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**Dr. Rashmi M**

a) Assistant Professor,  
Department of Hospital  
Administration, AJ Institute  
of Hospital Management,  
Rajiv Gandhi University for  
Health Sciences and Quality  
Manager, Karnataka, India

b) Patient Safety Officer,  
Quality Assurance  
Department, AJ Hospital  
and Research Centre,  
Mangalore, Karnataka, India

**Dr. Swati Rai**

Manager Operations,  
Department of Hospital  
Administration, AJ Hospital  
and Research Centre,  
Mangalore, Karnataka, India

**Vijaya Parameshwari**

Professor and Head of  
Department, Department of  
Hospital Administration, AJ  
Institute of Hospital  
Management, Rajiv Gandhi  
University for Health Sciences,  
Mangalore, Karnataka, India

**Corresponding Author:**

**Dr. Rashmi M**

a) Assistant Professor,  
Department of Hospital  
Administration, AJ Institute  
of Hospital Management,  
Rajiv Gandhi University for  
Health Sciences and Quality  
Manager, Karnataka, India

b) Patient Safety Officer,  
Quality Assurance  
Department, AJ Hospital  
and Research Centre,  
Mangalore, Karnataka, India

## A study on reasons for OT cancellations in a multidisciplinary hospital applying quality improvement tools for improving the process

**Dr. Rashmi M, Dr. Swati Rai and Vijaya Parameshwari**

### Abstract

**Background of the study:** An operation theatre is that the heart of a hospital requiring considerable human resources and expenditure from the hospital budget. However, operation theatres are underutilized and lie idle a number of the time and lots of patients who are involved operation from waiting lists aren't operated upon. Planned operations that are cancelled reflect inefficiency in management and causes inconvenience to patients. Cancellation of operations presents a serious problem in most hospitals. There are many reasons for cancellation of elective surgical cases. Cancellation of cases on the scheduled day of surgery results in inefficient utilization of manpower and scarce resources. It also leads to prolonged hospital stay in many cases. Cancellation of elective scheduled operations on the day of surgery results in an inefficient use of OR (OR) time and a waste of resources. It also causes inconvenience for patients and families. Moreover, day of surgery (DOS) cancellation creates logistic and financial burden related to extended hospital stay and repetitions of pre-operative preparations also as opportunity costs of lost time and missed income, hence with an aim of providing suitable strategies to decrease the cancellation and re-scheduling the present study was undertaken.

**Aim:** To study the common reasons for OT cancellations applying quality improvement tools and to reduce the possible OT cancellations based on the derived reasons.

### Objectives:

1. To categorize all the OT cancellations under common reasons applying Quality Improvement tools
2. Plan actions to reduce the possible OT cancellations based on the specific reason to facilitate patient safety
3. To comply with Timely OT scheduling

### Research methodology:

**Study design:** Retrospective study

**Study methodology:** Structure process outcome method

**Study sample period:** Jan-20 to Dec-20 (1year)

**Study sample size:** All OT cancellation (46) during the study period

### Quality improvement tools applied:

1. Analytical Tool: Pareto chart followed by RCA
2. Statistical Tool: Cause & Effect analysis
3. Managerial Tool: PDSA

### Source of data:

- Records maintained in the operation theatre and medical records department in the hospital.
- The medical records of all the patients, who had their operations cancelled on the day of surgery in all surgical units of the hospital, were audited prospectively. The number of operation cancelled and reasons for cancellation were documented.

**Results:** Based on the reasons decisions were made to prevent the OT cancellation at ward level itself. Consultants were encouraged to post the case only after appropriate fitness. Anesthetist & Surgeon to be informed of the investigation reports immediately on receiving in wards by nursing staff. Major critical reports if suspected by consultant during fitness then case to be scheduled only after reviewing the reports. Checklist to be prepared and followed in wards for planned surgeries with the basic requirements to prevent OT cancellations.

**Conclusion:** OT cancellation in a multidisciplinary hospital can be prevented and controlled by studying the reasons using Quality improvement tools and implementing corrective actions based on the specific reasons derived.

**Keywords:** Cases, fitness, OT cancellation, OT scheduling

### 1. Introduction

There are unique reasons of cancellation of optionally available surgical operation that varies from one hospital to another. The variety of motives given include insufficient pre-op evaluation and practice, control associated elements or infrastructural limitations, loss of running room time, and unavailability of medical institution beds, affected person-associated elements, surgical operation associated elements general practitioner related issues, fallacious scheduling and Anesthesia associated elements. Unanticipated cancellation of scheduled optionally available operations decreases theatre performance, wastes theatre time

and assets, provides to clinic fees and is inconveniencing to the sufferers, their families and the scientific teams. It additionally causes affected person dissatisfaction and decreased body of workers morale. Case cancellation outcomes in wasted investigations and cross matching, ends in postpone in patient care and may probably affect the clinical final results. Four the price of surgical cancellation is one of the most critical excellent indicators of operation theatre centers. The reasons for cancellations can be affected person associated, workup associated, health care professional associated or administrative. By knowing the reasons, appropriate steps can be applied to lessen the fee of cancellations to a minimum.

A retrospective observational examine of affected person cancellations on the day of surgical procedure in the general surgical directorate. On the day-1 cancellations convey considerable effects. This article evaluations all instances that have been cancelled on the day of surgical treatment in the popular surgical directorate of the Royal Hallam shire Hospital, Sheffield from 2005 - 2010. 978 cancellations have been made on the day of surgical treatment. Most big reasons had been due to sufferers' health (40%) and loss of theatre time (21%). The end is drawn that 80% of cancellations are avoidable or potentially avoidable and cautioned implementation of further techniques to reduce cancellations<sup>[1]</sup>.

