

The Burden of Surgical Cancellations and No-Shows

Quality management study from a large regional hospital in Oman

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العبء الناجم عن إلغاء العمليات الجراحية وعدم حضور المرضى حسب مواعيدهم دراسة لإدارة الجودة من مستشفى إقليمي كبير في عمان

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ABSTRACT: Objectives: The operating theatre (OT) is a vital facility that utilises a considerable portion of the hospital's budget; thus proper OT utilisation is essential. Surgical cancellation is a leading cause of OT underutilisation. This study aimed to report the rate and reasons for surgical cancellations and no-shows in a large regional hospital in Oman. **Methods:** This study took place as part of a retrospective quality management project at the Ibri Regional Hospital, Ibri, Oman. All elective surgical procedures scheduled between January and December 2014 were included. Cancelled procedures were reviewed to determine the reasons for cancellation. **Results:** A total of 4,814 elective procedures were scheduled during the study period; of these, 1,235 (26%) were cancelled. Patient no-shows were the most prevalent reason for surgical cancellation (63%), followed by surgical reasons (17%); in contrast, OT-associated reasons were responsible for only 2% of cancellations. According to speciality, general surgery had the highest percentage of total cancellations (65%), while ear, nose and throat had the highest rate of surgical cancellations among their scheduled cases (42%). **Conclusion:** Ibri Regional Hospital had a higher surgical cancellation rate due to no-shows than those reported in the literature. Regular audits, quality management projects and the appointment of a dedicated procedure booking coordinator may enhance proper utilisation of the OT, potentially saving funds, conserving resources and alleviating the burden of cancellations.

Keywords: Elective Surgical Procedures; Appointments and Schedules; Operating Rooms; Hospital Financial Management; Oman.

الملخص: أهداف: تعدُّ غرف العمليات من أهم المرافق الحيوية التي تستخدم جزءاً كبيراً من ميزانية المستشفى. ولذا يعد الاستخدام الأمثل والسليم للوقت المتاح للعمليات أمراً ضرورياً، إلغاء العمليات الجراحية هو السبب الرئيسي لعدم كفاءة الاستخدام، هدفت هذه الدراسة إلى تقرير معدل وأسباب إلغاء العمليات الجراحية وعدم حضور المرضى في مواعيدهم المحددة وذلك في مستشفى إقليمي كبير بعمان بعمان. منهجية: كانت هذه الدراسة الاستعدادية جزء من مشروع لإدارة الجودة في مستشفى عبري المرجعي التابع لوزارة الصحة في عمان. شملت العينة جميع العمليات الجراحية الاختيارية المقررة بين يناير وديسمبر 2014م، وتم استعراض العمليات الجراحية الملغاة وتحديد أسباب إلغاءها. نتائج: بلغ المجموع الإجمالي للعمليات الاختيارية الداخلة في العينة ما مجموعه 4,814 خلال فترة الدراسة. ألغيت 1,235 عملية (26%) خلال هذه الفترة. كان السبب الأكثر انتشاراً لإلغاء العمليات الجراحية هو عدم حضور المريض لموعده المحدد (63%) تليه الأسباب الجراحية (17%)؛ وفي المقابل، كانت الأسباب المرتبطة بغرفة العمليات مسؤولة عن 2% فقط من الحالات الملغاة. ووفقاً للتخصص، كانت حالات الجراحة العامة أعلى نسبة من إجمالي الإلغاءات من بين بقية التخصصات (65%) في حين أن حالات الأذن والأنف والحنجرة حققت أعلى معدل للإلغاء بين الحالات المجدولة (42%). خاتمة: حقق مستشفى عبري المرجعي معدلات عالية لإلغاء العمليات الجراحية الاختيارية بسبب عدم الحضور مقارنة بالمعدلات العالمية المعروفة، ومن الممكن تقليل الفاقد وتعزيز الاستخدام السليم للوقت المتاح للعمليات عن طريق المراجعة والإجراءات التدقيقية المنتظمة، ومشاريع إدارة الجودة، وكذلك بتعيين منسق مختص لمتابعة إجراءات تحديد الحجز، مما سيوفر الكثير من الأموال، ويساعد على الحفاظ على الموارد وتخفيف عبء هذه الإلغاءات.

كلمات مفتاحية: العمليات الجراحية الاختيارية؛ المواعيد والجدول؛ غرف العمليات؛ الإدارة المالية للمستشفى؛ عمان.

