

Causes and Rate of Cancellation of Elective Surgeries- A Cross-Sectional Study

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Abstract

Cancellation of elective surgeries could be reduced to a greater extent if one knows the reasons or factors leading to cancellations. Cross sectional study conducted in a multi- specialty hospital in Dubai during 2014-2015, to determine the weightage of the causes and the rate of cancellations. Causes were classified into system related, patient related and medical related. Performed quantitative analysis of the causes and rate of cancellations. Trend of cancellations reduced across the period from October 2014 to June 2015. 6008 surgeries were scheduled from October 2014 to June 2015. 5656 surgeries were performed; there were 352 cancellations in total. 6% cases were cancelled. Based on category wise weightage, medical related causes scored the highest reason (69.89%). Patient related causes (15.63%) was slightly more than the system related causes (14.49%). 'Patient medically unfit for surgery' ranked highest in the order of the reasons for cancellations. 'Patients/relatives refused surgery' was the second highest. 'Patient had food before the surgery' though instructed nil oral, ranked the third highest reason. Study of cancellations is important as the identification of the causes of surgery cancellations would help in averting the conditions leading to cancellations. Proper and timely interventions could reduce the cancellation rate. The cancellation rate reduced comparatively in the post study period. Cancellation could cause wastage of valuable time, effort and energy. Moreover, financial burden to patients & hospitals. Resource wastage can be estimated based on the cancellation rate, if the hospital administrators around the world focus their attention to it.

Keywords: elective surgeries; surgery cancellations; day case surgery cancellations.

Introduction

Cancellation of scheduled surgeries causes loss of productive hours of the staffs in the hospital, postponement of the cases causes delay in getting surgery date for the waiting patients, lower the morale and productivity of the staff, wastage of operation theatre time, inconvenience to the patients and their family & prolonged hospitalization (7-9). Similar studies done in other parts of the world as the topic is of immense importance as far as the hospital & health care field is concerned. Elective surgeries were cancelled due to multi-faceted reasons. A prospective study conducted at a major tertiary hospital in Australia in 2002 to determine the rate and reasons of cancellation on the scheduled day of surgery. They observed that during the 6-month study period, 11.9% cases were cancelled. The reasons for the cancellations were 1) The over-run of the previous surgery resulting in 'no theatre time'(18.7%), (2) No post- operative bed(18.1%), (3)surgery cancelled by the patient -(17.1%),(4) cancellations due to the change in patient's condition where the patient become unfit for surgery-(17.11%), (5) 'procedural reasons' (which include list error, surgeon not ready, administrative reasons, communication failure between the teams etc. together) -20.1%. ENT Surgery cancellations topped (19.6%) followed by cardio thoracic surgery (15.8%).

Background

Cancellation of surgeries and postponement of cases troubled not only the patients but also their relatives. Certain surgeries required observation of the patients post -operatively in an Intensive Care

unit. Lack of vacant beds in the ICU could lead to cancellation of those cases. Studies showed that improper pre-operative preparation was the main cause for cancellation (4,5). Lack of availability of Recovery room beds was the most important cause for the cancellation of surgery (9). Rakesh Garg et al. study showed that 1590 patients were scheduled for elective surgical procedures in 458 operation rooms. 30.3 % patients were cancelled on the day of surgery. Of these, 59.7% were cancelled due to lack of availability of theatre time, 10.8% were cancelled because of medical reasons and 16.2% did not turned up on the day of surgery. In 5.4% patients, surgery was cancelled by surgeons due to a change in the surgical plan, 3.7% were because of administrative reasons. Determination of the rate and the causes of cancellations were found to be significant as far as hospital administration is concerned. It was significant for better planning; maximum avoidance of cancellation helped in saving in terms of cost, time, energy & resources.

Purpose

Objectives of the research study was to:

- 1) Identify the causes for cancellation of elective surgeries performed daily in Operation Theatre in the hospital.
- 2) Analyze the causes of surgery cancellation.
- 3) To determine the weightage of each cause or contributing factor for the cancellations.
- 4) Compare the trends in the frequency of surgery cancellations of the last quarter of 2014 with the first half of 2015.