Planning of diverse activities in an OT ought to be performed systematically in order that the allocation of body of workers is done effectively. This will involve close cooperation amongst surgeons and anesthetists. Realistic scheduling of procedures will avoid cancellation of operations. Potentially long operations ought to be diagnosed and deliberate in a way that it's far possible to finish them inside the time to be had. Cancellations interrupt affected person float and reduce the throughput of the theaters, ensuing in wasted sources. Cancellation additionally results in mental trauma to sufferers as they have to undergo the pre-operative mental and medical practice again. The emotional and financial implications for the affected person and their families can be extensive. There are various factors contributing to effective usage of to be had aid hours, including educated body of workers, appropriate centers, equipment, properly communication, operational layout, and so forth. Good usage also relies upon on a complex interaction among the provision of personnel and resources and on the attitudes and suitable exercise of all body of workers involved. Efficiency inside the theater is necessarily prompted through a massive range of surrounding sources together with pre-operative planning and evaluation, beds, theater sterile supply unit (TSSU) capacity and staffing ranges in different disciplines. Cancellation of surgical procedures refers to the exercise whereby scheduled surgical strategies aren't accomplished at the intended day of surgical treatment for diverse reasons. Cancellations and delays of surgical strategies are not uncommon occurrences for the duration of the world. The normal charge of cancellation of non-obligatory operations on the day of surgical procedure varies significantly in the literature, ranging from of planned optionally available operations. Different motives could have been accounted for cancellation of surgical procedures. Cancellation of surgeries is indicative of inadequate utilization of the operating room assets, prolongs the waiting listing, depreciates the sources of fee-paying sufferers, waste

manpower resources and affects negatively on the overall health care shipping. Other effects of surgical cancellation are psychological, social and financial implications for patients and their households. There might be monetary loss to health center, disappointment, frustration and lack of schooling opportunities. It is likewise disturbing for patients and their families or relative to get permission once they missed the primary granted to them, Cancellation of emergency surgical cases then again can cause deterioration of patient's widespread situation, inconveniences to the affected person and household, growth in affected person prices while such patients are referred to another middle, and affected person may additionally finally die. Every hospital's management seeks to achieve excellence in working theater's efficiency; however this would be tough with an excessive cancellation fee of non-obligatory surgical operations. The operating theater is the clinic's largest price center and the most important supply of income. It is recommended to recognize the efficiency of the running theater and to reduce the excessive price and boom the source of sales.

In the growing nations, cancellation of elective surgical operations is common and maximum of these cancellations are because of preventable reasons. Cancellation of elective operations is known to boom fee, lower efficiency, and waste time and resources; it is able to additionally cause enormous emotional distress and trauma to the affected person and his family, further to the economic improved burden and social disturbances. The monetary burden is accelerated through repetition of preoperative investigations and arrangements. The social burden is caused by the coolest quantity of the patient's family contributors and friends who accompany the affected person to assist him at some point of and after operation. In Sudan as in many growing international locations wherein the families are prolonged, participants of the own family feel obliged to come to visit and guide their affected person in the course of surgery. This requires go away from paintings and financial fee. The struggling of sufferers who had cancelled operations is probably extended and the chances of achieving most beneficial effects is probably decreased. Cancellation can also prolong the postoperative rehabilitation length, and it is able to also result in loss of accept as true with and confidence inside the sanatorium and health care provider and make a contribution to the sensation of lack of confidence and uncertainty and for this reason growing the concern of the affected person. The maximum negative effect of cancellation of surgical treatment is while cancellation happens after patient's training (i.e., at the day of surgical operation inside the operating room [OR]. Cancellation costs vary extensively between different types and capacities of hospitals and rely upon the surgical subspecialty, character surgeons, how data had been accumulated, and how cancellation become defined. The price of cancellation can be excessive while nonattendance of patients and/or the administrations' related causes are included. Data whether or not amassed prospectively or retrospectively might also have an effect on the cancellation's fees. The significance of the hassle of the cancellations of the surgical operations varies substantially from 1% to up to 25% for outpatients and 66% for inpatients. This variant of the charges of cancellations of non-compulsory surgical operations also relies upon on the availability of group of workers and patients' clinical

conditions. Different research pronounced specific incidences, motives, and causes of cancellations of optional surgical operations. To lessen the charges of cancelled surgical operations and improve the running theater efficiency, the motives and reasons of cancellation must be diagnosed, analyzed, and taken appropriate measures that would help decreasing the value of the problem. Late cancellations or postponements of optional surgery will continually be present due to intercurrent diseases, paintings dedication, and social duties of the fitness care companies and sufferers. The goals of the present have a look at have been to research and examine the reasons and causes of cancellation of the optionally available surgical operations, establish its quantity, and recommend measures to be followed to reduce prices and improve operating theater performance, in our teaching hospital.

