SURGICAL CANCELLATIONS AND DELAYS – A CASE STUDY OF JEHANGIR HOSPITAL

Dissertation Submitted to

The IIHMR University, Jaipur

for the partial fulfilment for the award of the degree of Master

of Business Administration (MBA)

in

Hospital and Health Management

by

Rahul Chaudhari

Under the Supervision and Guidance of

Dr. Alok Mathur

2023

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled: **Surgical cancellations and delays - A case study of Jehangir hospital,** is the bonafide record of my original researchwork. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished workof others has been duly acknowledged in the text.

(signature)

Name of the student: Rahul Chaudhari

Date:

JEHANGIR HOSPITAL

We Add Care

Ref: JH/HR/2023-24/May

Date: 25/05/2023

Certificate of Internship

This is to certify that **Mr. Rahul Chaudhari** has successfully completed his internship in **Quality Department** from **13.03.2023 To 25.05.2023**

During the internship period he was found to be sincere, hardworking and dedicated. We wish him all the very best for his future endeavor.

For Jehangir Hospital, Pune

Gaidhani

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Dial 1066 / 8888881066 for a life support ambulance in a medical emergency

CERTIFICATE

This is to certify that dissertation titled**: Surgical cancellations and delays - A case study of Jehangir hospital** is a record of the research

work undertaken by (Name of Student) in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management)/MBA (Pharmaceutical Management)/MBA (Development Management) from the IIHMR University, Jaipur under my guidance and supervision and his/her approach to the research study has been sincere, scientific, and analytical.

Faculty Guide
IIHMR University, Jaipur

Date:

School Dean
IIHMR University, Jaipur

Date

Abstract

Surgery delays and cancellations have been a recurring problem for healthcare systems around the world, with negative effects for patients, healthcare workers, and hospitals. This case study, which focuses on the renowned Jehangir Hospital, examines the underlying causes of surgery cancellations and delays as well as their effects on various stakeholders. In order to reduce these problems and improve surgical care delivery, the study intends to offer insights into various techniques and interventions that might be used. Surgical delays and cancellations affect many patients. Due to extended waiting times and delayed surgeries, patients feel more anxious, inconvenienced, and may even run the risk of developing health problems. Healthcare providers struggle with declining work satisfaction, weakened patient confidence, and resource waste. The report suggests solutions to these problems.

Study Objectives

the study is to determine and categorise the underlying reasons for planned surgical delays and cancellations, to investigate how frequently and how often planned surgical delays and cancellations occur and to evaluate present preoperative preparation, surgery planning, and interaction with OT staff policies, procedures, and practises.

Methodology

To bring up the proper findings of the study methodology which is followed is to Review the in/out timing of surgeries performed and identify any gaps in delays of any procedures and suggest the method and ideas created after the in-depth analysis of numerous factors causing delays in surgeries.

The case study's methodology involves observation of thorough surgical procedures at Jehangir Hospital. The study demonstrates that systemic difficulties, administrative problems, and patient-related factors all interact to affect surgery cancellations and delays at Jehangir Hospital.

Key Results

Based on the study it is observed that the most cancellations occur when a patient is not admitted, an insurance claim is denied, a surgery is not scheduled for the day, is postponed to the following day by the surgeon, diagnostic test results are abnormal, a fitness clearance is pending, and a cancellation by the surgeon occurs.

it is also observed that the biggest delays are caused by the doctor arriving late, the case starting late, unpaid bills, and prediction errors (the last procedure took longer than expected).

Conclusion

In conclusion, the study of difficulties caused by surgery delays and cancellations, which have an effect on patients, healthcare professionals, and the institution itself. Hospital has a scope of improvement in patient outcomes, increase operational efficiency, and solidify its position as a provider of high-quality surgical care by addressing patient-related factors, administrative issues, and systemic challenges and putting the suggested strategies, like pre-

operative assessment, informing patient a day prior of surgery, informing doctors for scheduled surgeries. The findings from this case study add to a greater information of techniques to reduce surgical cancellations and delays, which eventually will improve the entire delivery of surgical services.

We can work towards developing mitigation strategies and more dependable and responsive healthcare system that will ultimately improve results and increase patient confidence in surgical care by addressing the reasons of cancellations and delays.

Key Words: Surgical cancellations, Surgical delays, Healthcare delivery, Mitigation strategies

Acknowledgement

The study has been a novel experience as being a exposure to hospital industry. This study helped in understanding and learning the hospital setup, its various departments, their function and their interrelation. However, none of this would ever have been possible without the priceless support of several people. I wish to take this opportunity to express our deepest gratitude to all of them who have made this endeavour possible. I would remiss if we do not specifically mention some individuals who supported me. I would like to thanks specially to Ms.garima (Head QSO), Dr. ss gill(MD) for their help and guidance. I would like to extend our thanks to the management, medical staff of Jehangir Hospital for giving me all information and support required to complete my internship. My deepest gratitude to my guide Dr. Alok mathur of IIHMR University Jaipur, who have always been a source of encouragement and guidance which enabled me to do a good work, I would like to thank all others who left their mark in the projects and helped me in spite of their busy schedule and hectic work hours. Last but not least, I acknowledge the moral support of my parents, family members and friends during my internship.

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Abbreviations

• OR: Operating Room
• ICU: Intensive Care Unit
• PAC: Post-Anaesthesia Care
• LOS: Length of Stay
• SSI: Surgical Site Infection
• PPE: Personal Protective Equipment
• TKA: Total Knee Arthroplasty
• THR: Total Hip Replacement
• CABG: Coronary Artery Bypass Graft
• ENT Surgery: Ear, Nose, throat Surgery
• MRD: medical records department
• EHR: Electronic health record

Introduction

In the world of healthcare, surgical procedures are critical interventions that require careful planning, skilled healthcare professionals, and well-organized systems. However, despite the best efforts of healthcare providers, surgical cancellations and delays continue to pose significant challenges and concerns within the industry. These unplanned things not only compromise on patient outcome but also on healthcare resources.

This case study explores the issues related to surgical delays and cancellations, revealing the underlying causes, effects, and potential remedies. The objective is to develop a thorough understanding of this global problem and investigate solutions that can lessen its impact on patients and healthcare professionals by looking at real-life events and drawing on significant research.