Conceptual definition

- **Elective surgeries:** Surgeries that are normally planned by the concerned surgeons on the previous days and are scheduled in the OT list, for the forthcoming days.
- **Day case surgeries** implies that patients are admitted on the day of surgery and discharged the same day after 2-3 hours of observation.
- **Major surgeries** were those which need to be admitted in the ICU bed or the concerned specialty unit's bed for days 3 to 15 days based on the patient's condition and speed of recovery.
- OT- Operation Theatre
- OT List: List of surgeries for the particular day.

Review of literature

The inferences derived from the study could form a baseline measure for assessing the nurses and midwives ongoing attitudes and engagement around higher degree/post graduate learning. According to a study in Oman (Dianne 2015), the benefits which the nurses found in undertaking higher studies are a) improved nursing practice and quality of patient care b) career aspiration and self-growth and c) knowledge and skill acquisition. Analysis published by CEDEFOP (2003), the reasons for future learning were to achieve more personal satisfaction, increase general knowledge (31% each), do a job better (27%) and obtain a qualification (20%). Hardwick & Jordan (2002) identified a number of motivating factors that influenced nurses and midwives to undertake graduate level education including the need to extend personal knowledge of nursing as well as a need to update academic qualifications. Spencer (2006) conducted a United Kingdom phenomenological study to explore motivations for undertaking higher education courses, found that the ability to challenge practice was related to an increase in knowledge. Participants indicated that their graduate education had a positive to strongly positive effect on their self-esteem (Pelletier et al., 1998) with 75% reporting this had a positive effect on their ability to carry out their role (Pelletier et al., 2005). Motivational factors for adult participation in Higher Education (CEDEFOP (2008): Socio-communication improvement, career advancement, escape to get rid of loneliness & Personal development (discover one's potential, improvement of thinking skills, etc.). Studies conducted among professionals in other disciplines identified a number of reasons for doing a higher degree including the enhancement and development of career or promotional prospects (Hardwick and Jordan, 2002), the ability to increase earning potential (Astin, 1993), the need to acquire advanced professional and research capabilities (Atkins & Redley, 1998) or the desire to change career (Burgess, 1997).

Studies conducted on the constraints/barriers/ challenges faced by the nurses in undertaking higher studies.

(Essa,2011) conducted a qualitative study which explored the barriers to higher education in nursing who were unable to complete their Masters, the results were work place responsibilities, student's attitude towards their study, inadequate program information, inadequate skills for advanced studies, unexpected circumstances, feelings of disappointment, failure and regret and administrative shortcomings were the drop out reasons. Those were the interesting findings from the perspective of South African nurses. Work schedule, shift duty, constraints were found to be barriers for the RNs to do higher studies (Bahn, 2007). Cost identified as yet another barrier (Bahn 2007; Delaney & Piscopo,2004). Inconvenience with the class schedules (Reilley,2003; Delaney & Piscopo,2004), long distance travel to University (Penz et al 2007; Jukkala et al,2008; Delaney & Piscopo,2004) identified as yet another barrier.

Adult participation in education had three barriers identified 1) Institutional barriers (flexibility in admission procedures/requirements, flexible attendance options), 2) Dispositional barriers (motivation, individual attitude) and (3) Situational barrier (cost of education, geographical location, time, accessibility for provisions etc.). (Fentahun & Molla, 2012) cross-sectional study in Ethiopia showed 71.8% participants reported lack of support from employers, 42.3% - lack of funding and 9.4% - lack of resources as main reasons. Analysis by Harold. J. Peach and Jeffery Bieber reported – difficulty in finding time to research, write, travel, increased planning and preparation time required for online classes, and the encroachment of work into personal or social time. Study by Bell, Rominski, Bam, Donkor, and Lori (2013) to describe the strength, challenges and current status of bachelor nursing education in Ghana showed that severe shortage of nurses, qualified nursing faculty and substandard infrastructure are the challenges faced by the nursing education. Main reasons for cancellation were: no theatre time due to over-run of previous surgery (18.7%); no postoperative bed (18.1%); cancelled by patient (17.5%); and change in patient clinical status (17.1%). Procedural reasons (including patient not ready, no surgeon, list error, administrative cause, and communication failure) totalled 21.0%. Ear, nose and throat surgery experienced the most cancellations (19.6%), followed by cardiothoracic surgery (15.8%).

