Summer Training

At

Narayana Multispecialty Hospital, Jaipur

"Operation Theatre Utilization"

A Report

By

Vishal Anand

Internship report submitted for the partial fulfillment of

MBA Hospital and Health Management

2018-20

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CERTIFICATE

This is to certify that **Vishal Anand** has undergone Summer Training at **Narayana Multispeciality Hospital, Jaipur** from 1st April 2019 to 31st May 2019.

The candidate himself completed the project assigned to him in summer training. His approach to project was sincere and proactive. This Summer Training is in partial fulfillment of the course requirement recommended for the award of MBA in Hospital and Health Management.

I wish him success in all his future endeavors.

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TRAINING CERTIFICATE

NH Narayana
Multispeciality Hospital
Unit of Narayana Health

This is to certify that

Vishal Anand

has satisfactorily completed his /her Internship/Training with us at

Narayana Multispeciality Hospital, Jaipur

Period of Training 2 months

Project Name Operation theatre Ultizalion

Date from 01.04.2019 **to** 31.05.2019

Department Operation Theatre

We wish him/her success in future career

Vishnu Priya Sharma
General Manager
Dept. of Human Resource

Acknowledgement

The success and final outcome of this project required a lot of guidance and assistance from many people and I am extremely privileged to have got this all along the completion of my project. All that I have done is only due to such supervision and assistance and I would not forget to thank them.

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Acronyms/Abbreviations

AHU Air Handling Unit

CAPD Continuous Ambulatory Peritoneal Dialysis

CCU Cardiac Care Unit

CT Computerized Tomography

CSSD Central Sterile Supply Department

ER Emergency Room

HDU High Dependency Unit

HEPA High Efficient Particulate Air

HIS Hospital Information System

HVAC Heat Ventilation Air Conditioning

ICU Intensive Care Unit

MICU Medical Intensive Care Unit

MRI Magnetic Resonance Imaging

NICU Neonatal Intensive Care Unit

OT Operation Theatre

PAC Pre Anesthesia Checkup

SICU Surgical Intensive Care Unit

TMT Tread Mill Test

ORGANIZATION OVERVIEW

Narayana Health Overview

Narayana Health is headquartered in Bengaluru, India, and operates a network of hospitals across the country, with a particularly strong presence in the southern state of Karnataka and eastern India, as well as an emerging presence in northern, western and central India. Our first facility was established in Bengaluru with approximately 225 operational beds and we have since grown to 23 hospitals, 7 heart centers, 19 primary care facilities across India and an international hospital in the Cayman Islands. The group now features over 6,000 operational beds through a combination of greenfield projects and acquisitions. We believe that the "Narayana Health" brand is strongly associated with our mission to deliver high-quality, affordable healthcare services to the broader population by leveraging our economies of scale, skilled doctors, and an efficient business model.

In aggregate, our centres provide advanced levels of care in over 30 specialties, including Cardiology and Cardiac Surgery, Cancer Care, Neurology and Neurosurgery, Orthopedics, Nephrology and Urology, and Gastroenterology.

Vision

"Our vision is affordable quality healthcare to the masses worldwide."

Mission

'Our mission is to deliver high quality, affordable healthcare services to the broader population in India'.

Values

Our core values are represented by the acronym "iCare", which encompasses:

i: innovation and efficiency,

C: Compassionate care,

A: Accountability,

R: Respect for all, and

E: Excellence as a culture

At the same time, we seek to generate a strong financial performance and deliver long-term value to our shareholders through the execution of our business strategy.

Chairman's Message

" There is a difference between how Narayana Health is perceived and what we truly are."

Dr. Devi Prasad Shetty
Founder and Chairman

The world perceives us as a low-cost Indian healthcare service provider; what we are engaged in is a passionate journey to establish ourselves as the lowest-cost, high-quality healthcare service provider in the world.

At Narayana Health, we are convinced that 'quality' and 'lowest cost' are not mutually exclusive when it comes to healthcare delivery. In fact, we are well on our way to demonstrate that we are not running our institution as just another number-only business, but are attractively placed to create an affordable, globally benchmarked quality-driven healthcare services model.

At Narayana Health, we will continue to trust what has worked for us in the past. We will keep our model predominantly asset-light; we will reinvest our accruals; we will engage with governments for land and help them achieve affordable healthcare promises made to their constituencies; we will rent premises from private owners and create small-to-large clinics within existing hospitals. As a result of this flexible approach, we will commission hospitals, medical facilities, and clinics across the breadth of this country, getting closer to patients and taking the promise of quality affordable healthcare to the doorstep of the country's millions.

It is this exciting prospect that stokes my motivation to do bigger and better for the glory of the country that is mine.

'Organizational Learnings'

NARAYANA MULTISPECIALITY HOSPITAL, JAIPUR

Narayana Multispeciality Hospital, Jaipur a branch of Narayana Health (Head quartered in Bengaluru, India) is a privately-owned hospital in Jaipur, established in 2010, is an optimal blend of technological excellence, complete infrastructure, competent care and heartfelt hospitality - our patients say so.

NH Jaipur is a 330 bedded multispecialty tertiary care hospital, located at Pratap Nagar in the Southern part of Jaipur. The hospital is in a sprawling 4.7-acre campus and offers high quality affordable medical care to the people of not only Rajasthan but also the bordering states of Uttar Pradesh, Haryana and Madhya Pradesh. The hospital is defined by its multi-disciplinary approach to provide holistic healthcare to its patients. NH Jaipur has one of the best teams of specialists trained in top institutions in India & abroad bringing in international experience to treatments and procedures.

The hospital houses one of the largest dialysis units in the region with a capacity of performing 3000 dialysis sessions per month. It is also an authorized center for performing heart & kidney transplants. The hospital houses one of the largest cardiology units in the region and is the largest center in Rajasthan performing CABG (By-pass Surgery) using LIMA RIMA Y technique. High end technological infrastructure coupled with clinical excellence has helped the hospital emerge as the preferred center for high-risk, minimally invasive and re-do surgeries in Western India and of the leading hospitals of the Narayana Health group.

Narayana Multispeciality Hospital, Jaipur offers comprehensive care across 37 specialties which includes its six Centers of Excellence - Cardiology & Cardio-vascular surgery, Medical & Surgical Gastroenterology, Orthopedics & Joint Replacement, Renal Sciences & Kidney Transplant, Medical & Surgical Oncology (Cancer) and Critical Care Medicine

Milestones achieved in the last 7 years (since inception)

- 32,500+ Cardiac procedures performed which includes Angioplasties, Complex Congenital Surgeries, Coronary Bypass Grafting with Advanced Techniques like Beating Heart Surgeries, Minimally Invasive Cardiac Surgery and other Valvular and Vascular Surgeries

- 87,000+ dialysis sessions done till date which includes an active and very successful kidney transplant programme by internationally trained transplant experts

- 4700+ Neurosurgeries performed which includes Endoscopic Surgery of all types of brain tumors, Brain Vascular Surgery, Aneurysm & AVM Surgery, Minimally Invasive Spine Surgery, Spine fixation & Surgery for spinal tumors, Brain Endoscopy and treatment of Hydrocephalus

- 7,00,000+ patients treated in the last 7 years (since inception) on Profile

Scope of Services:

- Anesthesia & Critical care
- Department of Cardiac Sciences
- Department of ENT
- Department of Gastro Science
- Department of Neurosciences
- Department of Pediatric
- Department of Plastic surgery
- Department of Renal Sciences
- General & Laparoscopic surgery
- Institute of Bone, Joint & Spine
- Internal Medicine
- Obstetrics & Gynecology
- Psychiatric
- Respiratory Medicine
- Dietetics
- Emergency & Trauma
- Lap Medicine

Departmental Services

Outpatient Department:

4 decentralized OPD:

- North OPD
- South OPD
- Cardiac OPD
- Nephrology OPD

In-patient Department:

- Neuro Ward
  Location: Lower ground floor
  Bed capacity: 19
- Surgical Ward
  Location: Lower ground floor
  Bed capacity: 16
- CCU
  Location: Ground floor
  Bed capacity:20
- MICU
  Location: Ground floor
  Bed capacity:18
- General ward
  Location: 1st floor
  Bed capacity: 34
- ANC Ward
  Location: 1st floor
  Bed capacity: 8
- Paediatric Ward

Location: 1st floor

Bed capacity: 6

- PICU

  Location: 1st floor

  Bed capacity: 5

- NICU

  Location: 1st floor

  Bed capacity: 5 cribs

- ITU

  Location: 1st floor

  Bed capacity: 21

- Semi-private Ward

  Location: 1st floor

  Bed capacity: 34

- KTU

  Location: 1st floor

  Bed capacity: 3

- Private ward

  Location:2nd floor

  Bed capacity:18

- Cardiac General ward

  Location: 2nd floor

  Bed capacity:34

Radiology Department:

Location: Lower ground floor

Machinery:

- MRI (1.5 tesla)
- CT (128 slice)

- X-ray

Areas:

- Reception area (Billing, Report collection & X-ray desk)
- Changing Room
- Pre-hold area
- Console room
- Imaging room (MRI, CT, X-ray and Mammography)

Diagnostic Services:

Scope of services:

- USG (Ultrasonography)
- TMT (Treadmill Test)
- ECG (Electrocardiography)
- ECHO (Echocardiography)
- Holter
- EEG (electroencephalogram)
- EMG (electromyography)
- NCV (Nerve Conduction Velocity)
- Bronchoscopy
- PFT (Pulmonary Function Test)
- Uroflowmetry
- Urodynamics study
- Endoscopy
- Balloon Enteroscopy
- Capsule Endoscopy
- ERCP (Endoscopic Retrograde Cholangio-Pancreatography)

Human Resource Department:

Location: 2nd floor

Key functions: Recruitment and Selection

- Recruitment sources:
  - Walk-ins
  - Data banks
  - References (high profile)
  - Naukri portal
  - Campus recruitment
  - Job mela
- Screening process:
  - HR round
  - Written technical round
  - HR head-Technical head
- Pre-Joining:
  - Health checkups
  - Degree verification
  - Background check
  - Technical competency
  - Police verification for criminal record
- Induction and Orientation:
  - Documentation
  - 3 days orientation by HR and all department heads
  - & days extra technical trainings for nursing staff
  - E-mail ID given to everyone.
- Leaves allotted:
  - Casual leave: 12
  - Sick leave: 9
  - Earned leave: 21
- Other benefits:

- Provident fund
- Insurance/ESI
- Gratuity(after 4.7 years)
- En-cashable Earned leave: 60

❖ Insurance:

- Sum Insured: 1 lac
- Clause:10% co-pay
- Coverage: 1+3(spouse+child) covered
- Extra: 5lac (accidental damage) & 5lac (death)

❖ After joining:

- Employee feedback: after 30days and 90days
- Probation period:6 months
- Promotion period: after 2.5 years

❖ Resignation:

- 1-month notice period
- 2-month notice period (high level employee)
- 1 day (pay 1-month salary to company)

Other functions:

❖ Payroll management

❖ Conduct Open House session (every month on 2nd wed)

- Employee gathering around 50-60
- Employee engagement
- Birthdays in the month are celebrated
- Rewards and Recognition
- Appreciates
- Games
- Inconveniences and problems discussed

❖ NEST Portal (Narayana Employee Service Tab)

Self-service tab:

- Time management

- Leaves
- Punch in and outs
- Insurance
- Resignation
- Tax declaration form 16
- Roster
- Maker/checker activities

Emergency Services:

Location: Lower ground floor

Bed capacity: 10 (3 bed for each triage category Red, Yellow, Green and 1 for Isolation)

Staff: 1 Emergency Incharge, 2 Medical officer, 1 Floor nurse, 3 Staff nurse, 1 Admin Staff, 1 Housekeeping, 1 Security guard

Operation Theatre:

Location: 1st and 2nd floor

Capacity: 10 functional OTs out of 11 (5 OTs in first floor and 5 in second floor)

Departments:

- Cardiac OT- 1-4
- Urology OT- 5
- Orthopedic OT-6 & 9
- Neuro OT- 7
- Gynea and laproscopic OT-8
- General OT- 10

Zones:

- Outer zone

- Clean zone
- Sterile zone
- Disposable zone

Staffing per OT:

- 3 Scrub nurse
- 1 floor nurse
- Team of Doctors
- Team of Anesthetist
- 1 Technician

CSSD (Central Sterile Supply Department):

Location: Lower Ground floor

Zones:

- Dirty: Receiving area, Inspection and documentation
- Clean : Assembly and packaging
- Sterile: Sterilization and storage

Sterilization check:

- Bowie-dick test
- Leak test
- Penetration test
- Batch monitoring test
- Biological(bacteria) Indicator

Sterilization equipments:

- Autoclave
- ETO machine
- Disinfection washer

Blood Bank & Laboratory:

Location: Ground floor

Sample collection counter: 3 (EHC and wheelchair patients given priority)

Blood donor couch: 2

Apheresis couch: 1

Areas:

- Sample collection room
- Counselling room
- Blood bank office
- Blood donation room
- Refreshment room
- Apheresis room
- Blood storage room
- Blood components storage room
- Histopathology room
- Sterilization & washing room
- Laboratory office
- Serology room
- TTI Testing room
- Biochemistry/hematology/clinical pathology room

Accreditation and Certificates:

- National Accreditation Board for Testing and Calibration of Laboratories (NABL by Quality Council of India)
- ISHBT- CMC Eternal Quality Assessment Scheme
- BIO-RAD -EQAS External Quality Assessment Scheme
- ISHTM AIIMS- EXTERNAL QUALITY ASSURANCE PROGRAMME

Medical Records Department:

Location: Ground floor

Duration of record storage:

- Death/MLC: Forever
- IPD files: 5 years
- OPD: 2 years

Functions:

- Maintain and store medical records of all patient records.
- Maintain excel records for all medical records received.
- Handling patient post-discharge queries.
- Issuing medical records to patients or attendants after discharge for a fixed fee.
- Issuing medical records to hospital staff while maintaining Tracer card.
- Correction in mistakes of patient details during registration.
- Documentation and reporting of vital events to government bodies.
- Notifiable diseases are notified to government bodies.

Discarding process:

- Firstly, advertisement is given in two newspapers: one local (Punjab kesari) and one national (Times of India)
- File is then shredded and burned.
- Whole process takes place under the supervision of purchase department staff and MRD staff.

Dialysis Department:

Location: Lower ground floor

Dialysis machine: 29 (28 operational)

Beds: 21 (Normal patients:15, Hep C+ patients:4, Hep B+ patients:2)

Time taken: 4hrs

No. of procedures done per day: 55

Charges: ₹2000 for new dialyser and 1100 for old dialyser per dialysis.

Kidney Transplant Department:

Location: Lower ground floor

Licensing: LICENSE FOR TRANSPLANT OF ORGAN-KIDNEY (by Rajasthan government)

Regulating Act: Human Organ Act, 1994

Chronic Kidney Disease-Stage 5 are commonly suggested for kidney transplant.

Steps before kidney transplant:

1. Blood group test
2. Blood tests
3. Doppler, ECG, etc
4. HLN Crossmatch
5. Legal documentation
6. Approval form Narayana Multispecialty Hospital Legal Committee and SMS Hospital legal committee.
7. Clearance from some department doctors regarding clearance for surgery.
8. Financial clearance.

Project Report:

'Operation Theatre Utilization'

EXECUTIVE SUMMARY

The purpose of this study was to analyze the process flow of Operation Theater and to look at and break down its time utilization. The thought was to realize how much time is OT really used for different activities like moving of patient into OT, conveyance of anesthesia, part preparation, performing medical procedure, rolling out of patient and lastly clean up time after the medical procedure. This would then assist in understanding whether the OT is in effect ideally used or not.

An intensive review of literature was done before this to gather insight about the essential functioning of OT and furthermore to realize the significant variables impacting the use of services. A portion of the examination exercises done on this topic somewhere else were additionally reviewed.

Having done this fundamental work, a foundation for this investigation was figured.

Following this, specific objective was identified with the goal that the investigation could fulfill these objectives by completing a progressively engaged examination. A form called the 'OT Time Utilization form' was created for the intention of data collection. This form was created after discussion with the external guide and as per his recommendations. The information was gathered over a time of about fourteen days, which secured around 50 medical procedures.

All the pertinent preconditions preceding data analysis were evidently described. The data analysis was carried out considering these preconditions. Other than knowing the genuine time utilization of OT, the investigation was additionally conveyed to address the research question framed. In light of the examination, all the significant discoveries of the investigation have been described. Finally, certain proposals have been made based on these discoveries from the examination.

INTRODUCTION

In spite of the fact that demand for surgical services might keep increasing, its margins are definitely not increasing. Superficially it might create the impression that OT suites are completely used and the procedures are running easily, yet when administration digs deeper they may see generous fractures like holes in authoritative information, absence of steady benchmarks in provision of care and resources use, and inadequate utilization of staff and different resources because of poor planning and sequencing of occasions, all of which contrarily influences the yield.

So what is the reason of these inefficiencies? Most can be attached straightforwardly to the absence of an enterprise wide care conveyance framework that coordinates the information and procedures of the numerous useful regions that sustain the OT. In the past when management personnel enhanced their skills along managerial lines, they frequently did as such with little respect to the effect on different offices up and down the care scale. Hence, activities had just minimal effect on the improvement of efficiencies and benefits of the general associations. In any case, when associations venture back and take a gander at the whole consideration conveyance process all in all, seeing how each progression, every asset, every office is interconnected and related, they can start to make jumps forward in progress.