Surgery delays and cancellations have complex effects. When a medical treatment is delayed, patients who have expressively and physically prepared for it could feel more anxious, frustrated, and troublesome. Also, delays can worsen pre-existing medical issues, creating new complications and letting down the standard of care as a whole. The carefully planned schedules of surgeons, anaesthesiologists, and other support staff are overturned by cancellations and delays on the part of healthcare providers, which has a harmful impact on productivity, resource distribution, and overall operational competence.

This case study is conducted to analyse several contributing factors to surgical cancellations and delays in order to do further research into this subject. Insufficient preoperative assessments, last-minute emergencies, equipment faults, a lack of staff, poor communication, and surprising changes in patient conditions are just a few of the possible contributing factors. We may emphasise the interconnectedness of these components and their impact on the surgical process by analysing individual incidences and their outcomes. This case study examines various medications and strategies that help reduce surgery delays and cancellations. These remedies can include expanding lines of communication, putting in place procedures for screening healthy patients, enhancing systems for scheduling surgeries, and creating emergency plans.

The case study on surgical cancellations and delays is an vital reminder of the determined difficulties that patients and healthcare providers both come across. It emphasizes the requirement for thorough plans and creative answers to optimise surgical services, reorganize workflows, and improve patient practices. We may strive to develop a more loyal and responsive healthcare system by talking the underlying reasons for cancellations and delays, which will eventually improve results and increase patient sureness in surgical care.

Review of literature

Surgery delays and cancellations continue to be a problem for healthcare systems around the world, having an influence on patient consequences, resource distribution, and healthcare professional plans. This review of the literature tries to investigate the existing research and scholarly works on this subject, merging the information and understanding from many studies. This review offers a detailed impression of the problems of surgical cancellations and delays by looking at the fundamental causes, effects, and possible solutions.

Numerous studies have found a variety of factors that contribute to surgical delays and cancellations. The most recurrent causes have been identified as insufficient preoperative calculations, including insufficient patient assessments and inability to notice risk factors. The importance of preoperative testing and assessment processes in lessening cancellations and delays is emphasized by research by Wijeysundera et al. (2018).

Other important factors include crucial situations and surprising modifications in patient conditions. In order for healthcare teams to answer quickly to growing events, Pokker et al.'s (2019) study highlights the importance of actual communication and harmonization. Equipment faults, such as broken anaesthetic equipment or surgical tools, have also been noted as possible interruptions (Gillespie et al., 2017).

It has been well-documented that recruitment issues can cause surgery cancellations and delays. The need of appropriate employees' levels and skill mix is emphasised in studies by Ozcan et al. (2019) and Farrokhi et al. (2020) in order to reduce delays in surgical schedules. Moreover, highlighted as important sponsors to cancellations and delays are problems in communication between healthcare workers and patients (van Klei et al.,2018).

Patient sadness is only one of the belongings of surgery delays and cancellations. According to research, delays can raise illness, death, and hospital re admission rates (Borchard et al., 2019). Development changes or delays might cause patients to develop more nervous, have a inferior quality of life, and experience more pain and uneasiness (Schoenfelder et al., 2020).

There are serious impacts for healthcare experts as well. Surgery rearrangements and cancellations affect how efficiently operating rooms and other properties are used, which has a cost impact on health care organisations (van Klei et al., 2018). Due to schedule conflicts and lower output, surgeons and support people may experience exhaustion and raised stress levels (Pokker et al., 2019).

Developing standardized protocols and checklists for preoperative assessments and screenings can help identify potential risks and minimize cancellations (Wijeysundera et al., 2018).

Improving surgical scheduling systems through the implementation of technology solutions and predictive models can aid in better resource allocation and minimize delays (Ozcan et al., 2019). Having contingency plans in place to handle emergencies and unexpected changes in patient conditions is also essential (Farrokhi et al., 2020). Investing in adequate staffing levels and skill mix can enhance the resilience of surgical services and mitigate cancellations caused by staff shortages (van Klei et al., 2018).

History of surgical cancellations and delays

Surgery postponements and cancellations have been ongoing issues in the area of medicine throughout time. They may have serious repercussions for patients, medical professionals, and the healthcare industry as a whole.

Evidence of surgical practises stretching back thousands of years indicates that they have been practised from antiquity. However, cancellations and delays were not significant problems because there was a lack of contemporary medical knowledge and technology. In ancient societies like Egypt, Greece, and Rome, surgery was primarily used to treat emergencies and wounds sustained on the battlefield. Cancellations and delays were uncommon because to the lack of knowledge about anaesthesia, infection prevention, and surgical procedures.

Significant improvements in surgical methods and medical understanding were made throughout the Renaissance. However, a number of problems continued to make cancellations and delays problematic. Because anaesthesia methods were still rudimentary, patient tolerance was low and hazards were considerable. Additionally, there was an increased danger of infection because surgical procedures were frequently carried out in unsterile settings. Cancellations and delays were also caused by unstandardized surgical practises, a lack of funding, and insufficient training.

The Industrial Revolution led to revolutionary advances in medical technology and science. The incidence of infections was dramatically decreased by the use of antiseptics and enhanced operating room hygiene. But because of issues with limited access to surgical facilities, a shortage of facilities, of skilled surgeons, and inadequate infrastructure and other factors, cancellations and delays continued.

About the Hospital

Mission

- Providing First-class Health care: Jehangir Hospital is dedicated to giving its patients access to high-quality health care facilities.
- Jehangir Hospital endeavours to put the ease and well-being of its patients first.
- Jehangir Hospital is dedicated to cultivating the society's health and educational values.

Jehangir Hospital, located in the city of Pune, Maharashtra, is a example of superior medical care and patient-centred care. One of India's foremost healthcare facilities, Jehangir Hospital has a long history crossing more than seven decades and has steadily been at the lead of medical revolution, cutting-edge treatments, and empathetic care.

The hospital was first built as a 70-bed facility in 1946 by the visionary philanthropist Sir Cowasji Jehangir with the aim of providing top-notch healthcare services to the people. Jehangir Hospital has seen enormous growth over the years, developing into a leading-edge, multi-specialty capability with over 350 beds and a wide range of medical, surgical, and diagnostic services. The hospital has also achieved accreditation of NABH,NABL and NABH nursing excellence.

