The Burden of On Day Surgery Cancellationsin a Quaternary Care Hospital

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ABSTRACT

Background: Considerable resources are invested in maintaining a well-functioning operatingtheatre. Cancellation of elective scheduled operations leads to an inefficient use ofoperating room time and a waste of resources. Cancellation is a major problem inmost hospitals. Elective surgical case cancellation refers to any surgical case that is bookedinto the operation theatre list on the day prior to surgery but is not operated upon as scheduled. The reasons for cancellation of elective surgical cases are many; they are as unique as they are similar.

Aims & Objective: The study aims to assess the magnitude ofelective case cancellation and delineate the reasons for elective case cancellations across all surgical departments. The study aims to suggest necessary steps to alleviate the problem.

Methodology: A prospective study was done from 2nd January 2020 to 19th March 2020 ata quaternary care hospital. All elective surgeries scheduled during the period were taken into study. The cancellations on day of surgery was recorded and the reasons for these cancellations were obtained from the Patient Financial Counsellors.

Procedure: The reasons were categorized as potentially avoidable and unavoidable, as well as hospital related and patient related reasons. The collected data was analyzed and a pareto analysis was done to identify the major contributing factor for potentially avoidable cancellations.

Results: Out of 3998 elective surgeries, 534 surgeries were cancelled (13.3%). The majorreason for cancellation was clinical reasons (22%) followed by bookings with incorrect details(16%), non-affordability (14%), postponed due to delay in insurance approval (12%), postponed due to personal reason (12%), patient not willing for surgery (12%), patient not responding to calls (7%), surgery done in other hospital (2%), cancelled due toclinical reason (2%), wants to take second opinion (1%) and medical management, unavailability of OT, unavailability of surgeon each at 0%. Cancellation was highest withOrthopedics (20%), ENT (16%), Urology and Oncology with 13% each. The pareto analysis reveals that 80% of cancellations were due to bookings with incorrect details, non-affordability, postponed due to delay in insurance approval, postponed due to personal reasons and patient not willing for surgery. Appropriate interventions focusing on the majorcontributors for cancellations will help reduce the on day surgical cancellation rates.

INTRODUCTION

An Operation Theatre is considered as the major revenue center for any hospital. Major hospitals invest considerable resources in maintaining operating theatres and also instaffing the operation theatre asper the fixed schedule. For elective surgeries, preoperativeprotocols can include laboratory and radiological work-ups, pre-anesthetic clinic (PAC) assessments and the booking of intensive care unit beds. Unanticipated cancellation of scheduled elective surgeries at the last minute or even on the morning of surgery is a matterof concern to patients, their families and the medical teams. Studies have shown that patient related reasons, administrative and medical reasons have accounted for operation cancellations [18]. From an administrative perspective, surgical cancellation leads to OT underutilization. From a quality management perspective, a low surgical cancellation rateis a fair indicator of the efficient OT utilization as well as the hospital's financial resource.

The study was done in a 600 bedded quaternary care hospital in Bangalore. Several literatures have suggested scheduling cases a day prior to the surgery rather than months or weeks before and also confirming with the patient a day prior to the surgery to minimizecancellations. The hospital having such measures in practices faces a cancellation rate of 13.3%. The aim of the study was to identify on day cancellations of scheduled elective surgeries and determine the reasons for these cancellations. Cancellation on the day of theintended surgery was defined as the surgery that was scheduled on the final list of surgeryfor the day (generated at 4:00 PM the previous day) and that was not performed that day. The hospital has 4 Operation Theatre Complexes housing 20 Operation Theatres. The cancellations of various specialties were considered in the study. The reasons for cancellations for each day is captured by the individual Patient Financial Counsellors of each specialty. The rate of surgical cancellations within different surgical specialties was determined to identify specific specializations with high cancellation rates.

The reasons were analyzed and categorized into various sub categories. Further a Pareto Analysis was done for the reasons for cancellation to look into the factor that has a major impact on cancellations. This study looks into the gaps of the existing process measures and thereby recommending steps to streamline the process.

OBJECTIVES

- To identify cancellation of elective surgeries on the intended date of surgery
- To determine the reasons for cancellation of elective surgeries
- To identify specialty wise cancellation of elective surgeries
- To evaluate the reasons and identify areas of improvement

LITERATURE REVIEW

Cancellations are a world-wide problem, ranging from 0.37–28 percentage in developed [2,3,4,5,6,7,8,9]

and from 11 to 44 percentage in developing countries [10,11,12,13,14]. Itcan be avoidable and non-avoidable [15] and avoidable cancellations were the commonest[4, 16, 17]. The reasons for cancellation are unique to each hospital. The reported incidenceof cancellation in different hospitals ranges from 10% to 40% [35]. Cancellation of surgical procedures leads to wastage of hospital resources and monetary as well as psychological trauma to the patients and their families. Fischer reported that almost 90 percentage of operating room (OR) cancellations are day-of-surgery cancellations [21]. In a study that included emergency and elective surgeries, it was observed that 89 percentage of cancellations occurred among patients undergoing elective surgery [22]. Cancellation canbe due to factors related to the hospital itself or due to patient-related factors. Garg et al inhis study stated that hospital and administration related factors were the main reasons for operation cancellations [1]. A study at a district hospital in UK found 51 percentage of the cancellations due to patient related reasons [23]. 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 percentage; medical causes were responsiblefor 28 percentage of cancellations, while facility unavailability led to 20 percentage of thecancellations.[2] .A hospital in Malawi had a cancellation rate of 44.2 percentage of 10,730 scheduled surgeries with the most common reason for cancellation being infrastructural limitations (84.8 percentage), including equipment shortages (50.9 percentage) and time constraints (33.3 percentage). Anesthesia provider limitations accounted for 16.5 percentage of cancellation and Preoperative medical conditions contributed to 26.3 percentage of cancellation [14]. 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 percentage and 18.1 percentage of surgical cancellations, respectively, while 17.5percentage were due to patient cancellations.[3].The National Audit Office in Britain examined five district health authorities and concluded that hospitals are being used half itcapacity despite the long waiting lists. In a study at the MOH hospital in Oman, patient no-shows were the most prevalent reason for surgical cancellation (63 percentage) with the second most common reason being surgical (17 percentage), including changes in surgical plans.[19] 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. In majority of the literature the reason for cancellation was attributed to non-availability of the facility. There is a lack of agreement in the literature regarding the mostprevalent reasons for cancellations. In the light of this gap in literature this study aims at identifying not only the reasons for surgical cancellations but also the rate of surgical cancellations within different medical specialties. Several literatures suggest previous dayscheduling of cases rather than generating the surgery list weeks or month prior. Pratap etal. reported a quality improvement trial at a children's hospital aimed at reducing patient-related causes of surgical cancellation using additional communication techniques such assimplified colorful instruction sheets and call/text message reminders; these interventionssuccessfully reduced wasted OT time from 5.7 to 3.6 hours per day [20]. Marc et al in theirstudy on predicting patient nonappearance to improve operation theatre utilization suggested identification of such patients in advance by predicting patient

nonappearance on an objective basis from the preoperative record. Such patients could be scheduled at the end of the OR day, when nonappearance would be less likely to disrupt the OR schedule. Redesigning work processes, improving management, and performing early clinical evaluation of patients have been suggested to reduce cancellations [24,25]. Hospitals haveredesigned the scheduling process to reduce on day surgical cancellations. The hospital under the study has an existing practice of previous day preparation of surgery list and alsoof taking a verbal confirmation from the patients side the previous day. With the existenceof these practices the audit of cancellations will help us to identify the areas of improvement and minimizing wastage of resources.

METHODOLOGY

Sample Design: Descriptive Prospective Study

Study Area: General OT Complex, Orthopedics OT Complex and Neurosurgery OT Complexes

Study Period: January 2nd 2020 to March 19th 2020

Sample Size: All scheduled elective surgical cases

Exclusion Criteria: Elective surgeries on Sundays and public holidays were excluded in the study. Cardiothoracic surgery was excluded from the study as it doesn't follow the online scheduling system.

Study Method: Cancellation on the day of the intended surgery was defined as the surgerythat was scheduled on the final list of surgery for the day (generated at 4:00 PM the previous day) and that was not performed that day. Data of the cancelled surgeries was collected real time and sent to Patient Financial Counsellors (PFC) specific for each specialty. All patients scheduled for elective surgery between January- March were included. The PFCs contact the patients and the respective surgeons and updates the reasonfor cancellation. These reasons were categorized as potentially avoidable and unavoidablereasons and also as patient related and hospital relate reasons. A Pareto chart was constructed to prioritize the reasons that accounted for 80 % of the potentially avoidable surgical cancellations.