The incorporation of resources management exercises inside and across the organization enables associations to increase numerous points of interest like:

- Improved benefits through better basic leadership, decreased expenses, and expanded number of surgical patients per suits every day.
- Performance management upgrades dependent on access to constant, enterprise wide information.
- Amplified resource utilization through decrease of planning holes and deferrals.
- Streamlined work process by end of excess and manual procedures.
- Improved care conveyance through better incorporation of and access to patient care information.

REVIEW OF LITERATURE

1. An analysis of time utilization and cancellations of scheduled cases in the main operation theater complex of a tertiary care teaching institute of North India

Abstract: The objective of the study was to analyze the time utilization of Operation Theatre and explore the causes of cancellation of scheduled cases. The sample of the study was 325 scheduled cases out of which 22.5% surgeries were cancelled. Delay in starting the OT table at the scheduled time was found to be 15.63% and out of total resource hours the mean 'Raw utilization' was 81.54% and the 'Adjusted utilization' was 86.09%. the mean time spent on 'Supportive services' was 12.02% and on 'Actual surgery' was 61.37%. The room turn over time was 5.39%.

Among the stated reasons for cancellation the most common reason found was the lack of operating time i.e. in 57 cases (78.1%).

2. Utilization of operating room time in a cancer hospital

Abstract: The study was conducted to evaluate the pattern of usage of Operating room. This was a prospective audit carried over 2 month in 11 major ORs in a cancer hospital. The OR anesthesiologists filled a standard form for all patient undergoing elective surgery and recorded all the key times. Two surgeries per OT session were performed on an average. Anesthesia and surgery related processes contributed to 17% and 79%, respectively, of the total OR time whereas turnover time between cases accounting for the remaining 4%. The percentage of OR sessions starting 10mins later than planned was found to be 15% and 17% of OR sessions ended more than 2hrs after the scheduled finish time. An anesthesia procedure room was utilized in only 15% of cases where it could potentially have been used. The audit helped identify the pattern of OR utilization and helped to detect areas of inefficient utilization.

JUSTIFICATION

The surgical suite commonly devours 8-10% of the medical facility spending plan. Technological advances like minimally obtrusive medical procedure which needs exorbitant priced equipments, payments dependent on finding, limited expense for administrations have all altogether decreased edges in the surgical business. It is consequently not astonishing that this zone is set apart by numerous medical facilities as a spot to decrease costs.

We all who work in the OT must be cost effective and must augment efficiency for long haul achievement. Accomplishing these objectives requires dependable information to support different stakeholders like Facility Director, General Manager, administration staff and medical staff. Along these lines it is clear that a dedicated report on usage of OT assets will be of monstrous advantage. The advantage won't just be restricted to the individuals who are straightforwardly associated with working of OT yet in addition to the top administration which can take exact and auspicious choices dependent on certainties.

As referenced before, embracing a progressively far reaching approach while doing any examination on OT will surely give more data on the bottlenecks that exist in dealing with the OT. As a manager, one must know about the regular issues that may be inalienable in the framework. Since OT is one of the greatest incomes producing focuses of any corporate medical facility, it turns out to be progressively significant that this zone be overseen expertly.

So as to streamline the OT procedure we should hold fast to specific benchmarks that are accessible as protocols. A manager accountable for OT ought to have the ability to justify any deviations from these set protocols. For instance, there must be a solid and substantial explanation behind any medical procedure to be dropped or deferred. Correspondingly if the frequency of postoperative infection is high, one should cautiously analyze it to discover the essential or the main driver. Just if strict and effective protocols are drilled in the OT, its yield as far as income generation and staff and patient satisfaction can meet the ideal result. It is advantageous to make reference here that embracing a framework approach and giving more accentuation on the procedure is required to yield a progressively good result. As such, just by making an enormous infrastructure won’t enable a medical facility to work effectively if the correct procedure isn't set up and the opportune individuals are not locked in.

RESEARCH QUESTIONS

The investigation did by me on "OT utilization" plans to give answers to a portion of the applicable inquiries. It is likewise expected to give answers for a portion of the issues looked in dealing with an OT. The examination turns out to be significantly increasingly important and deliberate in a different and developing association like this.

The investigation ought not be seen as a shortcoming discovering study. Despite what might be expected, the investigation is required to give essential data on different aspects in the OT. The motivation behind the examination is to discover answers to specific inquiries relating to the working of OT. Some of research questions are mentioned below:

- What is the process flow of OT?
- Do medical procedures start on booked time?
- For how long the OT services are really used?
- What is the average time between two listed medical procedures?

HYPOTHESIS

The current management and utilization rate of OT is not optimal.

RESEARCH QUESTION

What is the current utilization rate of OT?

OBJECTIVES

This study aimed to understand the utilization of Operation Theatre at Narayana Hospital, Jaipur with following objectives:

- To document the process flow of Operation Theatre suite.
- To assess the utilization pattern of Operation Theatre.
- To analyze the time between two medical procedures in the Operation Theatre.
- To identify the bottlenecks, if any in effective utilization of Operation Theatre time.
- To suggest corrective measures for better utilization of Operation Theatre time.

RESEARCH DESIGN

STUDY DESIGN: Observational cross-sectional study

APPROACH: Quantitative

DATA COLLECTION METHOD: Primary and Secondary

DATA SOURCES: Direct Observation and Hospital records

STUDY POPULATION: 231 patients who had surgery between 20 April 2019 to 6 May 2019 except those who had surgery after 8PM and before 8AM or on Sundays.

STUDY SETTING: Multispeciality Hospital

METHODOLOGY

- Primary Data was collected by direct observation for around 50 surgeries by following every patient as soon as he/she is shifted from ward to OT complex and shifted back out from the OT complex.
- Secondary Data was collected at the end of the day for all the other surgeries which I was not able to follow during the day.
- A tool was created in which all the entries were done every day.
- Both data were merged into one datasheet.
- Data was analyzed and compared with other studies done on the same subject.

THE OPERATION THEATRE

NARAYANA MULTISPECIALITY HOSPITAL, JAIPUR

The Operation Theatre suite at Narayana Multispeciality Hospital, Jaipur is located on the first and second floor of the main building and is directly accessible via the 4 elevators from any floor. The OT suite comprises of a total of 10 OTs out of which 5 are on the first floor among which 4 are for dedicated cardiac procedures and 1 is for Urology, these OTs are directly connected to ITU located on the same floor and on second floor there are 5 of the remaining OTs amongst which OT-5 is dedicated for Orthopedic surgery in which implants are placed such as TKR or THR, whereas OT 7, 8, 9 and 10 are dedicated to Neurology, Gynecology, Orthopedic and General surgery respectively but there four can be used interchangeably as per the required or availability. Also, OT 7 and 8 are interconnected for the sake of keeping donor and recipient in case of kidney transplant reducing the need to go out for visiting the other OT. The OTs on the second floor are close to Medical and Surgical ICU so as quickly transfer the patient out from the OT or recovery room to ICU without losing much time in transportation and also decreasing the chances of infection due to increased exposure to external environment.

The OTs here are fully equipped with state-of-the-art technology and infrastructure to carry out any major or minor surgery in various specialties. Besides having the highly specialized equipments required for various surgeries the OTs are jointless and have Laminar airflow with HEPA filters with ceiling pendent for Medical Gas supply. A C-arm is available on each floor that can be shared by the OTs as per their need.

The OT manager is responsible for ensuring smooth day to day functioning of all OT processes. The main responsibilities include coordinating with surgeons, scheduling of surgeries, overseeing in-charges of both floors, ensuring correct documentation, handling staff issues and ensuring patients are handled properly.

The smooth OT functioning is achieved not only due to the continuous efforts of the OT staff but also because of other departments such as Central Sterile Supply Department (CSSD), IP Pharmacy, Blood Bank, Engineering and Laboratory work relentlessly in the background. The CSSD department ensures a timely and uninterrupted supply of sterile items required in OT via two dedicated lifts for sterile and dirty supplies.

Definitions:

Scheduled Time:

Time when the patient was planned to be wheeled-In to the Operation Theatre. This time is set a day in advance by the OT In-charge in coordination with the concerned surgeon and the time availability.

Wheel-In Time:

It is the time when the patient (scheduled or unscheduled) is brought inside the Operation Theatre.

Difference between Scheduled Time and Wheel-In Time:

It is the time gap between the time when the patient was supposed to be wheeled-in as per the schedule and when the patient was actually wheeled-In.

Induction Time:

It is the time when the patient is induced with anesthesia.

Time Out:

The "time out" represents the final recapitulation and reassurance of accurate patient identity, surgical site, and planned procedure. In addition, the correct patient positioning, the need for perioperative antibiotics, presence of allergies, and the availability of relevant documents and diagnostic tests, instruments, implants and other pertinent equipment are confirmed during this time.

Incision/Knife time:

It is the time when any surgery actually begins i.e. surgeon introduces a cut on the skin of the patient with the surgical blade in order to initiate the procedure.