The extraordinary squad of extremely gifted medical staff at Jehangir Hospital demonstrates its promise to excellence. The hospital services have renowned medical professionals like doctors, surgeons, nurses, and support staff who are devoted to deliver customised care, leveraging the latest technical progressions, and maintaining the maximum standards of patient safety.

The physical design of the hospital is meant to deliver patients with a calm and healing environment. Current operating rooms, state-of-the-art diagnostic tools, well-resourced intensive care units, and specialised departments that provide to various medical specialities like gastroenterology, orthopaedics, oncology, cardiology, and more are all features of this hospital. To ensure exact diagnosis and treatments, modern tools and technology are easily combined into the hospital's set-up.

The many services Jehangir Hospital offers, each of which is especially created to fulfil the varied healthcare necessities of persons and families, validate its firm commitment to patient-centric care. The hospital offers a full variety of healthcare services, from simple treatments and routine check-ups to multifaceted surgeries and serious care. Additionally, the hospital places a strong value on patient edification and provides persons with the knowledge they need to vigorously participate in their own health.

Along with its healing skills, Jehangir Hospital serves as a centre for medical innovation, research, and training. To develope medical research and inspire scientific advancements, the hospital cooperates with leading healthcare organisations and institutes. The hospital supports a ritual of information exchange and Jehangir Hospital actively contributes in community outreach programmes as a informally responsible institution, offering healthcare to marginalised groups and supporting activities aimed at attractive public health. Beyond the

limits of medical care, the hospital's dedication to corporate social responsibility has a positive impact on people's lives.

In gratitude of its ongoing commitment to quality, Jehangir Hospital has got a number of awards and accreditations over the years. The hospital has won recognition for its devotion to ensuring patient safety, offering top-notch health care, and improving medical research and education. These awards raise the status of Jehangir Hospital as a reputable healthcare facility in the area.

Specialities offered in Jehangir Hospital

- Medical Specialties
- Emergency Care
- Intensive Care Units (ICU)
- Diagnostic Services
- Rehabilitation Services
- Wellness and Preventive Care

Overview of OT in Jehangir hospital

An operating room (OR), usually referred to as an operation theatre, is a vital space in a hospital where invasive medical operations like surgery are performed. The operation theatre is a designated area where surgeons, anaesthesiologists, nurses, and other healthcare professionals perform surgeries and related treatments at Jehangir Hospital, which has 350 beds.

- Size and Layout: It has a clean operating room where the procedure is performed, as well as nearby spaces for food preparation, storage, and cleaning. The arrangement is intended to guarantee effective productivity and sustain a sterile atmosphere. Maintaining a sterile environment is essential to preventing infections and surgical complications. To reduce the presence of airborne pollutants, the operating room is outfitted with specialised ventilation systems, air filters, and positive air pressure. To ensure sterility, strict guidelines are followed for cleansing, gowning, and gloving.
- Tools and Equipment: The operating room is furnished with a variety of surgical tools, anaesthesia machines, monitors, operating lights, operating tables, and other necessary tools. Before every surgery, these tools and equipment are painstakingly sterilised to avoid infections.
- Anaesthesia section: Because it is so important in surgeries, a section in the operating room is set aside for administering and monitoring anaesthesia. In order to maintain patient safety during anaesthesia, it normally consists of anaesthetic machines, monitors, ventilators, medicine carts, and other relevant equipment.
- Scrub Area: Surgeons, scrub nurses, and other members of the surgical team prepare for the procedure in the scrub area. There are sinks, hand sanitizers, sterile gowns, gloves, and masks available. Scrubbing aids in maintaining sterility by removing bacteria from the hands and arms.
- Support Systems: To guarantee efficient operations, the operating room is supported by a number of systems. These include the electrical supply for the operating room

lights and equipment, backup power generators in case of power outages, and communication systems for coordination with other hospital departments. Medical gas supplies (such as oxygen and compressed air) are also included.

- Monitoring and Recording**:** The operating room is equipped with sophisticated monitoring equipment that continuously track the patient's vital signs, anaesthesia depth, oxygen levels, and other information. To document the specifics of the procedure, the medications taken, and any other pertinent information, electronic medical records or paper-based documentation methods are used.
- Personnel: The operating theatre staff is made up of a variety of medical specialists. Together, surgeons, anaesthesiologists, surgical nurses, technicians, and support staff guarantee that operations are carried out safely and effectively. They adhere to tight guidelines for infection prevention, safety precautions, and hand cleanliness.
- Specialised Operating Rooms: The operation theatre complex may contain specialised operating rooms, depending on the sorts of procedures conducted. These includes areas designated specifically for cardiac surgery, orthopaedic surgery, neurosurgery, and other specialised operations. These rooms have extra tools and instruments that are designed for the particular specialty.

The Operating rooms at Jehangir hospital are well equipped to support a complete range of surgical procedures across all specialties including:

- Bariatric surgery
- Cardiothoracic surgery
- ENT Surgery
- General Surgery
- Hand Surgery
- Minor OT surgical procedures
- Neurosurgery
- Obstetrics and Gynecology
- Oncosurgery
- Ophthalmic Surgeries
- Oral-Maxillofacial surgery
- Orthopedic Surgeries including Knee Joint replacement, Hip Replacement,
- Arthroscopies
- Pediatric surgery
- Pediatric endoscopic surgery
- Pain management
- Plastic and reconstructive surgery
- Spine surgery
- Urology
- Vascular surgery.