Sampling: All patients scheduled for elective surgery between January 2nd 2020 to March19th 2020 were included in the study

Data Collection: Primary data collection was by recording the daily cancellation of scheduled elective surgeries. The cancellations of the following specialties were included in the study as they were scheduled the previous day:

1) General Surgery
2) Vascular Surgery
3) ENT
4) Surgical Oncology
5) Plastic Surgery
6) Pediatric Surgery
7) OBG
8) Urology
9) Nephrology
10) Orthopedics
11) Spine Surgery
12) Neurosurgery
13) Surgical Gastroenterology
14) Dental Surgery
15) Respiratory Medicine and Pulmonology

The reasons for cancellation of these surgeries were obtained from the PFC's real time.

DATA ANALYSIS AND RESULTS

4.i. Mapping of the scheduling Process:

The following chart represents the process flow for scheduling. A dedicated OT Coordinator looks in to the scheduling process and with coordination with the Patient Financial Counsellors finalizes the surgery list.

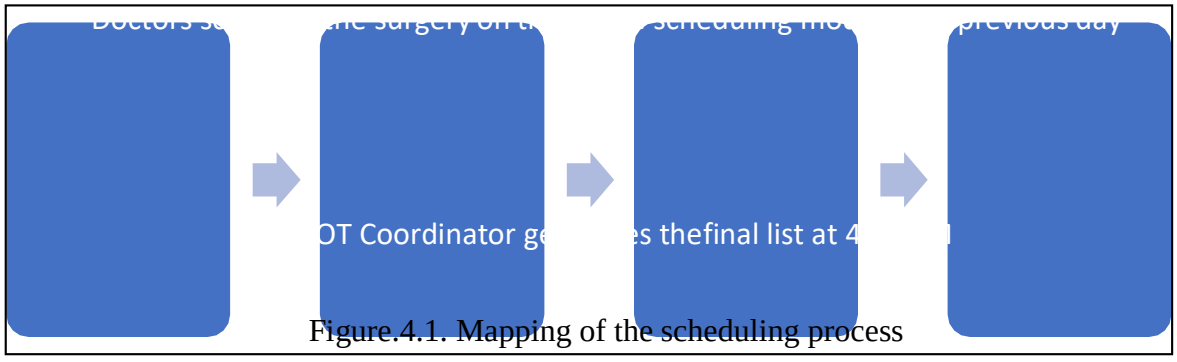


Figure.4.1. Mapping of the scheduling process

4.ii. Percentage of cancellation during the study period

The total number of elective surgeries during the period were 3998 and the numberof cancellations were 534. The cancellation rate was derived as 13.3%.

Total number of Surgeries performed during the period	3998
Number of Cancellations	534
Percentage of Cancellations	13.3%

Table.4.1. Percentage of cancellations

4.iii. Status on previous day based on response from PFC

The details of the surgeries posted online were sent to the PFC daily. The PFC's check withthe patient through telephonic conversation for their confirmation flowing which the OT Coordinator receives an updated list with the confirmation status. The following table

represents the status as confirmed on the previous day by the PFC's for the cancelled surgeries during the study period.

Status on Previous Day	**Frequency**
Confirmed	**287**
Not confirmed	**123**
Dummy booking	**58**
Not Responding	**51**
No information	**15**
Total	**534**

Table.4.2. Status on previous day based on response from PFC

Based on the data, 54% of cancelled surgeries were updated as confirmed by the PFCs onthe previous day, 23 % unconfirmed surgeries that was scheduled by the coordinator resulted in cancellations.

The unconfirmed status indicated the patient has not given confirmation due to reasons such as affordability, awaiting insurance approval, postponement due to personal reason, patient wants to take second opinion and not prepared for surgery. Unconfirmed status wasalso due to booking with incorrect details and medical reasons like postponement or cancellation due to clinical reason.

The dummy booking status updated by PFC's indicates the prevalence of booking with incorrect details by doctors for reserving slots in the OT List for any anticipated but not confirmed patients. Among 534 cancelled surgeries, 11% was marked as dummy bookingthe previous day by the PFC's.

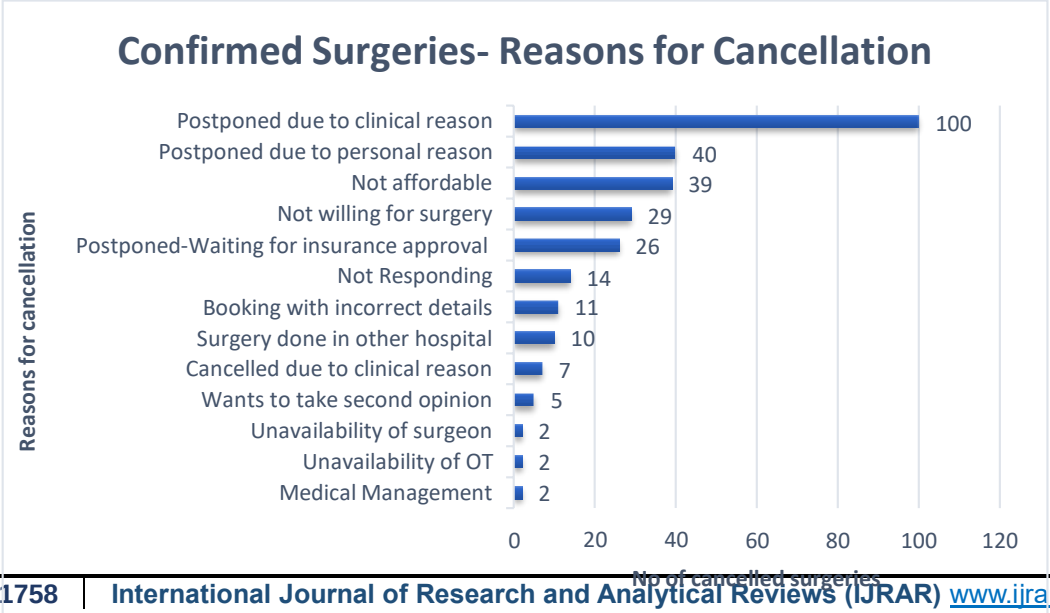
For 9.5% of cancelled surgeries, the patients were not responding to the calls by the PFC.There was no information provided by the PFC's on the previous day for 2.8 % of cancelledsurgeries.

4.iv. Status of confirmation on previous day versus Reason for cancellation

The following are the reasons for cancellation for scheduled surgeries along with the statusof confirmation updated the previous day.

4.iv. (a) Confirmed Surgeries- Reasons for Cancellation

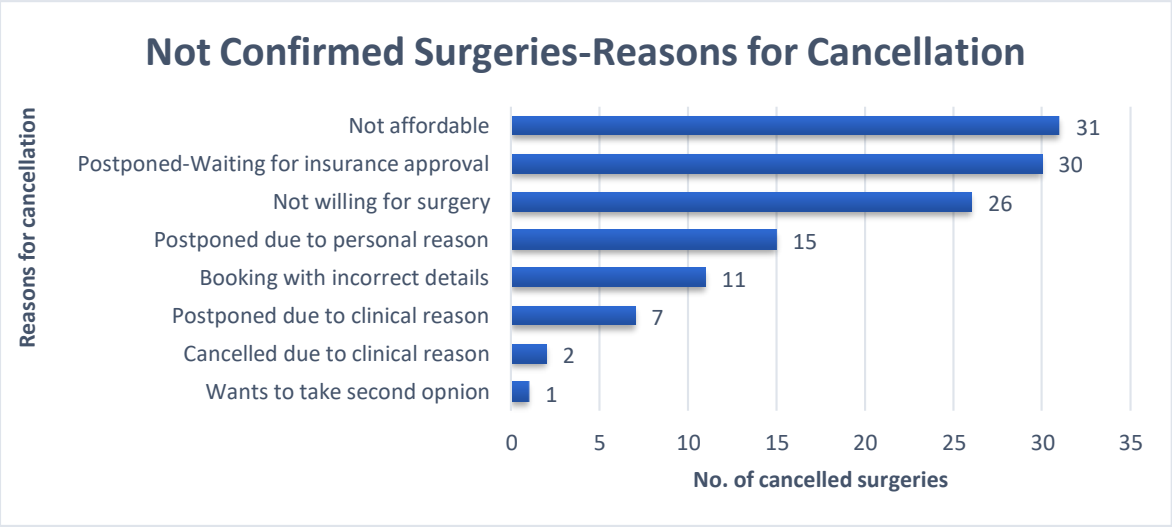
On analysis of the 287 cancelled surgeries that were confirmed on the previous day by thePFC's it revealed that 34% of the cancellations were due to clinical reasons,14% surgerieswere postponed due to personal reasons not specified by the patient. Non affordability wasstated by 13.5% patient as the reason for on day cancellation. 10% patients were not willingfor surgery and 9% patients had the surgery postponed due to delay in insurance approval.4.8% patients did not show up for surgery or respond to calls after giving confirmation theprevious day. 3.8% of surgeries that were confirmed the previous day were later identified as dummy booking following the on-day cancellation and 2.8% patients had the surgery done in other hospitals. 2.4 % of surgeries were cancelled the previous day due to clinicalreasons like betterment of the patient condition and 1.7 % of patients wanted a second opinion. The unavailability of the surgeon and unavailability of OT accounted for of 0.6%cancellations and 0.6 % patients had the surgeries cancelled on the advice of the doctor formedical management.



