

# Reasons for Cancellation of Elective Surgical Operations: A Cross-sectional Study from a Tertiary Care Centre in North-East India

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## ABSTRACT

**Introduction:** Cancellation of elective surgical operations is defined as an elective operation which is not performed on the scheduled date. The rates and the reasons for cancellation vary in different parts of the world. Cancellation causes increased cost of treatment, loss of daily wage and mental trauma. It also causes under utilisation of hospital resources and loss of training opportunities to surgical trainees.

**Aim:** To estimate the rate of cancellation of elective surgical operations in a tertiary care centre in North-East India and determine the reasons for cancellation.

**Materials and Methods:** A prospective cross-sectional study was conducted at a 500 bedded, North-Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, Shillong, Meghalaya, India, from January 2018 to September 2018. All consecutive elective surgical cases scheduled during this

period were included in the study. The rate and the reasons for cancellation were noted. Descriptive statistics was used for analysis of the results.

**Results:** Out of 1812 elective surgical operations scheduled during the study period, 491 operations (27.10%) were cancelled. The most common reasons for cancellation were shortage of time (78.62%), medical causes (10.79%) and administrative problems (4.48%). Cancellation rate was highest in the Department of Surgical Oncology (40.23%), followed by Departments of Orthopaedics (34.51%) and Obstetrics and Gynaecology (OG) (31.02%).

**Conclusion:** The rate of cancellation of elective surgical operation was high (27.10%) and the most common reason was shortage of time and Surgical Oncology Department had highest rate of cancellation.

**Keywords:** Elective surgery, Operation theatre, Preanaesthetic clinic, Shortage of time

## INTRODUCTION

Cancellation of elective surgical operation is defined as any surgical procedure listed on the operation schedule that is not performed on the day it is planned [1,2]. This important problem is prevalent in most of the hospitals across the world [3]. The reasons for cancellation of elective surgeries are related to patient factors, hospital issues and the healthcare workers [4-6].

Cancellation of elective surgeries affects the patients and their families as it leads to increased cost of treatment and travel, loss of working days and anxiety [7]. It also causes under-utilisation of hospital resources and loss of training opportunities for surgical trainees [3]. In many cases, it also causes anger and bitterness among the patients and the doctors [8]. Cancellation also has health, social and functional effects on the patients [9].

Studies have reported the reasons for cancellation of elective surgical operations and these vary from one hospital to another. The common reasons are shortage of time, patient unfit for operation, unavailability of beds and operation theatres, patient not willing for operation and patient not turning up for operation [10,11]. In other cases, it may due to scheduling errors, shortage of materials, inadequate preoperative evaluation and emergency cases intervening in the elective schedule [12].

Although there is no agreement regarding the acceptable rate of cancellation of elective operation, less than 5% is generally recommended [13]. Cancellation rate ranges between 10-40% in the developing countries and 0.21-26% in the developed countries [12,14].

The national rate of cancellation rate of elective operation in the United Kingdom is 8% [15]. A study from a teaching hospital in Hong Kong showed the cancellation rate to be 7.6% [16]. Reported cancellation

rates from India ranges between 17.6-30.3% [8,10,11,17]. However, as far as author's knowledge, no study has been published on this important problem from this region. Knowledge of the rate and reasons of cancellation will sensitise the hospital authorities and the staff to this problem so that measures can be initiated to reduce the cancellation rate. So, this cross-sectional study was conducted to determine the rate of cancellation of elective surgical operations and the reasons for the cancellation at a tertiary care referral centre in the North-East India.

## MATERIALS AND METHODS

The cross-sectional hospital-based study was conducted at the North-Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, Shillong, Meghalaya, India. The study was conducted from January 2018 to September 2018. The study was approved by the Institute's Ethical Committee (approval no. NEIGR/IEC/M3/ F7/170). Non probability convenience sampling technique was used to recruit the study sample. The hospital is a newly set-up tertiary care centre of 500 beds with higher speciality surgical departments.

During the period of the study, nine surgical departments shared six elective and one Emergency Operating Theatres (OTs). Elective operations are conducted Monday to Friday from 9 AM to 4 PM with no scheduled break, and the last patient induced at 3 PM. One separate emergency OT functions 24x7 days a week. Every Surgical department except department of Surgical Oncology allots two operating days in a week with one operating table in each operating day. Department of Surgical Oncology is allotted one operating day with one table in a week. Ear, Nose and Throat (ENT), Neurosurgery and Surgical Oncology Departments share one OT whereas Orthopaedics, Urology and General Surgery Departments share two OTs. Obstetrics and Gynaecology (OG),

Cardiothoracic and Vascular Surgery (CTVS) and Eye departments have one OT assigned to each department. Eye department operates twice a week, one day under general anaesthesia and the other day under local anaesthesia. All the elective OTs are cleaned every Saturday, so all OTs except Emergency OT are closed on Saturdays and Sundays.

