

Study on Factors Affecting the Operation Theatre Scheduling
Process Using DMAIC Approach in The Mission Hospital,
Durgapur

By

Nupur Singh Rajput

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2017-2019



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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Nupur Singh Rajput** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **The Mission Hospital, Durgapur** from **4th February to 30th April 2019**.

The Candidate has successfully carried out the study on topic **Study the factors affecting Operation Theatre Scheduling Process using DMAIC approach in The Mission Hospital, Durgapur** assigned to her during internship training and her approach to the study has been sincere, scientific and analytical.

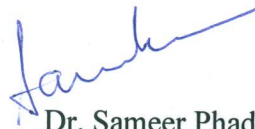
The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

A handwritten signature in blue ink, appearing to read 'Ashok Kaushik'.

Col. (Dr.) Ashok Kaushik
Dean, Academics and Student Affairs
The IIHMR University, Jaipur

16 May 2019

A handwritten signature in blue ink, appearing to read 'Sameer Phadnis'.

Dr. Sameer Phadnis
Associate Professor (Guide)
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Date: 01/05/19

TO WHOM IT MAY CONCERN

This is to certify that **Dr. Nupur Singh Rajput** has done three months dissertation on **Study on OT Scheduling by using DMAIC approach** at The Mission Hospital, Durgapur, West Bengal from 04/02/2019 to 30/04/2019.

During the period of dissertation **Dr. Nupur Singh Rajput** has been found sincere, hard working having an attitude to learn.

We wish her a successful future and brilliant professional career ahead.

For The Mission Hospital, Durgapur

Ramesh Lall
Sr. General Manager - HR

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **Study on factors affecting Operation Theatre Scheduling using DMAIC approach at the Mission Hospital, Durgapur** submitted by **Dr. Nupur Singh Rajput** Enrolment No- **IIHMR- 617** under the supervision of Dr. Sameer Phadnvis, Associate Professor The IIHMR University, Jaipur for award of MBA in Hospital and Healthcare Management of the University carried out during the period from February 4, 2019 to May 4, 2019 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.



Signature

Dr. Nupur Singh Rajput

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1- ABBREVEATIONS/ACROYNMS

- **ECG: - ELECTROCARDIOGRAM**
- **EEG: - ELECTROENCEPHALOGRAPH**
- **EMG: -ELECTROMYOGRAPHY**
- **MRI: -MAGNETIC RESONANCE IMAGING**
- **PFT: -PULMONARY FUNCTION TEST**
- **TMT: -TREADMILL TEST**
- **CTVS: -CARDIOTHORACIC & VASCULAR SURGERY**
- **ITU: -INTENSIVE TREATMENT UNIT**
- **CSSD: -CENTRAL STERILE SUPPLY DEPARTMENT**
- **OT: -OPERATION THEATRE**
- **NICU: -NEO-NATAL INTENSIVE CARE UNIT**
- **ICU: -INTENSIVE CARE UNIT**
- **HDU: -HIGH DEPENDANCY UNIT**
- **OR: -OPERATING ROOM**
- **HEPA: -HIGH-EFFICIENCY PARTICULATE AIR**

2- ABOUT THE ORGANISATION

- The Mission Hospital, (A Unit Of Durgapur Medical Centre Pvt. Ltd.) is a 350-bed hospital located in Durgapur, West Bengal, India. Built in an area spanning three acres it offers an array of facilities –
- a digital flat panel Cath lab
- seven major operation theatres
- 100-bed critical care unit
- mother and child care unit
- 24-hour accident and emergency department
- blood bank and for the first time, a computerized pneumatic tube system
- The Mission Hospital started its operation on 2 April 2008. This is the first specialty corporate hospital in Eastern India outside Kolkata.

- **VISION: -**

- To provide affordable quality health care to patients by incorporating improvement in its day to day schedule

- **MISSION: -**

- To become a Centre of Excellence in health care by bringing tertiary level health care to the people of Eastern India.

- **SERVICES AND DEPARTMENTS: -**

- The Mission Hospital has the following departments:

- **CLINICAL SERVICES: -**

- | | |
|--------------------------------------|---|
| - Accident & Emergency Medicine | - Dentistry |
| - Anesthesiology | - Dermatology |
| - Cardiology | - Endocrinology |
| - Pediatric Cardiology | - ENT |
| - Cardio Thoracic & Vascular Surgery | - Gastroenterology & Gastrointestinal Surgery |
| - Critical Care | |

- General & Laparoscopic Surgery
- General Medicine
- Nephrology
- Neurology & Neuro Surgery
- Obstetrics & Gynecology
- Ophthalmology
- **LABORATORY SERVICES: -**
- Clinical Biochemistry
- Clinical Microbiology & Serology
- Clinical Pathology
- Cytopathology
- Haematology
- Histopathology
- Molecular Biology

- **DIAGNOSTIC SERVICES: -**
- 2D Echo
- CT Scanning
- DSA Lab
- ECG
- EEG
- EMG/EP
- Holter Monitoring
- MRI(1)

- **FLOOR MAP: -**

BASEMENT

- Executive health check-up
- Consultation rooms
- Library

- Report dispatch desk
- Quality room
- Pain Clinic
- Sample collection/ PFT/EEG/NCV/EMG/Physiotherapy

GROUND FLOOR

- May I help U desk
- Registration counter
- Operations room
- Insurance desk
- Corporate desk
- Billing counter
- Accident and Emergency department
- X-Ray department
- Ultra-sonic department
- C-T Scan
- MRI
- Cafeteria
- Pharmacy

FIRST FLOOR

- OPD Consultation rooms
- Male General ward
- Female general ward
- Infection Control Room
- Echo, TMT, ECG
- Central laboratory
- Blood Bank

SECOND FLOOR

- MICU
- Cath lab

- Coronary care unit (CCU)

THIRD FLOOR

- Operation Theatre
- CTVS/ITU
- CSSD

FOURTH FLOOR

- Administration
- IP Pharmacy
- Cardiac Ward

FIFTH FLOOR

- Labour room & Minor OT
- NICU
- Paediatric ward
- Dialysis Unit
- ESWL room
- Telemedicine

SIXTH FLOOR

- Semi-Private ward/Inpatient room
- Surgical ICU
- CTVS-HDU / Inpatient Billing

SEVENTH FLOOR

- General Ward- Paediatric Cardiology
- Semi-Pvt / IP room

EIGHTH FLOOR

- Private/Deluxe room/ deluxe suites

3- LEARNINGS IN VARIOUS DEPARTMENTS

- In these three months of training in The Mission Hospital, I have learnt the working management in tertiary care hospital.
- Learnt the working management of quality and operational team
- Within these three months I had done minor project on smoothening of process flow in OPD.
- I had made NABH compliance audit in Operation Theatre department.
- Attended Basic Life Support Conference
- Helped in making OT equipment checklist for audit.

4- PROJECT REPORT

4.1- INTRODUCTION: -

- An **operating theater** is a facility within hospital where surgical operations are carried out in an aseptic environment.
- Historically, the term "operating theatre" known as a non-sterile, tiered theater or in which students and other spectators can watch surgeons perform surgery. Contemporary operating rooms devoid of a theatre setting, making the term "operating theater" a misnomer. Only two old-style operating theaters left, both of which are preserved as part of museums.
- Operating rooms are spacious, easy to clean, and well-lighted, typically with surgical lights, and also have screens and monitors for viewing vitals. Operating rooms are generally had a tight packed window to maintain the controlled temperature and humidity. Special filter of air is present to maintain a slightly elevated pressure. Electricity support has backup systems in case of a light-out. Rooms are supplied with wall suction, oxygen, and other anesthetic gases. Operation Theatre also consists of the operating table and the anesthesia cart, with addition, there are tables to set up instruments. Storage space for common surgical supplies also present. There are different colour coded containers for waste disposals. Outside the operating room there is a dedicated scrubbing area which is used by surgeons, anesthetists, operating department practitioners, and nurses prior to surgery. An operating room have a map to enable the terminal cleaner for realigning the operating table and equipment to the desired layout during cleaning.
- Besides the operating rooms and their wash rooms, it contains rooms like changing room, washrooms, and restroom, preparation and recovery rooms, storage and cleaning facilities, dedicated corridors, and other supportive units. In larger facilities, the operating suite is climate- and air-controlled room separated from other departments so that only authorized personnel have access inside it.
- Operating room equipment



- The operating table is present in the centre of the room so that it can be raised, lowered, or tilted in any direction.
- The operating room lights are overhead of the table so that it can provide bright light, without shadows, during surgery.

- Anaesthesia machine is at the head of the operating table. This machine has tubes that connected to the patient to keep an eye on him or her in breathing during surgery, and OT monitors are there that help to control the mixture of gases in the breathing circuit.
- An anaesthesia cart is present next to the anaesthesia machine. It contains the medicines, equipment's, and other supplies that the anaesthesiologist may need during the surgery.
- Sterile instruments that are used during surgery are arranged on a stainless-steel table.
- An electronic monitor (which records the heart rate and respiratory rate by adhesive patches that are placed on the patient's chest) present.
- Pulse oximeter machine attaches to the patient's finger with an elastic band aid. It measures the amount of oxygen contained in the blood for surgery.



- Automated blood pressure measuring machine which automatically inflates the blood pressure cuff on patient's arm.
- An electrocautery machine with a high frequency electrical signals to cauterize the blood vessels and also be used to cut through tissue with a minimal amount of bleeding.
- A Heart-lung machine, or other specialized equipment, may be brought into the room if the surgery requires. Heart lung machine takes the temporary control of the heart rate and lung during the surgery maintaining the blood circulation and oxygen of the body.
- Advances in technology now have a Hybrid Operating Rooms, which integrate diagnostic imaging systems such as MRI and Cardiac Catheterization in the operating room to assist surgeons in specialized Neurological and Cardiac surgeries.