ADVANCES IN KNOWLEDGE

- To the best of the authors' knowledge, no studies on rates of surgical cancellation have yet been published from governmental hospitals in Oman.
- The majority of surgical cancellations at the Ibri Regional Hospital, Ibri, Oman, were attributed to patient no-shows, with very few cancellations due to facility- or operating theatre-related reasons.
- Findings from the current study indicated a higher rate of surgical cancellations due to no-shows in comparison to reports from the international literature.

APPLICATION TO PATIENT CARE

- *Understanding the burden of surgical cancellation is a necessary step for the implementation of policies to minimise cancellations. As such, the results of the current study may help local healthcare administrators and lead to a better health service in Oman. Additionally, the resulting economic savings from such steps may help to cover other hospital expenditures, potentially improving patient care.*
- *Furthermore, a decrease in surgical cancellations could also reduce the psychological impact of cancellations and subsequent rescheduling of operations on patients and their families.*

THE OPERATING THEATRE (OT) IS AN integral part of any hospital and utilises considerable economic resources and manpower. The OT requires an assembly of staff from the surgery, anaesthesia and nursing teams in addition to surgical instruments and equipment. For elective surgeries, preoperative protocols can include laboratory and radiological work-ups, pre-anaesthetic clinic (PAC) assessments and the booking of intensive care unit beds. However, both hospitals and patients can be negatively affected if the surgery is subsequently cancelled following these preparations. From an administrative perspective, surgical cancellation leads to OT underutilisation; in 2001, the cost of unused OT time was estimated to be USD \$1,400–2,000 per hour.¹ Moreover, surgical cancellation inconveniences patients, as cancelled cases will need to be rescheduled. Patients may have travelled long distances and taken leave from work in order to come into the hospital; they may therefore feel emotional and psychological distress if their surgeries are cancelled or delayed.²

Although surgical cancellation has been extensively studied, reported rates of surgical cancellation are inconsistent (4.5–30.3%).^{3–7} Furthermore, there is a lack of agreement in the literature regarding the most prevalent reasons for cancellations. Common causes include previous surgeries running beyond their allotted OT time, hospital-initiated factors and the development of upper respiratory infections (URIs) among patients scheduled for surgery.^{4–8} However, other studies have identified patient-related reasons as the most common causes of surgical cancellation.^{3,9} To the best of the authors' knowledge, no previous studies focusing on surgical cancellation have been carried out at Ministry of Health (MOH) healthcare centres in Oman. In light of this gap in the literature, this study aimed to analyse the rate of surgical cancellations in an MOH hospital in Oman, identifying not only the reasons for surgical cancellations but also the rate of surgical cancellations within different medical specialties. These results may potentially aid the implementation of policies designed to minimise surgical cancellations and subsequently improve health services in Oman.

Methods

This retrospective analysis included all elective surgical procedures scheduled between January and December 2014 at the Ibri Regional Hospital, Ibri, Oman. This is a 270-bed secondary level MOH hospital with four operating rooms, including one designated solely for obstetrics and gynaecology cases. The hospital operates five days a week, with an average of 15 elective surgeries scheduled daily. Emergency surgery cases and second surgeries scheduled in double-entry cases were excluded from the study. After data for all scheduled surgeries had been collected, the rate of cancellations was determined. Surgical cancellation was defined as any surgery that was scheduled but not carried out for any reason. Following this, the rate of surgical cancellations within different medical specialties was determined to identify specific departments with high cancellation rates.

Electronic records from the Al-Shifa[®] healthcare information system, Version 2 (Ministry of Health, Oman), were reviewed to determine the reasons for cancellation in all surgical cancellation cases. Documentation of the reason for surgical cancellation is a mandatory step in this system. In rare cases where reasons were not mentioned, doctors' and/or nurses' notes were used to deduce the cause of the cancellation. If a deduction could not be made from the notes, the cancellation reason was documented as unknown. Reasons for surgical cancellation were categorised into the following groups: patient no-shows; surgical (i.e. the procedure was cancelled by surgeons); acute conditions (e.g. URI or uncontrolled hypertension or diabetes mellitus); OT-related; administrative; improved patient condition; and unknown. Patients who were assessed by an anaesthesiologist and surgeon and scheduled for surgery, but who did not show up on the day of surgery without previously cancelling, were classified as no-shows.