**2. Objectives**

1. To categorize all the OT cancellations under common reasons applying Quality Improvement tools
2. Plan actions to reduce the possible OT cancellations based on the specific reason to facilitate patient safety

3. To comply with Timely OT scheduling

**3. Research methodology**

Study design: Retrospective Study

Study methodology: Structure Process Outcome method

Study sample period: Jan-20 to Dec-20 (1 year)

Study sample size: All OT cancellation (46) during the study period

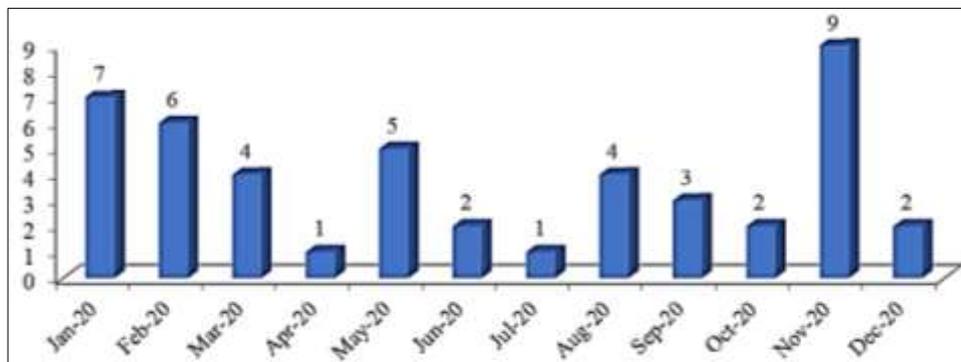
Quality improvement tools applied:

1. Analytical Tool: Pareto chart followed by RCA
2. Statistical Tool: Cause & Effect analysis
3. Managerial Tool: PDSA

**Source of data**

- Records maintained in the operation theatre and medical records department in the hospital.
- The medical records of all the patients, who had their operations cancelled on the day of surgery in all surgical units of the hospital, were audited prospectively. The number of operation cancelled and reasons for cancellation were documented.

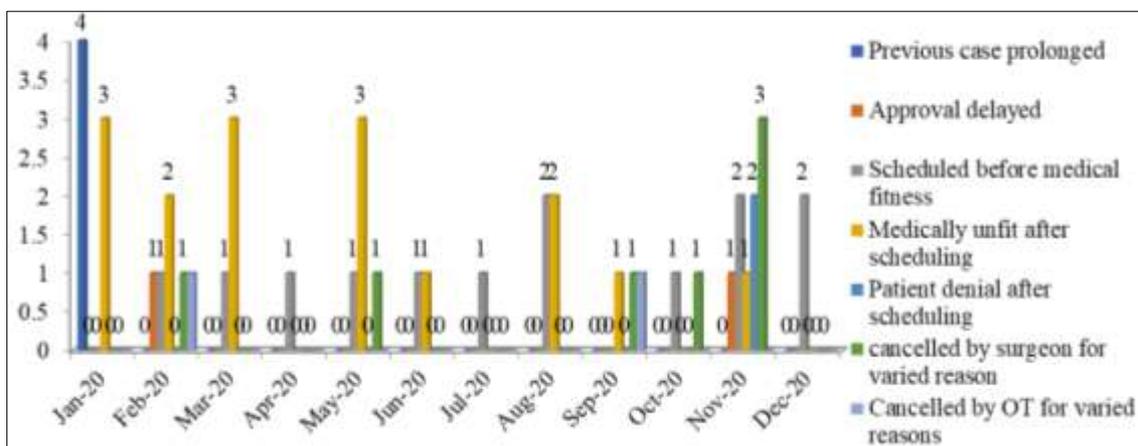
**Data analysis and Interpretation**



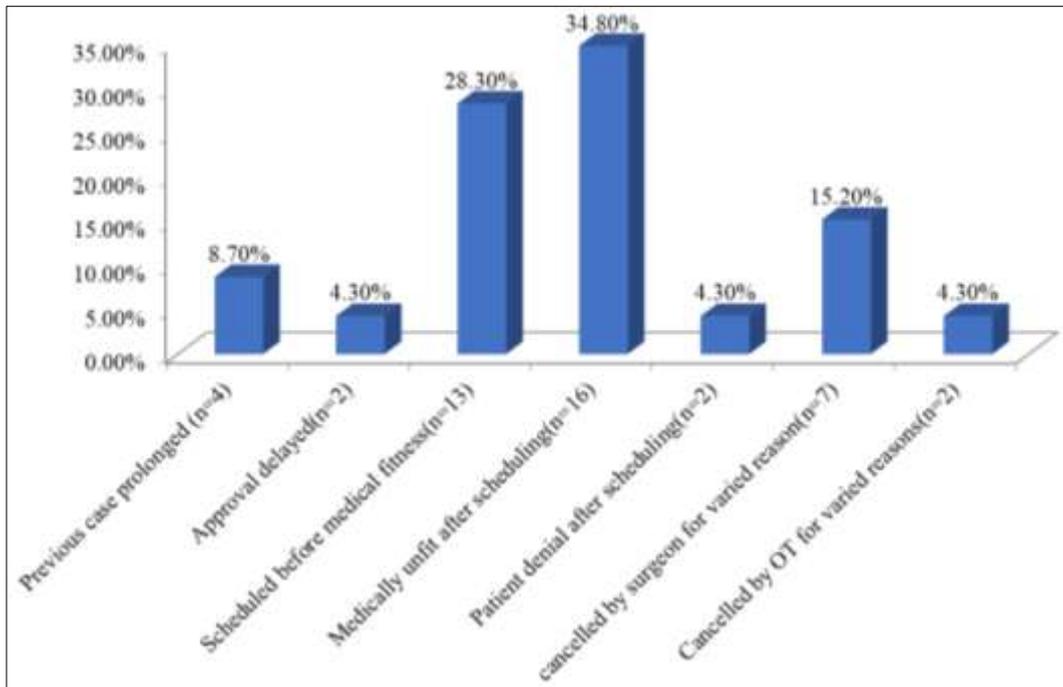
**Fig 1:** Details of OT cancellations (Jan-20 to Dec-20)

