

Summer Training at

**The Calcutta Medical Research Institute, Kolkata**

From May 10 to July 2, 2021

- Study on the Efficiency of Discharge Process at The Calcutta Medical Research Institute
  - Study on Utilization and Turnaround Time of Operation Theatre

By

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MBA Hospital and Health Management

**2020-22**



8<sup>th</sup> July 2021

TO WHOM IT MAY CONCERN

This is to certify that Ms. Ankita Jana, student of Indian Institute of Health Management Research, pursuing Masters in Business Administration has successfully completed her Project at our Institute.

She was with the Institute from 10<sup>th</sup> May,2021 to 2<sup>nd</sup> July,2021 as part of the training required for her academic endeavour.

During this period she has worked diligently in the assigned area and has shown keenness to learn.

We wish her success in all future endeavours.

Thanking you,

For **The Calcutta Medical Research Institute**



**Srijita Mukherjee**  
**Unit HR Head**



## **ACKNOWLEDGEMENT**

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Ankita Jana

MBA-HM 2020-22

IIHMR University, Jaipur

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### **LIST OF ABBREVIATIONS**

- CMRI- The Calcutta Medical Research Institute
- TAT- Turnaround Time
- HIS- Hospital Information System
- OPD- Outpatient Department
- IPD- Inpatient Department
- LAMA/DAMA- Leave against Medical Advice/ Discharge Against Medical Advice
- TPA- Third Party Administrator
- MLC- Medico Legal Case
- RMO- Resident Medical Doctor
- PAC- Pre-Anesthetic Consent
- OR- Operating Room
- NPT- Nonproductive time
- GDA- Ground Duty Assistants

## **OBSERVATIONAL LEARNINGS**

The Calcutta Medical Research Institute is a centrally located multi-specialty hospital in Kolkata. The 440 bedded hospital with state-of-the-art infrastructure is recognized for its unique quality healthcare service delivery. The flagship hospital of the CK Birla Group of Hospitals is an ISO 9001:2008 certified hospital accredited by the NABH and NABL.

Established in the year 1969, by late BM Birla, a visionary and philanthropist, CMRI has always operated with focus on patient, physician satisfaction and employee. The hospital has been providing excellent healthcare services for more than 50 years to millions of people from different states in India and the neighboring countries. Following a holistic approach, patient experience, care and empathy are ensured with the help of internationally trained team of nurses.

CMRI has always looked forward to innovations and excellence. It has conducted new clinical trials and research both in the national and international arena.

### **Mission**

To offer the best standard of medical services with care, commitment, and compassion to all the sections of the society.

To create clinical centers of excellence on a strong backbone of academics, research, and evidence-based medicine for best clinical and patient outcome.

### **Vision**

To be the leading healthcare and research institute in the Eastern India with International standard of service and quality.

To provide best and efficient patient service and to achieve clinical excellence.

### **Commitment**

To constantly improve human and technological resources to keep pace with the latest global developments in medical sciences.

The three key principles that define the foundation and ethos of CMRI:

1. **Clinical excellence**- Delivery of best patient care right from prevention to treatment of the most complex and serious diseases. Implementing international guidelines, protocols, and care pathways to ensure best clinical outcomes. Institute of choice for the best clinical service and nursing talent along with world-class infrastructure and equipment.
2. **Ethical conduct**- Honest and transparent service delivered to the patients by improving procedures as well as outcomes. Adherence to the highest standards of professionalism with clear communication of treatment plan.
3. **Patient centric**- Primary needs as well as comfort and convenience of patients and their attendants are ensured. Through compassion and empathy, a strong patient connects, and trust is established. Inclusive in embracing and respecting patients of different backgrounds.

### **Achievements**

- More than 5,50,000 successful elective surgeries
- A wide range of specialties and excellent diagnostic services under one roof.
- One of the most trusted hospitals in Eastern India
- Recognized for its positive clinical outcomes.
- Recognized as a model hospital as declared by multiple state undertakings and PSUs.

### **Clinical specialties:**

- Department of Clinical Oncology
- Department of Pulmonology
- Department of Plastic, Hand, and Reconstructive Surgery
- Department of Orthopedics & Joint Replacement
- Department of Gastro Science
- Department of ENT- Otolaryngology
- Department of Internal Medicine
- Department of Ophthalmology
- Department of Renal Science
- Department of Dental Sciences
- Department of Interventional Radiology
- Department of Rheumatology
- Department of Dermatology
- Department of General Surgery
- Department of Neurosciences
- Department of Pediatrics
- Department of Endocrinology
- Department of Hematology
- Department of Obstetrics and Gynecology

### Other Departments

- Indoor Department
- Outdoor Department
- Operation Theatre
- Intensive Care Unit (ICU)
- Emergency Services
- Diagnostic
- Endoscopy
- Dialysis
- Blood bank
- Pathology Department
- Radiology Department
- Medical Records
- Human Resource Department
- Marketing Department
- Housekeeping
- Dietary
- Maintenance
- Administration
- Purchase Department
- Pharmacy
- CSSD
- Mortuary

### SCOPE OF SERVICES

- ✓ ***Clinical services-*** Anesthesiology, Clinical Hematology, critical care- , ICCU,ICU, Neuro ICU, GI Endoscopy, Dialysis, Dermatology and Venereology, Emergency Medicine, , Family Medicine, Endocrinology, General Medicine, Neonatology, Medical Gastroenterology, Nephrology, Neurology, Neurosurgery, Obstetrics and Gynecology, Physiotherapy, Medical oncology, Surgery oncology, Ophthalmology, Plastic, Hands and Dermatology, Psychiatry, Respiratory Medicine, Rheumatology, Surgery, Surgical Gastroenterology, Thoracic Surgery, Transplant services
- ✓ ***Diagnostic services-*** Ultrasound, CT scan, Urology, Dental, EEG, Bone Densitometry, Mammography, MRI, Tread Mill testing, X-ray, 2D Echo, Audiometry, EMG/EP, Holter Monitoring, Spirometry, Urodynamic Studies, PFT
- ✓ ***Laboratory services-*** Histopathology, Biochemistry, Serology and Microbiology, Clinical Pathology, Cytopathology, Hematology
- ✓ ***Exclusions-*** Interventional Cardiology, Cardiovascular Surgery, Radiation Oncology