Methodology and study design

Methodology

Cross-sectional quantitative study was conducted on the surgeries scheduled in Operation Theatre from October 2014 to June 2015 in a multi-specialty hospital in Dubai with approximately 420 inpatient beds and around 172-day case beds. Operation theatre comprised of major O.T & Minor O.T. The OT rooms designated for the different specialties like Cardiothoracic, urology, general surgery, ENT, Ortho, Ob Gynae & Ophthalmology surgical cases. Previous day's 'Cancellation of surgery list' was collected daily @0500 next day. The data collected on daily basis from the OT were compiled during the study period. Data was subjected to scrutiny with utmost precision to determine the causes of cancellation of the cases. Quantitative analysis performed on the trends and the causes of cancellation of daily elective surgeries performed in the Operation Theatre Department.

Retrospective data collection on the cancellations of the last quarter of year 2014 and a prospective data collection conducted for the 1st four months of 2015. As the causes for cancellations are many and varied, listed down all the causes of cancellations. Grouped those cancellations into medical, patient related and system related causes. Based on the collected data, conducted a comparative study on the trends in cancellations in 2014 & 2015. The study strived to determine whether the trends of cancellation increasing or decreasing from 2014 to 2015.

Elective surgeries in different specialties are planned by the concerned surgeon on the previous days and are scheduled as OT list for the specific days. OT list comprised of the list of surgeries of different specialties like Cardiac surgery, orthopedic surgery, ophthalmic surgery, general surgery, ENT, Obstetric surgery, Urology surgeries etc. OT list comprised of the major surgeries, minor surgeries/ day case surgeries. Emergency surgeries were also conducted daily in addition to the scheduled cases. Some of the major surgery patients might need an ICU bed post-operatively for 2-3 days for close observation of the patients.

Table 1 list the code assigned to causes for the ease of data compilation, analysis & calculation.

Table 1. Causes for Surgery Cancellation Codes:

<u>CODES</u>		<u>MEDICAL RELATED</u>	<u>SYSTEM RELATED</u>
Code 1: Patient / relatives refused surgery	Code 9: Patient had infection in last 24 hours	Code 2	Code 5
Code 2: Medically unfit	Code 10: Equipment for procedure/surgery out of order	Code 3	Code 6
Code 3: Surgery not needed	Code 11: Implant / prosthesis out of stock	Code 4	Code 7
Code 4: Patient needs further investigation	Code 12: Patient had food	Code 8	Code 10
Code 5: Patient file not available / incomplete	Code 13: No bed available	Code 9	Code 11
Code 6: Payment not done	Code 14: Surgeon not available	<u>PATIENT RELATED</u>	Code 13
Code 7: Postponed	Code 15: Blood / Platelets	Code 1	Code 14
Code 8: Surgery done as Emergency	Code 16: Wrong booking	Code 12	Code 15
			Code 16

Causes are classified into as follows and the weightage of the causes in the above listed three domains were subjected to analysis.

- Medical related
- System related
- Patient related

Results

Data analysis done to determine the number of cancellations monthly, analyzed the variations across October 2014 to June 2015. Table 2 and 3 show the month wise cancellation cases. 6008 surgeries were scheduled from October 2014 to June 2015. Out of this, 5656 surgeries were performed. There were 352 cancellations out of the total cases scheduled. Six percent of the cases were cancelled. Mean of total cancellation accounts to 5.83.