**Table 1:** Percentage of OT cancellations (Jan-20 to Dec-20)

	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20
Number of surgeries planned	471	378	350	106	177	202	139	161	183	263	290	305
% of Cancellations	1.5%	1.6%	1.1%	0.9%	2.8%	1.0%	0.7%	2.5%	1.6%	0.8%	3.1%	0.7%



**Fig 2:** Reasons wise OT cancellations (Jan-20 to Dec-20)



**Fig 3:** Percentage of the reasons for OT cancellations (Jan-20 to Dec-20)

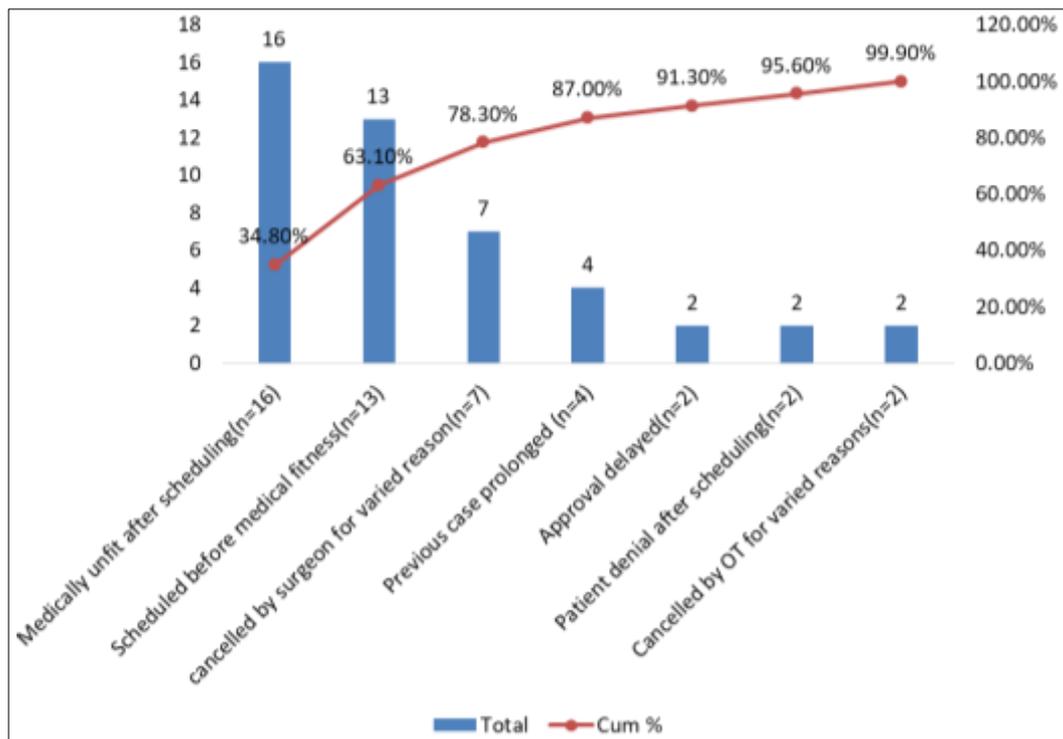
**Tools applied**

**I. Pareto analysis**

It is noted that among the reasons of OT cancellations 80% of the causes were from 43% of the reasons for

cancellations.

These 43% of reasons for cancellations were further studied with specific reasons through RCA method and analyzed.



**Fig 4:** Pareto analysis

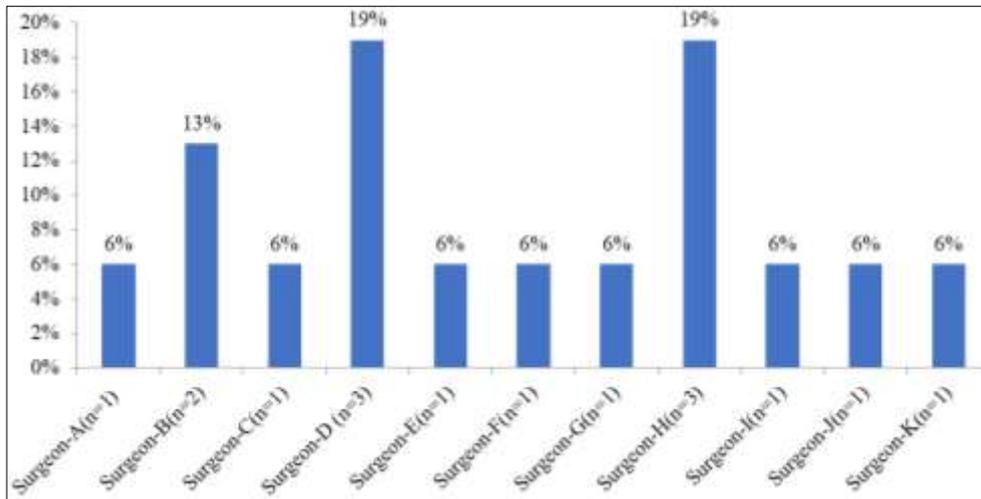
**II. RCA of the 43% of the Reasons noted**

**1) Medically unfit after scheduling: (n = 16 cases)**

- a. Medical fitness not asked by surgeon
- b. Medical fitness taken but variation noted in BP on day of surgery
- c. Medical and anesthesia fitness taken but investigation reports on the day of surgery showed variations

- d. Patient suddenly reported with high temperature on the day of surgery
- e. Clinical condition on the day of surgery did not support to be taken for surgery

Although endocrinologist fitness taken but FBS reported high on the day of surgery.