Wheel-Out time:

It is the time when the patient is brought out from the Operation Theatre and shifted to post-operative area.

Wheel-In to Wheel-Out time:

It is the actual utilization of the Operation Theatre i.e the time after the patient was brought into the OT and before bringing out from the OT.

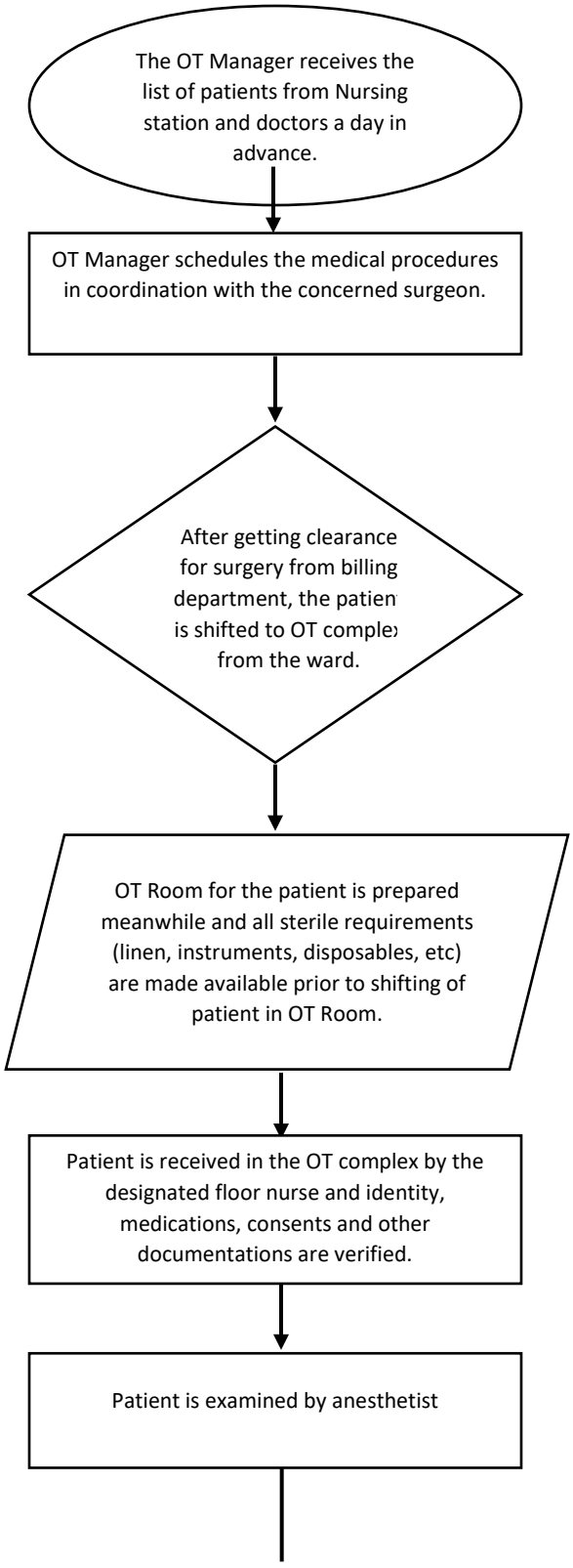
Surgery Time:

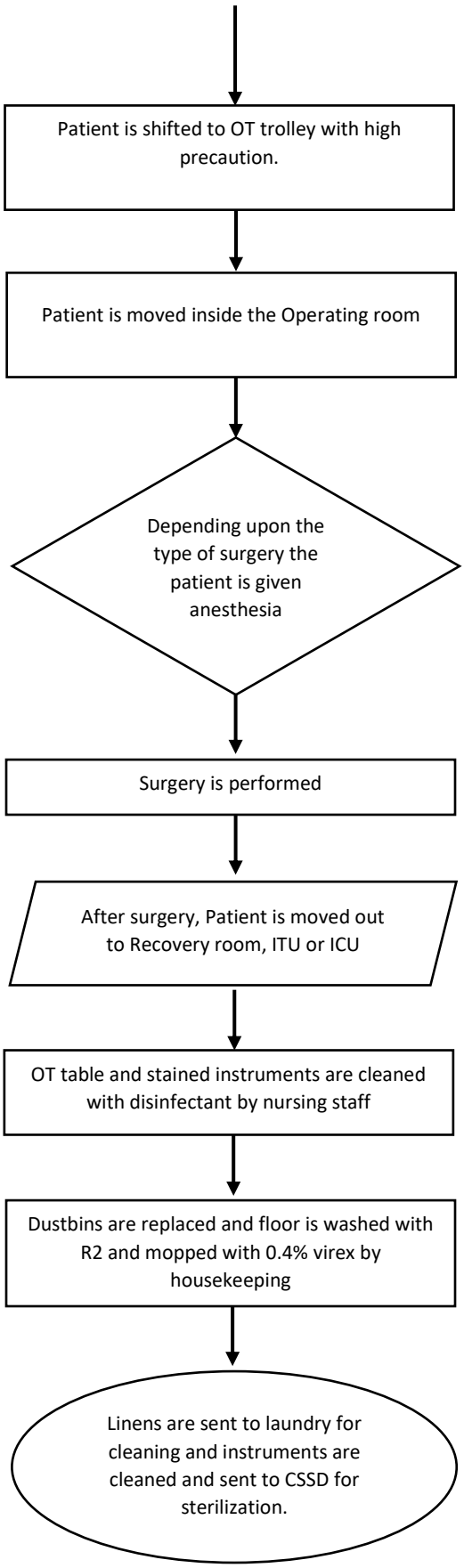
It is the time taken from Incision time to wheel-out time

Time taken between two surgeries:

It is calculated as the time after wheel-out of a patient after a scheduled surgery and before another patient is wheeled-in for a scheduled surgery.

OT Process flow




Patient is shifted to OT trolley with high precaution.
Patient is moved inside the Operating room
Depending upon the type of surgery the patient is given anesthesia
Surgery is performed
After surgery, Patient is moved out to Recovery room, ITU or ICU
OT table and stained instruments are cleaned with disinfectant by nursing staff
Dustbins are replaced and floor is washed with R2 and mopped with 0.4% virex by housekeeping
Linens are sent to laundry for cleaning and instruments are cleaned and sent to CSSD for sterilization.

DATA COMPILATION

OPERATION THEATRE 1

Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	0	0	0	0
22-Apr	1	311	375	64
23-Apr	1	242	296	54
24-Apr	2	337	411	74
25-Apr	2	450	532	82
26-Apr	2	355	402	47
27-Apr	0	0	0	0
29-Apr	1	344	400	56
30-Apr	1	273	328	55
1-May	2	264	337	73
2-May	1	498	560	62
3-May	2	475	580	105
4-May	1	230	290	60
6-May	1	220	270	50
Total	17	3999	4781	782
Average time per surgery		235	281	46
Average time per day		286	342	56

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	4781	79hr 41min
Average Utilization time/day:	342	5hr 41min
Average idle time/day: (8400-4781)/14	259	4hr 18min

OT utilization percentage (4781/8400)*100	56.92%

OPERATION THEATRE 2

Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	1	155	218	63
22-Apr	1	330	373	43
23-Apr	2	392	519	127
24-Apr	2	250	340	90
25-Apr	1	328	398	70
26-Apr	2	530	598	68
27-Apr	0	0	0	0
29-Apr	2	318	450	132
30-Apr	1	318	373	55
1-May	1	310	350	40
2-May	2	525	677	152
3-May	2	503	585	82
4-May	1	195	231	36
6-May	1	310	355	45
Total	19	4464	5467	1003
Average time per surgery		235	288	53
Average time per day		319	391	72

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	5467	91hr
Average Utilization time/day:	391	6hr30min
Average idle time/day: (8400-5467)/14	210	3hr 30min

OT utilization percentage (5467/8400)*100	65.08%

OPERATION THEATRE 3

Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	1	443	476	33
22-Apr	1	355	411	56
23-Apr	1	331	374	43
24-Apr	2	390	465	75
25-Apr	2	638	710	72
26-Apr	2	537	611	74
27-Apr	1	253	257	4
29-Apr	1	385	435	50
30-Apr	2	538	630	92
1-May	2	480	576	96
2-May	2	520	638	118
3-May	2	535	645	110
4-May	1	210	260	50
6-May	1	313	330	17
Total	21	5928	6818	890
Average time per surgery		282	325	42
Average time per day		423	487	64

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	6818	113hr38min
Average Utilization time/day:	487	8hr
Average idle time/day: (8400-6818)/14	113	2hr

OT utilization percentage (6818/8400)*100	81.17%

OPERATION THEATRE 4

Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	1	322	357	35
22-Apr	2	400	464	64
23-Apr	1	221	264	43
24-Apr	1	265	303	38
25-Apr	1	263	318	55
26-Apr	2	340	410	70
27-Apr	1	346	403	57
29-Apr	2	345	510	165
30-Apr	2	478	555	77
1-May	2	504	581	77
2-May	2	504	590	86
3-May	2	428	532	104
4-May	1	245	285	40
6-May	1	365	402	37
Total	21	5026	5974	948
Average time per surgery		239	284	45
Average time per day		359	427	68