Data were collected in a Microsoft Excel spreadsheet, Version 2007 (Microsoft Corp., Redmond, Washington, USA). After coding, the data were transferred to the Statistical Package for the Social

Table 1: Reasons for surgical cancellations at the Ibri Regional Hospital, Ibri, Oman (N = 1,235)

Reason for cancellation	n (%)
Patient no-shows	783 (63)
Surgical reasons	215 (17)
Acute conditions (e.g. URI or uncontrolled HTN or DM)	174 (14)
OT-associated reasons (e.g. over-booking, full OT or technical reasons)	23 (2)
Hospital transfers/administrative causes	16 (1)
Improved patient condition	17 (1)
Unknown	7 (1)
Total	1,235 (100)

URI = upper respiratory infection; HTN = hypertension; DM = diabetes mellitus; OT = operating theatre.

Sciences (SPSS), Version 16 (IBM Corp., Chicago, Illinois, USA) for further analysis. Nominal non-continuous data were reported as frequencies and percentages.

This study was granted ethical approval from the Studies & Research Committee of the Directorate General of Health Services, Ministry of Health, Al-Dhahira Governorate, Oman.

Results

During the study period, a total of 4,814 elective surgeries were scheduled by six different surgical specialties. Of these, 1,235 (26%) surgeries were cancelled, averaging nearly five cases daily. Patient no-shows were the most prevalent reason for surgical cancellation (63%). The second most common reason was surgical (17%), including changes in surgical plans. Acute conditions were the third most common cause (14%). Very few cancellations occurred due to

administrative causes or because of an improved patient condition (1% each) [Table 1].

According to the distribution of cancelled cases by speciality, the highest frequency of cancellations in total were attributed to general surgery (65%), followed by ear, nose and throat (ENT; 8%) and orthopaedics (7%). In comparison, ENT had the highest frequency of cancellations out of their scheduled cases (42%). Dental surgery had the lowest surgical cancellation rate in total (>1%); however, they also had the lowest number of scheduled cases (35 cases) [Table 2].

Discussion

Many procedures involving a considerable amount of work are usually undertaken to prepare a patient for surgery, including routine laboratory and radiology work-ups and PAC consultations. Patients sometimes require further clearance for surgery from general medicine, cardiology and paediatric clinicians due to uncontrolled illnesses. Certain surgeries may require not only coordination between anaesthesiologists, surgeons and nurses, but also the booking, preparation and assembly of specialist equipment, which can be costly. Technicians, interns and medical students may also need to attend surgeries. Surgical cancellation therefore results in a significant waste of time, energy and both financial and human resources. At the personal level, patients may have to change their schedules to accommodate a surgery date, take unpaid leave from work and/or arrange for childcare and long-distance travel. Additionally, patients may be instructed to abstain from or modify medication regimens before surgery. The ramifications of surgical cancellation thus extend beyond the misuse of financial resources for the hospital. The social, economic and psychological burden imposed upon patients should

Table 2: Rate of completed surgeries and surgical cancellations by specialty at the Ibri Regional Hospital, Ibri, Oman (N = 4,814)

Specialty	Surgeries completed	Surgeries cancelled	Total	Overall cancellation rate	Cancellation rate per specialty
General surgery	2,345	802	3,147	65%	25%
ENT	274	201	475	16%	42%
OB/GYN	437	39	476	3%	8%
Ophthalmology	245	89	334	7%	27%
Orthopaedics	240	94	334	8%	28%
Dental	32	3	35	>1%	9%
Other	6	7	13	1%	54%
Total	3,579	1,235	4,814	26%	-

ENT = ear, nose and throat; OB/GYN = obstetrics/gynaecology.

not be underestimated; indeed, surgical cancellation can result in dissatisfaction among patients and their families.²

From the perspective of quality management, a low surgical cancellation rate is a fair indicator of the efficient use of an OT as well as the hospital's financial resources. In a large study comprised of 329,784 surgical cases scheduled by nine different surgical specialties at 40 hospitals in the USA, the overall surgical cancellation rate was 12.4%; medical causes were responsible for 28% of cancellations, while facility unavailability led to 20% of the cancellations.¹⁰ In another study of 7,913 surgeries scheduled at a hospital in Australia, the over-running of previous surgeries and bed unavailability were responsible for 18.7% and 18.1% of surgical cancellations, respectively, while 17.5% were due to patient cancellations.¹¹ Regular audits as part of quality management or improvement activities are recommended to determine the current rate of surgical cancellations at specific health-care facilities.