Methodology:

- Observe the process of surgeries in operation theatre
- Review the in/out timing of surgeries conducted and find the gap in delay of any surgeries
- Recommendation of the process and ideas developed after the detailed study of several reasons for delayed surgeries

Observation and findings:

- Data of patients is being collected from the medical records of the patient undergone or undergoing Scheduled surgical process
- Checked Medical records of the Patients who had already undergone or is undergoing scheduled surgeries and also checked OT files such as: patient in-out, surgery start-surgery end.
- Total 191 samples are being taken to study the delays and cancellation of the surgeries in Jehangir hospital

Table No.1

Sr. No	Date	Surgery	Scheduled Start Time	Start (surgery)	Cancelled/ Delayed	Remarks
1	28-05-2023	MICS CABG	8:00	8:10		
2	28-05-2023	MICS CABG	13:00		Cancelled	Patient not admitted/not confirmed with the patient previous day
3	28-05-2023	Renal transplant recipient	13:30	14:00	Delayed	Last surgery took more time than expected
4	28-05-2023	Lap Renal transplant donor	8:00	8:00		
5	28-05-2023	Lap Renal transplant donor	11:30	12:40	Delayed	Last surgery took more time than expected
6	28-05-2023	Craniotomy + Tumour Excision	6:00	7:00	Delayed	Doctor arrived late
7	28-05-2023	PFCC repair + Fenton procedure Rt Wrist	12:30	12:00		
8	28-05-2023	Debulking	7:00	7:00		
9	29-04-2023	Cystoscopy + DJ stent removal B/L	8:30		Cancelled	Platelet count low, postponed to next day
10	29-04-2023	VH with PFR	6:00	7:00		
11	29-04-2023	Lap cholecystectomy	11:00	10:45		
12	29-04-2023	EUA + Laser hemorrhoidopexy	13:00	12:50		

13	29-04-2023	M L Scopy + Excision Biopsy	6:00		Cancelled	Insurance not approved
14	29-04-2023	Endoscopic intra canal wall mastoidectomy + tympanoplasty	8:30	8:15		
15	29-04-2023	Vitrectomy + implantation	12:00	11:30		
16	29-04-2023	MICS CABG + Total arterial	8:00	8:30		
17	29-04-2023	ENDO ASD	12:30	15:45	Delayed	Treatment going in ward
18	29-04-2023	Lt- Knee ACL reconstruction	6:00	6:10	Delayed	First case started late
19	29-04-2023	Rt Cochlear Implant	6:00	6:45	Delayed	First case started late
20	30-04-2023	Chemo port insertion	11:00	11:10		
21	30-04-2023	AVF creation	12:30	13:40	Delayed	Billing clearance pending
22	30-04-2023	Craniotomy + Tumour excision	6:00	6:50		
23	30-04-2023	Cystoscopy DJ stent removal- B/L	11:00	11:45	Delayed	delayedFrom ward
24	30-04-2023	EUA + Cauterization	12:30	14:25		
25	30-04-2023	Adenotonsillectomy + Septoplasty + FESS + SMD	14:00		Cancelled	Insurance not approved
26	30-04-2023	ISBT/ICBT	6:00	7:00	Delayed	Doctor arrived late
27	30-04-2023	TAH	8:00	9:02	Delayed	First case started late
28	30-04-2023	Cytoreductive surgery	12:00	13:05		
29	01-05-2023	Lap Inguinal hernia mesh repair	6:00	7:00	Delayed	Doctor arrived late
30	01-05-2023	Diagnostic Lap and Proceed	9:30	10:30	Delayed	First case started late
31	01-05-2023	Laparotomy and procedure	12:00	13:10	Delayed	First case started late
32	01-05-2023	D and C with Mirena insertion	8:00	10:00	Delayed	Doctor arrived late
33	01-05-2023	HAIR TRANSPLANTAION -EACH GRAFT	7:00	7:15		
34	01-05-2023	Open CABG	8:00		Cancelled	Surgery not scheduled for the day

35	01-05-2023	Osteotomy - Rt Ebow + Internal fixation	6:00		Cancelled	Patient not admitted/not confirmed with the patient previous day
36	01-05-2023	OCTR + Median n erve neurolysis- Rt wrist	9:30	6:45		
37	01-05-2023	CRIF/ORIF wire fixation Rt thumb	12:30	9:05		
38	02-05-2023	Left eye cataract	15:00	14:50		
39	02-05-2023	Bipolar hemiarthroplasty	16:30		Cancelled	Fitness clearance pending
40	02-05-2023	C5,C6,C6-C7 ACDF	6:00	7:10	Delayed	Doctor arrived late
41	02-05-2023	Craniotomy MSE	11:30	12:55	Delayed	First case started late
42	02-05-2023	Cranioplasty	15:30		Cancelled	Infection
43	02-05-2023	Tracheostomy	18:00		Cancelled	Financial problem
44	02-05-2023	Tracheostomy	19:30	18:40		
45	02-05-2023	Closed reduction nasal bone fracture	6:30	7:00		
46	02-05-2023	ORIF maxilla + orbital	8:00	8:17		
47	02-05-2023	Wide excision + flap cover + neck dissection	12:30	13:50		
48	02-05-2023	Rt-CMT plasty	6:00		Cancelled	Patient not admitted/not confirmed with the patient previous day
49	02-05-2023	Hysteroscopy + D and C	6:00	7:00	Delayed	Doctor arrived late
50	02-05-2023	LSCS	7:30	7:45		
51	03-05-2023	Lap cholecystectomy	10:30	9:50		
52	03-05-2023	Excision with rhomboid flap repair	12:30	11:40		
53	03-05-2023	Open ventral hrenia mesh repair	6:00	7:45		
54	03-05-2023	Lap appendicectomy	9:30		Cancelled	Insurance not approved
55	03-05-2023	Lap radical hemicolectomy- Rt	11:30	9:50		
56	03-05-2023	LSCS	6:00	6:43		
57	03-05-2023	Open CABG	8:00	8:45	Delayed	Late start
58	03-05-2023	MICS CABG + Total arterial	12:30		Cancelled	Surgery not scheduled for the day
59	03-05-2023	MICS CABG	8:00		Cancelled	Surgery not scheduled for the day