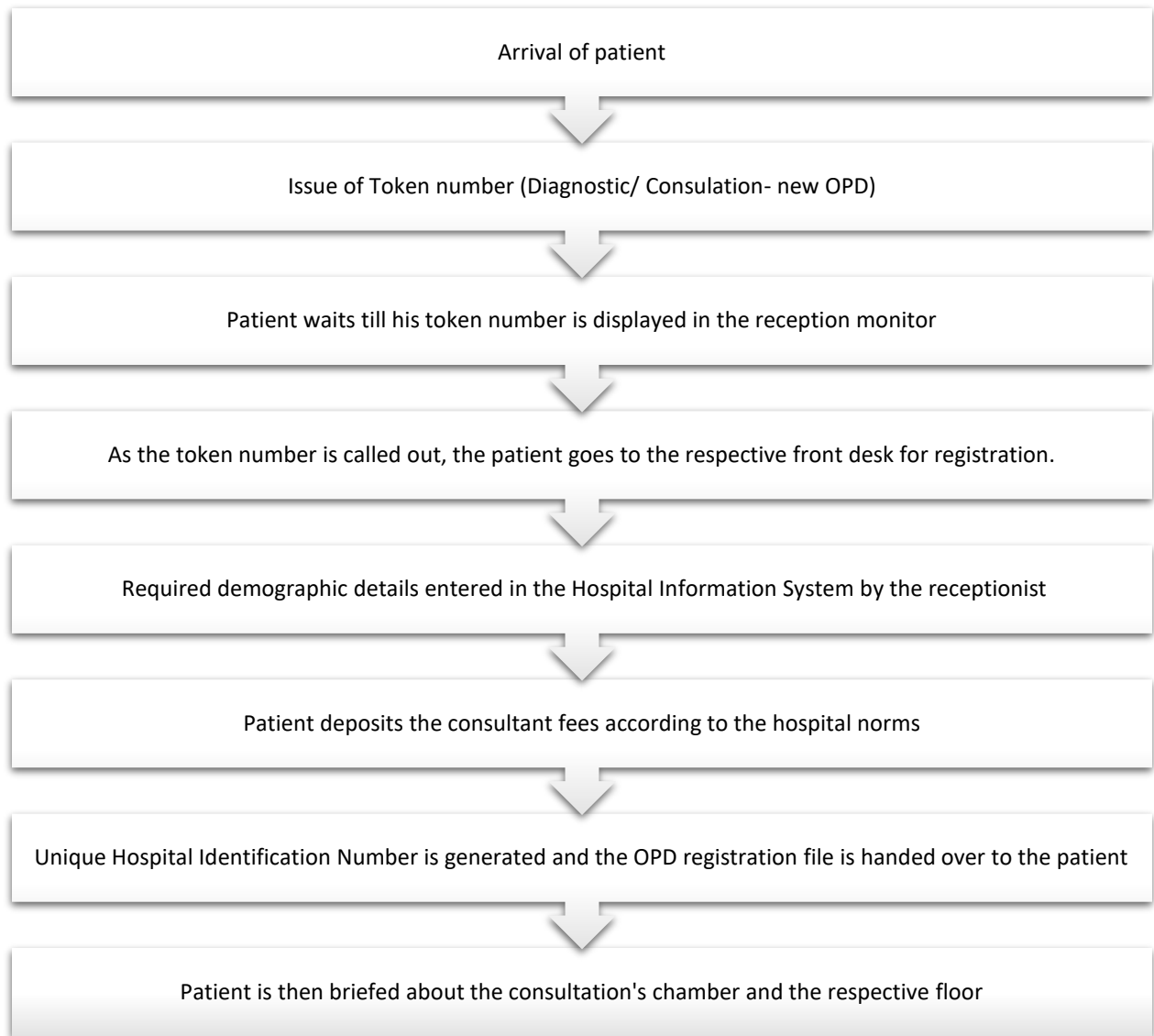
## **FLOOR PLAN**

- **Ground floor-** North block- Emergency unit (18 beds), Mortuary, Laundry  
West block- Auditorium, office billing, cardiology  
East block- pharmacy store, medicine store, Radiology
- **1<sup>st</sup> floor-** Department of Diabetes, Endocrinology & Obesity  
Diabetes Education room, Department of ENT, Dental, Department of Pulmonology, Plastic, Hands & Dermatology, Neurosciences, Pathology, Orthopedics, MABHGIS
- **2<sup>nd</sup> floor-** Operation Theatre, Gastroenterology
- **3<sup>rd</sup> floor-** COVID ICU- 18 beds, COVID CARE UNIT HDU- 14 beds, COVID CARE WARD MALE- 22 beds, COVID CARE WARD FEMALE- 20 beds
- **4<sup>th</sup> floor-** AC Special Ward (female- 42 beds & male- 42 beds), Bronchoscopy unit
- **5<sup>th</sup> floor-** North block- N.I.C.U. (9 beds), S.C.B.U (4 beds), P.I.C.U (4 beds)  
West block- labor room (4 beds), IP female ward,  
East block- IP Male ward
- **6<sup>th</sup> floor-** North block- Dialysis unit (13 beds)  
West block – 8 IP beds, East block- 6 IP beds
- **7<sup>th</sup> floor-** North block – ICU II (18 beds),  
West and East Block-Executive Ward (27 beds)
- **8<sup>th</sup> floor-** North block- Neuro ICU (20 beds)  
West block- Matron Department, Doctor's Library, School of Nursing Office  
East block- Academic Office, Critical care office, Quality Department, Infection Control room
- **9<sup>th</sup> floor-** West block- Medical Records Department, Urodynamic  
East block- Data center, Internal Audit room, Clinical Research Department, Dietitian room

### **Outpatient Department (OPD)**

The Outpatient Department of a hospital provides wide range of services including clinical examination, investigations, dispensing, diagnosis, minor surgical procedures, counselling, interventional procedures, and rehabilitation services. Efficient and effective functioning of the OPD reduces the overall burden on the inpatient department. The OPD of this hospital is divided into ground and first floors. The hospital receives walk-in patients as well as patients with prior appointments. Appointment can be booked on call or through hospital's website. There are a total of 16 consultation chambers on the first floor. The OPD timings are from 8am to 8pm. The reception has 5 front desks. The average number of OPDs per day in the hospital is 400.