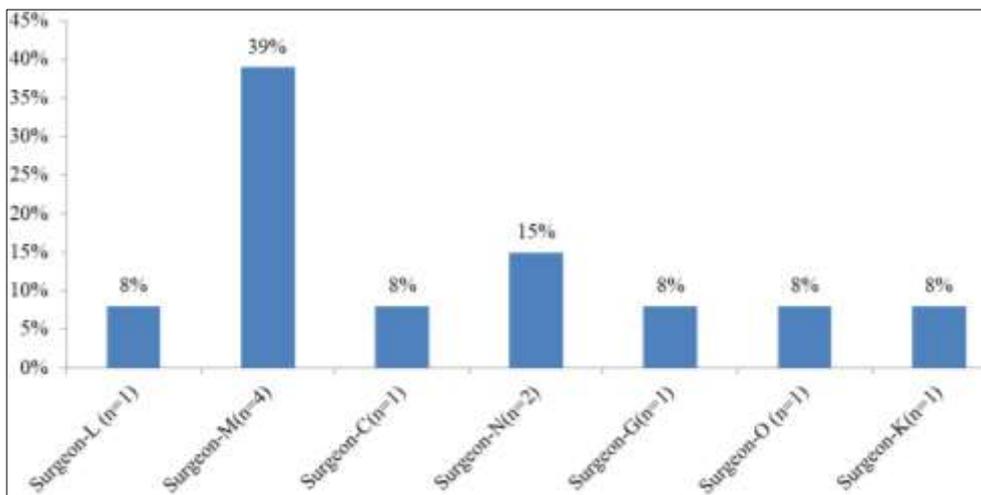


**Fig 5:** Medically unfit after scheduling (n = 16) doctor wise categorization

**2) Scheduled before medical fitness: (n = 13)**

- a. Anesthetist demanded medical fitness
- b. Reviewing the investigation reports the plan of surgery changed.
- c. Patient was on certain medication (Tab Clopitab, Tab Deplat etc.) due to that anesthesia fitness was not given
- d. During anesthesia fitness investigations (chest X-ray, PT INR, etc.) were suggested and hence case cancelled.

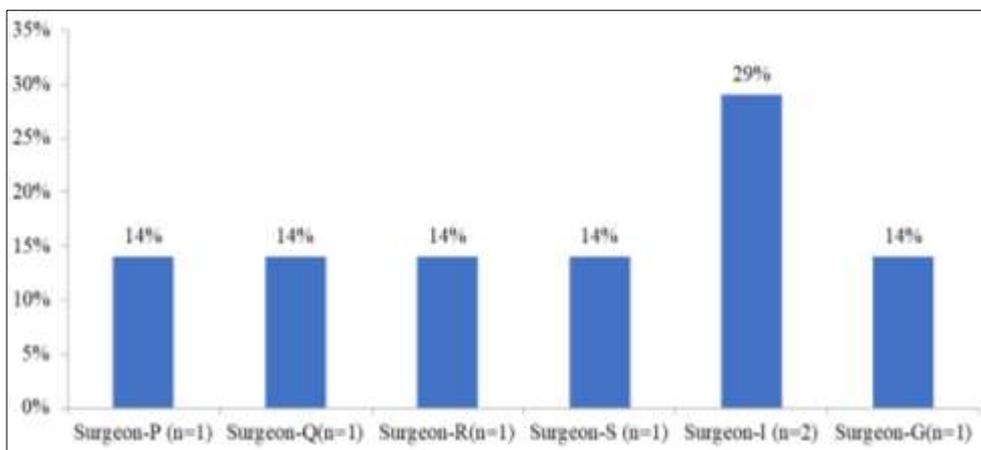
Clinical condition on surgery day has variations (cough, breathing difficulty, high BP, high temperature, etc.)



**Fig 6:** Scheduled before medical fitness (n = 13) doctor wise categorization

**3) Cancelled by surgeon for varied reason (n = 7)**

- a. Surgeon had emergency Case
- b. OT not available at surgeon's specified time
- c. Surgery plan was changed
- d. Further investigations were planned