60	03-05-2023	MICS CABG	12:30	12:55		
61	03-05-2023	TKR- U/L	9:30	9:20		
62	04-05-2023	Lt- THR	12:30		Cancelled	Patient on Dialysis
63	04-05-2023	Multilevel lumbar decompression	6:00	7:15	Delayed	Doctor arrived late
64	04-05-2023	Lumbar decompression	9:30	10:05	Delayed	First case started late
65	04-05-2023	Craniotomy +MSE	12:30	12:35		
66	04-05-2023	BNI	7:00	12:35	Delayed	Sodium low
67	04-05-2023	Lap sterilization	9:30	9:05		
68	04-05-2023	Lap inguinal hernia mesh repair B/L	10:00		Cancelled	Patient not admitted/postponed tomorrow
69	04-05-2023	Rt- Endoscopic tympanoplasty	12:30	10:20		
70	05-05-2023	LSCS	9:00	9:05		
71	05-05-2023	Stent removal	10:30	10:55		
72	05-05-2023	VIU	11:30	11:30		
73	05-05-2023	Lap inguinal hernia mesh repair- Lt	6:00	7:45	Delayed	Doctor arrived late
74	05-05-2023	Inguinal scrotal exploration	11:30		Cancelled	Postponed tomorrow by doctor
75	05-05-2023	Exploratory laparotomy	13:00	11:45		
76	05-05-2023	Conventional haemorrhoidectomy	16:00		Cancelled	Fitness clearance pending
77	05-05-2023	MICS CABG + Total arteial	8:00	10:40		
78	06-05-2023	MICS CABG	12:30		Cancelled	Cancelled by doctor
79	06-05-2023	ENDO MVR	17:30		Cancelled	Cancelled by doctor
80	06-05-2023	TKR-Lt	6:00	6:10		
81	06-05-2023	MICS CABG	9:30	8:35		
82	06-05-2023	CABG	14:30	12:10		
83	06-05-2023	Bipolar Hemiarthroplasty	9:30	16:00	Delayed	First case started late
84	06-05-2023	TURP	6:00	7:15	Delayed	Parallel booking. Doctor busy with another case
85	06-05-2023	RIRS Dj Stenting	8:30	14:40	Delayed	Next case taken first
86	06-05-2023	URS/RIRS	10:30	10:45		
87	06-05-2023	Endoscopic excision of papilloma nose	12:30	12:10		

88	06-05-2023	Sis trunk operation	14:00	14:10		
89	07-05-2023	Right BCS + Left chemoport insertion	8:30	9:05		
90	07-05-2023	Superficial Parotidectomy	11:00	12:15		
91	07-05-2023	Laparotomy and proceed	15:00	15:30		
92	07-05-2023	Whipple procedure	9:30	9:30		
93	07-05-2023	Lap CAPD cathetar insertion	15:00		Cancelled	Postponed to next week, patient's personal issues
94	07-05-2023	PFR + TOT repair	8:00	9:10	Delayed	Delay from ward
95	07-05-2023	EUA + Stapled haemorrhoidectomy	11:00		Cancelled	Patient not admitted/not confirmed with the patient previous day
96	07-05-2023	Pilonidal sinus excision	12:30	15:00	Delayed	Billing clearance pending
97	07-05-2023	Check cystoscopy	14:00	16:05	Delayed	Potassium high, PAC, Billing clearance pending. Surgery done in OT-7
98	08-05-2023	Hydrocelectomy	15:30	13:45		
99	08-05-2023	Lumbar decompression	6:00	7:10	Delayed	Doctor arrived late
100	08-05-2023	Chemo port insertion	10:30	15:35	Delayed	Abnormalities in report, next case taken first
101	08-05-2023	Breast lumpectomy-SOS mastectomy	12:00	12:10 om		
102	08-05-2023	EVLT	14:00	15:30	Delayed	Surgery done in OT-4
103	08-05-2023	Stereotactic biopsy	12:00	12:30		
104	08-05-2023	EVD placement	17:30	15:25		
105	09-05-2023	ML Scopy + excision biopsy	6:30	6:50		
106	09-05-2023	Lap inguinal hernia mesh repair	9:00	11:20	Delayed	Billing clearance pending
107	09-05-2023	Lap ventral hernia mesh repair	11:30	16:45	Delayed	No pre-op orders written last night. Surgery done in OT-7
108	09-05-2023	Cervical lymph node excision	14:00	13:50		
109	09-05-2023	Rt-foot wound debridement	7:00	7:05		
110	09-05-2023	RIRS DJ stenting	8:30		Cancelled	Patient had fever

111	09-05-2023	Circumcision	11:00	11:50		
112	09-05-2023	Lap cholecystectomy	16:00	16:35	Delayed	Last case got delayed
113	09-05-2023	CMT plasty- Lt	6:00	6:50	Delayed	Doctor arrived late
114	09-05-2023	CMT plasty- Rt	9:30	9:50	Delayed	First case started late
115	09-05-2023	ML Scopy + excision biopsy	13:00	13:05		
116	10-05-2023	Stent removal- Rt	15:30	16:05		
117	10-05-2023	Check cystoscopy/TURBT	16:30	15:20		
118	10-05-2023	EUA + laser haemorrhoidectomy + LIS	14:00		Cancelled	Insurance not approved
119	10-05-2023	Large lump excision- Rt hip	15:30	9:40		Surgery done in OT-4
120	10-05-2023	DJ stent removal	9:30	10:15		
121	10-05-2023	Stapled haemorrhoidectomy	11:30	9:52		Surgery done in OT-5
122	11-05-2023	MICS CABG	8:00		Cancelled	
123	11-05-2023	MICS CABG	17:30	14:00		
124	11-05-2023	TKR-Rt	6:00	6:20		
125	11-05-2023	Lap donor nephrectomy	13:00	14:35	Delayed	First case started late
126	11-05-2023	Cervical Laminectomy	16:30		Cancelled	Postponed tomorrow by doctor
127	11-05-2023	L4, L5 decompression	6:00	6:50	Delayed	Doctor arrived late
128	11-05-2023	EUA and proceed	9:30	10:05	Delayed	Doctor arrived late
129	11-05-2023	Osteotomy-Rt elbow internal fixation	6:00	6:45	Delayed	PAC pending, billing clearance pending
130	12-05-2023	Adenotonsillectomy	9:30		Cancelled	Patient not admitted though confirmed the day before
131	12-05-2023	Leg wound debridement	7:00	7:15		Surgery done in OT-5
132	12-05-2023	Total laryngectomy + reconstruction + TEP insertion	9:00	8:05		
133	12-05-2023	BCS	15:30	14:35	Delayed	Surgery took longer time than expected
134	12-05-2023	Endo MVP	8:00	14:06	Delayed	Reports not ready. Next case taken first
135	12-05-2023	MICS CABG	13:00	8:40		
136	13-05-2023	TKR-Rt (High flex)	6:00	6:55	Delayed	Doctor arrived late