### ***Process Mapping***

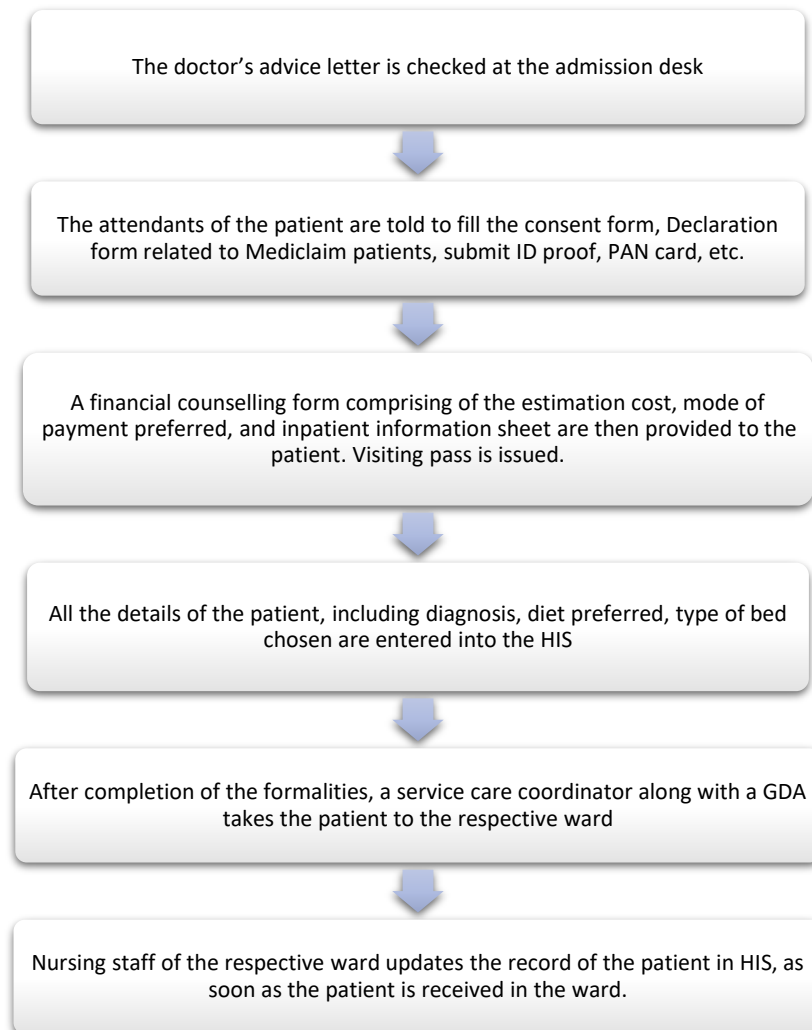


### **INPATIENT DEPARTMENT (IPD)**

#### **Admission**

The hospital staff facilitates in smooth operation of the admission process. Patients advised to get admitted in the hospital are required to go to the admission desk, located on the ground floor for the process to be initiated. The patients received can be from OPD, Emergency ward, those advised to undergo surgery, or transferred from another hospital.

***Process flow:***



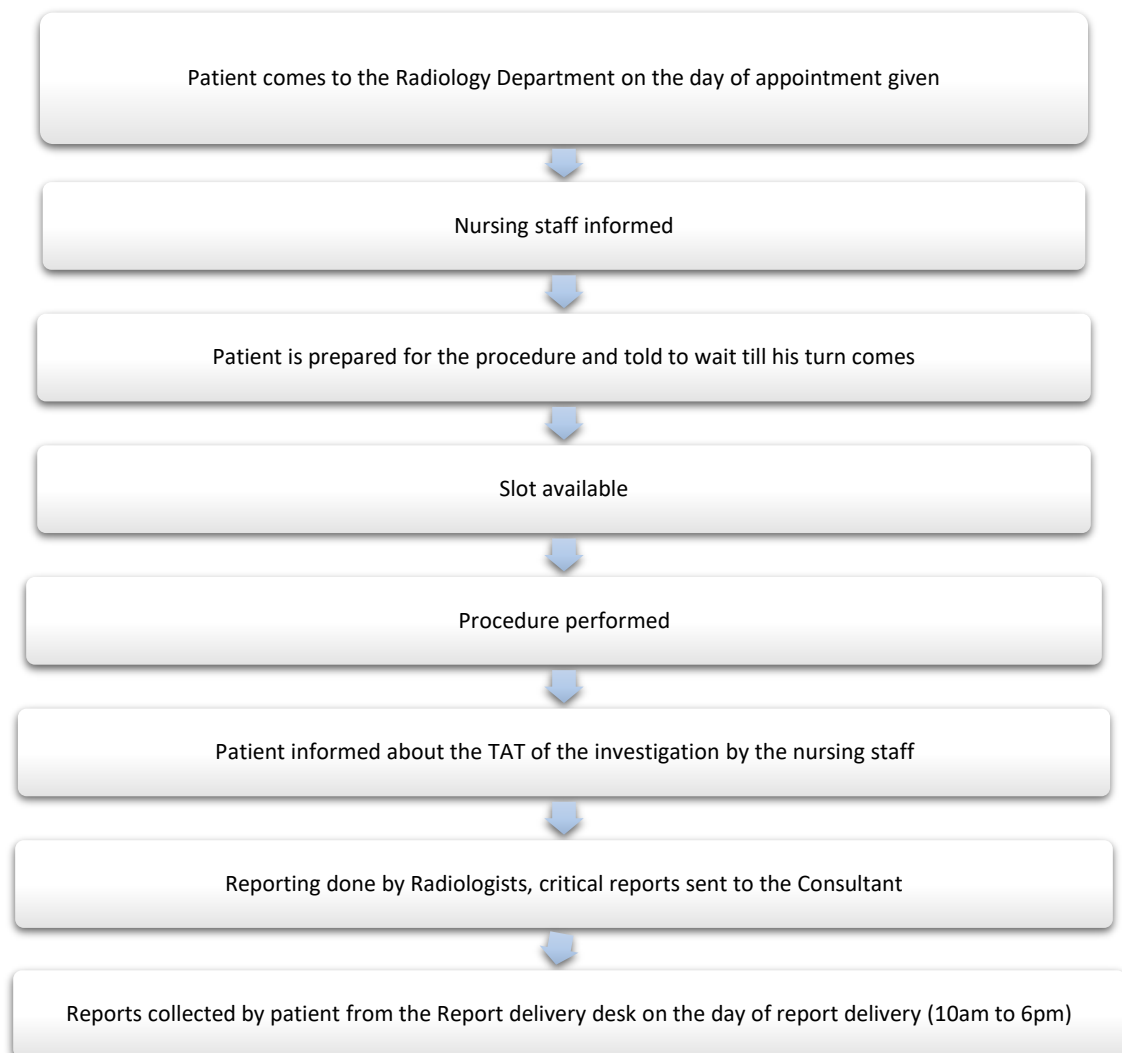
- Following of a transparent treatment process- The procedures of treatment are first explained to the patient and then performed after having agreement. A written consent is mandatory to undergo hospitalization and surgical procedures.
- Medication- All the required medicines are to be purchased from the pharmacy of the hospital.
- Billing- The bill generated shows all the charges including service charges, doctor's fees, charges for room rent, OT charges, medicines, and other expenses to maintain transparency. Cash, debit cards, credit cards, and pay orders are accepted by CMRI.

## **Radiology and Imaging services**

The Department of Radiology and Imaging is located on the ground floor. Scope of services:

- High powered X-Ray
- USG
- 1.5 T MRI
- 64 Slice CT
- BMD
- Mammography
- Interventional Radiology

### ***Process Mapping***

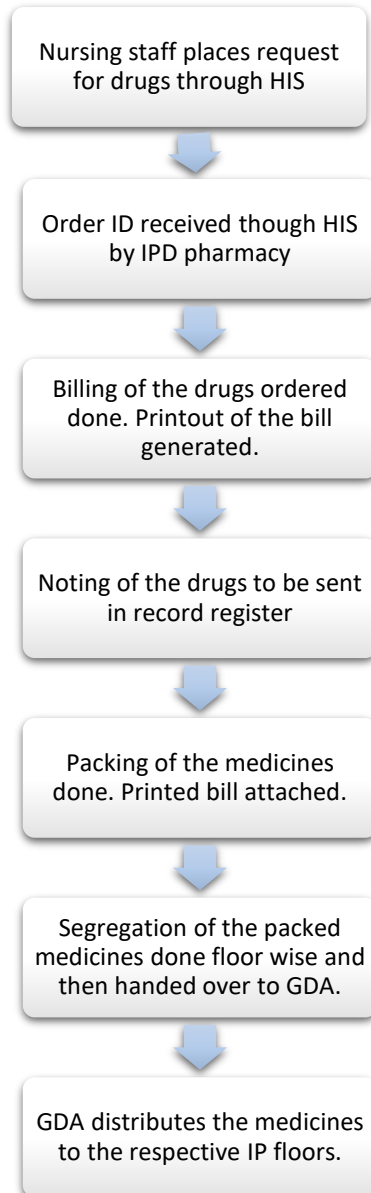


The report preparation TAT for USG and X-ray is 15-30mins, and for CT/MRI is 24hours.