Graph.4.1. Graph representing Confirmed surgeries with the reasons for cancellation

4.iv. (b). Not Confirmed Surgeries- Reasons for Cancellation

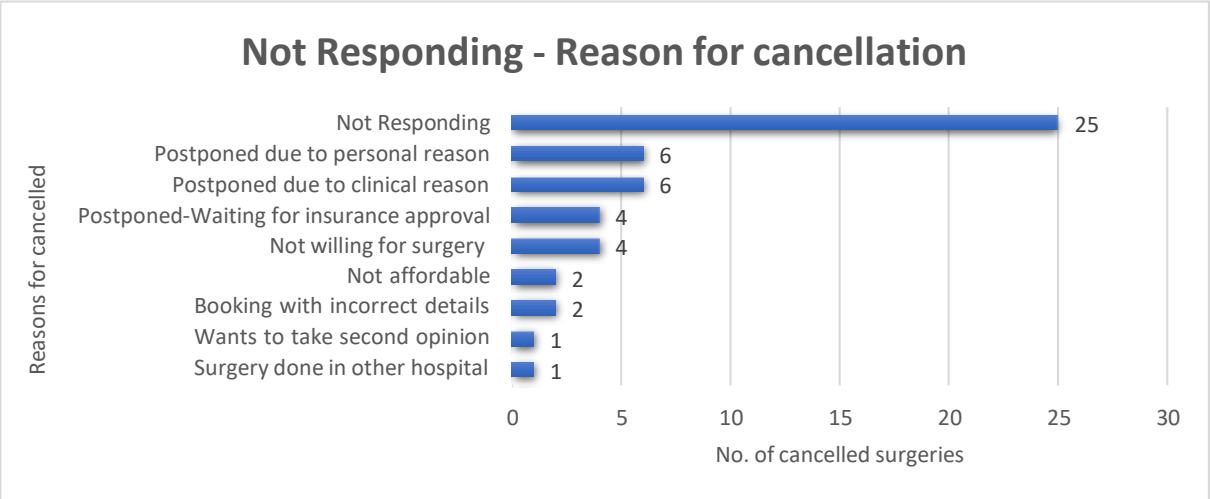
25% of the not confirmed cases scheduled were cancelled due to non-affordability and 24.3% of cases were postponed due to delay in insurance approval. Patient not willing forsurgery accounted for 21.1%. 12.1% of surgeries were cancelled due to personal reasons unspecified by the patient. 8.9% of unconfirmed surgeries scheduled were identified as bookings with incorrect details. Postponed due to clinical reasons and cancelled due to clinical reason accounted for 5.6% and 1.6% respectively of unconfirmed scheduled surgeries. The patients that sought a second opinion accounted to 0.6%.



Graph.4.2. Graph representing the not confirmed surgeries with reasons for cancellations

4.iv. (c) Not Responding-Reasons for Cancellation

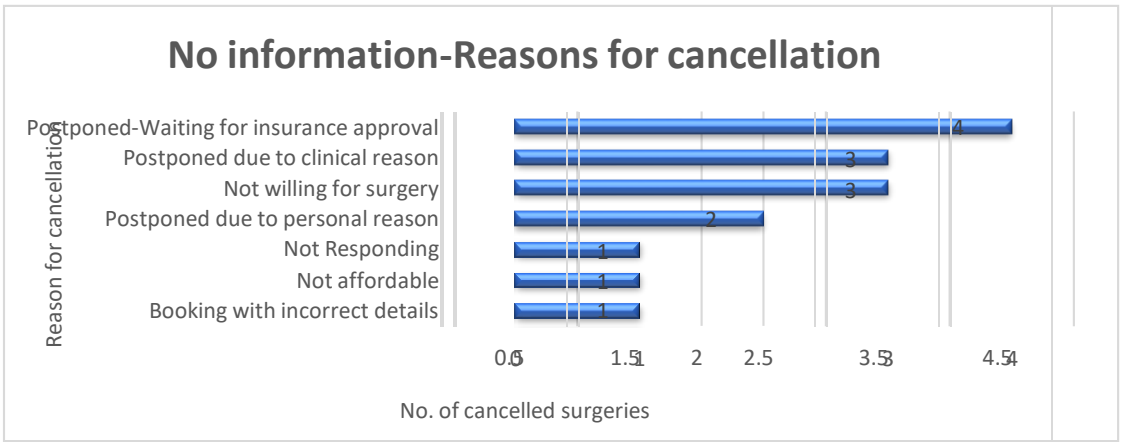
The following graph represents the patients who were not responding to calls on the previous day and the reason for cancellation for those patients. The patients who were notresponding to telephonic calls even while tracking for reason for cancellation were 49%. 11.7% accounted for postponement due to personal reason and postponement due clinical reasons. Delay in insurance approval accounted for 7.8% of cancellations. 7.8% patients were not willing for surgery and 3.9% cancellations were due to non-affordability. 3.9% cancellations were found to be bookings with incorrect details. Patients who sought secondopinion and those who were treated in other hospitals were 1.9%.



Graph.4.3. Graph representing the patient's not responding on previous day with reasons for cancellations

4.iv. (d) No Information -Reasons for Cancellation

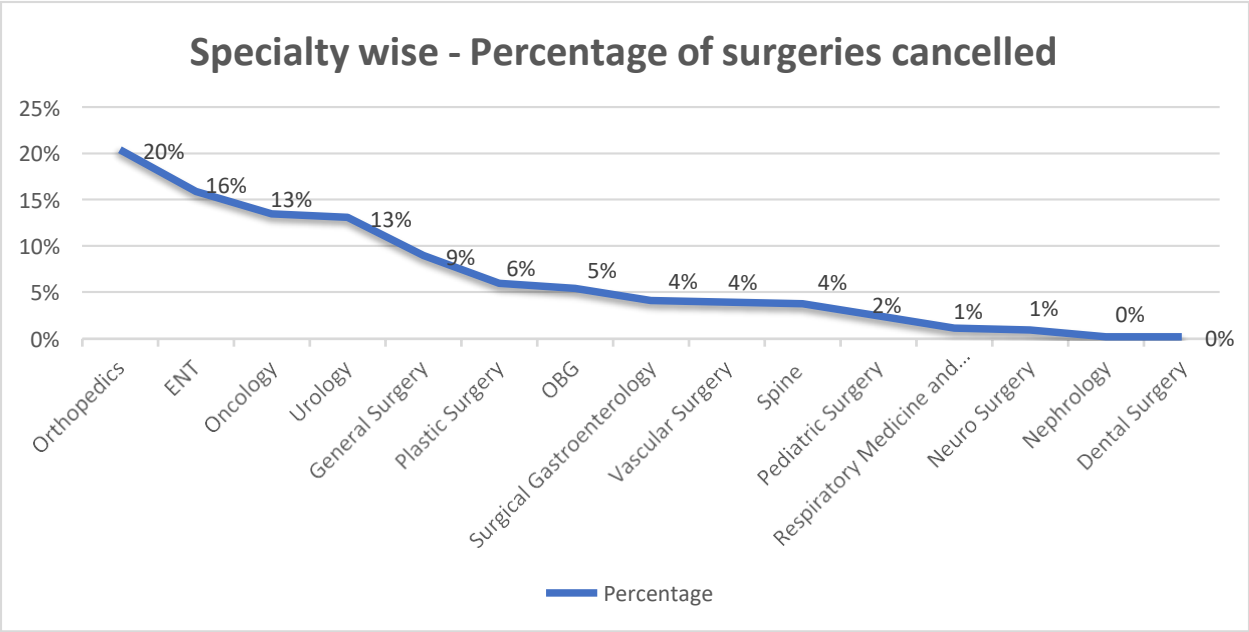
No information was given on the previous day by the PFC's for 15 patients. The reason forcancellation for these patients were delay in insurance approval (26.6%), postponed due toclinical reason (20%), not willing for surgery (20%), postponed due to personal reason (20%), not responding to calls (6.6%), non-affordability (6.6%) and booking with incorrectdetails (6.6%).