4.2- PROTOCOLS OF OPERATION THEATRE

- Surgeons and anaesthesiologists follow the following protocols: -
- Surgical hand gloves
- A protective hair cap.
- Masks which covers their lower face, covering their mouths and noses with minimal gaps to prevent- inhalation of plume or airborne microbes during surgical procedures.
- Shades/glasses, including specialized coloured glasses with different lasers. a fibre-optic headlight also attached for greater visibility.
- Long gowns, with the bottom no closer than six inches to the ground.
- Protective shoe covers
- lead aprons/neck covers are used to prevent overexposure to radiation during X-ray

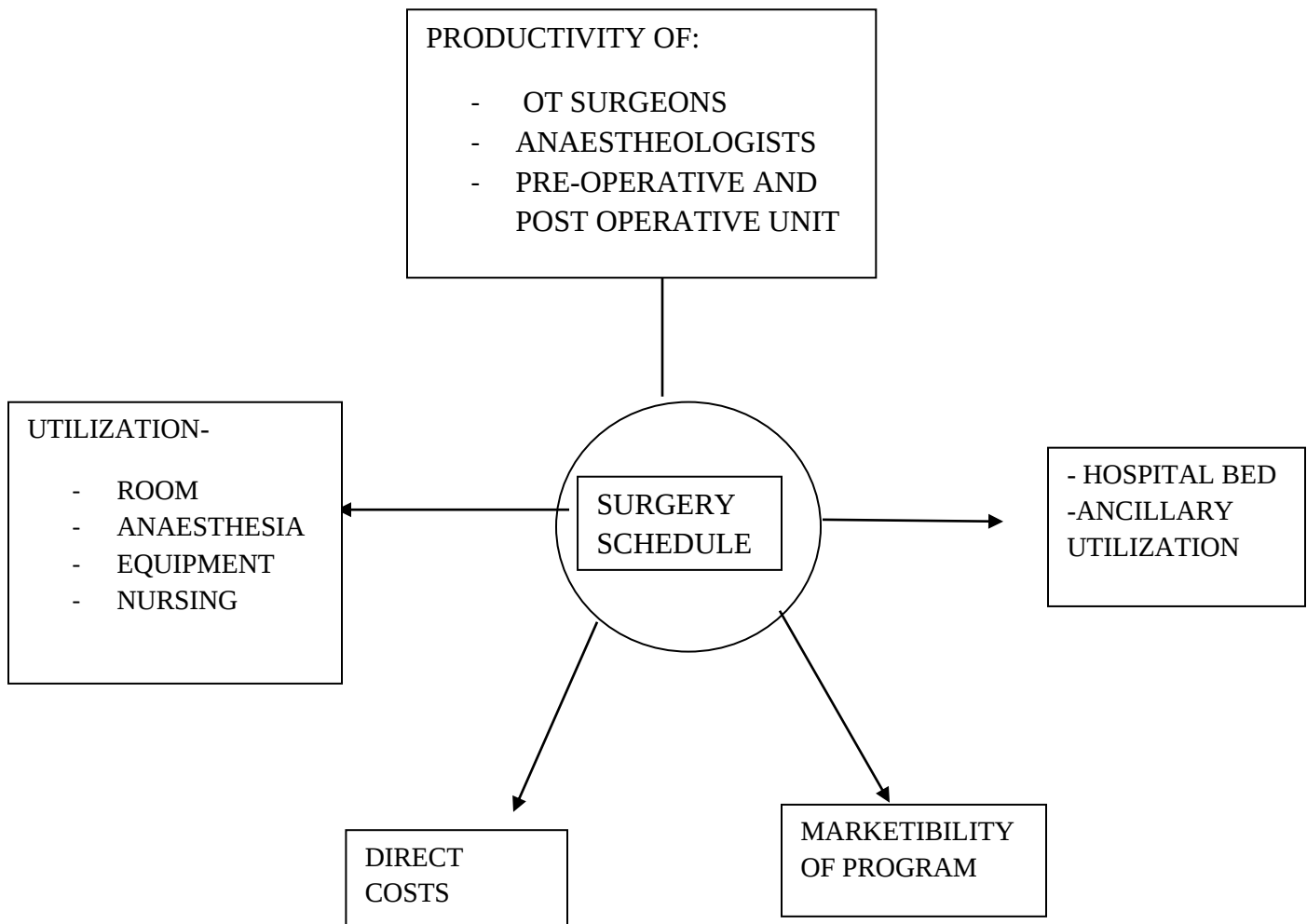
- The circulating nurse and anesthesiologist will not wear a gown in the operating room because they are not a part of the sterile team. They must keep a distance of 12-16 inches from any sterile object, person, or field.

(2)

4.3- **OPERATION THEATRE SCHEDULING**

- Poor scheduling of Operating Theatre causes longer waiting time and can also worsen the patient's disease. That's why an effective schedule has to be developed to improve the reputation and performance of hospitals.
- Another objective is to minimize the costs of Operating Theatre such as staffing cost, or overtime cost. As the hospital has to spend much to satisfy the needs of the patient. Scheduling of Hospital Operating Theatre can be divided into several types of strategies which are open scheduling, block scheduling and modified block scheduling.
- Open scheduling: - In this, surgical cases were assigned according to the convenience of the surgeons.
- Block scheduling: - specific surgeons or groups of surgeons were assigned time blocks, normally for some weeks or months, so that can arrange their surgical cases. In the pure form, the surgeon or group "owns" their time blocks.
- "Modified block scheduling": -It is modified to increase its flexibility. Either some time is blocked, and some is left open, or unused block time is released at an agreed-upon time before surgery, for instance 72 hours.
- Implementation of different types of operating theatre scheduling is based on the complexities of the situation in the hospitals.(3)

4.4- AFFECT ON HOSPITAL DUE TO OT SCHEDULING(4)



4.4.1- "Out of Balance" Schedule

- Delay in arriving time of surgeons.
- High rate of add-ons.
- Juggling of cases
- Extended pre-operative stay of patients
- Decreased morale due to the pressure of overtime
- Extra demand for the "first case."
- Need for more anesthesia coverage.

4.4.2- Components of Schedule Planning

- All the Coverage Plans Balanced with Surgical Demand
- Variable access of OT rooms
- Maintenance of correct material requirement.
- Accurate estimation of case duration
- Policies and Guidelines for Assigning and Re-Allocating the Block Time

4.4.3- Block Management Policy

- Block Times defined as by hour-of-day
- Scheduling Block Time: - a process for booking into one's block time
- Block Time Allocation (how blocks are requested and assigned)
- Required Utilization Target
- Measurement & Reporting Frequency for proper utilization of block time
- Measurement Formula (how is block utilization to be computed)
- Block Release means when should unused time be made available for others' use
 - Automatic
 - Voluntary
- Requesting Block defined as the process for new surgeons to gain guaranteed access to the schedule(4)

4.5- Scheduling Policy Planning

- Scheduling Goals
- Scheduling Definitions
- Schedule Start time
- Turnover time(5)

4.6- DMAIC APPROACH

- **DMAIC** (an acronym for **Define, Measure, Analyze, Improve and Control**) refers to a data-driven improvement cycle used for improving, optimizing and stabilizing business processes and designs. The DMAIC improvement cycle is the core tool used to drive Six Sigma projects. However, DMAIC is not exclusive to Six Sigma and can be used as the framework for other improvement applications

DMAIC comprises of 5 components - Define, Measure, Analyze, Improve and Control. All the DMAIC steps are to be always proceed in the given order.

DEFINE

The purpose of this step is to know the business problem, goal, potential resources, project scope and the project timeline. This information is typically captured within project charter document. Thus we have to Define the following:

- Defined problem
- The customer perception
- Voice of the customer

MEASURE

- The purpose of this step is established current baselines as the basis for improvement.
- To measure the defined problem
- To identify the various variables for measuring the problem statement.

ANALYSE

- In this step we have to identify, validate and select root cause for elimination. Potential root causes of the project problem are identified via root cause analysis (for example a fishbone diagram).

- Results of all the measurable variables that we had taken
- Prioritize potential root causes of the problem to improve the identified problem

IMPROVE

- To recommend the needful changes.
- To improve the possible changes
- Create the way for changes
- Focus on the simplest and easiest solutions so that it can be easily applicable
- To Test solutions using Plan-Do-Check-Act (PDCA) cycle
- Based on PDCA results, attempt to anticipate any avoidable risks associated with the "improvement" using the Failure mode and effects analysis (FMEA)
- To Create a detailed implementation plan
- Deploy improvements in the identified problem

CONTROL

The purpose of this step is to embed with the changes and ensure sustainability, Control is the final stage within the DMAIC improvement method. In this step we have to know the Track improvement; Officially close the project; Gain approval to release resources.

- 1. A guide to continue monitoring the process
- 2. provide a response plan for each of the measures being monitored in case the process becomes unstable.
- Standard operating procedures (SOP's) and Standard work
- Process confirmation
- Development plans for changes
- Transition plans for recommended changes
- Control plan
- Benefit delivery(6)

5- DISSERTATIONREPORT

OPERATION THEATRE: -

- The Mission Hospital, Durgapur is multi-specialty hospital consisting of 7 major operation theatres (Cardiac, Neuro, Ortho, General and Trauma).
- The operation theatre is located on 3rd Floor of the building and the minor OT is situated in 5th floor.
- The C.S.S.D is located at the backside of OT complex on the 3rd floor.

GOALS OF DEPARTMENT:

- Getting the patients from wards, MICU and emergency
- Check the patient tag, investigations, consent and patient check list.
- If any patient need blood- check the batch number and group
- Patient shifting inside the OT on time

5.1- OBJECTIVES & SCOPE

- To Provide a clear and sterile atmosphere in the Operation Theatre.
- Ensure best surgical care to the patients before, during and after surgery under sterile environment.
- To set up the operation room with medicines, linen and all the instruments to be used during the surgery.
- To Provide the required equipment before the commencement of surgical procedure ensuring their fitness of use.
- Operation theatre act as an integral part of the hospital.

5.2- EQUIPMENTS IN OT

- ❖ Operation table
- ❖ Operation lights
- ❖ Operation microscopes
- ❖ Anaesthesia Boyle's apparatus with monitor
- ❖ Suction machine

- ❖ C-Arm (ortho cases)
 - ❖ X – ray viewer
 - ❖ Head lamp & microscopes (for ENT, Neuro cases, ophthalmology cases)
 - ❖ Cautery machine
 - ❖ Endoscopes
 - ❖ Diathermy units all ranges
 - ❖ Scrub room with all accessories
 - ❖ TV camera (depends on the cases)
 - ❖ Drug trolley(emergency injections, routine injections, syringes, I.V set, blood set, bandages, three way, antibiotics, beta dine, wok dine solution etc.
- These are the general equipment's required for an operation theatre and all other instruments, packs are required

Following points are emphasized for operation theatres: -

- ❖ HEPA filters for effective filtration of air.
- ❖ Surgical and Anaesthetic pendants fitted with gases and anaesthesia machine for the convenience of the consultants and to keep the floor decongested
- ❖ Powerful shadow free lights
- ❖ White board for noting the important points
- ❖ 100% air change facility for infection control purpose with right humidity and temperature.