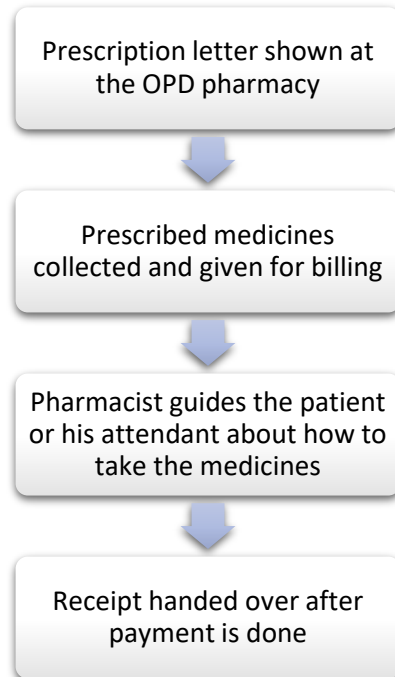
## **PHARMACY**

CMRI provides a broad range of various pharmaceutical products, disposable, surgical, nutritional supplements, lifesaving, and general healthcare products. Stringent quality control is ensured such that medicines are updated regularly and are of best quality. The hospital has 1 outpatient pharmacy and 1 inpatient pharmacy.

### ***Process flow of pharmacy for inpatients***



### *Process flow of pharmacy for outpatients*



### **Emergency Department**

The Department of trauma and emergency care of CMRI located at the ground floor treats all life-threatening crises like strokes or fractures with same care. The ED team available for 24\*7 attends infants, children, adolescents, and adults in all emergency needs. The highly efficient and dedicated team consists of multidisciplinary doctors, nurses trained in critical care and emergency, and specialists who are available round the clock. Once a patient is admitted, a triage nurse examines and allots the patient to a zone depending on the severity of the condition. Patients having life-threatening and time-critical conditions are immediately attended by the doctor and treated in a separated zone called as the 'Resuscitation Bay'. After shifting the patient to this bay, a team of expert doctors and nurses start assessing and interventions are started to stabilize the patient. CMRI has state-of-the-art diagnostic equipment that helps in quick scanning for internal injuries to start the right course of treatment for fast recovery.

Total number of beds= 18

- A system of triage is maintained to determine which category of patients is to be attended immediately.

**Red zone-** for patients who need immediate treatment as in life threatening conditions (seen immediately)

**Yellow zone-** for patients who are in stable condition (seen within 30 mins)

**Green zone-** for patients who are unlikely to deteriorate for several hours, non-urgent cases (seen within 120mins)

### Emergency codes used at CMRI

**CODE BLUE**- Cardiac arrest

**CODE PINK**- Child abduction

**CODE YELLOW**- External disaster

**CODE RED**- Fire

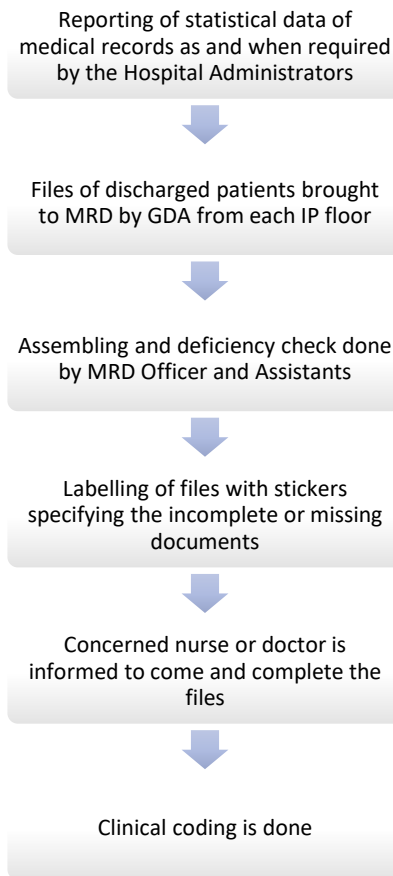
**CODE VIOLET**- Violent patient\ attendant

**CODE ORANGE**- Spill

### **MEDICAL RECORDS DEPARTMENT**

The Medical Records Department of CMRI is located on the 9<sup>th</sup> floor. Its prime objective is to maintain patient medical records in a professional and standardized way.

#### ***Workflow***



- **Color coding of files**

MLC records- blue

Death files- green

IPD files- yellow

- **Records Retention period**

IP Record- 10 years

MLC records- 15 years

Birth/ death files- not destroyed

# PROJECT REPORT 1

## **STUDY ON THE EFFICIENCY OF DISCHARGE PROCESS AT THE CALCUTTA MEDICAL RESEARCH INSTITUTE**

### **ABSTARCT**

*Background:* The discharge of patients in hospitals is a complex process involving multiple stakeholders. It is a transition phase where an episode of treatment delivered to a patient by the health professionals and health care provider organization is formally concluded. The discharge process must be efficiently carried out to improve patient satisfaction. Delays in the discharge process causes a backlog for new admissions from the Emergency Department, OPDs, and transfers from the ICUs. The present study has been conducted on 136 patients admitted at a multispecialty hospital of Kolkata to assess the efficiency, to record the TAT for various steps involved in discharge process, and to find out the major factors causing delay in the process which directly impacts operational efficiency of the hospital thus leading to patient dissatisfaction.

*Methods:* According to the literature review done, the reasons for delay in discharge process were found to be deficient manpower, improper process flow and communication, problematic cashless process, non-availability of resident doctors to prepare discharge summary, delay in picking chart from ward for billing, final bill clearance, final check out of the patients and time taken in TPA approval. Limitation of the studies was the fact that they were carried out within adult acute hospital care excluding geriatric settings, long term facilities and pediatric settings.

The data collected for the present study has been analyzed using MS Excel through charts (bar charts, pie charts) and fish bone diagram.

*Results:* By analyzing the collected data, it can be inferred that the average TAT for planned cash patients was 228 minutes and for unplanned cash patients it was 280 minutes. The average TAT for planned TPA patients was 300 minutes and that for unplanned TPA patients was 440 minutes. It was observed that discharge summaries were not prepared on time, the hospital was running on a GDA dependent system, the Audit department faced IT challenges frequently and there were no fixed round timings of the consultants. The main interventions included establishing of a discharge tracking queue and fixing of the round timings of consultants.

*Conclusion:* The Calcutta Medical Research Institute, Kolkata has been facing issues related to increasing unplanned discharges. The present study was aimed to understand, analyze, and improve the efficiency of discharge process in the hospital. The study helped in understanding the roles of each stakeholder in the process and the bottlenecks affecting the turnaround time of the discharge process. A thorough process mapping aided to identify the problems better. Accordingly, recommendations were given to reduce the TAT and to increase the overall efficiency of the discharge process.