Graph.4.4. Graph representing cases where no information was provided by PFC with reasons for cancellations.

4.v. Specialty wise – Cancellation of Surgeries

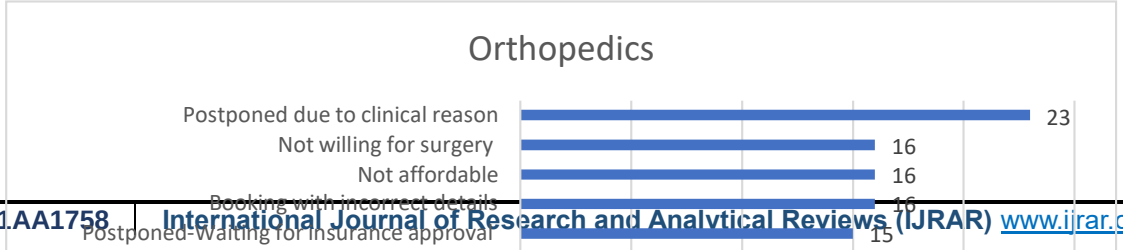
Among the cancellations during the study period, Orthopedics recorded the highest (20%) followed by ENT (16%), Urology and Oncology with 13% each. General Surgery accountsfor 9% of the cancellations and Plastic Surgery with 6%. The least is recorded with Neurosurgery at 1% and Dental and Nephrology at 0%.



Graph.4.5. Graph representing specialty wise percentage of cancellation

4.v. (a) Orthopedics - Reasons for Cancellation

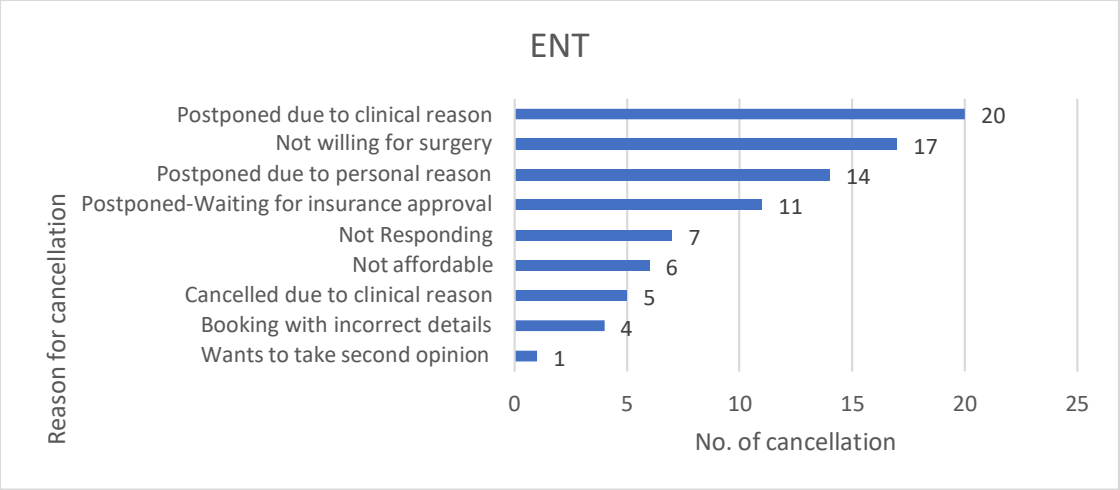
Orthopedics had 21% of cancellations due to the clinical reasons. Patients who were not willing for surgery, non-affordability and booking with incorrect details accounted to 14.6% of cancellations. Delay in insurance approval resulted in 13.7% cancellations and postponed due to personal reason accounted for 11% of cancellations. 5.5% patients did not respond to calls. 1.8% patients opted for a second opinion. Surgery done in other hospitals and unavailability of surgeon due to another emergency accounted to the minimum (0.9%).



Graph.4.6. Graph representing cancellation percentage for Orthopedics

4.v. (b) ENT – Reasons for Cancellation

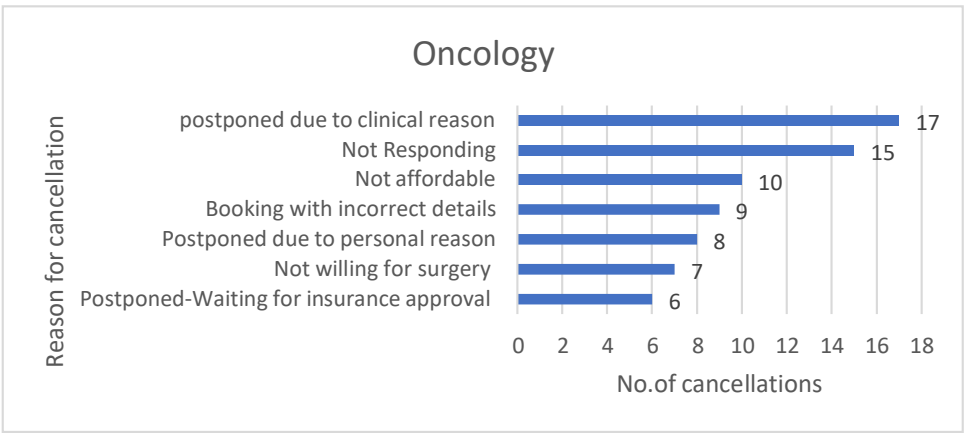
The highest number of surgeries were postponed due to clinical reasons which accounted to 23.5% followed by 20% patients who were not willing for surgery. Postponed due to personal reasons accounted to 16.4% of cancellations. Delay in insurance approval resulted in 12.9% cancellations and 8.2% patients were not responding to calls. Non-affordability resulted in 7% of cancellations and 5.8% surgeries were cancelled due to clinical reasons. Cancellations due to bookings with incorrect details accounted to 4.7%. The least cancellations were due to patients opting for second opinion (1.1%).



Graph.4.7. Graph representing cancellation percentage for ENT.

4.v.(c) Oncology – Reasons for Cancellation

23.6% cases were postponed due to clinical reasons. Patients not responding to calls accounted to 20.8%. 13.8% patients stated non affordability as the reason for cancellation.Booking with incorrect details accounted to 12.5% cancellations. 11.1% surgeries were postponed due to personal reason which were not specified and 9.7% patients were not willing for surgery. 8.3% cancellations were due to delay in insurance approval.

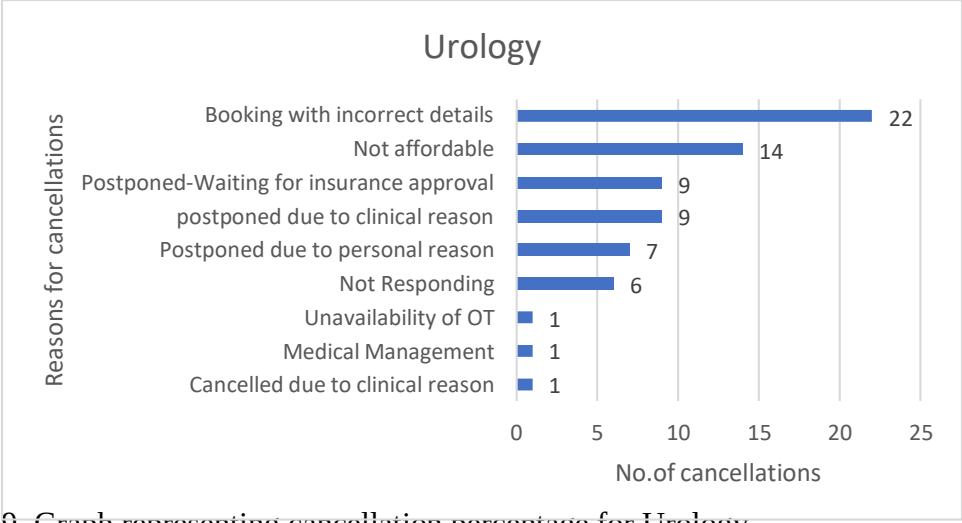


Graph.4.8. Graph representing cancellation percentage for Oncology.