5.3- BASIC DESIGNING OF THE OT COMPLEX IN TMH

❖ **Protective Zone: includes**

- Reception
- Lift area
- Waiting area
- Changing room

❖ **Clean Zone: consists of**

- Pre – op room
- Staff room
- Nursing station
- Post – op room

❖ **Sterile Zone: Areas consists of**

- Operating room
- Scrub room
- Induction room

❖ **Disposal Zone: it includes**

- Dirty utility room
- Disposal corridor
- Pass – box

5.4- OPERATING ROOM TECHNIQUES

a) PURPOSE:

- To render the operative site as free as possible from transient and resident micro-organisms.
- To ensure **a minimal source of** infection at the site of the skin infection.

b) POLICY:

- After the patient has been anesthetized and positioned on the operation table and immediately prior to draping, the skin of the operative site, and the extensive area surrounding it, is mechanically cleansed with peps solution 10%.
- Foreign substances must be removed from the skin before the area is mechanically cleansed with the peps solution 10%

c) PROCEDURE FOR CLEAN AREAS: -

- Wear gloves. Use enough pressure and friction to remove dirt and micro-organisms from the skin and pores.
- Discard the sponge after reaching the periphery. Never bring a soiled sponge back toward the centre of the area.
- Repeat the scrub with a separate sponge for each round.
- Document the preoperative skin preparation on the nurse's note.

5.5- STANDARD PRECAUTIONS TO BE FOLLOWED IN OPERATION THEATRE

- Hand washing technique
- Gloves
- Hair Mask, eye protection, face shields
- Patient Care Equipment
- Linen –soiled linen soaked with blood, body fluids, secretions and excretions will be handled, transported in such a way that it prevents exposure of skin and mucous membrane, contamination of cloth and transferring of micro-organisms to other patients and the environment.
- Occupational health and Blood borne Pathogens – Avoid injuries while using needles, scalpels other sharp instruments.
- Never recap needles, place all contaminated needles, syringes, scalpel blades and other sharp items in designated puncture- resistant container. These containers should locate as close as to the area where the items are used.

5.6- BOOKING AND SCHEDULING OF SURGERIES

In order to book OT time for surgery the following procedure may be followed:

- 1- The Anaesthetist in charge is to be contacted.
- 2- When the patient has been seen by doctor and a surgery or a procedure has been proposed, the booking of the OT will be done in booking register present in the back office of Anaesthesia department.

Ensure that the specified theatre is preferably used for a particular specialty. These OTs can be used for other cases in emergencies after informing the HOD Anaesthesia/OT Nurse/OT technician who will co-ordinate accordingly.

The following particulars will be entered in the booking register if the

PATIENT IS ADMITTED

- 1) MR Number/IP Number
- 2) Name, age, sex of the patient
- 3) Place of admission (Room No., suite)
- 4) Name of the surgeon
- 5) Name of proposed surgery
- 6) Operation theatre to be booked
- 7) Date and time of proposed surgery
- 8) Type of anaesthesia

- 9) Advance payment status
 - 10) Diagnosis
 - 11) Appropriate duration of surgery
 - 12) Special requirements in terms of equipment (if any)
 - 13) Intimation of known infection, or any co morbid condition
- The above booking will be provisional until payment of booking deposit. This deposit will be done by IPD billing desk by the patient or their relatives
 - Provisional booking will be cancelled if the booking amount is not deposited or TPA clearance is not taken within the specified time frame
 - OT list finalised
 - OTs allotted for anaesthesia consultants, checking and signing the OT list
 - OT list print out is given to the wards, and OT staff
 - PURPOSE: - To ensure timely and appropriate booking and scheduling
 - SCOPE: - All surgeries or procedure to be carried out in the operation theatre except emergency procedures
 - RESPONSIBILITY: - OT coordinator
 - PROCEDURE: - In order to book OT time for surgery the following procedure to be followed

5.7- RESCHEDULING OF OT

- In case of a scheduled surgery being cancelled, then the cases, which are next scheduled can be taken up for surgery.
- Inform all the consultants performing surgeries on that day about the available free slot and confirm the case.
- Ensure that the surgery is rescheduled in case of a medical cause being the reason of non-performance of surgery. Reason for rescheduling is entered in the rescheduling register
- Verify with IP billing for the requisite deposits/ TPA clearance of all the scheduled surgeries for the day
- Inform the surgeon, anaesthesiologist and concerned staff about the same.

5.8 - PRE-OPERATIVE CARE & RECORDS CHECK

- Patient come as come as an OP and IP for surgical procedure in OT
- Patients file is submitted along with all the consent forms in the patients file
- Band is tied on the patient's wrist or foot end for patient's identification and the surgical site marking is done
- Patient is then taken to the theatre for surgical procedures(7)

6- RATIONALE

- Hospital Operating Theatre (OT) scheduling involves the arrangement of operating rooms to the surgeons in a period of time. In the health service sector such as government or private hospitals, the scheduling of Operating Theatre plays an important role towards achieving organization goals. Their main goal is to meet the patients' satisfaction by minimizing his/her total waiting time before undergoing major or minor operations. Poor scheduling of Operating Theatre may cause longer waiting time and can also worsen the patient's disease. In this case, an effective scheduling in operation theatre has to be developed in order to improve and increase the reputation and performance of hospitals.
(8)

7- RESEARCH QUESTION

- What are the factors effecting the of Operation Theatre Scheduling Process?
- What measures should be taken to improve the Operation Theatre Scheduling process?

8- OBJECTIVES OF THE STUDY

- To assess the factors affecting the Operation Theatre scheduling process by using DMAIC approach in The Mission Hospital, Durgapur
- To improve the scheduling process of Operation Theatre in The Mission Hospital, Durgapur

9- METHODOLOGY

- **STUDY DESIGN:** Cross-sectional and observational study
- **STUDY LOCATION:** The Mission Hospital, Durgapur
- **DURATION OF STUDY:** Two Months
- **SAMPLE SIZE:** 450 patients
 - **DATA COLLECTION:**
 - **Sample Technique:** - Convenient Sampling
 - **Inclusion Criteria:** - IPD patients, patients included in PRE-OT list
 - **Exclusion Criteria:** - Emergency patients
 - **Primary Data:** -collection through observation
 - **Secondary data:** - By document Review
 - **Statistical Tools:** -Bar chart, MS Excel
 - **Quality Tool:** -FISH-BONE Analysis

10- REVIEW OF LITERATURE

1- TITLE: - Study on Time Utilization and Scheduling of Operation Theatre

- DONE BY: -Shweta Choudhary
- **AIM:** - To perform a thorough and step-by-step assessment of operating rooms (OR) time utilization, with a view to assess the efficacy of our practice and to identify areas of further improvement.
- **Objectives of study:**
 - To examine the time utilization & scheduling of operation theatre
 - To identify the bottle necks, if any, in proper and efficient utilization of Operation Theatre time.
 - To suggest remedial measures for improving the Operation Theatre time Utilization.
- **Background:** Utilization ratio analysis is an important part of hospital operations which has been a priority area for hospital administrators. Operation theatres are popularly known as the heart of hospital. Utilization analysis of Operation theatres is essential to improve the efficiency of operation theatres and to decide about augmentation or downsizing of the theatre facility. This utilization analysis varies in different hospital and healthcare settings. Optimum utilization of the OT complex does not only reduce cost of operations but also increases revenues. Present case study aims at measurement of utilization of Operation Rooms, pre and post-operative Recovery areas of OT complex and identification of bottlenecks needed to be removed for the optimum utilization of operation theatre. This study is a prospective study. The variables chosen were the scheduled time of surgery in OT-List, exact time of surgery, total time spent in pre-op recovery, time for which patient was inside the operating theatre and the total time spent in post-op recovery area. The data was collected, compiled and analyzed. The study concluded that:
 - i) The utilization of OT complex can be optimized by increasing the total timing of operations of Operation rooms by functioning in two shifts and performing minor procedures in minor operation theatres of the OPDs
 - ii) The main bottlenecks include the non-availability of the Operating Room Manual and non- adherence to OT Schedules.
- **Methodology:** Study type: A descriptive study was carried out from 1st March to 30th April 2015. Utilization of each of O. Ts was calculated. Area and Period of Study: The study was carried out in Operation Theatre Complex located on the third floor of the

Hospital in a time period of 60 days Sampling: Convenience sampling Data collection: Primary data source: By direct observation of the processes and discussion with the staff and team members. Secondary data source: Review of O.T registers

Findings: There should be a theatre users committee with a set of rules and responsibilities. There should be a policy document for operation theatre that should be reviewed regularly. Management Information to use theatre resources efficiently and effectively. Hospital should consider making use of analysis and measures of theatre utilization as a starting point for benchmarking. First case should reach O.T. in time from the ward, to allow the O.T. to be started on time. Perform all the minor procedures in minor O.T. is attached to the OPD. The first case to be done in OT must be In-house so that delay because of late admission of the patient in the hospital can be avoided. â€¢ More trolleys are needed to shift the patients in and out of M.O.T. Complex. The Anesthesia and other equipment must be made ready by the assisting staff so that the O.T. starts on time.

- **Recommendations:** The utilization time of existing OT complex is 72% and the maximum possible OT utilization by global standard ranges from 85% to 90%. So, there is a gap of 13% to 18%. This gap is due to delay of approximately 1 hour in OT timings in the existing setup. The major reason for this delay can be attributed to TPA cases in which approval is required in orthopedic cases. So, the gap can be fulfilled
- i) by scheduling TPA orthopedic cases properly and
- ii) by increasing the shifts from 2 to 3. (9)

2- **TITLE:** -STUDY ON OT SCHEDULING BY USING DMAIC APPROACH

- **DONE BY:** - Doyel Roy
- **Agency:** - Operation Theatre; DMAIC Approach; Patient Satisfaction; Operation Theatre Efficiency
- **Objective:-** To observe the operation theatre schedule and to find out whether surgery is performed on scheduled time or not.
 - To identify the gap between scheduled and actual time of surgeries.
 - To identify the reasons for delay in cases.
- **Methodology:** A descriptive study was conducted in Medical Super-Specialty Hospital, Kolkata for a period of 3 months from 6th Feb -6th May 2017 with a random sample of 400 patients and the study approach used was DMAIC.
- **Background:** Operation Theatre scheduling is a major contributing factor to enhance the efficiency of Operation Theatres. Accurate and real time scheduling assist in predicting staffing needs, ensuring availability of required equipment and supplies; one of the most

important concern related to patient satisfaction. An accurate schedule must list realistically the starting and ending time of each surgery.