*Keywords:* Discharge Process, Turnaround Time, Delay in Discharge, Final Summary

# **STUDY ON THE EFFICIENCY OF DISCHARGE PROCESS AT**

## **THE CALCUTTA MEDICAL RESEARCH INSTITUTE**

### *Introduction*

#### **Discharge process**

Hospitals initiate the discharge process for patients who can recover further in a domestic environment and no longer need to be kept under IP care.

Discharge process is a complex, lengthy procedure that involves the relieving of patient from a hospital setting who no longer requires inpatient care and can be sent to home with proper instructions and medications. It is a transition phase where an episode of treatment delivered to a patient by the health professionals and health care provider organization is formally concluded. The discharge process is considered to be the last contact between the hospital and the patient and hence it leaves a big imprint on the patient's mind. In this phase, all the details of the investigations undergone, and treatment received by the patient are recorded.

The discharge process must be efficiently carried out to improve patient satisfaction. This will in turn make the patients more likely to return to the hospital to seek treatment where they had experienced smooth discharge process. The admission and discharge processes can act as bottlenecks in many of the hospitals and thus adversely affect the efficiency of the hospital (Davies & Macaulay).

According to NABH, "the discharge process is defined as a procedure by which a patient is shifted out from the hospital with all concerned medical summaries ensuring stability. The discharge process is deemed to have started when the consultant formally approves discharge and ends with the patient leaving the clinical unit."

#### **Turnaround time (TAT)**

Turnaround time can be defined as the period of time needed to complete a particular task or process since the time it is formally demanded. It is used as a performance metric. To increase efficiency and customer satisfaction, the turnaround time must be reduced for various key processes in an organization.

Turnaround time in the context of discharge process can be defined as the time period beginning from the approval of discharge by the consultant till the patient leaves the clinical unit. It is calculated for a hospital to rule out the factors causing delay in the process. Such influencing factors must be controlled to make the discharge process more efficient so that the patients are relieved from the hospital at the earliest and the preoccupied bed can then be allotted to a new patient.

Decrease in the TAT of discharge process will help in minimizing unnecessary waiting time for the patients. This will improve patient satisfaction and patient footfall in the hospital. It will also have a positive impact on the revenue generation of the hospital indirectly by decreasing length of stay of patients and admitting new patients.

### **Types of Discharge**

- 1) *Planned Discharge*- Discharge is said to be planned when the consultant approves for the discharge of the patient a day or night before the discharge and gives a written consent for the same.
- 2) *Unplanned Discharge*- Discharge is said to be unplanned when the consultant declares the patient to be discharged at the time of his morning round on the same day of discharge.
- 3) *LAMA/ DAMA*- It is when the patient takes his discharge contrary to the consultant's recommendation or will of the attending physician.

### **LITERATURE REVIEW**

1. A study was conducted in 2019 in a multi-specialty hospital of Pune. The study was aimed to evaluate the discharge process of the hospital and to find out the mean time taken for the completion of discharge procedure. With the help of HIS, staff, and observation, the data of a total of 320 patients including 150 TPA and 170 cash patients was recorded. The results showed that the average time taken for completion of discharge process was 7 hours for TPA patients and 5 hours for cash patients. The reasons for this delay were deficient manpower, improper process flow and communication, problematic cashless process. Suggestions were given to reduce the amount of time required for discharge process such as avoidance of bulk discharges, prior intimation about patient's discharge and reducing the time taken by insurance companies (Pandit et al., 2019).
2. An observational study was conducted where a semi assembled set of questions was provided to the attendants of the patients comprising of the time taken in discharge process and the reasons behind any delay. It was observed that planned discharges required an average time of 250 minutes whereas an average of 255 minutes was required for discharged against medical advice cases. The results also showed that around 54% of the patients' relatives were dissatisfied and felt that delays were due to non-availability of resident doctors to prepare discharge summary. 23% of them considered that prolonged waiting time outside the MRD was the most prominent reason causing delay in discharge process. Suggestions to improve patient satisfaction and methods to reduce the time taken for discharge process were given. All concerned departments must be adequately staffed, hospital administration team must conduct a periodic time motion study and should also take necessary feedback from all the patients about discharge process and other ongoing services (Hamid et al.,2021).
3. A study was conducted at a multispecialty hospital located in Ludhiana on around 270 patients to assess the impact of late preparation of discharge summaries on the time taken for

completion of discharge process. The turnaround time was calculated for the time beginning from discharge intimation to the finalization of discharge summary by concerned doctor. The results showed that maximum cases were taking 3 to 5 hours' time between discharge intimation and finalization of summary thus proving to be the main reason behind delayed discharge process.

4. Mundodan JM, Sarala K, Narendranath V. A Study to Assess the Factors Contributing to Delay in Discharge Process in a Teaching Hospital. *Int J Res Foundation Hosp Healthc Adm* 2019; 7 (2):63-66.

Delayed discharge process is one of the main reasons for discontent among patients. A time motion study was conducted on 69 patients in a teaching hospital to study the issues impacting discharge process. The results showed that the average time taken for discharge process was 5 hours and 41 minutes. Only 13 patients (18.85%) were discharged within 180 minutes following the NABH standard time. The maximum delay was found to be occurring due to delay in discharge summary completion. The major loopholes identified were delayed discharge summary preparation, delay in picking chart from ward for billing, final bill clearance and final check out of the patients. Recommendations were given to reduce the time taken in each step of the discharge process: discharge summary can be prepared prior to confirmation of the discharge, updating of patients' files daily, case sheet can be sent to the billing office directly.

5. In 2018, a cross sectional study was conducted on 174 patients in a super specialty hospital in Siliguri, West Bengal by Ankit Singh. By using systemic random sampling technique, a sample of 174 insured patients was taken. It was found out from the results that the mean TAT for the discharge process was 374 minutes. The main reasons for delay were due to delay in the discharge summaries to finally reach in-house TPA department, and time taken in TPA approval.

## **RATIONALE**

The discharge of patients in hospitals is a complex process involving multiple stakeholders. After carrying out the literature review, it is understood that factors contributing to delay in discharge process were different for different hospitals. The Calcutta Medical Research Institute, Kolkata has also been facing delays and complications related to the discharge process. Hence, a study was conducted to observe and to record TAT for various steps involved in discharge process, and to find out the major factors causing delay in the process which directly impact the operational efficiency of hospital thus leading to patient dissatisfaction.

## **RESEARCH QUESTION**

How efficient is the discharge process in CMRI, Kolkata?

What are the reasons behind increased TAT of discharge process?

