the recommended benchmark, clinically and operationally significant variation existed across departments. Patient-related medical instability and surgeon-related factors were the leading causes, with delayed identification of surgical ineligibility contributing to late-stage cancellations. Department type was associated with DOSC, particularly in high-risk services. Strengthening preoperative assessment pathways and optimizing workflow and scheduling processes may represent potential targets for future quality-improvement initiatives. However, further prospective studies are required to identify which modifiable factors contribute most strongly to DOSC and to evaluate the effectiveness of such interventions.

Additional Information

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Author Contributions:

Conceptualization: Amornrat Suttijanuwat

Formal Analysis: All authors

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Visualization: Amornrat Suttijanuwat

Writing – Original Draft: Amornrat Suttijanuwat

Writing – Review & Editing: Ratikorn Anusornthanawat

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