- **Findings:-** 52% of the cases got delayed due to non-availability of surgeon and anesthesia doctor on time.
- • Out of the first 175 cases 121 cases got delay from their scheduled timing.
- • Pre-anesthesia check-up not done one day before in 57% of cases i, e. 225 cases out of 400 cases).
- • OT consent form which is filled in operation theatre did not actually happen in 55% of cases. 53 cases out of 95 cases)
- • Financial clearances do not happen on actual time as a result of which surgery gets delayed.
- • TBA patients are not admitted on their scheduled time.
- **Recommendations:** Improvement of OT scheduling will have direct impact on increasing the efficiency of Operation theatre. It will not only help reduce the waiting time of patient but also increase the satisfaction level among them and hence, Optimum utilization of OT can be also done.(10)

3- TITLE: - Study on operation theatre scheduling by using DMAIC Approach.

- Done By: -Swati Anand
- **Agency:** OT Scheduling, DMAIC, Case delay, Cause and Effect Diagram, Pareto Analysis
- **Objective:** To observe the operation theatre time schedule and to find out whether it is performed in schedule time or not.
- To identify the gap between scheduled time and actual time of surgeries, if any.
- To identify the reasons for first case delays and all case delays.

- To provide recommendations to improve the operation theatre scheduling by reducing the first case delays and all case delays.
- **Background:** Scheduling of Operation theatre is an important factor contributing to the operation theatre efficiency. It involves determining the average length of common operations and fitting them into the calculated available operating time. The scheduling of Operating Theatre plays an important role towards the patientsatisfaction by minimizing his/her total waiting time before undergoing major or minor operations. Poor scheduling of Operating Theatre may cause preoperative delays.
- **Methodology:** The study was carried out for the period of two months (March-April 2015) in Operation Theatre Complex of The Mission Hospital Durgapur. DMAIC (Define, Measure, Analyze, Improve and Control) “Six Sigma Methodology was used as tool to study the OT Scheduling. Purposive sampling method was used. The study was conducted during March-April 2015.
- **Findings:** In the define phase, process mapping of OT Scheduling was done. In measure phase, specialty wise data was collected which includes cardiac cases, ortho cases and general cases and average time for start of the case, average time between patient wheel inside the Operation Theatre to completion of induction, average time between the induction and start of the procedure, average time between start of procedure to completion of procedure; and average time between completion of procedure to patient wheeled out of Operation Theatre were identified. In analysis phase, average first case delay for cardiac case was 52 minutes and average first case delay was 19 minutes, for ortho case the average case delay was 48 minutes and ortho first case delay was 39 minutes, for general cases the average case delay was 40 minutes and general first case delay was 36 minutes. Fish bone diagram and Pareto Analysis were the tools which were used to identify the causes for the Operation Theatre Case delay. Operation theatre factors, patient factors, ward issues and other issues were contributing to Operation Theatre. In Improve phase, suggestions were given.
- **Recommendations:** DMAIC (Define, Measure, Analyze, Improve and Control) “Six Sigma Methodology was useful for OT scheduling (11)

11- PROJECT FINDINGS

- Operation Theatre is on the 3rd floor of the hospital.
- Dress code is strictly followed by all the Surgeons, Anaesthesiologists, technicians, nurses and other staff
- There are 5 lift openings – 2 lifts are dedicated for patient's shifting, 1 for waste disposal, 1 for patient's relatives, and the 5th one for Managers, Directors, Doctors.
- There are 2 fire exits door at the both sides of the OT.
- There are 6 beds in pre-op area and 5 beds in post-op area.
- There is no proper zoning inside the OT
- HIS not present in the post-op area
- Maintenance of negative pressure is not done in Disposal area

12- VARIABLES

- Manpower (table- 1)
- Average delay in patient's length of stay in pre-op area (table- 2) (graph- 1)
- Average delay in patient's length of stay in post-op area (table- 3) (graph- 2)
- Average delay in the start of first surgery (table- 4)
- Documentation (table – 5)
 - Before recommendation: - graph – 3
 - After recommendation: - graph - 4
- Quality indicators (table- 6)

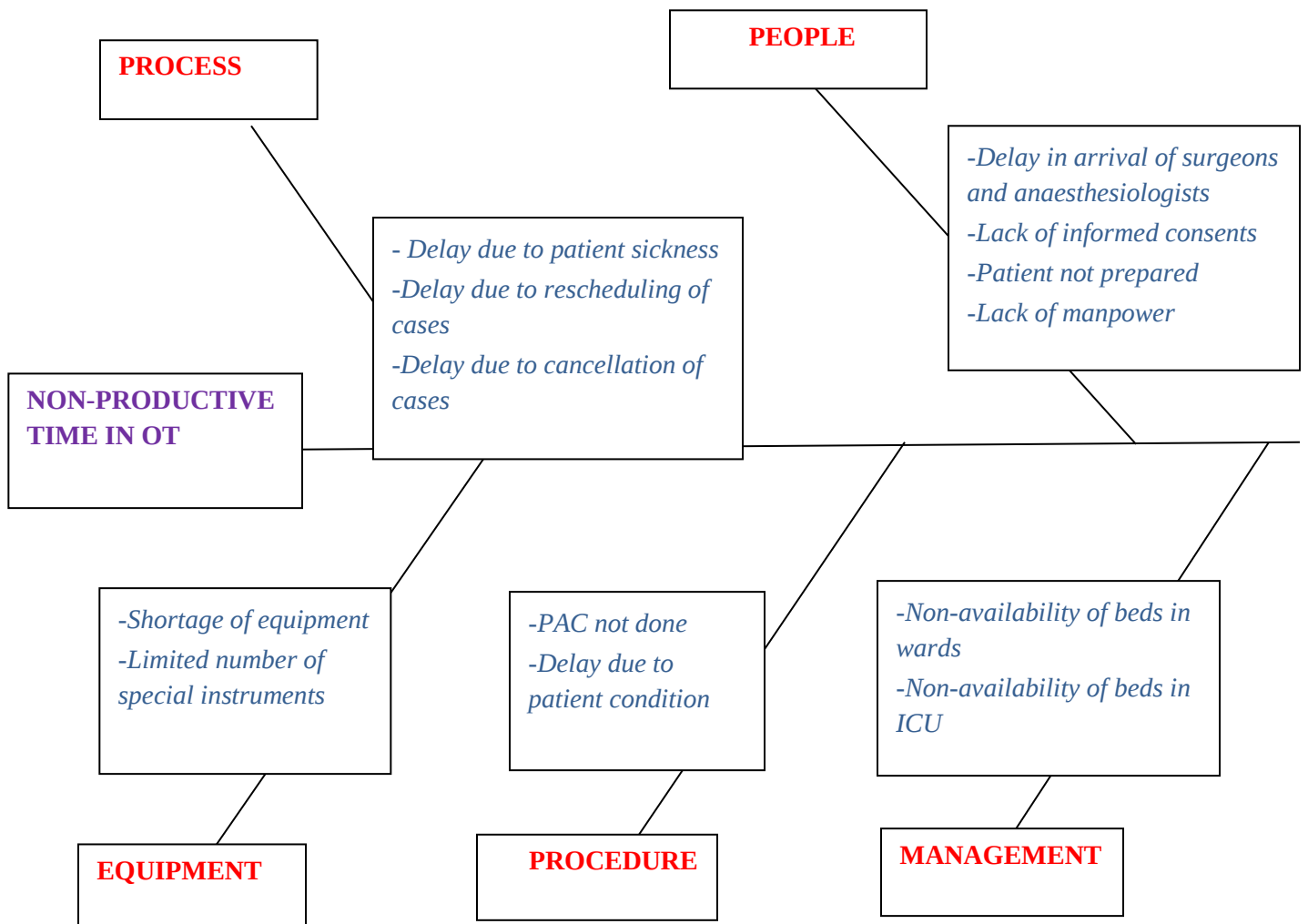
13- DMAIC APPROACH

- **DEFINE PHASE:** - flow process of OT is observed
- **PROBLEM:** - Delay in surgeries which results in the increase of patients waiting time in pre-op / post-op area.

- **MEASURE PHASE:** -
 - Average delay in the start of first surgery
 - Average delay between patient wheeled inside the pre-operative area and entering to the operating complex
 - Average time taken for patient's shifting from post-operative area to the respective wards/ICU after surgery.
 - Documentation completion i.e., Informed consent, High Risk Consent, Anaesthesia Consent, Procedure/Treatment Consent, vulnerable Consent, Pre and Post-operative checklist, Operation notes, Post-Operative Comments, Pre-Induction assessment, Pre-Anaesthetic Evaluation etc.