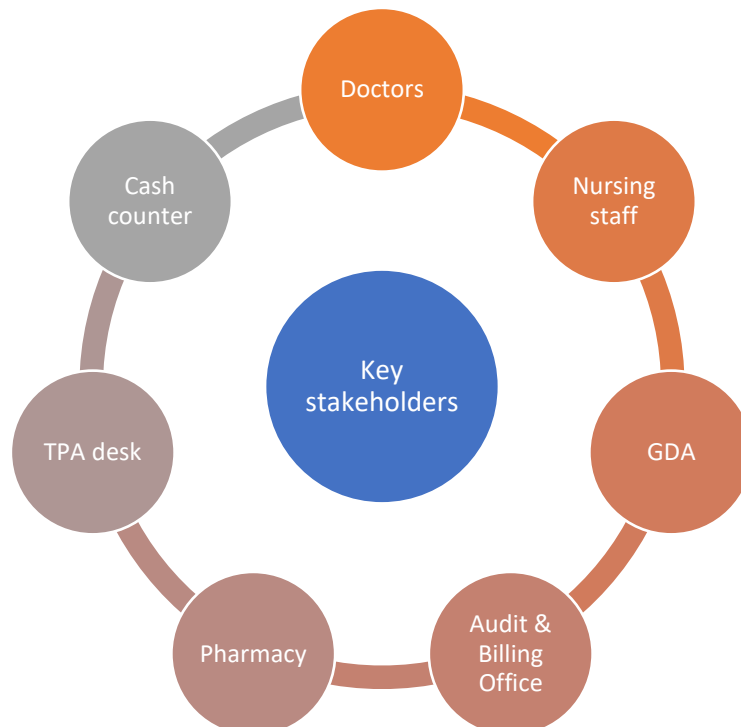
## **AIMS & OBJECTIVES**

- To study the process flow of discharge procedure
- To identify causes of delay in discharge process
- To suggest measures to reduce the TAT of discharge process

## **RESEARCH METHODOLOGY**

- Study area- Inpatient wards (IP floors- 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>) of CMRI, Kolkata
- Study design- Descriptive Cross-sectional study
- Duration of study- 5 weeks
- Sampling method- Convenience sampling
- Sample size- 136 patients (including cash, TPA, Govt/PSU)
- Data type- Quantitative
- Inclusion criteria- Cash and TPA patients of 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup> IP wards
- Exclusion criteria- Day care patients, patients admitted in ICU.
- Source of data- Primary- self-observation, interaction with nursing staff & billing personnel  
Secondary- Hospital Information System
- Data Analysis- Analyzed using MS Excel and presented graphically (through pie charts, bar graphs). Fish bone diagram used to perform root cause analysis.

## **INVOLVED STAKEHOLDERS IN DISCHARGE PROCESS**



## **PAYOR CATEGORY**

- Cash
- TPA
- Corporate
- Govt/ PSU

## **DISCHARGE PROCESS FLOW AT CMRI**

Probable discharge order is given by consultant during evening round one day prior to confirmed discharge



Rough discharge summary is written by the RMO



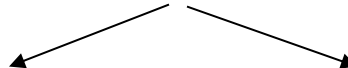
Typists in discharge pool prepare the discharge summary and then it is sent to respective IP wards



Final approval for discharge given by consultant on morning round



Discharge confirmed



Consultant checks the discharge summary and makes corrections if required

Refund of drugs initiated by nursing staff through HIS



Summary finalization

Pharmacy clearance



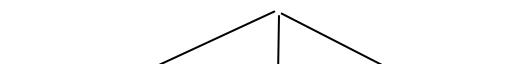
Investigation reports checked if pending



Patient's file is marked for discharge by the nursing staff



GDA takes the file, investigation reports, DFC card for Auditing and Billing

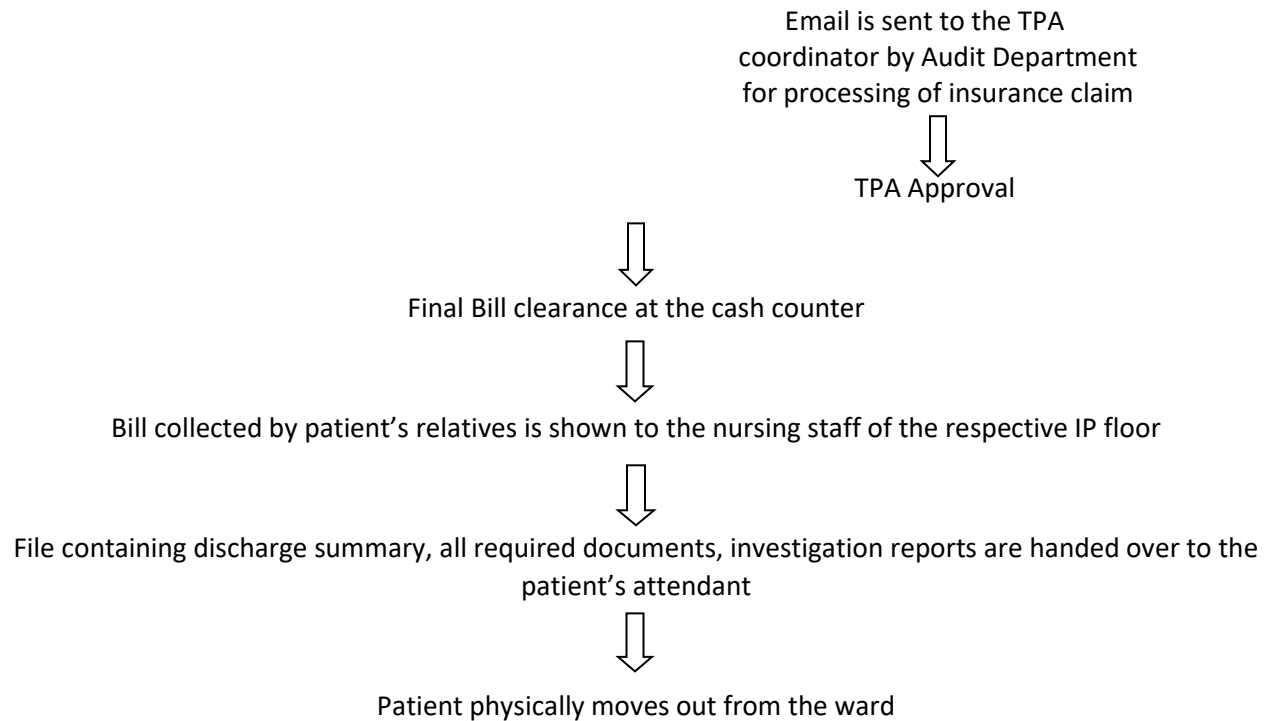


Cash patient

Corporate patient

TPA patient





### **DATA ANALYSIS AND INTERPRETATION**

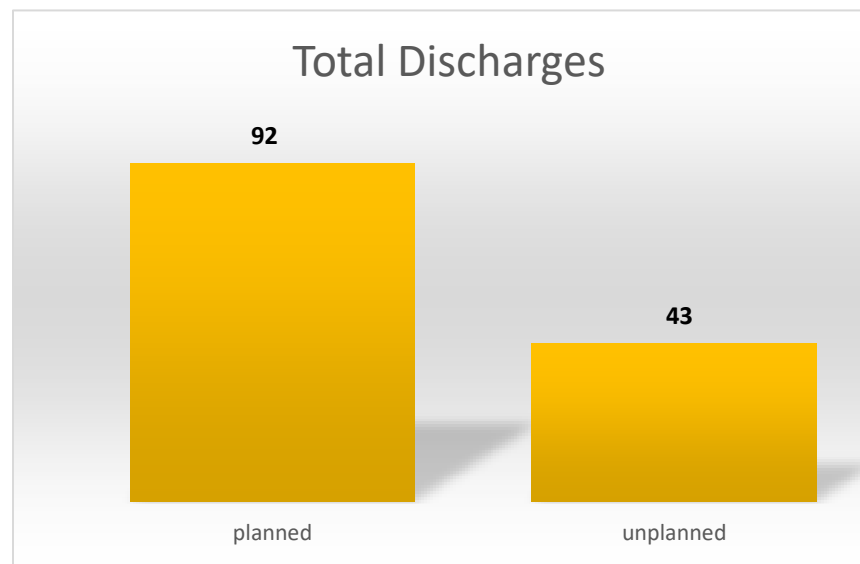


Fig 1.