4.v.(d) Urology – Reasons for Cancellation

Urology had the highest cancellations due to booking with incorrect details, these dummybookings accounted to 31.4%. Non affordability resulted in 20% cancellations. Postponed

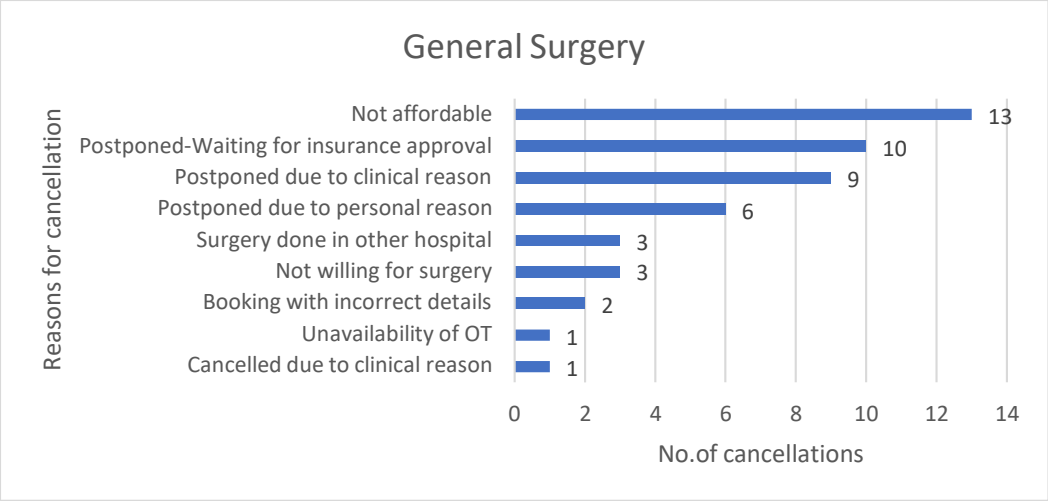
due to clinical reason and delay in insurance approval resulted in 12.8% cancellations. 10%surgeries were postponed due to patient's personal reasons which were not specified and 8.5% patients were not responding to calls. Unavailability of Operating room, cancellation due to clinical reason and medical management resulted in the least cancellations (1.4%).



Graph.4.9. Graph representing cancellation percentage for Urology.

4.v.(e) General Surgery – Reasons for Cancellation

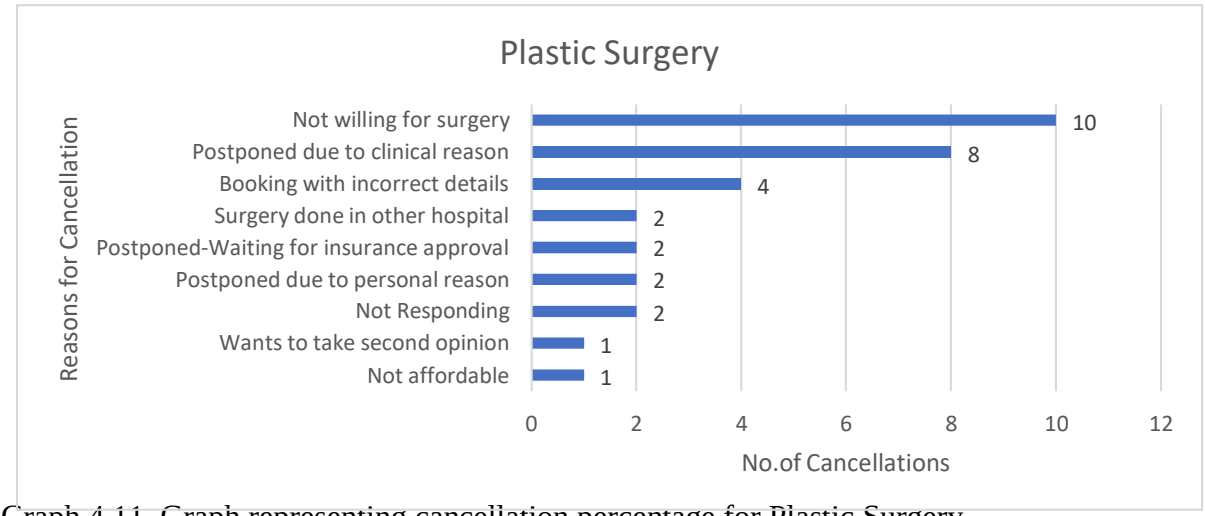
27% cancellations were due to non-affordability, followed by 20.8% of surgeries being postponed due to delay in insurance approval. Postponed due to clinical reasons accountedto 18.7% cancellations. 12.5% surgeries were postponed due to personal reasons. Surgerydone in other hospital and patient not willing for surgery accounted to 6.2% cancellations.Booking with incorrect details resulted in 4.1% cancellations. The least cancellation recorded was 2% due to unavailability of Operating Room and Cancelled due to clinical reason.



Graph.4.10. Graph representing cancellation percentage for General Surgery

4.v.(f) Plastic Surgery – Reasons for Cancellation

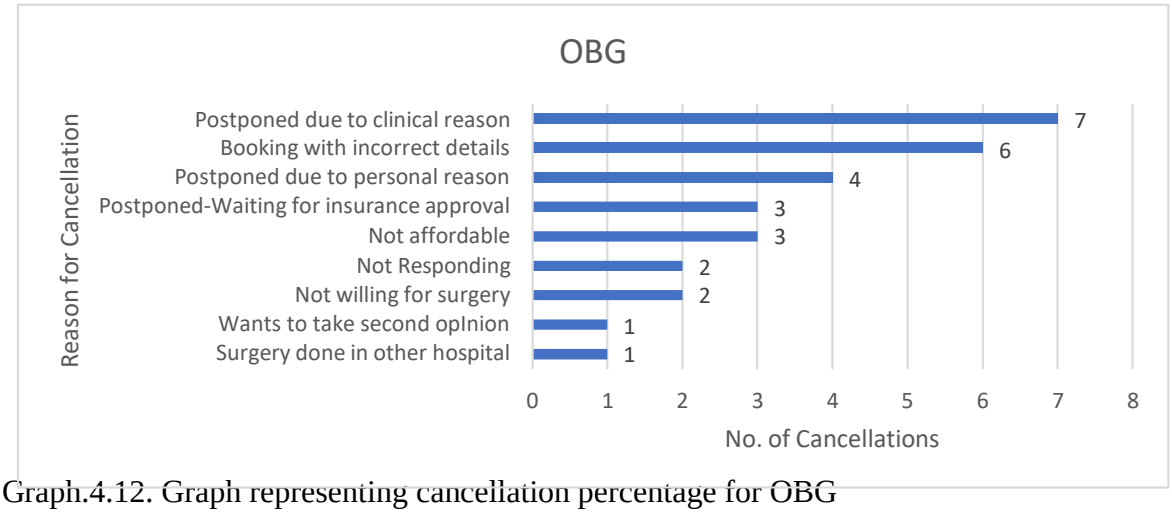
The cancellations as patient was not willing for surgery was the highest at 31.2%. 25% surgeries were postponed due to clinical reasons. Bookings with incorrect details accountedto 12.5% cancellations. Surgery done in other hospital, postponed due to delay in insuranceapproval, postponed due to personal reasons and patient not responding to calls were the reasons for 6.2% of the cancellations. Patient opting for second opinion and non- affordability accounted for the least number of cancellations (3.2%).