As per protocol, all elective surgical patients underwent preoperative check-up in the Preanaesthetic Clinic (PAC) managed by one anaesthesia consultant, one senior resident and two postgraduate students. Patients that were provisionally cleared for surgery were entered in the waiting list of the respective departments when their turns arrive as per the waiting list the patients were admitted for operation. One day before the proposed date of operation, operation list prepared by the senior resident and verified by the head of the Surgical Department was sent to the Anaesthesia department and to the respective OTs. One senior resident doctor along with the postgraduate student of the Anaesthesia department review these posted patients in the evening and inform the consultant anaesthetist. The consultant anaesthetist made the final decision regarding the fitness of the patients for operation on the next day.

For this study, all posted cases were followed-up the next day to determine whether they were operated as scheduled or they were cancelled. An elective surgical operation was said to be cancelled when a patient was admitted for operation after clearance from PAC but the operation was not performed on the scheduled date [18]. These cancelled cases were recruited for the study. The total number of patients posted for operation, the total number of patients whose operations were cancelled and the reasons for cancellation were noted and analysed. The published classification used by Garg R et al., for reasons for cancellation was used to categorise the cancelled cases as follows [10]:

- 1) **Shortage of time:** Insufficient time to take up all posted cases due to shortage of time and improper scheduling by the surgeons.
- 2) **Medical reasons:** patients were unfit due to Upper Respiratory Tract Infection (URTI), uncontrolled blood sugar and hypertension, hyper/hypothyroidism.
- 3) **Administrative problems:** OT not ready due to faulty OT light/table, no sterile gown and no instruments/implants, emergency operation occupying elective OT.
- 4) **Surgeon related issues:** operations cancelled by surgeons because they had to attend meetings or they were ill.
- 5) Patients not turning up for surgery; and
- 6) **Miscellaneous causes:** Incomplete preoperative work-up and blood for operation not available.

The data were collected by the corresponding author.

## STATISTICAL ANALYSIS

The rate of cancellation was calculated by dividing the total number of cancelled cases by the total number of posted cases. Frequency and percentages were calculated to describe the overall rate of cancellation, reasons for cancellation and rates of cancellation in different departments.

## RESULTS

During the study period 1812 patients were scheduled for elective operation. Out of 1812 patients, 491 patients (27.10%) were cancelled [Table/Fig-1]. Of these 491 patients, 249 were women, 213 men and 29 children. The most common reason for cancellation was shortage of time because of which 386 operations (78.62%) were cancelled. The second most common cause was patient being unfit due to various medical causes and 53 operations (10.79%) were cancelled because of this reason. The most common medical

cause was URTI. Other common medical causes were uncontrolled blood sugar/hypertension and hypo/hyperthyroidism. The third most common cause was administrative problem like faulty OT light/table no sterile instruments/OT gown etc., and 22 operations (4.48%) were cancelled due to this reason. In present study, there was not a single cancelled case which was cancelled because of more than one reason. Also, not a single case was cancelled because of absence of anaesthetists, staff nurses or OT technicians.

Reasons	Number of operations cancelled	Percentage (%)
Shortage of time	386	78.62
Medical causes (Active URTI, uncontrolled DM/HT, hypo/hyperthyroidism)	53	10.79
Administrative problems (Instruments/Implants not available, non functioning OT light/table, no sterile gown)	22	4.48
Surgeon-related issues	11	2.24
Patient did not turn up	7	1.43
Miscellaneous causes (Incomplete work-up, blood not available)	12	2.44
Total	491	100

**[Table/Fig-1]:** Reasons and number of cancelled operations.

URTI: Upper respiratory tract infection; OT: Operation theater; DM: Diabetes mellitus

The highest rate of cancellation was observed in the department of Surgical Oncology in which 35 patients out of 87 patients (40.23%) were cancelled [Table/Fig-2] followed by Orthopaedics department (34.51%).