Table 2. Cancellation cases –month wise 2014

Month	CANCELLATIONS	CASES DONE	Grand total	CANCELLATION %	S. D
October	48	573	621	8	
November	38	653	691	5	
December	32	616	658	6	
Total	128	1842	1970	6.33(mean)	1.5275

Table 3. Cancellation cases –month wise 2015

Month	CANCELLATIONS	CASES DONE	Grand total	CANCELLATION %	S. D
January	41	617	658	6	
February	38	583	621	6	
March	31	704	735	4	

April	39	679	718	5	
May	35	637	672	5	
June	40	594	634	6	
Total	224	3814	4038	5.33(mean)	0.8164

Table 4. Medical related causes

Sl. No	CODE	No:	%
1	CODE 2	205	58.24
2	CODE 3	15	4.26
3	CODE 4	14	3.98
4	CODE 8	9	2.56
5	CODE 9	3	0.85
	TOTAL	246	

Table 5. System related causes

Sl. no:	CODE	No.	%
1	CODE 5	6	1.7
2	CODE 6	3	0.85
3	CODE 7	2	0.57
4	CODE 10	12	3.4
5	CODE 11	1	0.28
6	CODE 13	17	4.83
7	CODE 14	4	1.14
8	CODE 15	0	0
9	CODE 16	6	1.7
	TOTAL	51	

Table 6. Patient related causes

Sl. No:	CODE	No:	%
1	CODE 1	38	10.8
2	CODE 12	17	4.83
	TOTAL	55	

Table 7. Category wise weightage

Category	No.	%
System related	51	14.49
Medical related	246	69.89
Patient related	55	15.63
	352	

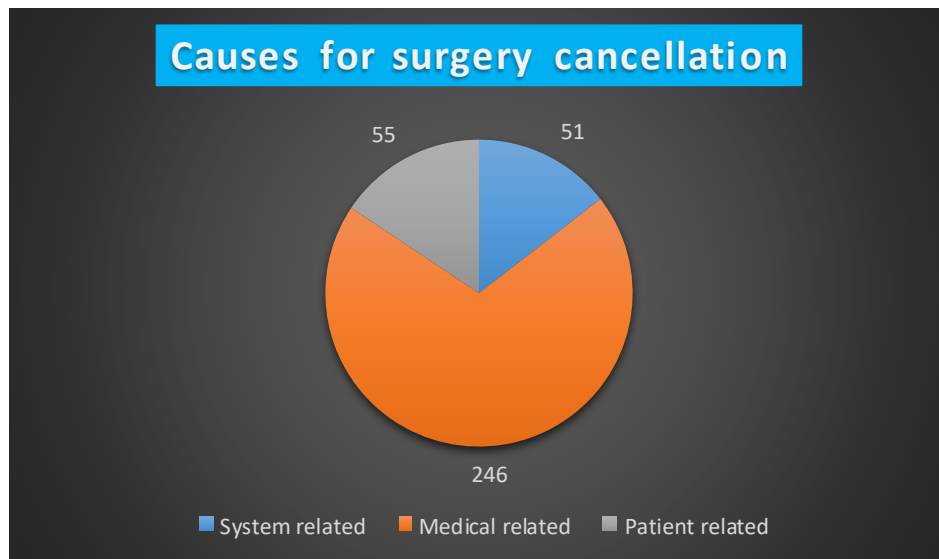


Chart: 1

Based on category wise weightage, medical related causes scored the highest (69.89%). Patient related causes (15.63%) is comparatively more than the system related causes (14.49%) (Table 7)

Table 8. Ranking: cancellation reasons

CAUSES	RANK
Patients / family refused surgery (code 1)	II
Medically unfit (code 2)	I
Surgery not needed (code 3)	IV
Patient needs further investigation to be done (code 4)	V
Patient file not available/incomplete (patient didn't come for pre anaesthesia checkup and or old file not available (code 5)	VIII
Had infection in the last 24 hrs (code 9)	X
Surgery postponed (code 7)	XI
Surgery done as emergency (prior to the scheduled date, as emergency) (code 8)	VII
Payment not done (code 6)	X

Equipment (relevant to that particular surgery) became out of order (code 10)	VI
Implant/prosthesis out of stock (code 11)	XII
ICU Bed unavailable to admit the patient post operatively (code 13)	III
Had food before surgery though instructed to be NPO (code 12)	III
Concerned Surgeon not available, due to unavoidable reasons (code 14)	IX
Wrong booking (code 16)	VIII

‘Patient medically unfit for surgery’ (Code 2) ranked highest in the order of the reasons for cancellations (Table 4). ‘Patients/relatives refused surgery’ (Code 1) was the second highest reason. ‘Patient had food’ (Code 12) and ‘No ICU bed available to admit post operatively’ (code 13) ranks third. (Code 3) ‘Surgery not needed’ (example-patient posted for lithotripsy, already passed out the stone through urination as evidenced by the ‘ultrasound check’ prior to the lithotripsy surgery) constituted fourth highest reason. ‘Patient need further investigations prior to surgery’ (Code 4) ranked fifth contributing cause for the cancellations. Patient developed ‘Infection in the last 24 hours’ (Code 9) was the lowest (0.85 %).