**Fig 7:** Cancelled by surgeon for varied reason (n = 7) doctor wise categorization

### III. Cause and Effect diagram

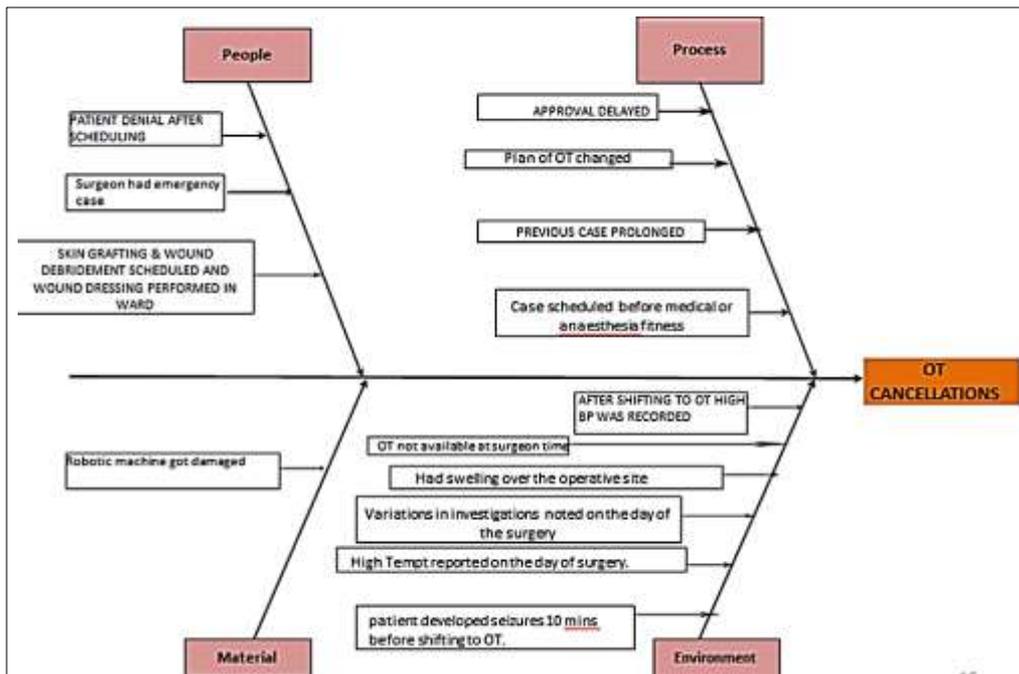


Fig 8: Cause and Effect diagram (Fish bone analysis)

### Outcome of OT cancellations

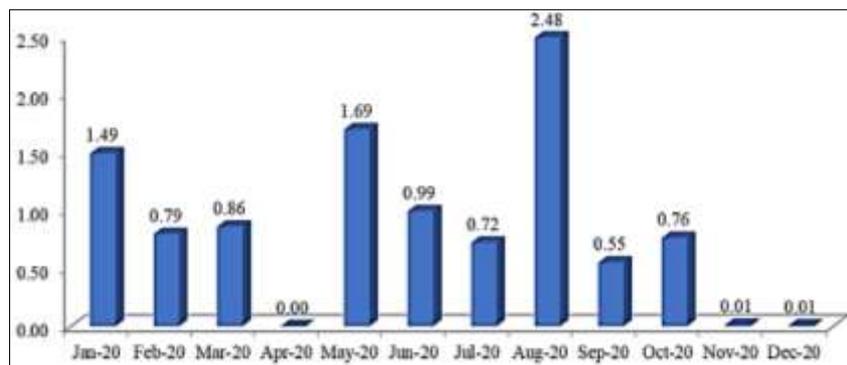


Fig 9: Percentage of rescheduling of surgeries (Jan-20 to Dec-20)

Table 2: Details of rescheduling of surgeries (Jan-20 to Dec-20)

	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20
Number of surgeries planned	471	378	350	106	177	202	139	161	183	263	290	305
No. of cases Cancelled	7	6	4	1	5	2	1	4	3	2	9	2
Number of cases rescheduled	7	3	3	0	3	2	1	4	1	2	5	2

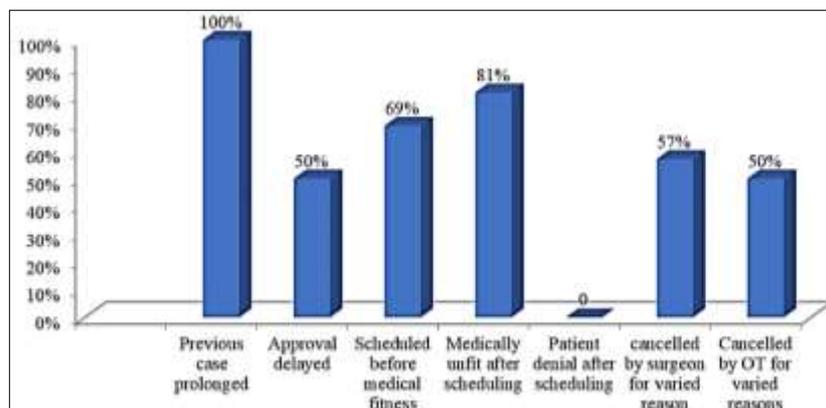
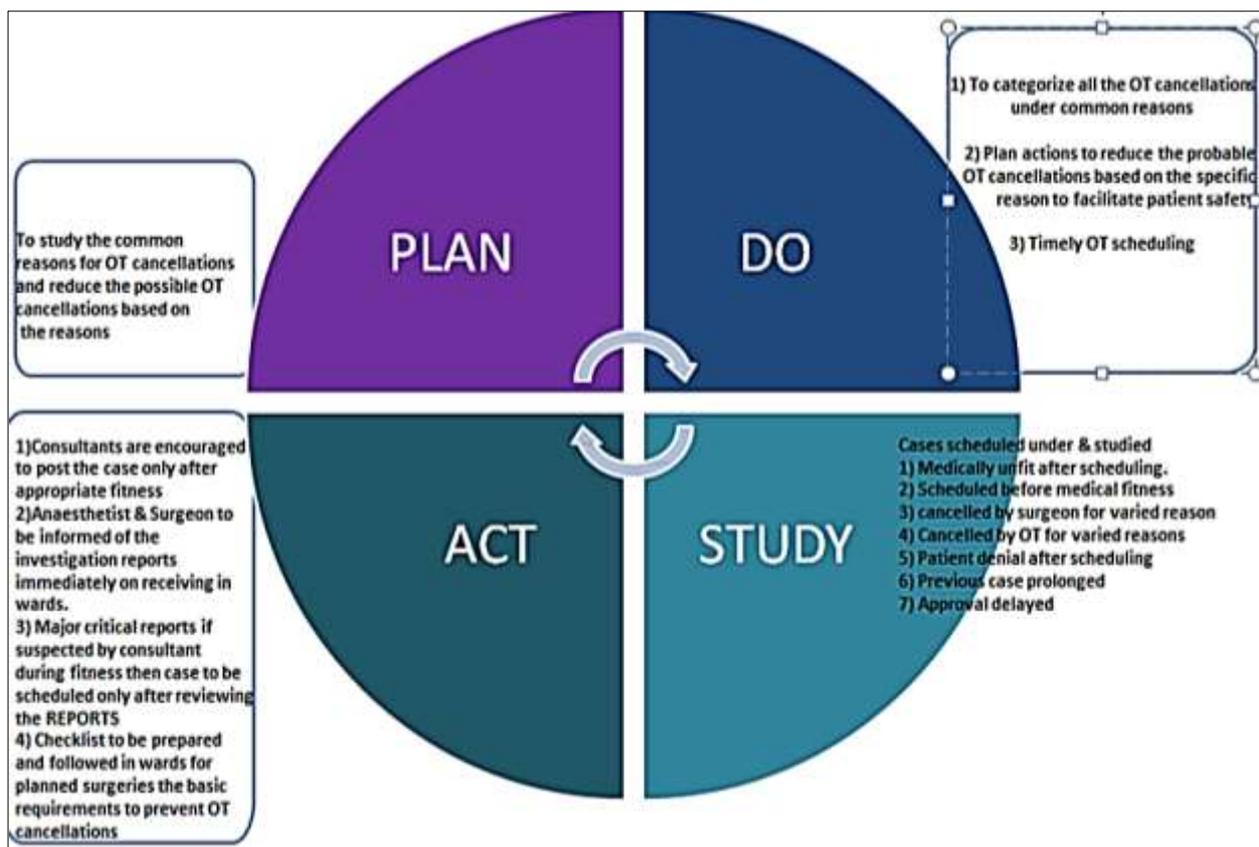