Department	Total number posted	Operations cancelled	Percentage (%)
Surgical Oncology	87	35	40.23
Orthopaedics	255	88	34.51
Obstetrics and Gynaecology	245	76	31.02
Urology	213	58	27.23
Neurosurgery	177	46	25.99
CTVS	151	38	25.17
Ear, Nose and Throat	144	36	25.00
Ophthalmology	99	23	23.23
General Surgery	441	91	20.63
Total	1812	491	27.10

**[Table/Fig-2]:** Total number of posted and cancelled operations of different departments.

\*CTVS: Cardiothoracic and vascular surgery

## DISCUSSION

Cancellation of elective operation is a world wide phenomenon which has economic, psychological and social impacts on the patients and their families [3,7,9,19]. It also causes increased cost because of extended hospital stay and repetition of investigations, under-utilisation of man power and resources which affects hospital-patient relationship and training [12,20]. The rate of cancellation of elective surgical operation is also a measure of the efficiency of the surgical services [14]. Studies have determined various reasons for cancellations of elective surgery and these reasons vary from one hospital to another [10,12,21-23]. Although there is no agreement regarding the acceptable rate of cancellation of elective operation, less than 5% is generally recommended [13]. The reported rates of elective cancellation range from 11-44% in the developing countries and 0.37-28% in the developed countries [24]. The present cross-sectional study aimed to determine the rate of elective case cancellation in a newly established tertiary care centre in the North-east India. Awareness of the rate and the reasons for the cancellation will serve the doctors and the authorities to take necessary measures to decrease the cancellation rate.

In present study, the rate of cancellation of elective operation was 27.10% and the most common reason for cancellation was shortage of time. The rate of cancellation was highest in the department of surgical oncology (40.23%). Compared to previous studies from India, cancellation rate is similar to the study done by Garg R et al., (30.3%) but higher than the rates reported by Talati S et al., (22.46%) and Kumar R and Sarma RK (17.6%) [10,11,17]. The rate of cancellation of elective surgical cases in this study (27.10%) is higher than the rate reported from Nigeria (9.1%) and Saudi Arabia (11%) but similar to the studies done in Ethiopia (32.1%), Uganda (28.8%), and Pakistan (25%) [17,25-28]. Studies have reported decreased cancellation rate and shorter waiting period after going through PAC [29-31]. Though we ran a regular PAC, our cancellation rate is still high.

In the current study, the most common cause of cancellation was shortage of time which accounted for majority (78.62%) of the cancellations. In the study hospital, each surgical department is allotted a very limited operation time. Every surgical department (except surgical oncology) is allotted only two operating days a week while only one operating day is allotted for surgical oncology. This is the only tertiary care centre in the North-east India funded by the Government of India, where higher speciality surgical services were provided at a low cost. So, patient load is heavy. Each surgical department has a long waiting list. Because of this limited operating time and long waiting list, surgeons postpatients more than they could operate upon. Extra cases are posted so that even if one case is cancelled at the last minute, the next one can be operated. It was found that many cases were cancelled due the impractical scheduling by the surgeons and the last case was induced at 3 PM. However, if the case to be taken up at this time was a total gastrectomy, coronary artery bypass surgery (which normally takes longer than two hours in the set-up), then this operation was cancelled. So, if the surgeon had posted cases which normally last less than two hours to be taken up at this time of the day, lower number of cases could have been cancelled. This high rate of cancellation could be reduced by the surgeons posting a realistic number of patients so that each patient could have a reasonable chance of being operated. Though we have six elective OTs, only four routine OTs are run on a day due to lack of anaesthetists. The cancellation rate could be reduced by having more anaesthetists and more operating days so that the surgeons will not be put under pressure to post more cases than they could operate.

Studies from academic institutions noted prolonged operation and anaesthesia times due to training of surgical and anaesthesiology residents [32,33]. This scenario is common in all teaching hospitals around the world. Since our hospital is a teaching hospital, this factor contributed to shortage of time in our study. Cancellation of elective surgeries due to shortage of time is also reported by other studies [10,11,17].

In a study of 1590 patients scheduled for elective surgical procedures, Garg R et al., reported a cancellation rate of 30.3%- the most common cause of cancellation was lack of OT time (59.7%), other causes were medical reasons- 10.8%, did not turn up on the day of surgery-16.2%, change in surgical plan- 5.4%, administrative reasons- 3.7%, and miscellaneous reasons-4.2% [10]. In a study of 325 patients from a tertiary care teaching Institute from North India, Talati S et al., reported cancellation rate of 22.5%, the most common cause was lack of OT time (78.1%), other causes were medical conditions and patients did not report [11]. Kumar R and Sarma RK reported cancellation rate of 26% and the most common cause of cancellation was unrealistic scheduling and shortage of OT time [17]. A meta-analysis on the root causes of elective surgical case cancellation showed that the pooled prevalence of surgical

case cancellation was 21.41% and the administration-related reason was the most common cause followed by surgeon-related reason [21]. A study from a recently opened, tertiary level hospital in the middle-east showed that the cancellation rate was 22.4% and the common reasons for cancellation were cultural norms and patient no-shows [22].