- **ANALYSIS PHASE:** -
 - Average delay in the start of first case is 47 minutes.
 - Average delay in pre-op area is 26 minutes
 - Average delay in shifting of patient from post-op to Wards / ICU is 21 minutes
 - Fish Bone analysis is done to know the root cause for the operation theatre case delay

FISH BONE ANALYSIS(12)



- **IMPROVE PHASE:** - In this phase suggestions were given
 - Manpower should be increased in Operation Theatre
 - Proper zoning should be there in the Operation Theatre area.
 - Implementation of HIS should be done in OT computers
 - Surgeons and Anaesthesiologists should arrive on time.
 - Customization of lifts should be there
 - Entry registers should be maintained properly.
 - Proper storage area should present in OT
 - Documentation should be completed and maintained properly

- **CONTROL PHASE:** - In this phase implementation on suggestions were done
(graph – 4)
 - Zoning was done as follows: -
 - ▶ **1- Unrestricted / Clean Zone:** - Areas where surgical suites interfaces with other areas of hospital such as
 - Delivery of supply/ equipment's, materials, personnel & patients.
 - OT Attire is not mandatory in this zone.
 - ▶ **- Semi-restricted / semi-sterile zone:-** it includes
 - pre-operative area
 - corridors or hallways
 - supply room
 - scrub-sink area

Scrub Attire is mandatory, hair cover, shoe cover.
traffic should be limited to authorized personnel and patients.
 - ▶ **Restricted/ Sterile Zone:** it includes: -
 - Operating Suite
 - Gowning Area
 - Sterile preparation area

- HIS implemented in post-op area
- customization of lifts were done i.e., separate lift for patient and patient's relatives, and biomedical waste travelling

14- RESULTS

- There is no proper optimization of OT Scheduling process in hospital
- Manpower is less i.e., nurse patient ratio affecting the smoothening the process of OT
- Surgeons are arriving late than the scheduled time due to there is delay in the start of first case
- Consents forms are not fully filled adds to the one of the factors for the non-productive in OT
- Due to the unavailability of beds in the wards, or ICU, patient have to wait in the post-op area for the longer than the scheduled time
- Anaesthesiologists arriving late results in the delay in the start of surgery

OTHER FINDINGS: -

- There is no proper zoning inside the OT
- HIS not present in the post-op area
- Maintenance of negative pressure is not done in Disposal area
- There are no dedicated lifts for patient's and waste travelling.
- Proper dedicated storage room not present inside OT, induction room is used as the storage area in OT
- Entry without OT Attire should be strictly prohibited in sterile area
- Red slippers i.e., slippers dedicated inside the sterile area wore by the surgeons outside the OT complex also

15- DISCUSSION

- OT Scheduling process has a direct impact on the hospital efficiency. The lack of quality can lead to consequences on the efficiency of hospital and satisfaction of patients. To maintain a proper workflow, all the staff including surgeons, anaesthesiologists, should arrive at time, also the increase in manpower and all other factors helps in improving the non-productive time in OT.

16- CONCLUSION

- Scheduling of surgeries in any care setting is a challenging task. There are multiple variables that go into consideration - Surgeon's availability, the patient's condition, availability of the OT and the right medical devices/ surgical instruments etc among other things. And if done rightly, it contributes to improving the operational efficiency of the hospital and also ensures timely care to patients with minimal waiting time. Hence it is important that the staff are supported with the right tool to make efficient schedules. (13)

17- RECOMMENDATIONS

- Manpower should be increased in Operation Theatre
- Proper zoning should be there in the Operation Theatre area.
- Implementation of HIS should be done in OT computers
- Surgeons and Anaesthesiologists should arrive on time.
- Customization of lifts should be there
- Entry registers should be maintained properly.
- Proper storage area should present in OT
- Documentation should be completed and maintained properly

18- REFERENCES

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19- ANNEXURES

- TABLE – 1

OT	MORNING	EVENING	NIGHT	OFFICE/LEAVE	CURRENT TOTAL	TOTAL
Cardiac OT	10	5	0	5	11	20
Neuro OT	3	2	1	1	4	7
Ortho OT	8	4	1	3	11	16
General OT	10	6	1	5	12	22
General OT (pre and post recovery)	2	2	-	1	3	5

**There should be 70 nurses/brother in OT. Currently we have 41 people in OT
NEED: - 29 more nurses/brother in Operation Theatre.**

- TABLE - 2

SL NO.	PATIENT IP NO	PRE-PROCEDURE CHECK-IN	SIGN IN TIME TO OT	DIFFERENCE
1	18-000014861	15:10	15:55	0:45
2	18-000015298	12:40	13:30	0:50
3	18-000015237	12:05	13:55	1:50
4	18-000013768	15:45	16:49	1:04
5	18-000015183	8:45	9:15	0:30
6	18-000015305	9:00	9:10	0:10
7	18-000015344	9:00	9:18	0:18
8	18-000015328	10:10	10:28	0:18
9	18-000015304	10:55	11:30	0:35
10	18-000015286	11:15	12:15	1:00
11	18-000015329	13:40	14:40	1:00
12	18-000015238	14:15	14:55	0:40
13	18-000014613	14:30	15:10	0:40
14	18-000015339	9:00	9:12	0:12
15	18-000015424	8:00	9:00	1:00
16	18-000015426	8:05	9:30	1:25
17	18-000015449	9:30	11:11	1:41
18	18-000015391	9:40	9:45	0:05
19	18-000015376	10:00	10:20	0:20
20	18-000015338	10:10	10:55	0:45
21	18-000015422	10:30	11:12	0:42
22	18-000015451	11:12	11:20	0:08
23	18-000015299	12:16	12:58	0:42
24	18-000015440	12:23	14:05	1:42
25	18-000015236	12:47	13:50	1:03
26	18-000015436	13:30	14:15	0:45
27	18-000015473	8:00	9:00	1:00
28	18-000015484	8:15	9:00	0:45
29	18-000015421	8:30	9:02	0:32
30	18-000015493	8:50	9:20	0:30
31	18-000015475	10:00	11:07	1:07
32	18-000015034	10:45	11:44	0:59
33	18-000015512	11:32	11:54	0:22

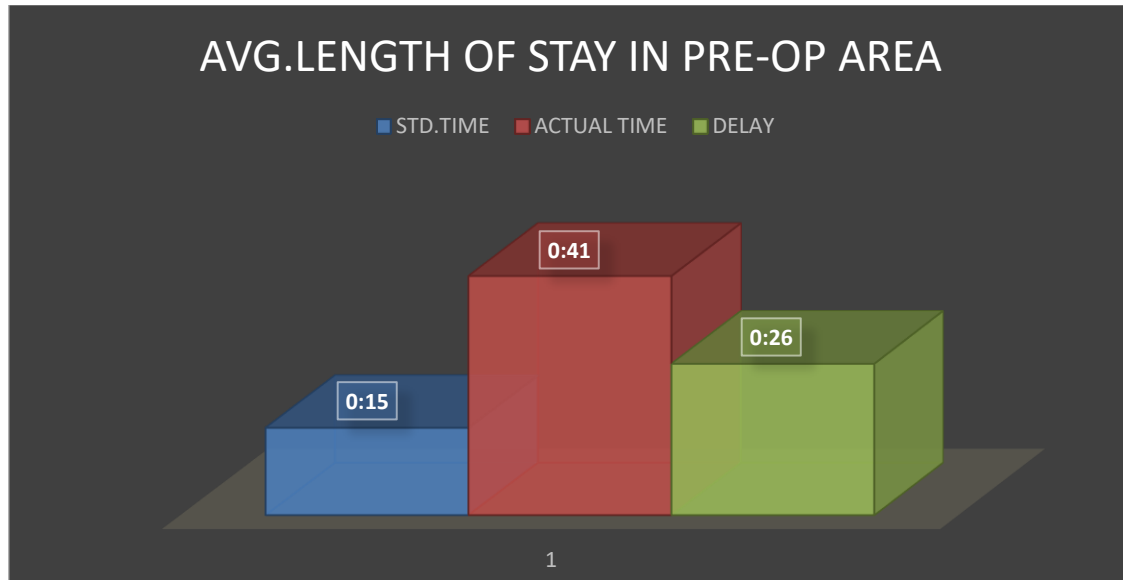
34	18-000015516	11:32	12:23	0:51
35	18-000015487	11:50	13:23	1:33
36	18-000015501	12:18	12:39	0:21
37	18-000015497	12:55	13:20	0:25
38	18-000015550	8:15	8:46	0:31
39	18-000015534	8:45	9:30	0:45
40	18-000015551	8:50	9:00	0:10
41	18-000014764	10:05	10:17	0:12
42	18-000015566	10:50	11:10	0:20
43	18-000015533	11:30	12:18	0:48
44	18-000015465	12:01	12:16	0:15
45	18-000015529	12:18	12:35	0:17
46	18-000015540	12:49	13:05	0:16
47	18-000015586	10:50	10:50	0:00
48	18-000015590	7:35	7:45	0:10
49	18-000015593	8:20	9:10	0:50
50	18-000015576	8:48	9:21	0:33
51	18-000015607	9:00	10:01	1:01
52	18-000015610	8:40	9:50	1:10
53	18-000015619	10:55	11:19	0:24
54	18-000015591	11:20	12:10	0:50
55	18-000015621	12:10	12:42	0:32
56	18-000015624	13:00	13:19	0:19
57	18-000015625	13:30	14:01	0:31
58	18-000015685	8:50	9:10	0:20
59	18-000015470	9:00	9:29	0:29
60	18-000015465	11:00	11:40	0:40
61	18-000015671	12:40	13:19	0:39
62	18-000015646	12:45	13:10	0:25
63	18-000015623	13:05	13:41	0:36
64	18-000013768	14:00	14:32	0:32
65	18-000015604	14:30	14:50	0:20
66	18-000015682	7:50	9:30	1:40
67	18-000015702	8:45	9:10	0:25
68	18-000015692	10:00	10:50	0:50
69	18-000015722	11:21	11:54	0:33
70	18-000015899	8:25	10:30	2:05
71	18-000015811	8:30	9:30	1:00
72	18-000015854	9:15	9:35	0:20
73	18-000015921	10:30	11:40	1:10
74	18-000015931	10:30	11:00	0:30

75	18-000015392	10:45	11:15	0:30
76	18-000015948	12:01	12:31	0:30
77	18-000015951	12:00	12:42	0:42
78	18-000015949	12:45	12:56	0:11
79	18-000015943	9:00	9:20	0:20
80	18-000016025	9:00	9:48	0:48
81	18-000015957	10:10	10:28	0:18
82	18-000016041	10:50	11:15	0:25
83	18-000016026	12:00	12:32	0:32
84	18-000015786	13:00	13:13	0:13
85	18-000016014	13:45	14:02	0:17
86	18-000016023	8:05	9:00	0:55
87	18-000015983	9:00	10:00	1:00
88	18-000015960	9:15	9:30	0:15
89	18-000016077	9:30	10:00	0:30
90	18-000016097	9:45	10:35	0:50
91	18-000016102	10:00	10:50	0:50
92	18-000016127	10:00	10:30	0:30
93	18-000016104	11:00	11:35	0:35
94	18-000016110	11:15	11:38	0:23
95	18-000016098	12:00	13:17	1:17
96	18-000016113	12:30	13:17	0:47
97	18-000016109	13:05	13:20	0:15
98	18-000016075	12:05	12:25	0:20
99	18-000016300	8:35	9:05	0:30
100	18-000016244	8:40	10:00	1:20
101	18-000016112	9:40	10:26	0:46
102	18-000016243	9:40	11:33	1:53
103	18-000016327	10:30	10:40	0:10
104	18-000016325	10:35	10:50	0:15
105	18-000016310	10:40	11:39	0:59
106	18-000016328	12:30	12:39	0:09
107	18-000016333	12:40	13:43	1:03
108	18-000016242	12:41	13:17	0:36
109	18-000016439	9:30	9:55	0:25
110	18-000016451	8:45	10:00	1:15
111	18-000016304	7:35	9:15	1:40
112	18-000016429	10:00	10:45	0:45
113	18-000016428	10:05	10:42	0:37
114	18-000016378	11:34	12:50	1:16
115	18-000016453	11:36	11:54	0:18