137	13-05-2023	Arthroscopic ACL reconstruction- Rt knee	14:00	15:15	Delayed	First case started late
138	13-05-2023	TKR-Lt	17:00	13:20		Surgery done in OT-3
139	13-05-2023	Lumbar decompression	10:30		Cancelled	Abnormality in diagnostic report
140	13-05-2023	Lipo Excision	7:00	7:15		
141	13-05-2023	Septoplasty + Rhinoplasty	11:00	11:10		
142	14-05-2023	EVLT- B/L	16:00		Cancelled	Patient not admitted/not confirmed with the patient previous day
143	14-05-2023	Wide excision tongue neck dissection	6:00	6:49	Delayed	Doctor arrived late
144	14-05-2023	Lt- supraclavicular lymph node biopsy	8:30	10:00	Delayed	Last surgery took more time than expected. Patient admitted late, fitness clearance pending
145	14-05-2023	Lap inguinal hernia mesh repair- B/L	12:00		Cancelled	Abnormality in diagnostic report
146	14-05-2023	Cervical rib excision + Subclavian aneurysm repair	16:30	17:05		
147	14-05-2023	Septoplasty + FESS + SMD	16:00		Cancelled	Already booked in OT-4
148	14-05-2023	Lap inguinal hernia mesh repair	6:00	7:15	Delayed	Doctor arrived late
149	15-05-2023	Lap Cholecystectomy	10:30	14:35	Delayed	Surgeon wants to operate next case
150	15-05-2023	Neck lump excision biopsy	15:30		Cancelled	Patient not admitted/not confirmed with the patient previous day
151	15-05-2023	TAH with BSO	8:30	10:10	Delayed	Doctor arrived late
152	15-05-2023	DJ stent removal	11:00	12:20	Delayed	First case started late
153	15-05-2023	DJ stent removal	12:00	15:00	Delayed	Surgery done in OT-6
154	15-05-2023	Permcath Removal	13:00	14:00		
155	15-05-2023	TURP	5:30	5:45		
156	15-05-2023	EUA + Lap cholecystectomy	14:00	14:05		
157	15-05-2023	Cervical lymph node biopsy	16:30	14:20		Surgery done in OT-7

158	16-05-2023	Stappled Haemorroidoppexy	9:00	9:15		
159	16-05-2023	Lap inguinal hernia mesh repair	10:30		Cancelled	Abnormality in diagnostic report
160	16-05-2023	Lap inguinal hernia mesh repair- Lt	13:30	10:45		
161	16-05-2023	Lap cholecystectomy	16:00		Cancelled	Patient not admitted, postponed tomorrow
162	16-05-2023	EUA + Laser hemorroidpexy + Laser Sphincterotomy	18:00	14:05		
163	16-05-2023	Cobiation Tonsillectomy	7:30	9:15	Delayed	Next case taken first
164	16-05-2023	Septoplasty + FESS	9:30	7:10		
165	16-05-2023	Circumcision	12:30	13:00		
166	16-05-2023	MICS CABG	8:00	8:38		
167	16-05-2023	ENDO AVR	13:00	13:08		
168	16-05-2023	THR-Lt	6:00	6:22	Delayed	Doctor arrived late
169	16-05-2023	Lt- Shoulder lipoma excision	10:00	10:35	Delayed	Last surgery took more time than expected
170	16-05-2023	TKR-Rt	11:30		Cancelled	Patient not admitted/not confirmed with the patient previous day
171	17-05-2023	Rt-Ete retinal detachment	7:00	8:40	Delayed	PAC pending, billing clearance pending
172	17-05-2023	Rt-Eye cataract	9:30	1:02	Delayed	Patient admitted late
173	17-05-2023	Pterygium + autographt-Lt Eye	11:00	13:50	Delayed	Billing and Fitness clearane pending
174	17-05-2023	EVLT-U/L	12:30	15:18	Delayed	Billing and Fitness clearane pending
175	17-05-2023	RIRS-Rt	6:00		Cancelled	Fitness clearance pending
176	17-05-2023	VH with PHR	9:30	6:35		
177	17-05-2023	Lap Cholecystectomy	12:00	11:45		
178	17-05-2023	Open hysterectomy + open umbilical hernia	9:30	10:20	Delayed	First case started late
179	17-05-2023	EUA+ Abscess drainage+ Fistulectomy	12:30	14:18	Delayed	Billing clearance pending
180	17+B181:B205-05-2023	EUA+ Sphincterotomy	14:00	13:05		
181	17-05-2023	Wound debridement Ankle-Rt	7:00	7:10		

182	18-05-2023	Hysteroscopy + D & C	9:00	10:00	Delayed	Doctor arrived late. Surgery done in OT-5
183	18-05-2023	Lap Cholecystectomy	10:30	10:05		
184	18-05-2023	Lap Cholecystectomy	13:30	11:35		
185	18-05-2023	LSCS	9:00	11:55		
186	18-05-2023	Arthroscopic ACL Reconstruction- Rt knee	6:00	6:35	Delayed	Doctor arrived late
187	18-05-2023	Cataract- Lt	9:30	10:35	Delayed	First case started late
188	18-05-2023	AVF Creation+ Permcath insertion	11:00	13:10	Delayed	Patient on Dialysis. Surgery done in OT-3
189	18-05-2023	Total Thyroidectomy	8:00	7:40		
190	18-05-2023	Circumcision	6:00	7:05	Delayed	Doctor arrived late
191	18-05-2023	DJ stent removal	7:30	12:50	Delayed	Patient had fever

Root cause of planned surgical delays and cancellations

Surgical cancellations

These cancellations take place when planned surgeries are cancelled, which causes problems for healthcare professionals and disturbances for patients also. Following are the major causes of such cancellations:

I. Lack of Patient admission Confirmation: Hospital staff failing to confirm patient admission on the previous day and This lack of confirmation breeds doubt and results in miscommunications between patients and medical professionals, ultimately leading to the cancellation of scheduled surgeries.
II. Diagnostic Test Abnormalities: The occurrence of diagnostic test abnormalities is another significant underlying cause. Surgeons decide it is necessary to cancel the surgery until additional examination and the proper course of treatment are carried out if test results indicate unanticipated. These differences can include difficulties that develop during the diagnostic process or pre-existing medical concerns that were undiscovered before the examinations.
III. Unscheduled Surgery: In some instances, the surgery is postponed since it was not properly scheduled for the day. Administrative mistakes, poor communication among hospital employees, is what results in cancellations of surgery for that particular day.
IV. No Insurance Approval: a frequent cause of cancelling a planned surgery is insurance denial. Insurance companies must first approve surgical treatment in order to pay for the patient's care. If other payment alternatives are not available, cancellations of surgery take place due to this.