Among the ‘medical related causes’ patient unfit for surgery ranked the highest. Among the patient related causes, ‘Patients/relatives refused surgery’ scores the highest. Among the system related causes, ‘No ICU bed available’ (code 13) scored highest. ‘Patient had food’ (Code 12) is the second contributing factor. Observations shows that ‘patient medically unfit for surgery’ (Code 2) excels other causes, which means majority of cancellations were due to reason that patients were medically unfit for surgery. Reasons were cough, fever, upper & lower respiratory infections which is an absolute contra indication for proceeding with the surgery as it can lead to increase in the patient’s post-operative stay in hospital due to infections. Other main cause was the blood investigation reports like platelet count low, high serum bilirubin etc.

The below nine reasons together caused approximately 31% of the Surgery Cancellations:

- 1) Patients / family refused surgery after being scheduled on the operation list.
- 2) The patient had food before surgery (though instructed them to be NPO)
- 3) Implant/prosthesis is out of stock
- 4) The surgery had to be done as emergency case, prior to the scheduled date.
- 5) Wrong booking
- 6) Payment for the surgery not done by the patients.
- 7) ICU Bed not available to admit the patient post operatively.
- 8) Patient file incomplete. Eg: - anaesthesia checkup not done or file unavailable on the previous day for the anaesthesia check up to be conducted.
- 9) Patient needs further investigation before the surgery.

Discussion

In this study, tried to investigate and determine the cancellation of elective surgeries daily in the Operation Theatre of the multi- specialty hospital in Dubai during 2014-2015. Medical related causes were found to be the reason for many elective surgery cancellations. The incidence of medical related cancellations were more than 4 times higher compared to the patient related and system related causes. Patient medically unfit was the major cause for the cancellation. Patient or the family refused surgery was the next higher reason for cancellation. Medical related causes attributed to 69.89 % of cancellations whereas patient related causes attributed to 15.63 % of the cancellation causes and system related causes contributed to 14.49 % causes for cancellation.

‘Patient medically unfit for surgery’ ranked highest in the order of the reasons for cancellations (Table 4). ‘Patients/relatives refused surgery’ was the second highest reason. ‘Patient had food’ and ‘No ICU bed available to admit post operatively’ was the third highest reason. ‘Surgery not needed’ (example-patient posted for lithotripsy, already passed out the stone through urination as evidenced by the ‘ultrasound check’ prior to the lithotripsy surgery) constituted fourth highest reason. ‘Patient need further investigations prior to surgery’ ranked fifth contributing cause for the cancellations.

The percentage of total cancellations in this study (6%) was almost close to the findings in Farhanul Huda et al study. Out of 3618 scheduled surgeries, 246 (6.8%) were cancelled. In the Australian study, (Schonfield et al) surgery cancellation was found to be even higher 11.9%. Reasons for cancellations in the Australian study were ‘Over run of surgeries’ resulting in no theatre time (18.7%), procedural reasons (21%), no post-operative bed (18.1%), cancelled by the patient (17.5%) and ‘change in patient’s clinical condition’ (17.1%). (Farhanul Huda et al) conducted a Retrospective Analysis of Reasons for Cancellation of Elective Surgery in a Teaching Hospital at Teerthanker Mahaveer Medical College and Research Centre, scheduled elective general surgical procedures were reviewed from June 2009 to May 2010, the most common category for cancellations was surgeon related (44.1%), followed by administrative (29.5%), workup related (16.2%) and patient related (10%).