Interpretation: The above chart shows that out of 136 discharges, 67.6% discharges were planned whereas 31.6% of the discharges were unplanned.

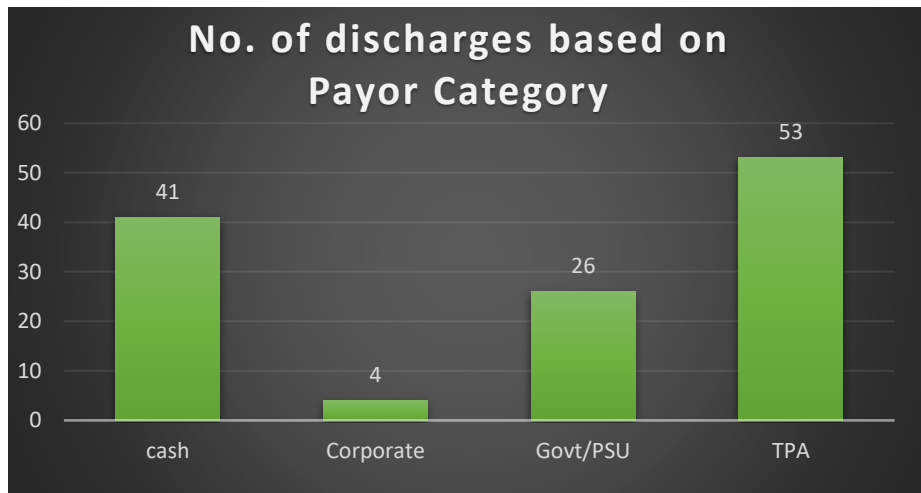


Fig 2.

Interpretation: The above chart shows that out of 136 discharges, 32.35% made payment in cash, 44.11% through TPA. The rest of 17.7% were corporate patients and 5.9% fell under the category of Govt/PSU.

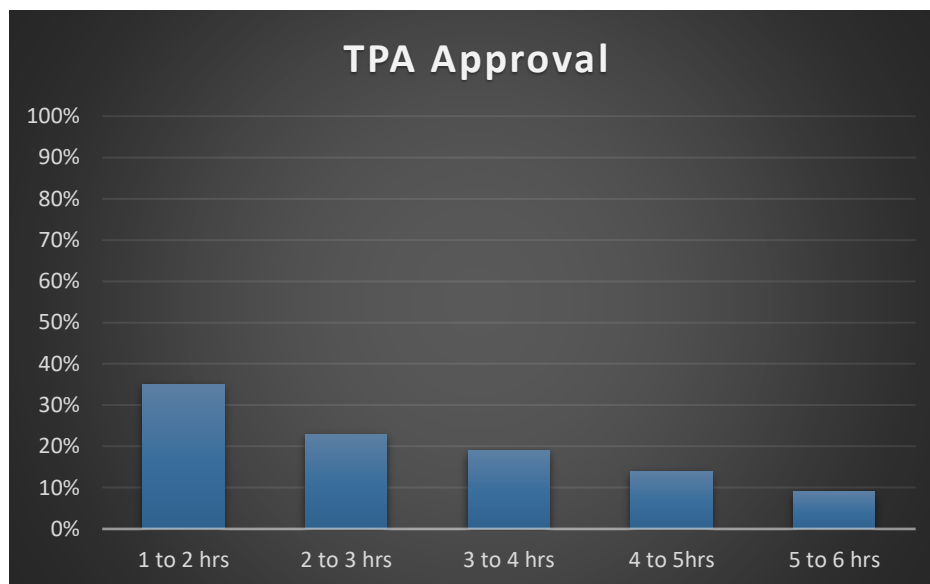


Fig 3.

Interpretation: The time taken for TPA Approval was 1-2hrs for 35% of the patients, 2 to 3hrs for 23% patients, 3-4hours for 19% patients, 4-5hrs for 14% patients and 5-6% for 9% of the patients.

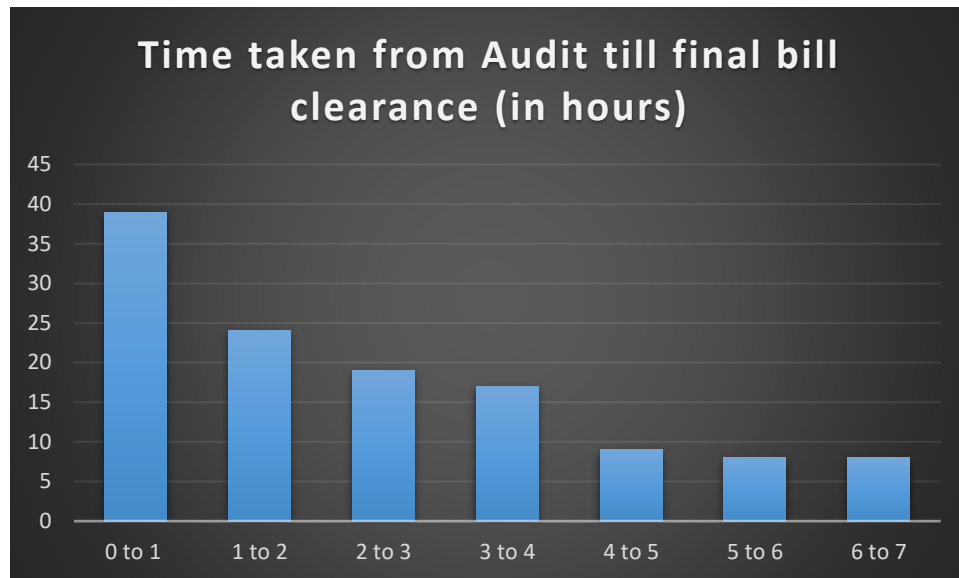


Fig 4.

Interpretation: The above chart shows that it took less than 1 hour time for final bill clearance after Audit and Billing for 39% cases, 1 to 2 hours for 24% cases, 2 to 3 hours for 19% cases, 3 to 4 hours for 17% cases, 4 to 5 hours for 9% cases and more than 6 hours for 8% of the cases.