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	5974	97hr
Average Utilization time/day:	427	7hr
Average idle time/day: (8400-5809)/14	173	3hr

OT utilization percentage (5809/8400)*100	71.12%

OPERATION THEATRE 5

Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	3	197	263	66
22-Apr	1	10	20	10
23-Apr	3	195	270	75
24-Apr	3	47	78	31
25-Apr	3	95	125	30
26-Apr	4	387	435	48
27-Apr	2	207	250	43
29-Apr	3	53	97	44
30-Apr	2	112	165	53
1-May	4	158	235	77
2-May	5	200	375	175
3-May	4	77	150	73
4-May	4	238	328	90
6-May	2	83	110	27
Total	43	2059	2901	842
Average time per surgery		48	67	20
Average time per day		147	207	60

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	2901	48hr21min
Average Utilization time/day:	207	3hr30min
Average idle time/day: (8400-2901)/14	393	6hr30min

OT utilization percentage (2901/8400)*100	34.54%

OPERATION THEATRE 6

Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	2	230	325	95
22-Apr	1	155	220	65
23-Apr	0	0	0	0
24-Apr	1	150	215	65
25-Apr	1	70	120	50
26-Apr	2	223	320	97
27-Apr	1	65	85	20
29-Apr	0	0	0	0
30-Apr	0	0	0	0
1-May	3	322	481	159
2-May	2	185	316	131
3-May	0	0	0	0
4-May	1	148	210	62
6-May	0	0	0	0
Total	14	1548	2292	744
Average time per surgery		111	164	53
Average time per day		111	164	53

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	2292	38hr
Average Utilization time/day:	164	3hr
Average idle time/day: (8400-2292)/14	436	7hr

OT utilization percentage (2292/8400)*100	27.29%

OPERATION THEATRE 7

Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	1	305	390	85
22-Apr	0	0	0	0
23-Apr	1	62	125	63
24-Apr	1	83	125	42
25-Apr	1	78	125	47
26-Apr	2	250	350	100
27-Apr	2	228	286	58
29-Apr	1	75	115	40
30-Apr	1	70	95	25
1-May	0	0	0	0
2-May	3	345	425	80
3-May	3	325	463	138
4-May	1	70	90	20
6-May	3	263	345	82
Total	20	2154	2934	780
Average time per surgery		108	147	39
Average time per day		154	210	56

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	2934	49hr
Average Utilization time/day:	210	3hr30min
Average idle time/day: (8400-2934)/14	390	6hr30min

OT utilization percentage (2934/8400)*100	34.93%

OPERATION THEATRE 8

Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	1	350	400	50
22-Apr	0	0	0	0
23-Apr	1	180	213	33
24-Apr	1	115	135	20
25-Apr	1	60	78	18
26-Apr	3	250	358	108
27-Apr	1	236	285	49
29-Apr	2	122	200	78
30-Apr	4	293	380	87
1-May	2	210	260	50
2-May	2	155	220	65
3-May	3	348	435	87
4-May	3	207	290	83
6-May	1	90	135	45
Total	25	2616	3389	773
Average time per surgery		105	136	31
Average time per day		187	242	55

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	3389	56hr30min
Average Utilization time/day:	242	4hr
Average idle time/day: (8400-3389)/14	358	6hr

OT utilization percentage (3389/8400)*100	40.35%

OPERATION THEATRE 9

Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	2	155	250	95
22-Apr	2	153	220	67
23-Apr	3	249	400	151
24-Apr	2	165	245	80
25-Apr	2	108	202	94
26-Apr	2	375	505	130
27-Apr	2	202	292	90
29-Apr	2	135	205	70
30-Apr	2	116	170	54
1-May	2	265	310	45
2-May	2	153	198	45
3-May	2	235	350	115
4-May	1	43	91	48
6-May	1	55	100	45
Total	27	2409	3538	1129
Average time per surgery		89	131	42
Average time per day		172	253	81

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	3538	59hr
Average Utilization time/day:	253	4hr
Average idle time/day: (8400-3538)/14	347	6hr

OT utilization percentage (3538/8400)*100	42.12%

OPERATION THEATRE 10

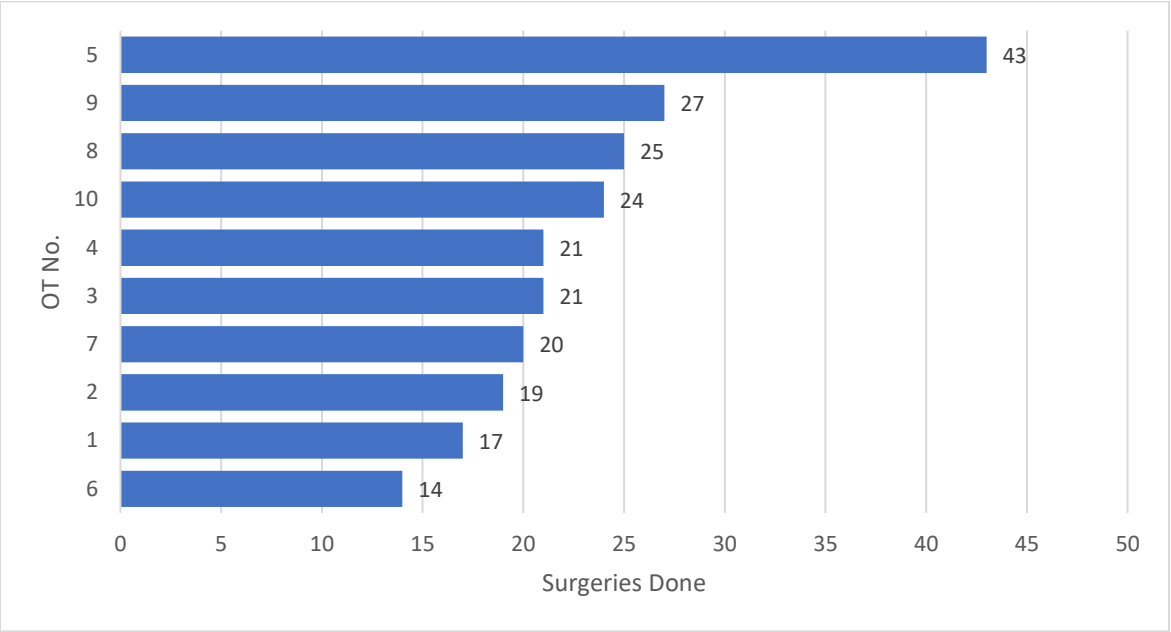
Date	No. of surgeries	Surgery Duration (min)	Utilization Duration (Wheel-In to Wheel-Out time) (min)	Difference (min)
20-Apr	2	141	225	84
22-Apr	1	112	130	18
23-Apr	2	151	206	55
24-Apr	1	150	165	15
25-Apr	0	0	0	0
26-Apr	1	15	45	30
27-Apr	3	198	287	89
29-Apr	1	65	95	30
30-Apr	2	146	185	39
1-May	2	157	245	88
2-May	2	167	211	44
3-May	2	123	172	49
4-May	3	113	170	57
6-May	2	100	155	55
Total	24	1638	2291	653
Average time per surgery		68	95	27
Average time per day		117	164	47

	(min)	
Total time available for OT utilization in a day:	600	10hr
Total time available for OT utilization in 14 day:	8400	140hr
Total time utilized in 14 days:	2291	38hr
Average Utilization time/day:	164	3hr
Average idle time/day: (8400-3538)/14	436	7hr

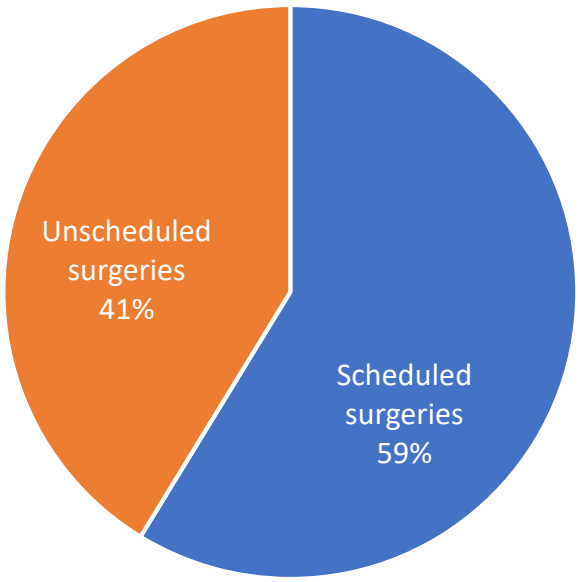
OT utilization percentage (2291/8400)*100	27.27%