116	18-000016411	11:30	11:42	0:12
117	18-000016431	12:00	13:15	1:15
118	18-000016345	12:32	13:10	0:38
119	18-000016434	12:40	13:14	0:34
120	18-000016474	8:00	9:30	1:30
121	18-000016202	8:35	9:10	0:35
122	18-000016483	8:45	10:10	1:25
123	18-000016278	10:00	10:30	0:30
124	18-000016481	10:25	10:42	0:17
125	18-000016496	11:30	12:00	0:30
126	18-000016459	11:35	12:05	0:30
127	18-000016471	11:40	12:32	0:52
128	18-000016472	12:55	13:40	0:45
129	18-000016440	13:05	13:40	0:35
130	18-000016508	13:05	13:32	0:27
131	18-000016484	13:45	14:10	0:25
132	18-000015440	12:45	13:10	0:25
133	18-000015236	13:05	13:41	0:36
134	18-000015473	14:00	14:32	0:32
135	18-000015493	14:30	14:50	0:20
136	18-000015475	7:50	9:30	1:40
137	18-000015034	8:45	9:10	0:25
138	18-000015552	10:00	10:50	0:50
139	18-000015516	11:21	11:54	0:33
140	18-000014861	8:25	10:30	2:05
141	18-000015304	8:30	9:30	1:00
142	18-000015339	9:15	9:35	0:20
143	18-000014613	10:30	11:40	1:10
144	18-000015286	10:30	11:00	0:30
145	18-000015426	10:45	11:15	0:30
146	18-000015376	12:01	12:31	0:30
147	18-000015397	12:00	12:42	0:42
148	18-000015183	12:45	12:56	0:11
149	18-000015328	9:00	9:20	0:20
150	18-000013768	9:00	9:48	0:48

AVERAGE DELAY: - 00:26:00

- GRAPH – 1



- TABLE – 2

SL NO.	PATIENT IP NO	SIGN OUT ITME FROM OT	PATIENT HAND OVER TO WARD NURSE	DIFFERENCE
1	18-000015304	13:30	16:10	2:40
2	18-000015286	14:00	17:15	3:15
3	18-000015237	15:15	17:15	2:00
4	18-000015328	13:00	15:30	2:30
5	18-000015298	14:30	16:00	1:30
6	18-000015238	15:45	18:00	2:15
7	18-000015329	15:35	17:43	2:08
8	18-000014861	16:50	19:00	2:10
9	18-000015424	10:30	13:23	2:53
10	18-000015426	10:50	12:35	1:45
11	18-000015376	11:05	14:23	3:18
12	18-000015391	12:05	13:10	1:05

13	18-000015338	12:45	16:00	3:15
14	18-000015422	13:15	14:25	1:10
15	18-000015451	13:15	15:20	2:05
16	18-000015394	10:05	11:20	1:15
17	18-000015421	14:30	17:17	2:47
18	18-000015463	15:00	17:05	2:05
19	18-000015473	10:55	13:00	2:05
20	18-000015493	10:55	12:50	1:55
21	18-000015484	11:40	13:05	1:25
22	18-000015512	12:15	15:54	3:39
23	18-000015516	13:05	14:30	1:25
24	18-000015421	14:30	15:35	1:05
25	18-000015534	11:30	13:53	2:23
26	18-000015550	11:00	13:40	2:40
27	18-000014674	11:45	13:45	2:00
28	18-000015551	11:45	14:52	3:07
29	18-000015566	12:45	14:14	1:29
30	18-000015607	11:00	14:02	3:02
31	18-000015586	12:30	15:03	2:33
32	18-000015465	13:30	15:55	2:25
33	18-000015465	13:30	16:05	2:35
34	18-000015671	15:50	18:30	2:40
35	18-000015646	14:40	17:30	2:50
36	18-000015604	16:00	18:46	2:46
37	18-000013768	16:00	17:20	1:20
38	18-000015649	16:30	17:30	1:00
39	18-000015648	16:45	18:50	2:05
40	18-000015682	10:55	13:24	2:29
41	18-000015811	10:25	13:00	2:35
42	18-000015854	11:30	15:22	3:52
43	18-000015931	12:00	15:00	3:00
44	18-000015921	12:40	16:00	3:20
45	18-000015948	13:10	14:54	1:44
46	18-000015899	12:30	14:00	1:30
47	18-000015943	11:00	12:15	1:15
48	18-000016025	12:00	14:36	2:36
50	18-000015957	12:25	14:11	1:46
51	18-000016026	15:40	18:52	3:12
52	18-000015786	14:00	16:02	2:02
53	18-000016014	16:00	17:35	1:35
54	18-000016127	11:30	14:44	3:14

55	18-000015960	10:10	12:10	2:00
56	18-000016023	10:30	12:24	1:54
57	18-000016097	11:15	14:55	3:40
58	18-000015983	12:00	15:05	3:05
59	18-000016104	12:25	15:10	2:45
60	18-000016102	12:50	15:10	2:20
61	18-000016300	10:20	11:50	1:30
62	18-000016327	11:20	14:52	3:32
63	18-000016325	11:50	13:50	2:00
64	18-000016244	12:00	14:00	2:00
65	18-000016439	10:05	12:15	2:10
66	18-000016451	10:30	13:14	2:44
67	18-000016304	10:15	11:45	1:30
68	18-000016429	12:45	14:20	1:35
69	18-000016428	12:45	15:42	2:57
70	18-000016453	15:30	17:45	2:15
71	18-000016202	12:05	14:54	2:49
72	18-000016463	10:45	12:00	1:15
73	18-000016278	11:50	16:10	4:20
74	18-000016459	12:55	15:43	2:48
75	18-000016421	14:00	15:40	1:40
76	18-000016508	15:00	17:54	2:54
77	18-0000472	14:10	16:20	2:10
78	18-000015943	16:00	18:00	2:00
79	18-000016025	16:00	18:23	2:23
80	18-000015957	16:30	18:02	1:32
81	18-000016041	16:45	18:50	2:05
82	18-000016026	10:55	13:10	2:15
83	18-000015786	10:25	12:00	1:35
84	18-000016014	11:30	14:00	2:30
85	18-000016023	12:00	15:32	3:32
86	18-000015983	12:40	15:30	2:50
87	18-000015960	13:10	15:45	2:35
88	18-000016077	12:30	15:30	3:00
89	18-000016097	11:00	13:45	2:45
90	18-000016102	12:00	14:02	2:02
91	18-000016127	12:25	15:00	2:35
92	18-000016104	15:40	16:20	0:40
93	18-000016110	14:00	17:02	3:02
94	18-000016098	16:00	18:23	2:23
95	18-000016113	11:30	14:10	2:40

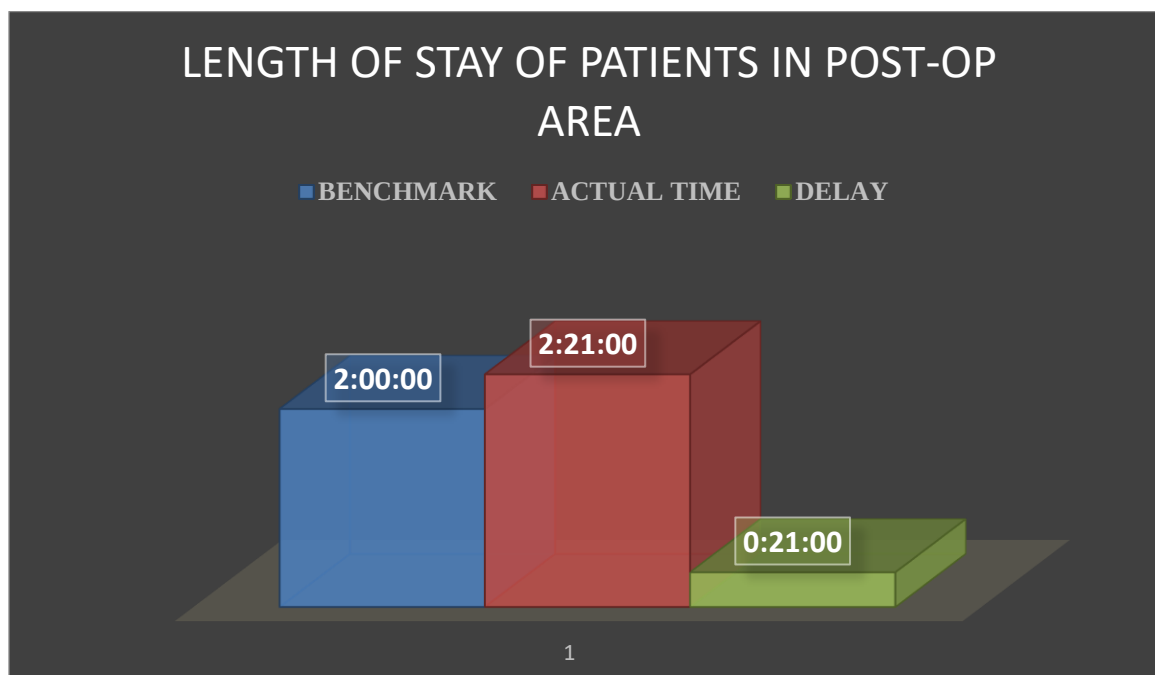
96	18-000016109	10:10	12:10	2:00
97	18-000016075	10:30	12:24	1:54
98	18-000016300	11:15	12:55	1:40
99	18-000016244	12:00	15:21	3:21
100	18-000016112	12:25	14:41	2:16
101	18-000016243	12:50	15:42	2:52
102	18-000016327	10:20	13:56	3:36
103	18-000016325	16:00	18:00	2:00
104	18-000016310	16:00	18:27	2:27
105	18-000016328	16:30	18:45	2:15
106	18-000016333	16:45	18:50	2:05
107	18-000016242	10:55	13:47	2:52
108	18-000016439	10:25	12:35	2:10
109	18-000016451	11:30	14:42	3:12
110	18-000016304	12:00	14:40	2:40
111	18-000016429	12:40	14:50	2:10
112	18-000016428	13:10	14:54	1:44
113	18-000016378	12:30	15:27	2:57
114	18-000016453	11:00	13:52	2:52
115	18-000016411	12:00	14:42	2:42
116	18-000016431	12:25	15:00	2:35
117	18-000016345	15:40	18:01	2:21
118	18-000016434	14:00	16:42	2:42
119	18-000016474	16:00	18:25	2:25
120	18-000016202	11:30	13:40	2:10
121	18-000016483	10:10	12:10	2:00
122	18-000016278	10:30	12:24	1:54
123	18-000016481	11:15	12:55	1:40
124	18-000016496	12:00	14:59	2:59
125	18-000016459	12:25	15:33	3:08
126	18-000016471	12:50	15:07	2:17
127	18-000016472	10:20	13:26	3:06
128	18-000016440	16:00	17:45	1:45
129	18-000016508	16:00	18:43	2:43
130	18-000016484	16:30	18:30	2:00
131	18-000015440	16:45	18:50	2:05
132	18-000015236	10:55	13:53	2:58
133	18-000015473	10:25	12:00	1:35
134	18-000015493	11:30	14:11	2:41
135	18-000015475	12:00	13:30	1:30
136	18-000015034	12:40	15:20	2:40