Operations are cancelled due to clinical & non-clinical reasons. The findings of this study were not similar to the findings in the West Indies study. In the study (Jonnalagadda et al) conducted in a tertiary hospital in West Indies, the reasons for cancellations were (a) no recovery room bed available (cancellation% was 15%); (b) improper pre-operative preparation of the patients resulted in 13% cancellations; (c) patient did not show up on the day of surgery(9%); unavailability of anaesthetists accounted for 8% and unavailability of nurses contributed to 11% cancellations. The causes and the percentage of incidence of the causes were found to be mentioned in other studies too. Research (Seim et al) conducted in Norwegian hospital and a large hospital in US showed that the causes of cancellations were capacity constraints accrued to 42% in Norwegian hospital, patient issues were 41%, no pre-operative preparation (11%) in US hospital. On the other hand, Dr. Madhav et al, retrospective study (January 2015 to December 2017), the most common category for cancellations was surgeon related 234 (46 %), followed by administrative 101 (20 %), Anaesthetic workup related 71 (14%), patient related 62 (12 %) and medical causes 41 (8.05 %).

In this study, in a comprehensive way, classified the cases into medical related, system related and patient related causes. the findings based on category wise weightage, medical related causes scored the highest (69.89%). Patient related causes (15.63%) is comparatively more than the system related causes (14.49%). Medical related causes had the highest weightage. Obviously, health care workers had no control over the patient related causes whereas had limited control over the medical related causes. System related causes were many and could be controlled and avoided to a greater extend, if proper and timely measures were taken.

Suggestions & Recommendations

If the concerned doctors/OT staff prior inform the concerned units that their patient taken for procedure only by late evening (telling the approximate time) so that patients does not need to fast for more than 12 hours, which cause them to break their NPO status. When the OT gives the call to send the baby, they come to know that baby. Appropriate steps can be implemented to reduce the rate of cancellations due to scheduling error, lack of interdisciplinary coordination & cancellation due to equipment failure to minimum.

Due to long waiting time for the surgery makes the patient have food though instructed to be ‘Nil Per Oral’. Cases like babies posted for circumcision starts to cry while waiting for the surgery. This cause the mothers to breast-feed the baby. Communicate to the concerned units, if the surgery get delayed, so that can plan the feed accordingly whereby nil oral status would not extend hours extensively.

The concerned surgeons were sometimes not available due to various reasons that could be personal or official which is unavoidable. Suggesting the need to shortlist the OT list by the concerned Specialty & remove those cases from the scheduled list ahead of the surgery day. That slot could be used by other

surgeons in the same team/ other teams/other specialties to schedule their surgery. In addition, concerned doctors have to be keener to take interest or initiative to avoid wrong booking, to avoid such cancellations.

The hospital administrators could take the surgery cancellations as a Key Performance Indicator in their Operation Theatre to ensure the productivity, efficiency and effective use of the theatre resources.

Ethical considerations

Confidentiality and privacy were ensured. Confidentiality of the patients, units, surgeons, staffs were maintained. None of the patient identification details was used in any part of the study. No mention of the cases or individuals in the presentation or publication.

Limitations of study

No limitations experienced in conducting the research. Study achieved a good sample size of 6008 surgeries. Study was conducted for quite a long duration of 9 months. In addition, got a good catch of multiple specialty surgeries ranging from minor to major cases and day case surgeries too.

Scope for further research

There is scope for future research about the surgery cancellations. The hospital administrators who are concerned about the productivity and efficiency of their health care setting could encourage more research into their cancellation causes.

Conclusion

Late cancellation of scheduled operations is a major cause of inefficient use of operating room time and wastage of resources. Unanticipated cancellation of scheduled elective operation decreases operation theatre efficiency and also inconvenient to the patient, family and the health care teams. Appropriate and timely intervention could effectively increase customer satisfaction and the organizations performance and standards. Reduction in the incidence of surgery cancellation should be thereby a prime concern of the hospital administration. Operation theatre efficiency is proportional to the time management and productivity of the health care workers involved. Cancellation of elective surgeries therefore could turn out to be a Key performance indicator for the operation theatre functional efficiency. Reduction in the cancellation rate and bench marking to the international standards are the key for the effective operation theatre management.

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