Graph.4.11. Graph representing cancellation percentage for Plastic Surgery

4.v.(g) OBG- Reasons for Cancellation

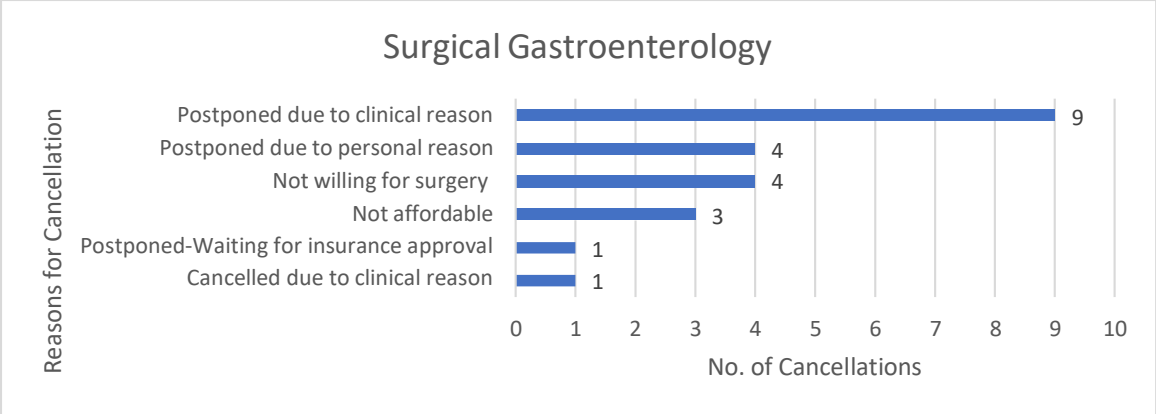
24.1% of surgeries were postponed due to clinical reasons. Booking with incorrect detailswere at 20.6% and postponed due to personal reasons accounted to 13.7% of cancellations.Postponed due to delay in insurance approval and non-affordability resulted in 10.3% cancellations. Patients were not responding to calls and patient not willing for surgery accounted for 6.8% cancellations. Patients willing to take second opinion and surgery donein other hospital were least at 3.4%.



Graph.4.12. Graph representing cancellation percentage for OBG

4.V.(h) Surgical Gastroenterology – Reasons for Cancellation

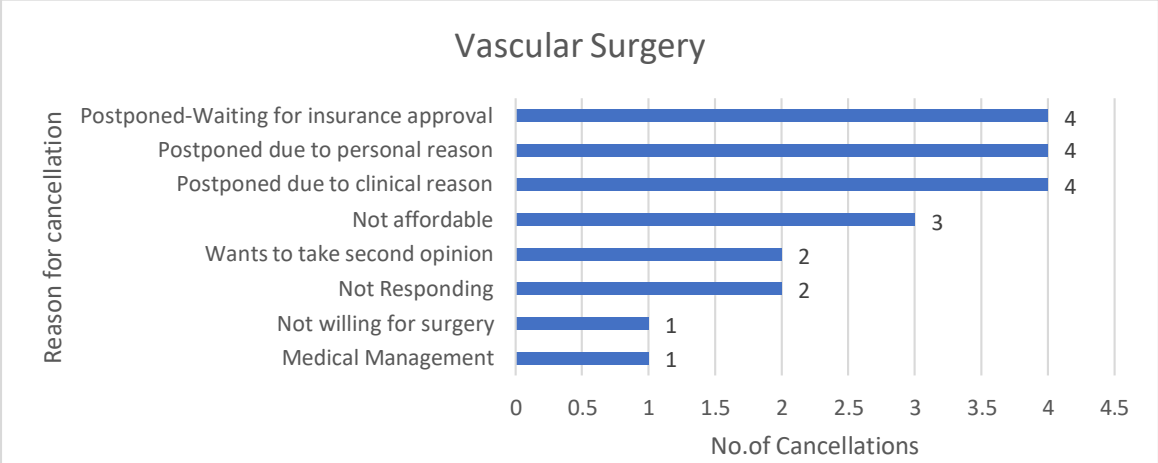
41% of surgeries were postponed due to clinical reasons. Postponed due to personal reasonand patient not willing for surgery accounted for 18.1% cancellations. Non -affordability resulted in 13.6% cancellations. Postponed due to delay in insurance approval and cancelled due to clinical reasons were the least at 4.5%.



Graph.4.13. Graph representing cancellation percentage for Surgical Gastroenterology

4.v.(i) Vascular Surgery- Reasons for Cancellation

Postponed due to delay in insurance approval, postponed due to clinical reason, postponeddue to personal reason accounted to 19% cancellations. 14.2% patients stated non- affordability as the reason for cancellation. Patients opting for second opinion and those who did not respond to calls was 9.5% of the cancellations. Patients not willing for surgeryand those referred for medical management were 4.7%.

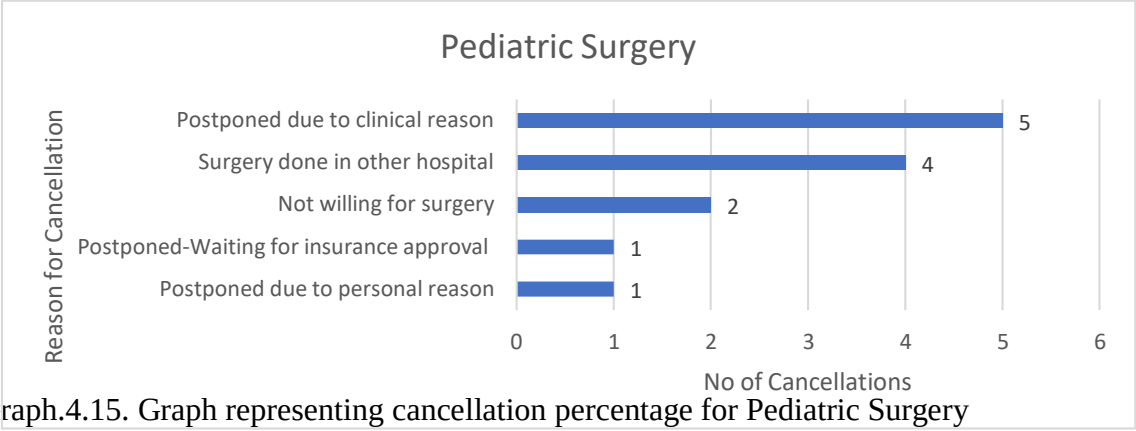


Graph.4.14. Graph representing cancellation percentage for Vascular Surgery

4.v.(j) Pediatric Surgery- Reasons for Cancellation

38.4% surgeries were postponed due to clinical reason and 30.7% patients had the surgerydone in other hospitals. 15.3% patients were not willing for surgery. Postponed due to delay

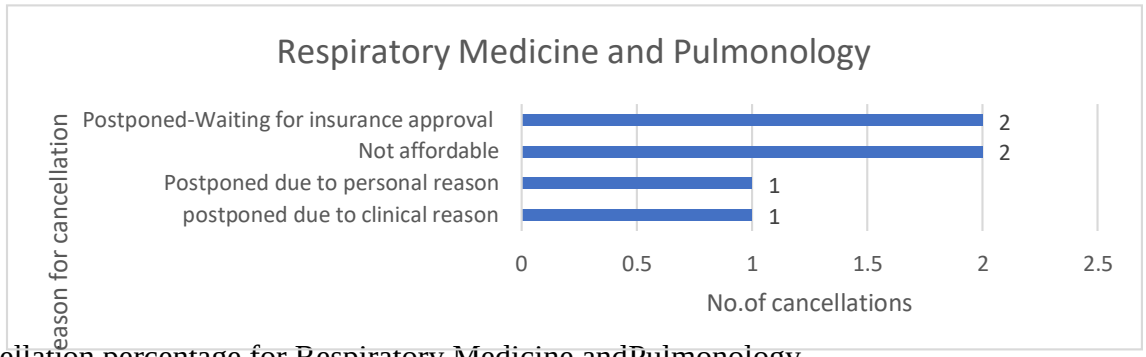
in insurance approval and postponed due to personal reason accounted to 7.6% of cancellations.



