






# The Rate and Causes of Elective Surgeries Cancellation: A Report From the North of Iran

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## Abstract

**Objectives:** Day of surgery (DOS) cancellation is an unfortunate situation that affects both patients and hospitals. Cancellation of elective surgeries as a strong indicator for evaluating the management efficacy and quality of care offered by hospital services is associated with several unfavorable consequences. The present study aimed at investigating the rate and causes of elective surgery cancellation in an academic referral hospital.

**Materials and Methods:** This descriptive study was performed at Al-Zahra hospital, an academic center in the North of Iran, during 2018-2019. All scheduled cases for elective surgeries were prospectively enrolled in this study. Then, complete data were collected and recorded from DOS canceled cases, including the type of surgery, age, ASA class, and the reason for cancellation.

**Results:** In general, 82 elective surgeries were canceled (3.3%) during the mentioned period. Among them, hysterectomy was the most canceled one (51.2%) and the lack of intensive care unit (ICU) beds (22%) and the patient's clinical status changes (20.7%) significantly above 60 ( $P=0.011$ ) and ASA class III ( $P=0.001$ ) were the main causes in this regard.

**Conclusions:** To improve operating room (OR) efficiency, great attempts should be made to eliminate the number of DOS cancellations through short intervals between preoperative visits and DOS, and to expand the ICU ward.

**Keywords:** Academic hospital, Elective surgery, Cancellation

## Introduction

Operating rooms (ORs) are considered as the main cost center while generating the largest income source for the hospital (1). Accordingly, managing this part of the hospital is crucial, and the day of surgery (DOS) cancellation is one of the main causes of decreasing the efficiency of OR (2). To prepare a patient for operation, a large amount of work should be undertaken, including holding preoperative consultations, checking the correct surgical instruments, and preparing the ward for the required pre- and post-operation care. Obviously, the patient, physicians, and secretarial and OR staff are involved in this process (3,4). Therefore, DOS cancellation leads to wasting the efficient time of OR, economic impact, and a financial burden (5-7). Moreover, prolonged waiting time might lead to deterioration of patients' conditions, emotional distress, and less trust and confidence in the hospital. Some studies have shown a variety of reasons for DOS cancellation, including listing too many patients for operation not proportional to the operating time, unplanned emergency surgeries (5,8-11), the patient's non-attendance, changes in patients' conditions to an unfavorable status, incomplete preparation before the surgery, and not prepared equipment (12-14). Therefore, reducing the rate of DOS cancellation must be one of the

main goals of each hospital. Surely, hospitals are different regarding the served population, personal experiences, provided services, and the work culture of the healthcare system. Obviously, the management of a public, tertiary hospital with complex cases is different from a local, private center. Therefore, to find the best practical strategies, each hospital should search for being aware of its unique profile. Our hospital is a referral, educational center for all types of obstetric surgeries. Thus, understanding the rate and the reasons for DOS cancellation in this center as the aim of this research is worth undergoing investigation.

## Materials and Methods

This descriptive single-center study was conducted at Al-Zahra hospital, affiliated to Guilan University of Medical Sciences (GUMS) during 2018-2019. Approximately 3500 elective surgeries including all types of obstetric operations are annually performed in this academic and referral center. In our hospital, all canceled cases with the reasons for cancellation were documented by the head nurse and then reported to the nursing office at the end of the OR time.

During the study period, all scheduled surgeries, which were not performed on the DOS, were documented at the end of OR time. A responsible medical student filled

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## Key Messages

- ▶ Wasting the efficient time of OR, financial burden, emotional distress for patients are some results of day of surgery cancellation.
- ▶ Restricting the intervals between preoperative visits and the day of surgery, increasing the ICU beds and determination of listed surgery cases based on the exact available time of OR are some solutions for the problem.

out a questionnaire including data on the type of surgery, patients' age, American Society of Anesthesiologists (ASA) class, and the cause of the cancellation.

### Statistical Analysis

SPSS 21 was used to analyze the obtained data. Categorical variables were presented as frequencies and percentages. Fisher's exact test was used, and  $P$  value  $\leq 0.05$  was considered statistically significant.

### Results

Overall, 82 cases were canceled (3.3%) during the study period. Patients were in the age range of 15-83 years. Among them, hysterectomy was the most canceled one (51.2%), and the lack of ICU beds (22%) and patient's clinical status changes (20.7%) significantly above 60 ( $P=0.011$ ) and in ASA class III individuals ( $P=0.001$ ) were the main causes.