Fig 9: Percentage of cases with specific reasons rescheduled

**Structure process outcome of the study**

**Table 3: Donabedian model**

Structure	Process	Outcome
1) OT scheduling is performed to have an uniform, timely and streamlined method of OT allocation and facilitate appropriate OT utilization and patient care is not affected. 2) Among the OT scheduled if cancellations occurs then there is disturbance in the routine process. 3) Patients kept on NPO are physically & mentally influenced and leads to patient dissatisfaction. 4) Patient safety culture in the organization is affected.	1) The number of cases scheduled are studied along with the cancellation and their reasons for cancellation also. 2) These all cancellations are categorized under major defined categories based on the retrospective reasons compiled. 3) Reason wise specifications are analyzed where the cancellations could have been prevented. 4) Doctor wise cancellations to any specific reasons were also analyzed to work on such reasons. 5) Reasons specific rescheduling also studied to know how many times the cases were rescheduled or missed out for administrative workup	1) Based on the reasons decisions were made to prevent the OT cancellation at ward level itself. 2) Consultants are encouraged to post the case only after appropriate fitness 3) Anesthetist & Surgeon to be informed of the investigation reports immediately on receiving in wards. 4) Major critical reports if suspected by consultant during fitness then case to be scheduled only after reviewing the Reports. 5) Checklist to be prepared and followed in wards for planned surgeries the basic requirements to prevent OT cancellations



**Fig 10: PDSA cycle**

**4. Discussion**

An examine evaluated the neurosurgical operation theater utilization in a neurosciences coaching hospital. Method used was statistics accrued included OT begin time, delay in start, anesthesia induction time, surgical coaching time, anesthesia recuperation time, operating time, time between cases, and theater closing time. Result, five hundred thirty-seven surgical procedures were carried out all through the look at length. The percentage of time used for anesthesia induction, actual surgical operation, healing from anesthesia, and theater education among the two instances had been 8%, 70%, 6% and five%, respectively. Fourteen percentage of scheduled cases were cancelled. On 220 activities (70 Fifty one %), theater changed into over-run.

Late start contributed to lack of 8370 mins (140 hours) of theater time. In Conclusion, this look at identified the percentage of time spent on each interest within the neurosurgical OT. This understanding is probable to facilitate higher making plans of neurosurgical theater schedule and result in optimum usage [2].

Kumar R, Ghandhi R, administered on observe “Reasons for cancellation of operation on the day of intended surgery during a multidisciplinary 500 bedded hospitals. “Cancellation of operations in hospitals is a full-size trouble with some distance achieving consequences. This look at was deliberate to assess reasons for cancellation of non-compulsory surgical operation at the day of surgical procedure in a 500 bedded Government medical institution.

Method implemented right here is, the scientific facts of all the patients, from December 2009 to November 2010, who had their operations cancelled at the day of surgical operation in all surgical devices of the clinic, have been audited prospectively. The range of operation cancelled and motives for cancellation have been documented. Most reasons of cancellations of operations are preventable [3].

Late cancellation of scheduled operations is a main purpose of inefficient use of running-room time and a waste of sources. They studied elective running theatre bookings in standard surgical area. On the day of surgical procedure, the intended list changed into mentioned and a listing of cancellations with the cause turned into cited by way of the attending anesthesiologist. Many of the on-the-day surgical treatment cancellations of elective surgical treatment have been probably avoidable. It became found that cancellations because of loss of theatre time were now not simplest a scheduling problem however were specifically caused by surgeons underestimating the time wished for the operation. The requirement of the contraptions important for scheduled surgical listing need to be discussed a day prior to deliberate OR listing and arranged. The non-availability of the surgeon should be knowledgeable in time in order that some other case is substituted in that slot. All sufferers who've met PACU discharge standards have to be discharged directly to save you put off in shifting out of the operated affected person. Day care patients ought to be counseled safely to report on time. Computerized scheduling need to be utilized to create a practical optionally available time table. Audit have to be achieved at ordinary periods to find out the effective functioning of the operation theatre [4].