Graph.4.15. Graph representing cancellation percentage for Pediatric Surgery

4.v.(k) Respiratory Medicine and Pulmonology- Reasons for Cancellation

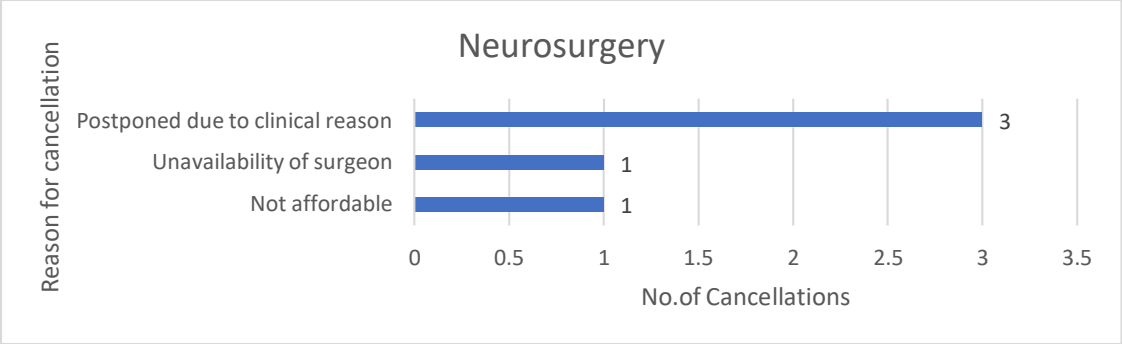
33.3% cancellations were due to delay in insurance approval and non-affordability. Postponed due to clinical reason and personal reason accounted to 16.6% of the cancellations.



representing cancellation percentage for Respiratory Medicine andPulmonology

4.v.(l) Neuro Surgery- Reasons for Cancellation

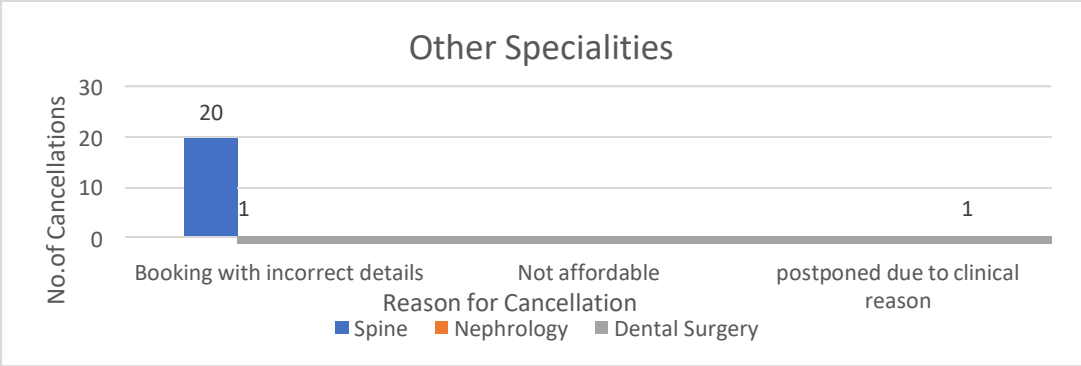
60% of surgeries were postponed due to clinical reason. Unavailability of surgeon due to other emergency and non -affordability accounted for 20% of the cancellations.



Graph.4.17. Graph representing cancellation percentage for Neurosurgery

4.v.(m) Others

Specialties such as spine had 20 cancellations which were found to be booking with incorrect details. Nephrology had 1 cancellation due to unaffordability and dental surgeryhad a surgery postponed due to clinical reason.



Graph.4.18. Graph representing cancellation percentage for Spine, Nephrology andDental Surgery

4.vi. Categorization of reasons for cancellation

The 13 categories of reasons for cancellation were further grouped as “Potentially Avoidable” and “Unavoidable” also into patient related and hospital related. As per the classification, 365 surgeries among 534 surgeries cancelled were judged as potentially avoidable and 169 as unavoidable. 222 of the potentially avoidable reasons were due to hospital related reasons and patient related reasons accounted for 143 cancelled surgeries. The potentially avoidable patient related reasons include postponed due to personal reason,not willing for surgery, surgery done in other hospital and patient opting for second

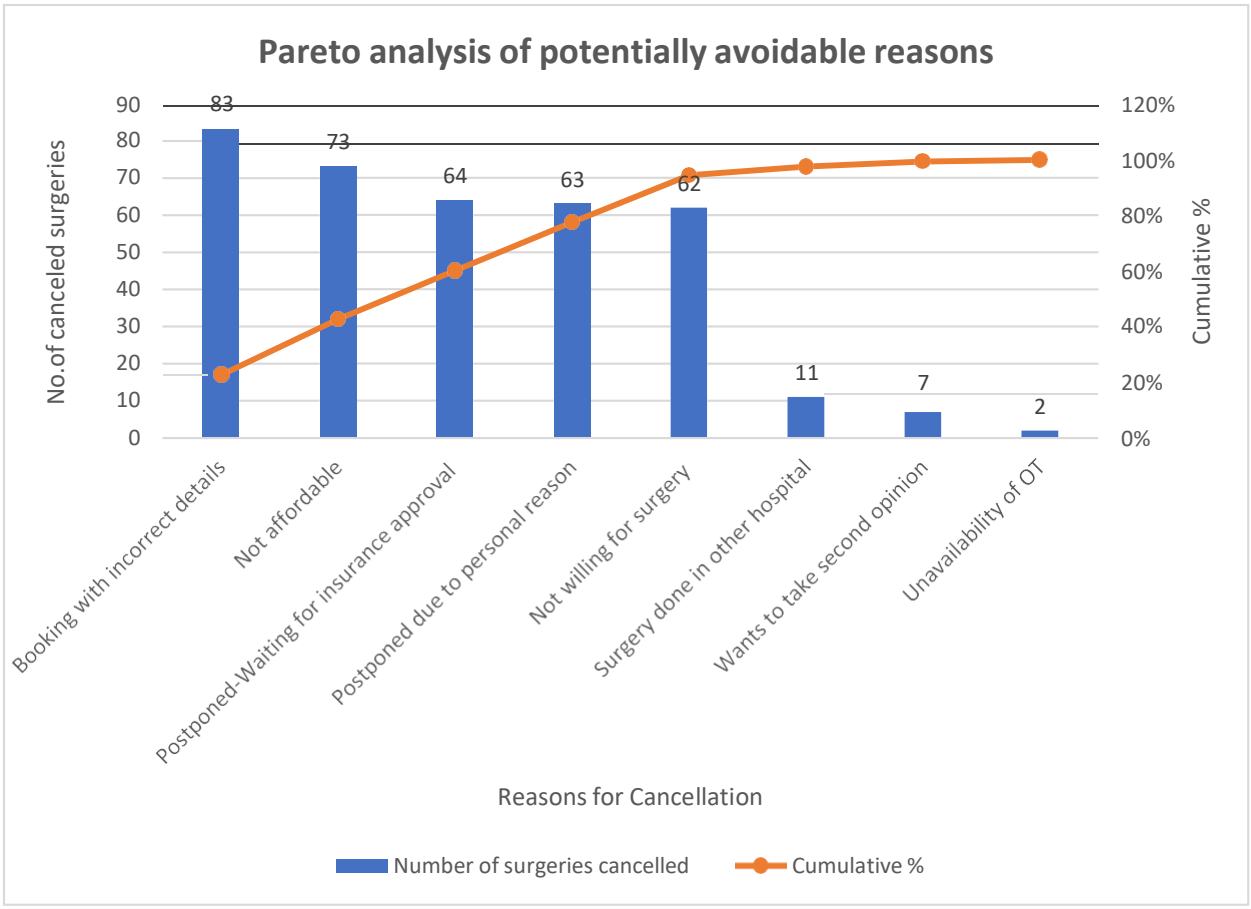
opinion. The hospital related potentially avoidable reasons included booking with incorrect details, unaffordability and delay in insurance approval. The unavoidable patient related reasons included 167 surgeries that were postponed due to clinical reasons, cancelled due to clinical reason (betterment of the patient condition as a result of which surgery was not required), medical management, patient not responding. Unavailability of the surgeon due to another emergency was the unavoidable hospital related reason which accounted to 2 cancelled surgeries.