Data on the DOS cancellation status are presented in Table 1. Table 2 provides the relationship between the DOS cancellation causes and the patients' conditions.

### Discussion

Previous research demonstrated that a feeling of insecurity due to DOS cancellation results in a number of unwanted consequences (8). The problem is much more highlighted in academic and governmental hospitals, where residents of different fields of medicine are being trained, and their teaching process would be affected by case cancellation. Moreover, lower-income people suffer the most from long waiting lists because they are dependent on governmental centers for their health care needs. Given the importance of the issue, a growing body of literature has focused on the topic with no general agreement on an accepted cancellation rate (8,10,11,15,16). The results of this study revealed a DOS cancellation rate of 3.3%, and the main causes were the lack of ICU beds and patients' clinical status changes. Nearly more than half of our canceled surgeries were hysterectomy, followed by dilatation and curettage. Canceled cases were significantly related to age above 60 and higher ASA classes. This rate might be acceptable considering the nature of our hospital as a referral center with a high rate of emergency surgeries that unexpectedly fill the ICU beds as the main cause of cancellations. However, the current status could be improved by some considerations. For example, a number of hysterectomy cases were canceled on the DOS due to

**Table 1.** The Day of Surgery Cancellation Status Regarding Age, ASA Class, Type of Surgery, and Cancellation Causes

	Cancellation, Number (%)
Age (25-84 years)	
<40	16 (19.5%)
41-60	41 (50%)
>60	25 (30.5%)
ASA class	
I	32 (39%)
II	35 (42.7%)
III	15 (18.3%)
Type of surgery	
Hysterectomy	42 (51.2%)
Dilatation and curettage	20 (24.4%)
Laparoscopy	9 (11%)
Hysteroscopy	6 (7.3%)
Myomectomy	5 (6.1%)
The causes of cancellation	
The lack of ICU beds	18 (22%)
Patients clinical status changes	17 (20.7)
Not prepared test results	9 (11%)
Patient dissuasion	8 (9.8%)
Not appropriate timing of operating room	8 (9.8%)
Patient non-attendance	7 (8.5%)
Lack of the required equipment	5 (6.1%)
Surgeon non-attendance	4 (4.9%)
Lack of preoperative visits	2 (2.4%)
Other causes	4 (4.9%)

Note. ASA: American Society of Anesthesiologists; ICU: Intensive care unit.

high-risk conditions and changing surgical planning to medical therapy. The mentioned findings emphasize that special attention should be paid to older patients with comorbidities in preoperative visits and proper decision-making before being listed for operation. The interval between preoperative visits and DOS must be optimum and the ICU ward should be expanded as well. According to the main causes of cancellation, other studies have also suggested different approaches. For example, Gonzalez et al reported a cancellation rate of 6.9% in a public general hospital in Spain. The major reasons for cancellation were insufficient OR time and overbooking theater lists, and then patient non-attendance (20%) and medical reasons (3%) were the other related causes, respectively (12). Several studies support that the exact pre-assessment of patients by specialists eliminates the cancellation rate. It is believed that patients having shorter intervals between preoperative visits and DOS have fewer cancellation rates. Some studies recommend that an interval of 2-4 weeks is more suitable and has finer outcomes compared to longer intervals. They declare that patient health conditions may change during a long interval, and shorter intervals have the problem of insufficient time for exact medical evaluations and required consultations. When a long interval is not avoidable, a second visit should be considered for patients with co-morbidities (17). According to evidence, miscommunication leads to patients' doubt and refusal to attend the DOS. Indeed, patients will know what is going

**Table 2.** The Relationship Between Age and ASA Class With Cancellation Causes

Cancellation Causes	Age			ASA Class		
	<40	40-60	>60	I	II	III
Surgeon not-attendance	2 (12.5)	2 (4.9)	0 (0)	2 (6.2)	2 (5.7)	0 (0)
Patient not-attendance	2 (12.5)	5 (12.2)	0 (0)	5 (15.6)	1 (2.9)	1 (6.7)
Patient dissuasion	2 (12.5)	5 (12.2)	1 (4)	6 (18.8)	1 (2.9)	1 (6.7)
The lack of ICU beds	0 (0)	7 (17.1)	11 (44)	0 (0)	11 (31.4)	7 (46.7)
Patient clinical status changes	5 (31.2)	5 (12.2)	7 (28)	7 (21.9)	6 (17.1)	4 (26/7)
Lack of preoperative visit	0 (0)	2 (4.9)	0 (0)	2 (6.2)	0 (0)	0 (0)
Not prepared tests results	0 (0)	6 (14.6)	3 (12)	2 (6.2)	7 (20)	0 (0)
Inappropriate time setting for surgeries	3 (18.8)	4 (9.8)	1 (4)	4 (12.5)	4 (11.4)	0 (0)
Lack of the required equipment	1 (6.2)	4 (9.8)	0 (0)	3 (9.4)	2 (5.7)	0 (0)
Other causes	1 (6.2)	1 (2.4)	2 (8)	1 (3.1)	1 (2.9)	2 (13.3)
		<i>P</i> =0.011			<i>P</i> =0.001	