Surgical delays

I. Doctor Arrived Late: the attending surgeon arrives after the surgery's scheduled start time; it significantly prolongs the procedure. The intended order of surgeries gets disrupted by this.
II. Before Case Started Late: certain preoperative tasks take longer than anticipated, these involve the time needed for necessary diagnostic tests, patient preparation, or anaesthesia administration. Which leads to delay in starting a case.
III. Billing Clearance pending: The delay took on by unsettled billing clearances is another element that had a significant impact on surgery delay
IV. Prediction Error (Last Surgery Took More Time): It is often difficult to predict how long a surgical treatment will take because of variances in complexity or unexpected consequences surgery takes longer time Which results in delay of upcoming surgery.

frequency and occurrence of planned surgical cancellations and delays

a) Cancelled Surgeries

Table No. 2

Date	No of cancelled surgeries
28-05-2023	2
29-04-2023	3
30-04-2023	3
01-05-2023	1
02-05-2023	4
03-05-2023	4
05-05-2023	2
07-05-2023	1
08-05-2023	2
09-05-2023	2
10-05-2023	1
11-05-2023	3
12-05-2023	1
13-05-2023	2
15-05-2023	2

- **Average number of surgery cancellation: 2.2 Surgeries**

b) Delayed surgeries

Table no. 3

Dates	No of delayed surgeries
28-05-2023	4
29-04-2023	4
30-04-2023	2
01-05-2023	2
02-05-2023	3
03-05-2023	1
04-05-2023	3
05-05-2023	3
06-05-2023	5
07-05-2023	3
09-05-2023	6
10-05-2023	2
11-05-2023	4
12-05-2023	3
14-05-2023	2
15-05-2023	5
16-05-2023	7
17-05-2023	1

- Average number for surgery delays: 3.3 Surgeries

From the data studied for 191 patient, delays and cancellations of surgeries frequencies are as follows:

- Average cancellation frequency of surgeries: in every 24-26 hours 2.2 surgeries are being cancelled
- Average delay frequency of surgeries: is in every 24-26 hours 3.3 surgeries are being delayed

Current procedures, policies, and practices related to preoperative preparation, surgical planning, and communication with OT staff

Workflow/Process map

Surgeon requests for OT booking

↓

OT Booking done by OT secretary as per the availability

↓

OT secretary gives the details of the patient to transport nurse

Transport nurse along with the patient and the documents arrives in the pre op area

Transport nurse hands over to the Pre op nurse

Pre op nurse checks the patient details (Consent, OP, and PAC)

Informs to the anaesthetist and pharmacy

Respective ORA/Scrub nurse /circulating nurse prepare the OT for the procedure

Pre op nurse then hands over to the scrub nurse/ORA

Patient taken to the OT room

Anaesthetist, surgeon, scrub nurse carries out time out and documents the same

Procedure begins

On the completion of the procedure, the patient is transferred to the post op area by the anaesthetist/ORA

Patient is handed over to the post op nurse who monitors the patient

After half hour by anaesthetist written order, if patient is fit, he/she is transferred to the ward through the transport nurse.

Results

Out of **191** samples studied **66** delayed surgeries and **35** cancelled surgeries were observed.

The most frequent causes of cancellations observed were, patient not admitted, insurance not approved, surgery not scheduled for the day. And most frequent causes of delays observed were, doctor arrived late, before case started late, billing clearance pending.

Patients, healthcare professionals, and healthcare systems all face difficulties as a result of surgical cancellations and delays. This case study outlined the reasons why cancellations and delays occur.

Cancelled surgeries

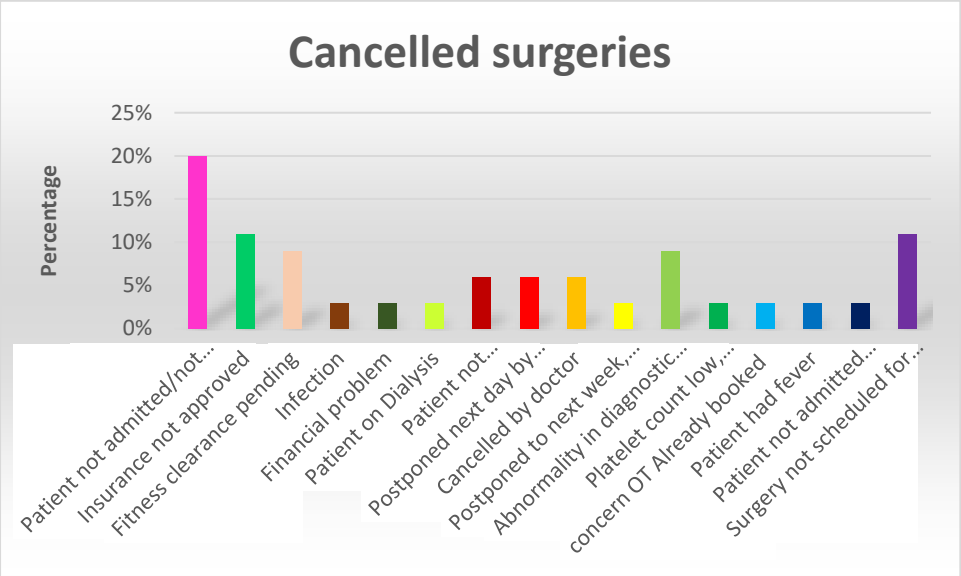
By tracking the Wheel in, Start, End, Wheel out time of all scheduled surgeries, the reasons for cancellations were found out to be as follows:

Table no. 4

Reasons of cancellation	No. of surgeries
Patient not admitted/not confirmed with the patient previous day	7
Insurance not approved	4
Fitness clearance pending	3
Infection	1
Financial problem	1
Patient on Dialysis	1
Patient not admitted/postponed next day	2
Postponed next day by doctor	2
Cancelled by doctor	2
Postponed to next week, patient's personal issues	1
Abnormality in diagnostic report	3
Platelet count low, postponed to next day	1
concern OT Already booked	1
Patient had fever	1
Patient not admitted though confirmed the day before	1

Surgery not scheduled for the day	4

Figure no. 1



- From the graph, it is seen that maximum cancellations are due to- patient not admitted, insurance not approved, surgery not scheduled for the day, postponed to next day by surgeon, abnormality in diagnostic reports, fitness clearance pending and cancelled by surgeon
- Patient not admitted can be due to- Insurance not approved, financial issues, personal issues, patient not mentally prepared for surgery etc.