Category	Potentially Avoidable	Unavoidable
Patient Related	Postponed due to personal reason (*n=63)*	Postponed due to clinical reason (*n=116)*
	Not willing for surgery (*n=62)*	Cancelled due to clinical reason *(n=9)*
	Surgery done in other hospital (*n=11)*	Medical Management *(n=2)*
	Wants to take second opinion (*n=7)*	Not Responding *(n=40)*
Hospital related	Booking with incorrect details *(n=83)*	Unavailability of surgeon due to another emergency *(n=2)*
	Not affordable *(n=73)*	
	Waiting for insurance approval *(n=64)*	
	Unavailability of OT *(n=2)*	

Table.4.3. Categorization of reasons for cancellation

4.vii. Pareto Analysis for the potentially avoidable reason for cancellation

To prioritize the reasons contributing to the highest potentially avoidable cancellations a pareto chart was formulated. The pareto analysis reveals that 80% of cancellations were due to bookings with incorrect details (dummy bookings), non-affordability, postponed due to delay in insurance approval, postponed due to personal reasons and patient not willing for surgery. Thus, any improvement to reduce the cancellation rate should target the abovementioned five reasons.



Graph.4.19. Graph representing Pareto Analysis for potentially avoidable reasons forcancellation

DISCUSSION

An efficient Operation Theatre should have low cancellation rates. Operation theatre cancellations leads to underutilization of the theatre and rise in costs. The preparations priorto a surgery such as staff allocation, equipment's and instrument arrangements are all jeopardized due to on the day surgical cancellations. Patients and their relatives also face financial, logistic and psychological hardships due to postpone date of surgeries.

Based on the study, it was found that surgeries postponed due to clinical reasons (22%) was the most common reason. This was comparable to the findings from other studies conducted in the US, Spain, Taiwan, and Jordan [29,18,30]. These reasons included patientdeveloping fever or vitals not being stable. Even though it is an unavoidable for cancellation, the existing practice of having preoperative anesthesia assessments at the preanesthesia clinic enables to ascertain to an extent the patient's fitness prior to surgery. Studies have shown that preoperative anesthesia assessment in preanesthetic clinics significantly reduces operative room delays and cancellations [26]. Hussain et al. reportedthat 8% of cancellation of cases, on the day of surgery, was anesthesia related [27]. The practice falls short primarily due to the delay in carrying out the preoperative anesthesia checks. Patients favor minimizing the length of hospital stay by getting admitted late evening the day prior to surgery unless indicated else wise. This practice leads to preoperative anesthesia assessments being done the previous night or on the morning of the surgery. This can be improved or converted into potentially avoidable by ensuring preoperative anesthesia assessments are done prior to admission so that surgeries can be planned efficiently considering the investigations or modifications required prior to the surgery.

This was followed by bookings with incorrect details(16%), non-affordability (14%), postponed due to delay in insurance approval (12%), postponed due to personal reason (12%), patient not willing for surgery (12%), patient not responding to calls (7%), surgerydone in other hospital (2%), cancelled due to clinical reason (2%), wants to take second opinion (1%) and medical management, unavailability of OT, unavailability of surgeon each at 0%.

Different results have been reported in other studies. For example, in a Jordanian tertiary hospital the medical reasons accounted to 38.2%, patient-related reasons (non-attendance- 31.4%) and administrative (unavailability of hospital beds-30.4%) of all cancelled elective operation [18]. A teaching hospital in Hong Kong reported the following causes of electivesurgery cancellations: facility (73 %), work-up (17 %), patient (10 %), and surgeon (1 %)[6]. In a study conducted in Spain, reasons for cancellations were medical reason (50 %), administrative/logistic reasons (24.7 %), and patient-related causes (23.1 %) [29]. In a study in US, patient (44.4 %), work-up (20 %), capacity (11.1 %), unavailability of specialized personnel (11.1 %) and no real cancellation, e.g. scheduling errors (11.1 %) comprised the causes of cancellations on the day of surgery at a major university hospital [31].

The specialty wise analysis of cancellations reveals that Orthopedics had the highest cancellations (20%) followed by ENT (16%), Urology (13%) and Oncology (13%) majorly contributed to the cancellation rate. Similar finding was present in a study conducted in Hongkong where the highest number of cancellations occurred in patients scheduled for major general surgical procedures (n=94, 20%), major urological procedures (n=64, 13%),major orthopedic surgery (n=38, 8%),

The hospital under study had most of the cancellations deemed as avoidable. The pareto analysis highlighted the following reasons as the major contributors for on the day surgerycancellations: bookings with incorrect details, non-affordability, delay in insurance approval, postponed due to personal reason and not willing for surgery. Below each of these are discussed briefly with potential solutions where applicable.

i. Booking with incorrect details:

This accounted for 16% cancellations which was the second major reason for cancellation in the study. An analysis in USA examining 56,000 cases retrospectively found that 31% of lists were predictably overbooked [3]. The hospital under study had an average of 60 surgeries per day. To ensure a slot in the OT list and also at a preferred time, surgeons often overbook with erroneous patientdetails in the online booking portal. The online booking portal was designed to overcome this by making either the UHID or patient phone number mandatory

fields for booking of an OT slot. The patient phone number was given as an alternative due to the booking by visiting consultants and referrals. The role of PFC's and OT Coordinator have a major role in tackling this challenge. In the studyit was found that for10.8% of surgeries identified by PFC's as dummy booking theprevious day was posted in the OT List by the coordinator. Improving the check and establishing controls on such practices can facilitate a reduction in the cancellation rate.

Specialty wise analysis of the reasons for cancellations indicated that Urology (n=22), Spine (n=20) had the highest number of cancellations due to bookings withincorrect details. A discussion can be initiated with the surgeon highlighting the wastage of OT resources and rummages occurring in the schedule due to overbookings.

ii. Non- Affordability:

India has 67.7% out of pocket expenditure in healthcare and a narrow insurance coverage of only 20% [28]. The hospital had a higher inflow of cash patient than insurance patients. Non affordability was stated by 14% of the patients in the study.The specialty wise analysis showed that Orthopedics (n=16) and urology (n=13) had the highest number of cancellations due to unaffordability.

This factor is potentially avoidable as PFC's discuss the possibilities of discounts and facilitate to reduce the financial burden. This current practice can be reinforcedand aimed to reduce the patient no shows.

iii. Postponed- Awaiting insurance approval:

The next most common potentially avoidable cancellations were cases that were cancelled due the patient presenting on the day of surgery with no insurance approval. This study had delay in insurance approval accounting to 12% cancellations. Orthopedics (n=15) followed by ENT (n=11) had the highest cancellations due to insurance approval delay. This is potentially avoidable as the pre insurance approval can be initiated early and availed prior to surgery. Due to the possibility of having insurance approved on the same day as of surgery such patients can be posted towards the end of the list to avoid delay and cancellations in the schedule.

iv. Postponed due to personal reason:

Patients failing to turnup is a particularly challenging problem. It may be due to thepatients' last-minute doubts and fears. The hospital has a standardized procedure tocall patients and remind them of their appointments on the previous day. Reminderphone calls by assigned personnel have been shown to improve patient compliancewith appointment keeping [32].

In this study, ENT (n=14) and Orthopedics (n=12) were found to have the highest cancellations due to this reason. In this scenario, constant patient engagement and identifying the actual reason for cancellation by the PFC s can enhance thepossibility to work on these reasons.

v. Patient not willing for surgery:

This could be due to patient fears, non-affordability or several other reasons. The highest of cancellations due to this reason was accounted with ENT (n=17) and Orthopedics (n=16).

Adequate counselling can be carried out prior to the surgery to understand the patient concerns and take effective measures to improve the patient's adherence tothe surgery schedule.

The study has also looked into the efficiency of the PFC and OT coordinator in minimizingcancellations by previous day confirmation of the OT List. This analysis revealed the following findings that had to be highlighted and worked on to reduce on day surgical cancellations.

i. 54% of cancelled surgeries were updated as confirmed by the PFCs on the previous day.

ii. 11% of the surgeries stated as dummy booking by the PFCs on the previous daywas included in the OT List by the OT Coordinator.

The potentially avoidable hospital related and patient related reasons have o be scrutinizedand identified early to prevent it being scheduled in the OT list.

CONCLUSION

On the day cancellations of elective surgical cases was found to be 13.3% which was significantly high. While no consensus has been reached on the acceptable cancellation rate, less than 5 % is generally recommended [33]; however, day of surgery cancellations of less than 2 % have been reported [34]. Identifying and addressing the cause improves the efficiency of theatre facilities. The study reveals that facility related cancellations was the least at 0%. Hence ensuring proper utilization by effective scheduling, proper preoperative assessment, efficient patient engagement and better interdepartmental coordination can help to reduce on day surgical cancellations of elective surgeries. Determining what the major avoidable contributors to on day surgical cancellations is an essential first step to developing appropriate interventions to improve operating theater efficiency.

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