137	18-000015552	13:10	14:54	1:44
138	18-000015516	12:30	14:00	1:30
139	18-000014861	11:00	14:16	3:16
140	18-000015304	12:00	15:43	3:43
141	18-000015339	12:25	16:00	3:35
142	18-000014613	15:40	17:34	1:54
143	18-000015286	14:00	16:35	2:35
144	18-000015426	16:00	18:35	2:35
145	18-000015376	11:30	13:45	2:15
146	18-000015397	10:10	12:10	2:00
147	18-000015183	10:30	12:24	1:54
148	18-000015328	11:15	12:55	1:40
149	18-000013768	12:00	14:32	2:32
150	18-000015949	12:25	15:16	2:51

AVERAGE: - 2:21:00

AVERAGE DELAY IN SHIFTING OF PATIENTS: - 00:21:00

- GRAPH - 2



- TABLE: - 3

S NO.	PATIENT'S IP NO.	SCHEDULED TIME	ACTUAL TIME OF SURGERY	DIFFERENCE
1	18-000015298	12:00	13:30	1:30
2	18-000015237	11:30	13:55	2:25
3	18-000013768	15:00	16:49	1:49
4	18-000015183	8:00	9:15	1:15
5	18-000015305	8:30	9:10	0:40
6	18-000015344	8:00	9:18	1:18
7	18-000015328	9:00	10:28	1:28
8	18-000015304	11:00	11:30	0:30
9	18-000015286	11:30	12:15	0:45
10	18-000015329	14:00	14:40	0:40
11	18-000015238	14:30	14:55	0:25
12	18-000014613	15:00	15:10	0:10
13	18-000015339	9:00	9:12	0:12
14	18-000015424	8:30	9:00	0:30
15	18-000015426	8:00	9:30	1:30
16	18-000015449	9:00	11:11	2:11
17	18-000015391	9:00	9:45	0:45
18	18-000015376	8:30	10:20	1:50
19	18-000015338	10:00	10:55	0:55
20	18-000015422	10:00	11:12	1:12
21	18-000015451	10:30	11:20	0:50
22	18-000015299	12:30	12:58	0:28
23	18-000015440	13:00	14:05	1:05
24	18-000015236	12:00	13:50	1:50
25	18-000015436	13:30	14:15	0:45
26	18-000015473	8:00	9:00	1:00
27	18-000015484	8:30	9:00	0:30
28	18-000015421	8:30	9:02	0:32
29	18-000015493	9:00	9:20	0:20
30	18-000015475	10:30	11:07	0:37
31	18-000015034	11:00	11:44	0:44
32	18-000015512	11:30	11:54	0:24
33	18-000015516	12:15	12:23	0:08

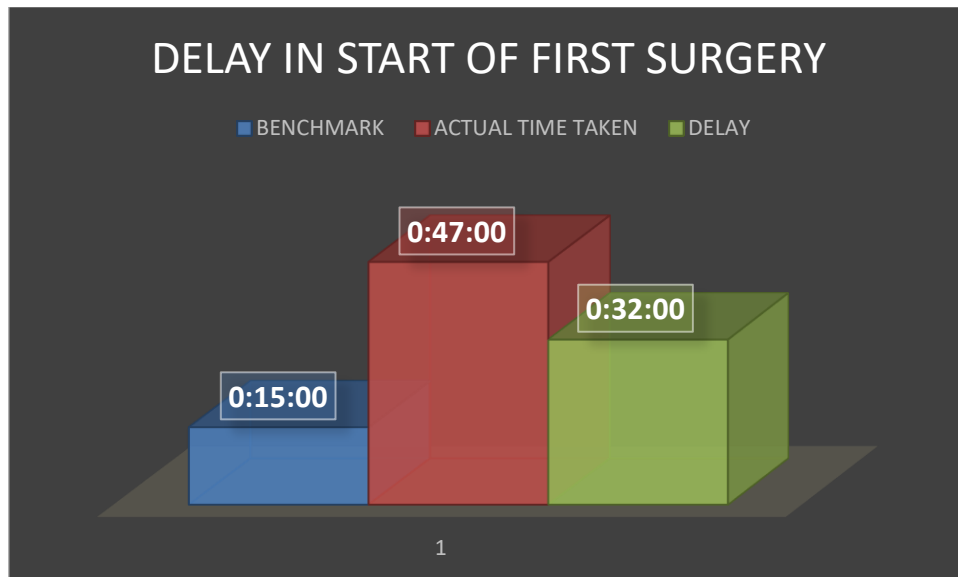
34	18-000015487	12:30	13:23	0:53
35	18-000015501	12:00	12:39	0:39
36	18-000015497	13:00	13:20	0:20
37	18-000015550	8:30	8:46	0:16
38	18-000015534	9:00	9:30	0:30
39	18-000015551	8:30	9:00	0:30
40	18-000014764	10:00	10:17	0:17
41	18-000015566	10:30	11:10	0:40
42	18-000015533	12:00	12:18	0:18
43	18-000015465	11:30	12:16	0:46
44	18-000015529	12:00	12:35	0:35
45	18-000015540	12:30	13:05	0:35
46	18-000015586	9:00	10:50	1:50
47	18-000015590	8:00	9:00	1:00
48	18-000015593	8:30	9:10	0:40
49	18-000015576	8:00	9:21	1:21
50	18-000015607	9:00	10:01	1:01
51	18-000015610	9:30	9:50	0:20
52	18-000015619	10:00	11:19	1:19
53	18-000015591	12:00	12:10	0:10
54	18-000015621	12:00	12:42	0:42
55	18-000015624	8:00	13:19	5:19
56	18-000015625	13:30	14:01	0:31
57	18-000015685	8:30	9:10	0:40
58	18-000015470	9:00	9:29	0:29
59	18-000015465	11:00	11:40	0:40
60	18-000015671	13:00	13:19	0:19
61	18-000015646	12:30	13:10	0:40
62	18-000015623	13:30	13:41	0:11
63	18-000013768	14:00	14:32	0:32
64	18-000015604	14:30	14:50	0:20
65	18-000015682	9:00	9:30	0:30
66	18-000015702	8:30	9:10	0:40
67	18-000015692	10:00	10:50	0:50
68	18-000015722	11:30	11:54	0:24
69	18-000015899	8:30	10:30	2:00
70	18-000015811	8:30	9:30	1:00
71	18-000015854	9:00	9:35	0:35
72	18-000015921	10:30	11:40	1:10
73	18-000015931	11:00	11:00	0:00
74	18-000015392	11:00	11:15	0:15

75	18-000015948	10:30	12:31	2:01
76	18-000015951	12:00	12:42	0:42
77	18-000015949	10:00	12:56	2:56
78	18-000015943	9:00	9:20	0:20
79	18-000016025	9:30	9:48	0:18
80	18-000015957	10:00	10:28	0:28
81	18-000016041	11:00	11:15	0:15
82	18-000016026	12:00	12:32	0:32
83	18-000015786	13:00	13:13	0:13
84	18-000016014	13:30	14:02	0:32
85	18-000016023	8:30	9:00	0:30
86	18-000015983	9:00	10:00	1:00
87	18-000015960	8:30	9:30	1:00
88	18-000016077	10:00	10:00	0:00
89	18-000016097	9:30	10:35	1:05
90	18-000016102	10:30	10:50	0:20
91	18-000016127	10:00	10:30	0:30
92	18-000016104	11:00	11:35	0:35
93	18-000016110	11:00	11:38	0:38
94	18-000016098	12:00	13:17	1:17
95	18-000016113	12:30	13:17	0:47
96	18-000016109	12:30	13:20	0:50
97	18-000016075	12:00	12:25	0:25
98	18-000016300	8:00	9:05	1:05
99	18-000016244	9:00	10:00	1:00
100	18-000016112	10:00	10:26	0:26
101	18-000016243	11:00	11:33	0:33
102	18-000016327	10:00	10:40	0:40
103	18-000016325	10:30	10:50	0:20
104	18-000016310	11:00	11:39	0:39
105	18-000016328	11:30	12:39	1:09
106	18-000016333	13:00	13:43	0:43
107	18-000016242	13:00	13:17	0:17
108	18-000016439	8:00	9:55	1:55
109	18-000016451	9:00	10:00	1:00
110	18-000016304	9:00	9:15	0:15
111	18-000016429	10:00	10:45	0:45
112	18-000016428	10:00	10:42	0:42
113	18-000016378	12:00	12:50	0:50
114	18-000016453	11:30	11:54	0:24
115	18-000016411	11:00	11:42	0:42