<u>Delayed surgeries</u>

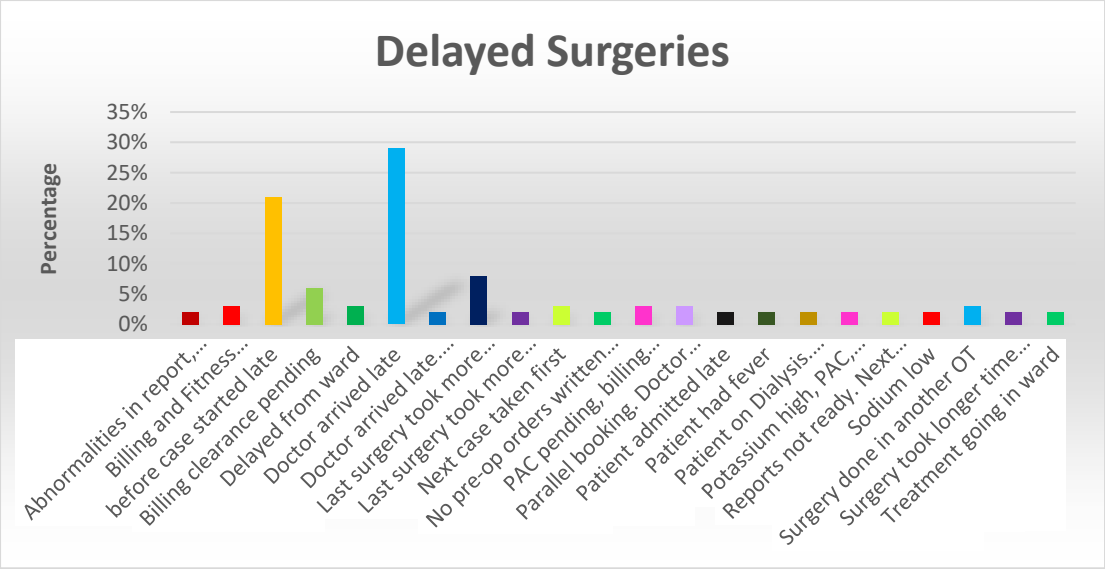
By tracking the Wheel in, Start, End, Wheel out time of all scheduled surgeries, the reasons for delays were found out to be as follows:

Table no. 5

Reasons of delay	No of surgeries
Abnormalities in report, next case taken first	1
Billing and Fitness clearance pending	2
before case started late	14
Billing clearance pending	4
Delayed from ward	2
Doctor arrived late	19
Doctor arrived late. Surgery done in another OT	1
Last surgery took more time than expected	5

Last surgery took more time than expected.	1
Patient admitted late, fitness clearance pending	2
Next case taken first	1
No pre-op orders written last night. Surgery done in OT-7	2
PAC pending, billing clearance pending	2
Parallel booking. Doctor busy with another case	1
Patient admitted late	1
Patient had fever	1
Patient on Dialysis. Surgery done in another OT	1
Potassium high, PAC, Billing clearance pending. Surgery done in another OT	1
Reports not ready. Next case taken first	1
Sodium low	1
Surgery done in another OT	2
Surgery took longer time than expected	1
Treatment going in ward	1

Figure No. 2



- From the graph, it is seen that maximum delays are due to- doctor arrived late, before case started late, billing clearance pending, prediction error (last surgery took more time)
- As the first case in each OT starts at 6am, most of the surgeons arrive late due to which the surgery gets delayed and subsequently the later cases also get delayed
- Prediction error is the extra time taken for the surgery. For e.g. - the surgery was scheduled for 3 hours, whereas it took 4 hours to complete.

Discussion

- Criteria for booking is developed to avoid last moment cancellations of booking. The criteria include Name, UHID, Diagnosis, Surgery, Date & Time, PAC, Consent, Pre-op investigations, Patient who is not registered with the hospital is not eligible for booking. For booking, advance deposit has to be paid. Guideline for advance deposit & refund is prepared. Such a booking system avoids delays and cancellations. the patient should be fit to undergo surgery. The patient must also get financial clearance by billing department which ensures that the patient is capable to clear the hospital bills. It ensures the coverage of the patient by any law or insurance or TPA etc.
- All the implants, consumables, CSSD packs, linen, medicines etc. which are essential for the particular surgery should be kept ready before starting the surgery to avoid delays.
- One of the factors that has had a significant impact on pri-operative delays is the delay in starting the first case of the day. The first case start depends on the measure 'wheels in', that is, when the patient is wheeled into the OT and the operative process begins with anaesthesia. Considering that induction of and recovery from anaesthesia are as important as the surgery itself, the time utilized for this should not be considered as irrelevant. Starting on time can also increase the capacity of a hospital to undertake more elective surgery.

Recommendations

For cancellation of surgery

- The patient should be called and asked whether he/she will be coming for the surgery. If they don't confirm, their name shouldn't be updated in the scheduled surgery list. The patient should be requested to get admitted a day prior to clear the PAC, fitness test
- If the surgeon cancels/postpones the surgery, OT executives should be informed a day prior so that they don't update the names
- All the diagnostic tests should be done a day prior so that no cancellations are done on the day of surgery

For delay of surgery

- A reminder can be sent to the surgeons about the timings of surgery. If the first case starts on time, gradually the next cases will start on time
- All the diagnostic tests should be done a day prior so that no delays are done during the surgery
- Prediction error can be eliminated by ensuring accuracy of procedure/surgery timings based on historical data

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