The second most common cause of cancellation was medical cause due to which 53 patients (10.79%) were cancelled. Because of the long waiting list, many patients had attended PAC long time before admission. Patients who were previously fit at PAC were not fit for operation on admission because of medical causes. Few patients also developed URTI after attending PAC. In fact, the most common medical cause of patients being unfit was active or recent URTI, which was common in children. Whether patients with recent URTI should undergo elective operation is controversial [34,35]. The routine practice in our hospital is to wait for 3-4 weeks after URTI before performing an elective surgery. Other medical reasons are uncontrolled blood sugar, uncontrolled hypertension, hyperthyroidism and hypothyroidism. It was found that many of these patients did not follow the medications prescribed at PAC.

Total 22 operations were cancelled because of administrative problems like non functioning OT light/table, sterile gown not available, OT not cleaned and no power supply to the operation room. This problem was high because our hospital was newly established and maintenance and repair of equipment were not often carried out in time due to shortage of staff. These cancellations could have been avoided by regular maintenance of OT table and lights. Prin M et al., reported that infrastructural limitations were the most common cause (84.8%) of cancellation of elective surgeries and equipment shortage accounted for 50.9% of cancellation [23].

Though our hospital has a separate emergency OT, it is small and furnished with limited equipment. So many emergency operations involving complex surgeries, laparoscopic and endourology procedures have to be taken up in the elective OTs leading to cancellation of elective operations. It is reported that dedicated emergency OT decreased cancellation of elective operations [36]. Presence of a large emergency OT could have avoided these cancellations. A meta-analysis on the root causes of elective surgical case cancellation showed that the pooled prevalence of surgical case cancellation was 21.41% and the administration-related reason was the most common cause followed by surgeon-related reason [21].

Eleven operations (2.24%) were cancelled due to surgeon-related issues like the surgeon attending emergency meetings or surgeon was ill. This problem happened because the department of Surgical Oncology, Urology and Neurosurgery are run by a single surgeon during the study period. In a study of 462 patients, Desta M et al., reported that 10.3% operations were cancelled because of unavailability of surgeon [24]. In the present study, there were no cancellations because of absence of anaesthetists, staff nurses and OT technicians.

Seven patients did not turn up for operation; all of them were posted for day care surgeries in Ophthalmology, Orthopaedics and General Surgery departments. This may be due to lack of communication with patients and scheduling problems. Abeeleh MA et al., reported no-shows as the most common cause of cancellation of elective surgeries [37]. A study from a recently opened, tertiary- level hospital in the middle-east showed that the cancellation rate was 22.4% and the common reasons for cancellation were cultural norms and patient no-shows [22].

Five patients had to be cancelled as their preoperative work-up was found to be incomplete in the OT. This could have been avoided by

meticulous work up and thorough checking in PAC. Two patients could not undergo operation because of unavailability of blood. One cataract operation had to be cancelled because patient did not bring the intraocular lens.

The highest rate of cancellation was observed in the department of Surgical Oncology (40.23%). This department is run by a single surgeon with one operation day in a week. It was noticed that many of the operations in this department took longer operation time than that of other departments. These factors contributed to more cancellations. The lowest rate of cancellation was observed in General Surgery department (20.63%). The department has two units with three surgeons in each unit; each unit has two operating days in a week. So, posting of cases might have been more realistic with less chance of cancellation. As there are more surgeons in the department, cancellation due to unavailability of surgeon was nil. In a 10-year study, Cho HS et al., reported the highest cancellation rate in Orthopaedics followed by General Surgery whereas Hori Y et al., reported highest cancellation rate in Orthopaedics (36.7%) [38,39].

### Limitation(s)

It is a single centre study and so may not be applicable to other institutions. We did not study the loss of OT time due to late starts, time lost in-between cases, and delay in transport of patients from the ward to the OT and from recovery room to the ward. These factors definitely contributed to shortage of time. Authors also did not study duration of unutilised OT hours because of cancellations.

### CONCLUSION(S)

In conclusion, the present study showed that the rate of cancellation of elective operations was high in this hospital and the most common reason was shortage of time. Cancellation rate was highest in the department of Surgical Oncology. More realistic OT list, more surgeons in higher speciality departments and more anaesthetists, a large and well-equipped emergency OT and regular maintenance of OTs and equipments could have avoided most of these cancellations. Regular audit of the operation list and OT utilisation should be carried out to decrease the rate of cancellation of elective surgeries.

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#### PLAGIARISM CHECKING METHODS: [\[Jain H et al.\]](#)

- Plagiarism X-checker: Apr 01, 2021
- Manual Googling: Jul 10, 2021
- iTenticate Software: Aug 05, 2021 (12%)

#### ETYMOLOGY: Author Origin

#### AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Mar 28, 2021**

Date of Peer Review: **Jun 19, 2021**

Date of Acceptance: **Jul 12, 2021**

Date of Publishing: **Sep 01, 2021**