Note. ASA: American Society of Anesthesiologists; ICU: Intensive care unit.

to happen with more clear dialogue, thus they feel more confident, resulting in less frequent last-minute patients' dissuasion. In another research, Hovlid et al suggested that as a rule, patients themselves could select the day of operation. In addition, the hospital called the patients two days before the surgery and confirmed the time with them and then gave them the opportunity to ask a question and receive support from the hospital continuity plan. They reported a great improvement in patient satisfaction and less cancellation rate (11). Similarly, Turunen et al found that structured preoperative protocol resulted in a cancellation rate decrease (6). Likewise, Meghan et al conducted a study at a tertiary hospital in Malawi and reported 44.2% DOS cancellation. They indicated infrastructural limitation (84.8%) such as equipment shortage as the most common cause (18), as well as the lack of enough anesthesia machines and complete dependency on foreign aids. In contrast, patient-related factors were the main cause of DOS cancellation in the UK (17). A similar study in a Brazilian public hospital showed a 6.79% rate of cancellation, and non-clinical reasons were most common in this regard (5). In their study, Kaddoum et al evaluated the rate and causes of DOS cancellation in a territory academic center. They reported a rate of DOS cancellation as 4.4% and stated that 82.4% of the canceled cases could be avoidable. They further indicated inadequate pre-operation assessment and the lack of financial clearance as the main causes (9). It should be noted that preparing the OR list by junior surgeons, who are not well familiar with the duration and the need for workup of the procedures, might be one of the factors leading to the lack of sufficient OR time and unexpected cancellation (12). Moreover, surgeons tend to add more cases to the list to eliminate the huge waiting lists. In addition to scheduling errors, proper length of anesthesia and a rapid recovery leading to a shorter interval between two operations are the other influencing factors in this respect. Accordingly, choosing regional anesthesia techniques, instead of general anesthesia, if possible, will save OR time because induction of the new patient would be possible while the previous one is still in the

OR (12). Generally, both surgeon and anesthesiologist's skills and experiences are important for performing the booked list in the expected time. That is why studies indicate that educational and academic hospitals have greater cancellation rates. Caesar et al also reported a high cancellation rate as 39% from an academic hospital of orthopedic procedures (3,8). In academic centers, the majority of procedures are performed by residents under the specialist's supervision. Therefore, managing the OR list will be challenging because the teaching process must be performed well while facing a huge waiting list in these public centers. As discussed above, no service acts quite perfect, and a wide range of cancellation is found in the current literature. It should be considered that while some of the causes (i.e., emergency surgeries and uneventful conditions during surgery) are generally out of control in the case of the death of a patient or the occurrence of a new disorder, approximately 80% of the causes of DOS cancellation are preventable (3). Accordingly, conducting similar studies in other centers is strongly recommended due to the importance of the issue.

### Limitations

In the present study, cancellation rates were defined and restricted on those operations that were canceled just on the DOS. Definitely, a higher rate would be achieved if other canceled surgeries on the day before operation, were also considered. Thus, it is impossible to compare the data between centers due to the lack of a standard definition of cancellation.

### Conclusions

According to the main causes of cancellation and related factors, some actions are strongly recommended, including paying special attention to older patients with co-morbidities in preoperative visits, restricting the intervals between preoperative visits and the confirmed DOS, and increasing the ICU beds.

### Authors' Contribution

MAA and GB wrote the manuscript. SK, FF, and YCh. collected the

data. In addition, ZA analyzed the data. Finally, RSh, MRH, and MKh peer-reviewed the manuscript.

### Conflict of Interests

Authors have no conflict of interests.

### Ethical Issues

This study obtained ethical approval from the Research Ethics Committee of Guilan University of Medical Sciences (under the registration code of IR.GUMSREC, 1397.218).

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