A Pareto evaluation confirmed that around eighty % of the regarded reasons for cancellation after admission had been thanks to a scarcity of surgical theatre time (30%), incomplete preoperative assessment (21%), top respiratory tract contamination (19%), and high blood stress (thirteen%). Conclusion of this take a look at recognized the maximum commonplace reasons for operation cancellation at a coaching health facility. Potential avoidable root reasons and advocated interventions have been recommended accordingly. Future research, to be had sources, clinic guidelines, and strategic measures directed to address these motives have to take priority [5].

A Prospective Study on Operation Theater Utilization Time and Most Common Causes of Delays and Cancellations of Scheduled Surgeries in a thousand-Bedded Tertiary Care Rural Hospital with a View to Optimize the Utilization of Operation Theater. The operation theater (OT) complicated is a costly factor of a sanatorium price range expenditure. This vicinity of hospital pastime requires maximum usage to make certain most efficient fee benefit. To obtain a high level of utilization in the OT, it's far essential to effectively coordinate quantity of sports and employees. Methods used in this take a look at become performed in a one thousand-bedded tertiary care coaching medical institution in rural Maharashtra over a period of two months. The OT complicated consists of 8 most important OTs. Normal working hours for routine scheduled cases on all running days except Sundays and public vacations. Results of the have a look at changed into overall have a look at duration consisted of ninety six operating days. There had been a complete of eight OT tables of various specialties, and parameters have been located during the ordinary hours excluding Sundays and vacations. The general manner time

turned into maximum for ENT followed via orthopedics and least for obstetrics. Room turnover time was most for obstetrics accompanied by means of popular and on surgery. Case delays had been most in widespread surgical operation and least for ophthalmology. The most commonplace motive for postpone in beginning the operation desk turned into affected person getting shifted past due from the ward and administrative reasons. The most prominent reasons for cancellation have been loss of running room time followed through scientific reasons of the patient. Examine concluded that most of the reasons of delays and cancellations of surgeries had been avoidable with right preoperative planning and optimization of patients and assets and precise verbal exchange between healthcare professional anesthesiologists and the nursing team of workers [6].

A prospective health center-primarily based cross-sectional take a look at design turned into performed in a tertiary referral educational medical centre in Ethiopia among 146 participants. A self-administered questionnaire with an observatory checklist became used for collecting records from the anaesthetist, nurse, and surgeons. In this study, 462 patients have been scheduled for optional surgical operations. The cancellation changed into especially because of flawed scheduling (20.5%), unavailability of surgeons (8 Nine %), unavailability of oxygen and blood (8%) and gadget (5.5%). Orthopaedic (28.8%) and fashionable surgery (17.1%) have been the most typical cancelled cases. The cancellation rate in instructional scientific Centre remains high. Improper scheduling, unavailability of surgeons, scientific contamination, and unavailability of working room equipment had been the most typical cause for the cancellation of optionally available operation. Most cancellations had been preventable. For this, right preoperative assessment, right scheduling, pleasing essential running room device's and move-matched blood via the medical institution and different stakeholders, early clean conversation with working room group like surgeons became recommended [7].

## 5. Interpretation of the study

- OT scheduling is performed to have an uniform, timely and streamlined method of OT allocation and facilitate appropriate OT utilization and patient care is not affected.
- Among the OT scheduled if cancellations occurs then there is disturbance in the routine process.
- Patients kept on NPO are physically & mentally influenced and leads to patient dissatisfaction. Patient safety culture in the organization is affected
- The number of cases scheduled are studied along with the cancellation and their reasons for cancellation also.
- These all cancellations are categorized under major defined categories based on the retrospective reasons compiled.
- Reason wise specifications are analyzed where the cancellations could have been prevented.
- Doctor wise cancellations to any specific reasons were also analyzed to work on such reasons.
- Reasons specific rescheduling also studied to know how many times the cases were rescheduled or missed out for administrative workup
- Based on the reasons decisions were made to prevent the OT cancellation at ward level itself.

- Consultants are encouraged to post the case only after appropriate fitness
- Anesthetist & Surgeon to be informed of the investigation reports immediately on receiving in wards.
- Major critical reports if suspected by consultant during fitness then case to be scheduled only after reviewing the reports.
- Checklist to be prepared and followed in wards for planned surgeries the basic requirements to prevent OT cancellations

## 6. Conclusion

The goal of every healthcare team in the new millennium should be to minimize cost of treatment by encouraging cost effectiveness in every aspect of patient care. Efforts should be made to prevent cancellation of elective surgery by careful planning, bearing in mind the local constraints in human and material resources. This study highlights that most causes of cancellations and delays of surgeries are avoidable, and efforts should be made to prevent cancellation of surgery by careful planning and utilization human and material resources.

## 7. Limitations of the study

1. As the study period was during the pandemic period, the numbers of OT cases scheduled were very minimal and hence cancellations also could not be matched accordingly.
2. There were no specific reason attributing to any specified surgeon and hence scope of improvement was minimal.

## 8. Future scope of study

The study can be continued in Phase-2 and monitored with corrective actions taken and for specific reasons from specified surgeons if any during the post pandemic phase.

## 9. Acknowledgment

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