ANALYSIS & INTERPRETATION

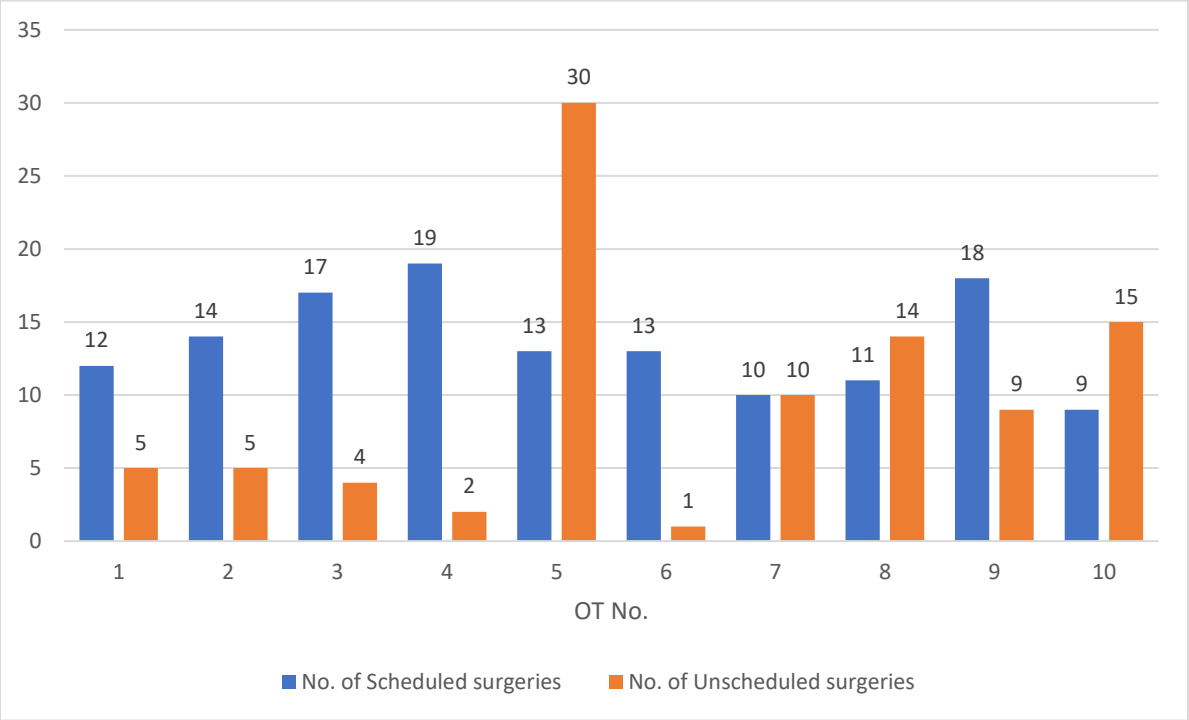
Total surgeries done by each OT in 14 days



Percentage of Scheduled vs Unscheduled total surgeries

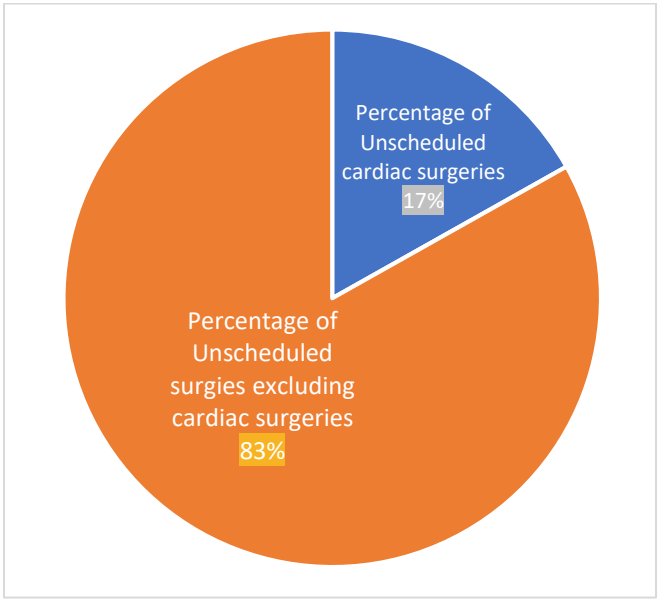


Number of Scheduled Surgeries and unscheduled surgeries done in each OT

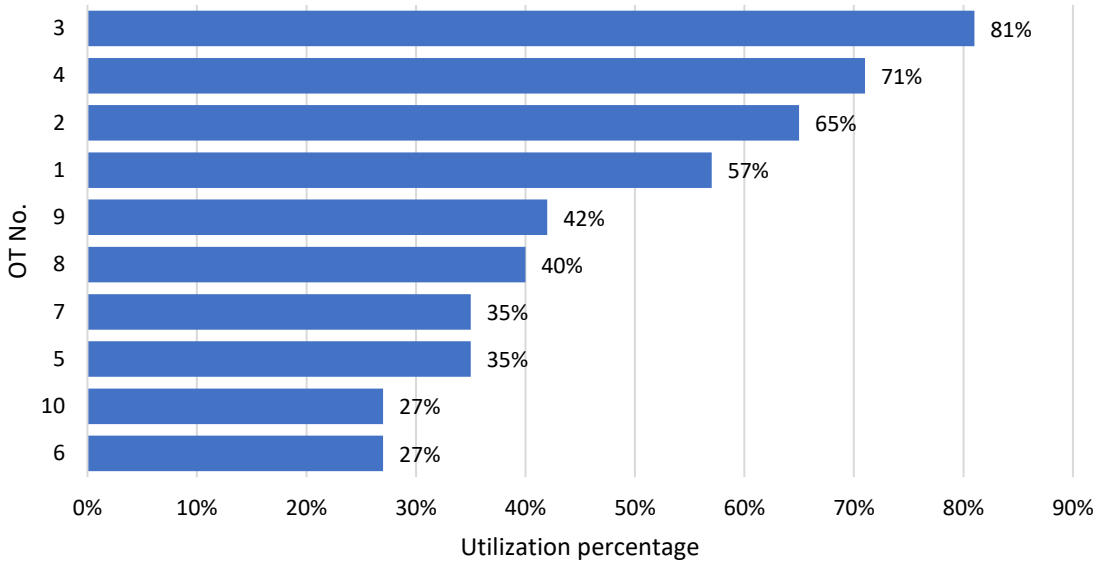


Unscheduled surgeries in cardiac theatres (OT 1-4) are quite less as compared to other theatres except OT 6 which is a Orthopedic transplant theatre.

Percentage of Unscheduled cardiac surgeries vs other surgeries



OT wise Utilization Percentage:

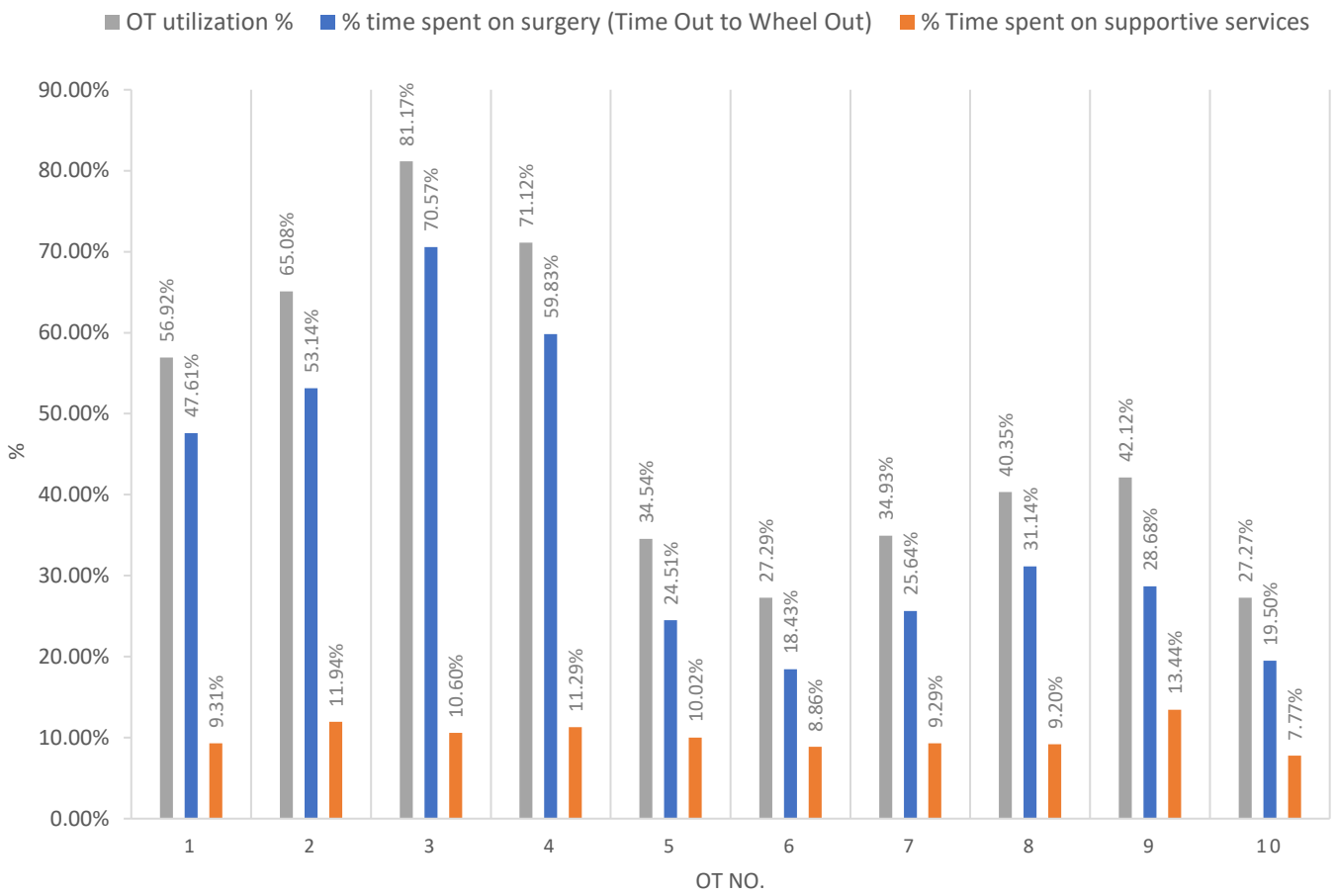


Overall OT Utilization Rate: 48.08%

$$\text{OT utilization rate} = \frac{\text{Sum of length of time (in hours) of all surgeries performed during a period} \times 100}{\text{Total OT time available during that period}}$$

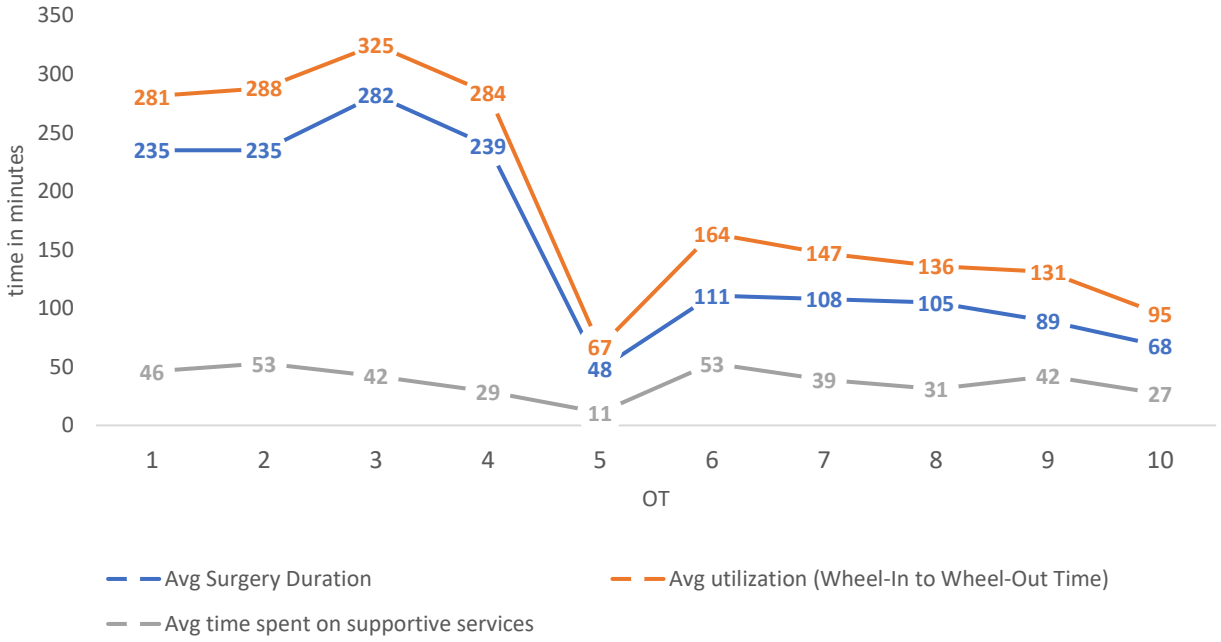
Various studies in India and around the world have cited the OT utilization rates for various hospitals to be ranging between 70% to 87% and the average utilization rate being around 80% but the findings in my study shows OT utilization rate of 48.08%.

Percentage of time spent on surgery and percentage of time spent on supportive services with OT wise utilization percentage:



The average percentage of time spent on surgery was observed to be 37.91% and percentage of time spent on supportive services was found to be 10.17% however as per the data found on various other studies shows time spent on surgery to be around 60% to 70% and the other percentage appears to be in ideal range.

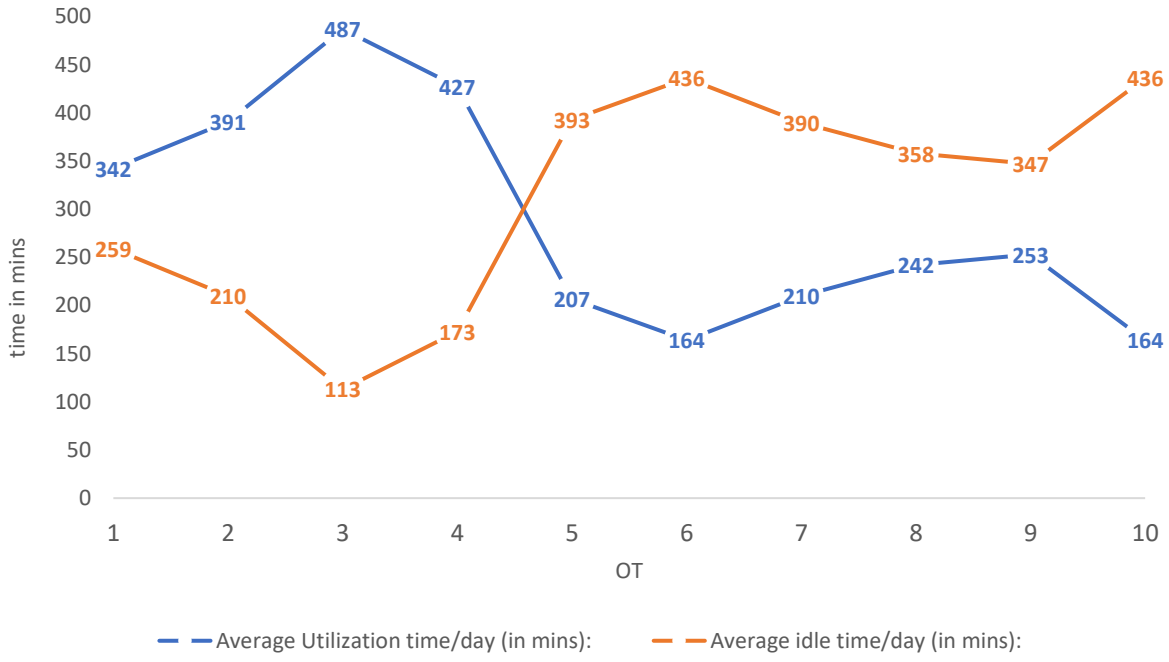
Average time spent on supportive services with Average Utilization and Average time spent on surgery.



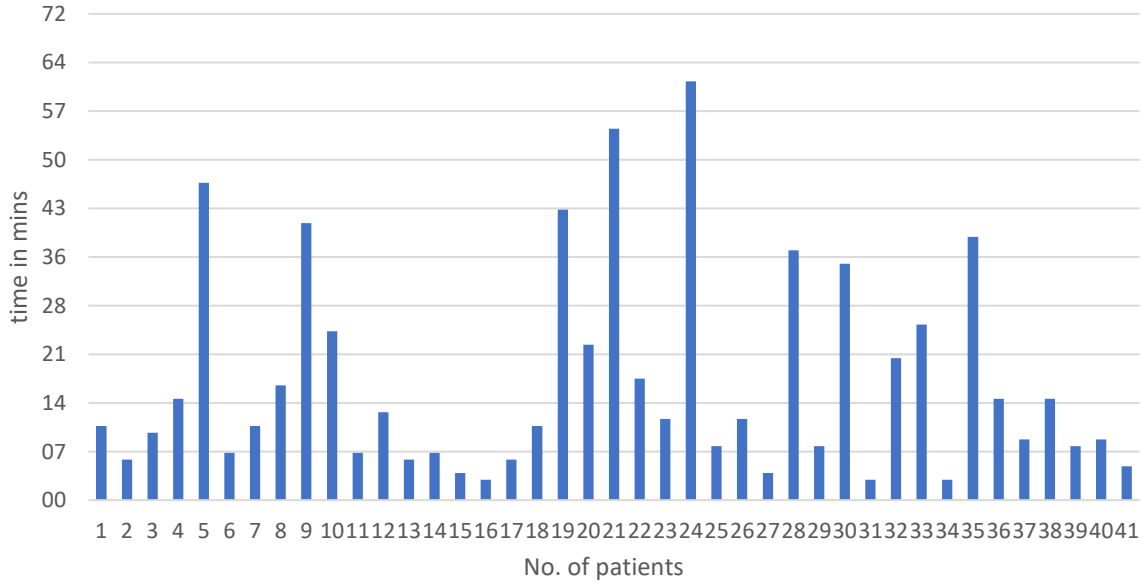
Average total time spent on supportive service was found to be 37min while if we consider only the average of cardiac theatres (OT 1-4) then the average time taken was 43min while average of all other theatres was found to be 34min.