116	18-000016431	13:00	13:15	0:15
117	18-000016345	13:00	13:10	0:10
118	18-000016434	12:30	13:14	0:44
119	18-000016474	9:00	9:30	0:30
120	18-000016202	8:00	9:10	1:10
121	18-000016483	9:30	10:10	0:40
122	18-000016278	8:30	10:30	2:00
123	18-000016481	10:00	10:42	0:42
124	18-000016496	11:00	12:00	1:00
125	18-000016459	11:30	12:05	0:35
126	18-000016471	12:00	12:32	0:32
127	18-000016472	13:00	13:40	0:40
128	18-000016440	13:30	13:40	0:10
129	18-000016508	12:30	13:32	1:02
130	18-000016484	13:30	14:10	0:40
131	18-000016110	13:30	14:02	0:32
132	18-000016098	8:30	9:00	0:30
133	18-000016113	9:00	10:00	1:00
134	18-000016109	8:30	9:30	1:00
135	18-000016075	10:00	10:00	0:00
136	18-000016300	9:30	10:35	1:05
137	18-000016244	10:30	10:50	0:20
138	18-000016112	10:00	10:30	0:30
139	18-000016243	11:00	11:35	0:35
140	18-000016327	11:00	11:38	0:38
141	18-000016325	12:00	13:17	1:17
142	18-000016310	12:30	13:17	0:47
143	18-000016328	12:30	13:20	0:50
144	18-000016333	12:00	12:25	0:25
145	18-000016242	8:00	9:05	1:05
146	18-000016439	9:00	10:00	1:00
147	18-000016451	10:00	10:26	0:26
148	18-000016304	11:00	11:33	0:33
149	18-000016429	10:00	10:40	0:40
150	18-000016428	10:30	10:50	0:20

AVERAGE DELAY: - 00:47:00

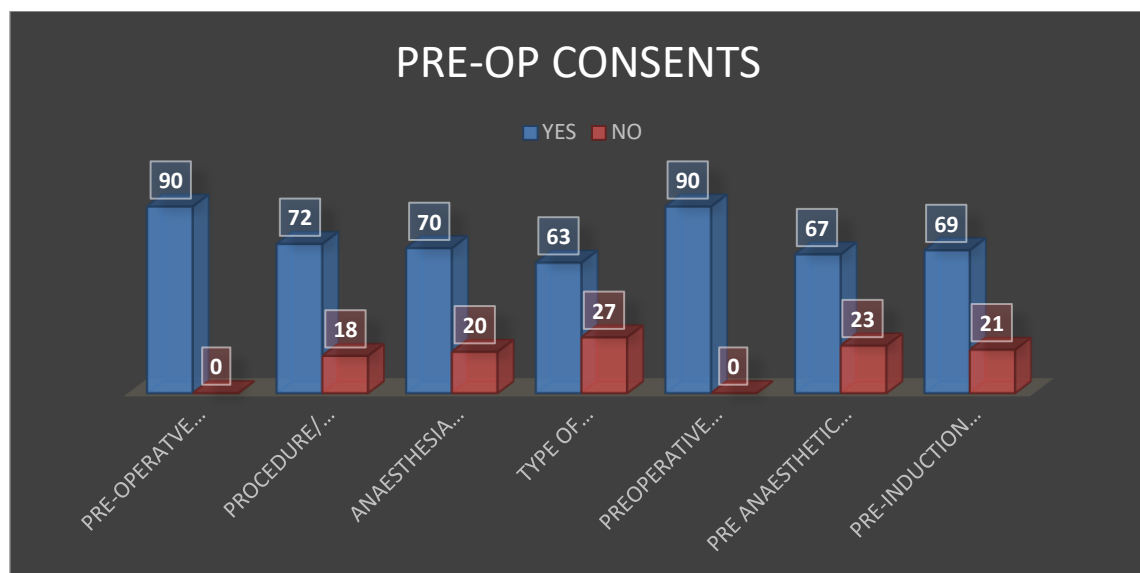
- **GRAPH – 3**

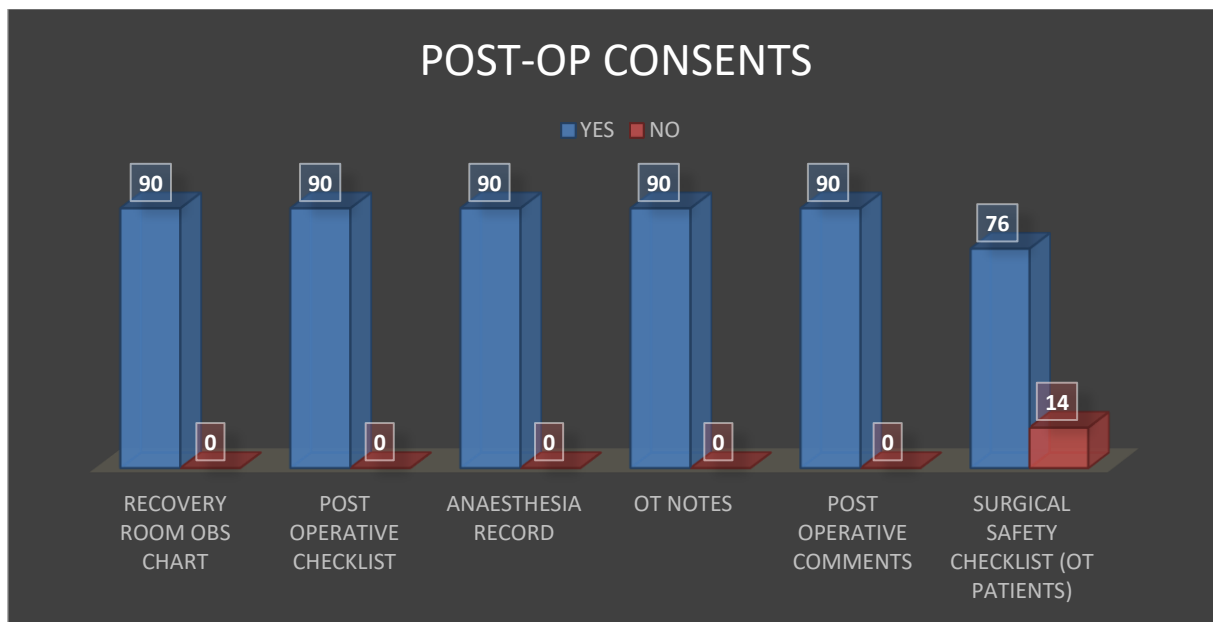


- **TABLE: - 4**

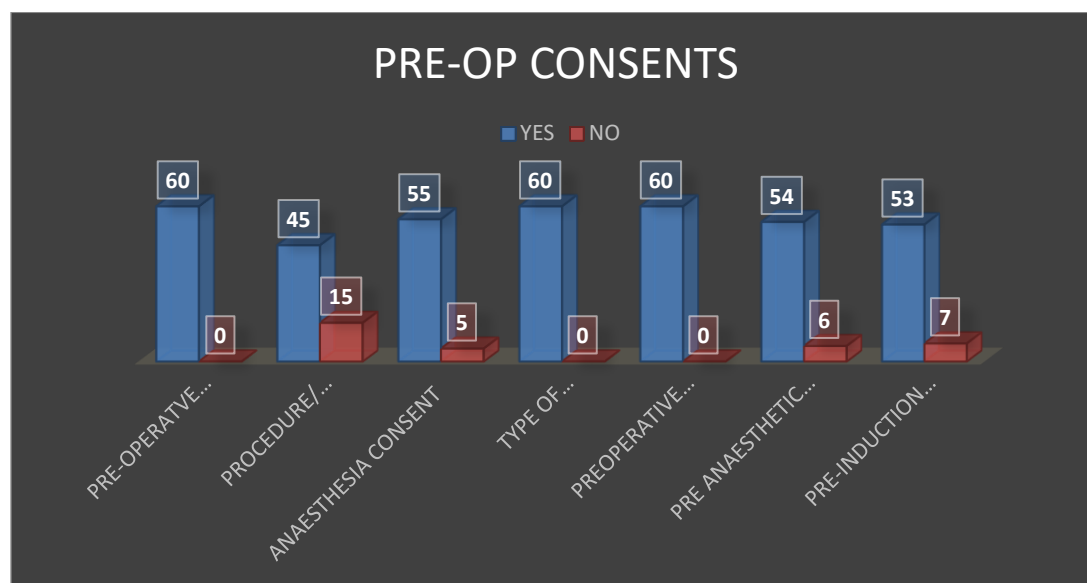
GRAPH – 4

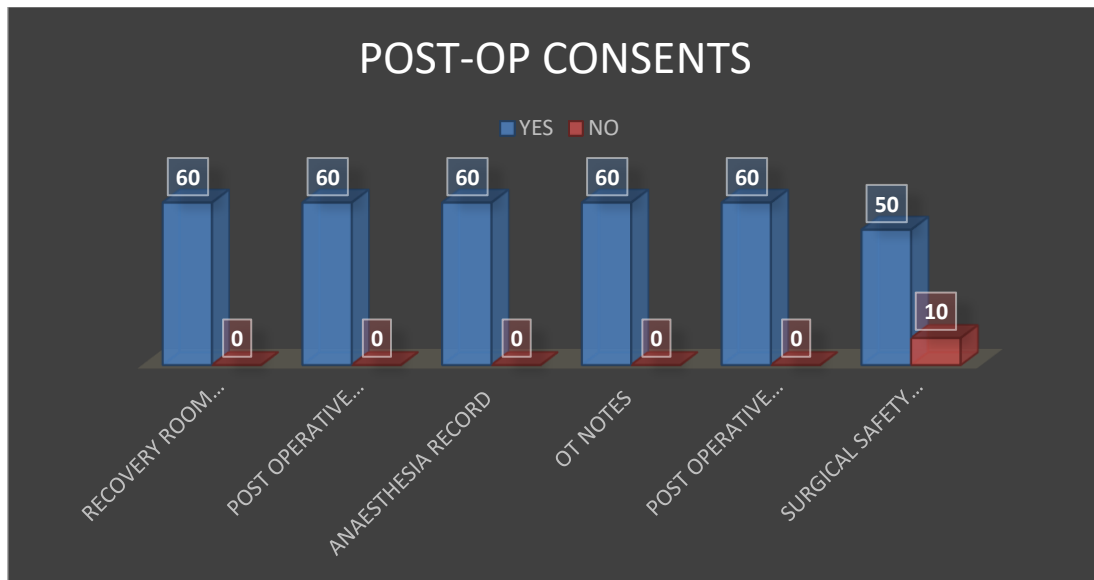
- Before Recommendation





- **GRAPH – 5**
After recommendation





- **TABLE: - 6**

QUALITY INDICATORS	RECENT STATUS
- Average time between surgeries	20 minutes
- PAC done before the day of surgery	80.66%
- Attendants meet by operating team after procedure	100%
- Percentage of modification of anaesthesia plan	0%
- Percentage of unplanned ventilation following anaesthesia	0%
- Percentage of adverse anaesthesia events	0%
- Anaesthesia related mortality rate	0%