No-shows are defined as individuals who have made but neither keep nor cancel their reservation, booking or appointment.¹² In the current study, no-shows were included among surgical cancellations because these patients unnecessarily occupied OT schedules, preventing other patients from being operated upon at that time. Cancellations due to no-shows occurred in 63% of cases in the current study; this is much higher than the reported international standard (7.6–30.3%).^{4,5,7,13} Many factors may contribute to the high prevalence of no-shows at Ibri Regional Hospital, including patient dissatisfaction, the preference to undergo surgical procedures at a tertiary hospital and the existence of a relatively long waiting list. These factors should be investigated further in a prospective study. As an MOH facility, Ibri Regional Hospital provides free services to Omani nationals. Very few patients require private funding or insurance for medical procedures; thus, high costs or insurance concerns are unlikely to contribute to the rate of surgical cancellations observed at this institution.

There are several ways in which the high rate of no-shows observed in the current study could potentially be reduced. One method would be to schedule operations one day prior to the surgery instead of days or weeks ahead of time. As a result, the OT can be used for the next patient listed if a scheduled patient does not show up. This would reduce underutilisation of OTs. For day care or outpatient surgeries, a booking coordinator can be assigned to ensure patient attendance. Pratap *et al.* reported a quality improvement trial at a children's hospital aimed at reducing patient-related causes of surgical cancellation

using additional communication techniques such as simplified colourful instruction sheets and call/text message reminders; these interventions successfully reduced wasted OT time from 5.7 to 3.6 hours per day.¹⁴ Some institutions have also recommended charging patients for no-shows, although this would be difficult to implement in governmental hospitals.¹² While financial penalties are an attractive option to prevent patient-related surgical cancellations, the authors of the current study do not believe that this option should be considered until hospital-associated reasons that may lead to patient noncompliance have been identified and managed appropriately.

Surgeries may also be cancelled due to medical reasons. In the current study, 14% of cancellations were due to acute conditions such as URIs. A similar rate of URI-related cancellations was reported by Palomero Rodríguez *et al.*; however, this decreased from 12.9% in 2001 to 7.2% in 2003 through enhanced communication of simple and appropriate information to parents.⁸ Knox *et al.* reported a significant reduction in medical-related surgical cancellations after the establishment of a preoperative assessment clinic ($P = 0.013$).¹⁵ The use of preoperative clinics to ensure patients' fitness before surgery is recommended in Oman. Currently, patients with known comorbidities are evaluated first by their primary physicians before being referred to PACs. Nevertheless, surgeries are inevitably cancelled for medical reasons, for example due to patient noncompliance regarding their medication regimens or the development of respiratory tract infections before surgery.

In the current study, ENT cases had the highest rate of surgical cancellation according to specialty; this was similar to findings reported by Schofield *et al.*¹¹ Although URIs may be responsible for cancellations among ENT cases, it does not explain why the cancellation rate was so high in comparison with other departments. Upon further investigation, it was found that the ENT team at the Ibri Regional Hospital intentionally overbooked surgeries to enhance OT utilisation. In terms of the overall rate of surgical cancellations in the current study, the greatest frequency of cancellations was reported from general surgery, followed by ENT and orthopaedics. Comparable results were reported by Chiu *et al.*⁴ Surprisingly, facility-related cancellations were very low in the current study; other studies have reported facility-related reasons (e.g. previous surgeries running over time and a lack of OT time and bed availability) as the most prevalent causes of cancellations (59.7–73%).^{4,5} These findings are common in busy hospitals with rapid turnover, long waiting lists or heavy emergency loads. This may also explain the low

rate of patient-related surgical cancellations in these hospitals (10–16.2%).^{4,5} The limited availability of OT time could make patients in busier hospitals more compliant due to increased awareness of the difficulty in rescheduling surgeries.

The current study is limited by its retrospective design. Additionally, specific reasons for no-shows could not be assessed. Further studies are needed from other MOH hospitals in Oman to increase the reliability of these findings and better understand patient reasons for no-shows. A prospective study at Ibri Regional Hospital is planned to assess the impact of quality improvement activities designed to minimise surgical cancellations. With these limitations in mind, this study assessed for the first time in Oman an important worldwide issue in hospital management. Hopefully, the results of this study will increase awareness of the burden of surgical cancellations and encourage similar audits to be performed in other hospitals in Oman.

Conclusion

A higher rate of surgical cancellations due to no-shows was found in comparison to those reported in the international literature. Measures to minimise surgical cancellations are highly recommended, potentially resulting in proper OT utilisation, the conservation of hospital funds and the alleviation of the psychological distress of cancelling and rescheduling surgeries on patients and their families. The results of this study may serve to increase awareness of the burden of surgical cancellation and encourage similar audits in other hospitals in Oman.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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