Operation Theatre 6 and 2 which is a Orthopedic transplant theatre and Cardiac theatre respectively has spent the highest time on supportive surgeries i.e. 53mins while OT 5 has spent the lowest time i.e. 11mins.

Average utilization time vs Average idle time

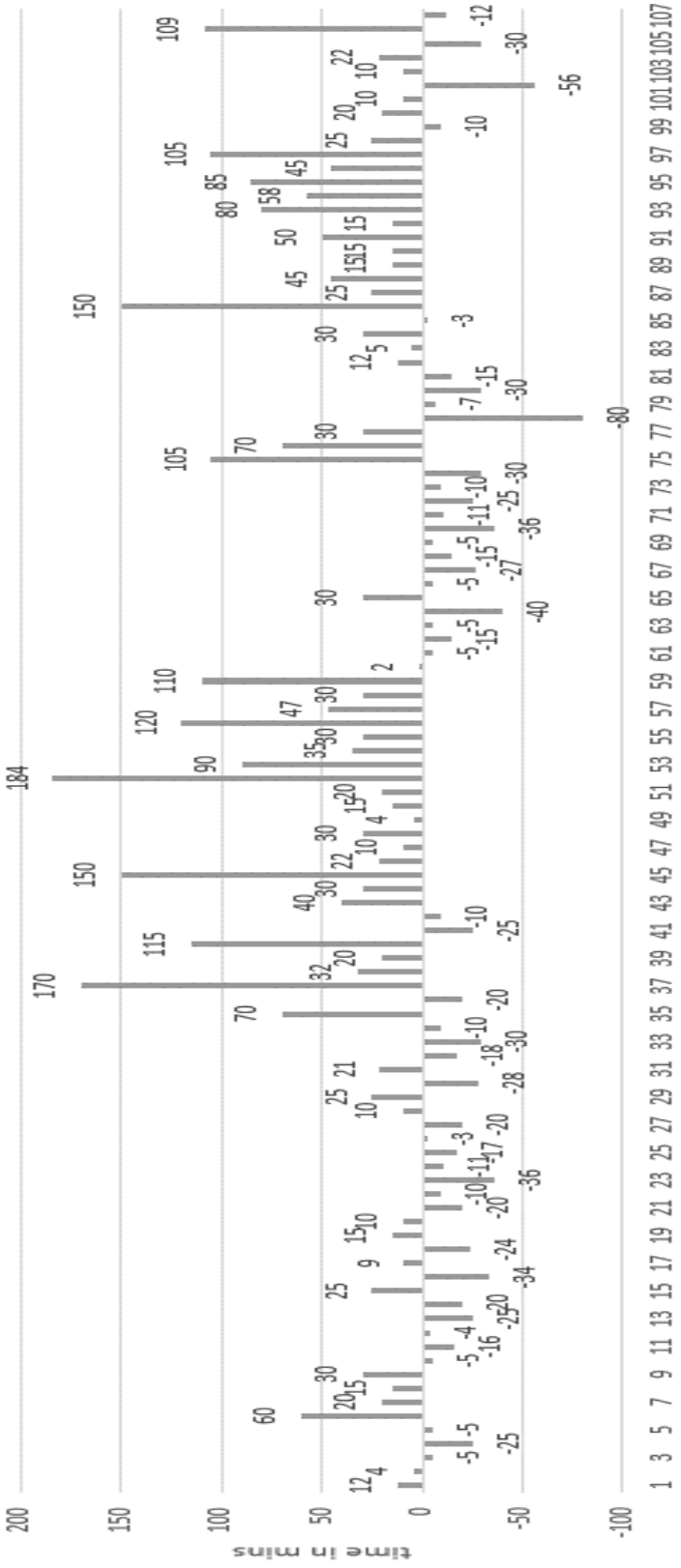


Duration stayed in Pre-operative area



Overall Average duration: 19mins.

Scheduled time and wheel-in time



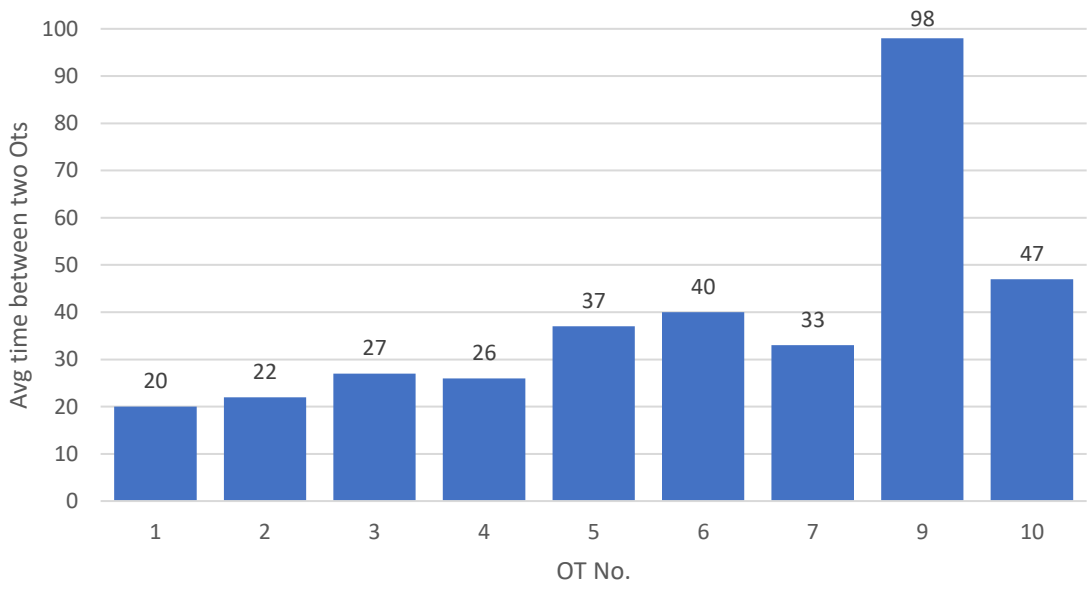
No. of surgeries that started:

Before scheduled time: 44%

On or After scheduled time: 56%

The average difference from Scheduled time of surgery to the actual wheel-In time was found to be 16 mins which is quite impressive however around 44% surgeries most of which were scheduled for the morning usually started before time, calculating the difference if considering only the delays gave a average of 46 mins which is very high considering a delay of under 15mins in considered ideal in various studies.

Average time between two scheduled surgeries



Overall Average time: 39mins

The average time between two OTs also known as the room turnover time was found out to be 39mins which is within desirable range but a bit on the higher side as studies done in other hospitals show a range from 10mins to 66min and the ideal being around 25mins.

KEY FINDINGS

- OT Utilization rate: 48.08%
  Time spent on actual surgery: 37.91%
  Time spent on supportive services: 10.17%

- Scheduled Surgeries: 58.57%
  Unscheduled Surgeries: 41.13%

  Unscheduled Cardiac surgeries: 16.85%
  Unscheduled other surgeries except cardiac surgeries: 16.85%

- Average difference between scheduled wheel-in time and actual wheel-in time:16min
  Average delay between scheduled wheel-in time and actual wheel-in time: 46min

- Average time between two OTs: 39min

- Average duration stayed in OT lobby before getting wheeled-in/ duration stayed in preoperative area: 17min

CONCLUSION

From the observed study we can conclude that the OTs are highly underutilized, and delays are quite significant. These can be attributed to the fact that:

- Delay is often seen in shifting patient from the ward to OT.
- Delay in getting clearance for surgery.
- Delay in surgeon's arrival.
- High numbers of Unscheduled surgeries.

SUGGESTIONS

- Dedicated GDA staff in wards readily available anytime for transport of patient to OT from wards on the right time thus reducing the delay.
- OT booking amount to be taken just after doctor consultation if surgery is planned so that the risk of cancellation can be minimized.
- Clearance of surgeries should be taken a day prior and should not be added to the OT schedule without prior clearance.
- Improved and effective scheduling method to ensure that the OTs can be used interchangeably and Idle time of OT 5-10 are almost double then their utilization rates and if possible manage all surgeries by using one less OT thus saving its resources. This would require in-depth study about the scheduling method, finding effective tools and combined effort with doctors.

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