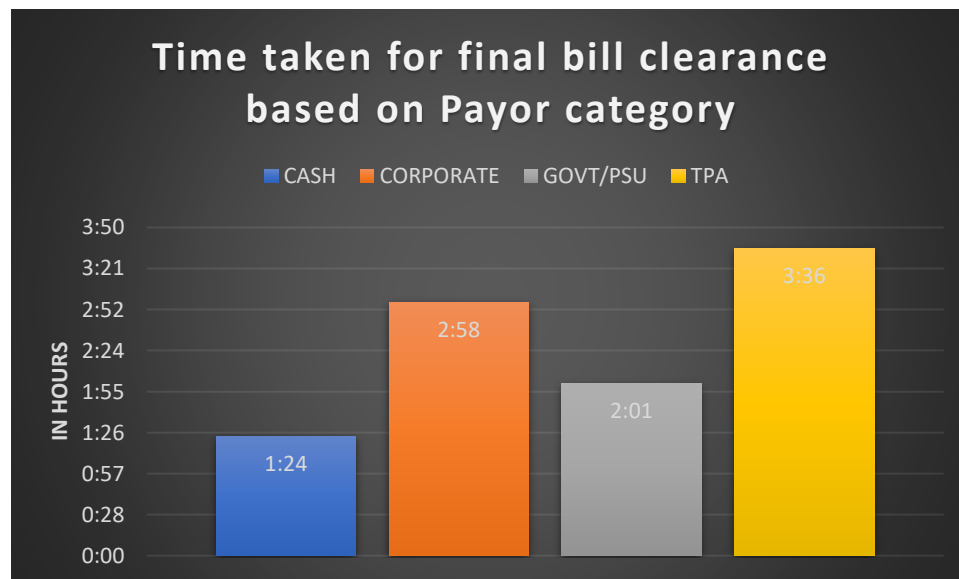


Fig 5.

Interpretation: The chart shows that the average time taken for final bill clearance is 1 hour 24 minutes for cash patients, 2 hours 58 minutes for corporate patients, 2 hours and 1 minute for Govt/PSU patients and 3 hours and 36 minutes for TPA patients. Thus, it can be inferred that maximum time for bill clearance is faced by TPA patients.

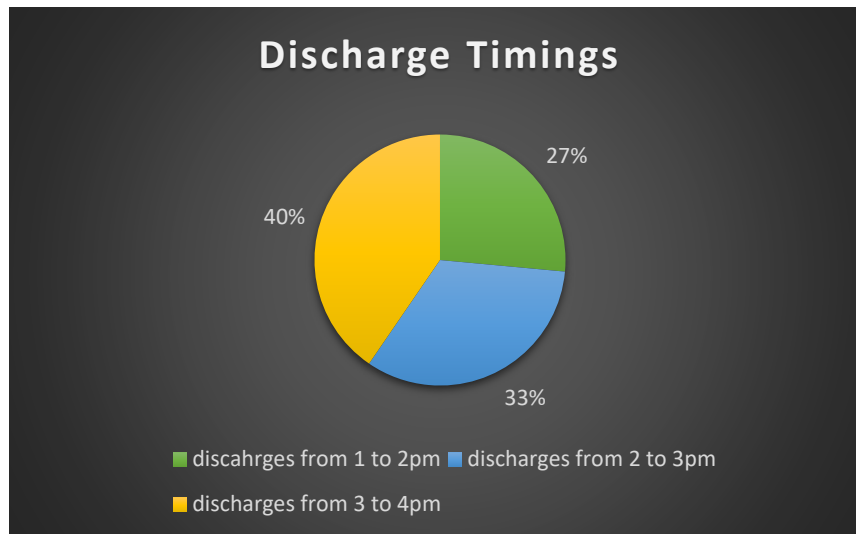


Fig 6.

Interpretation: The above chart shows that 40.4% of the discharges took place from 1 to 2pm, 33.1% discharges from 2 to 3pm and 26.5% of the discharges from 3 to 4pm and beyond.

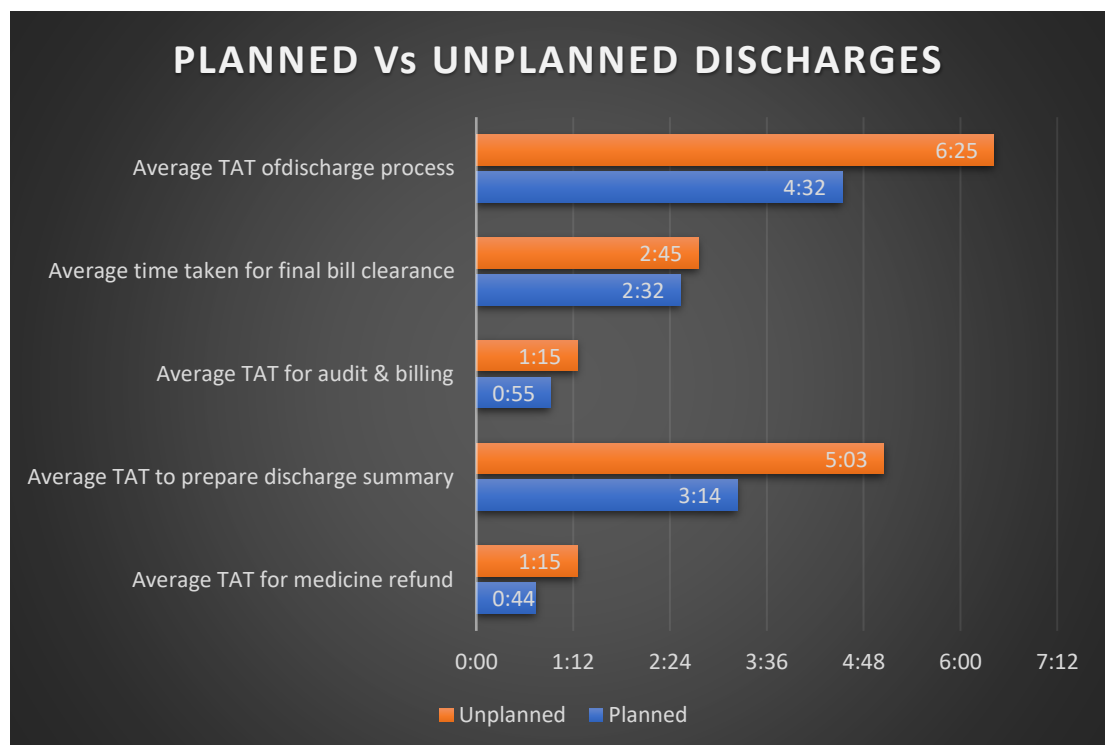


Fig 6.

Interpretation: The chart shows that the average TAT of discharge process for planned discharges is 4 hours 32 minutes and 6 hours 25 minutes for unplanned discharges. However, in both the cases the TAT exceeded the benchmark time of 180 mins.

The average TAT for final bill clearance in case of planned discharges is 2hrs. 32 mins. and for unplanned discharges it is 2 hrs. 45mins. No significant difference is noted between the TATs.

The average TAT to prepare discharge summary is 3 hours 14 minutes for planned discharges and 5 hours 3 minutes for unplanned discharges. Thus, it is evident that late discharge summary preparation could be one of the reasons for increased TAT in case of unplanned discharges.

The average TAT for pharmacy clearance is 44 minutes for planned discharges and 1 hour 15 minutes for unplanned discharges.

### FISH BONE ANALYSIS

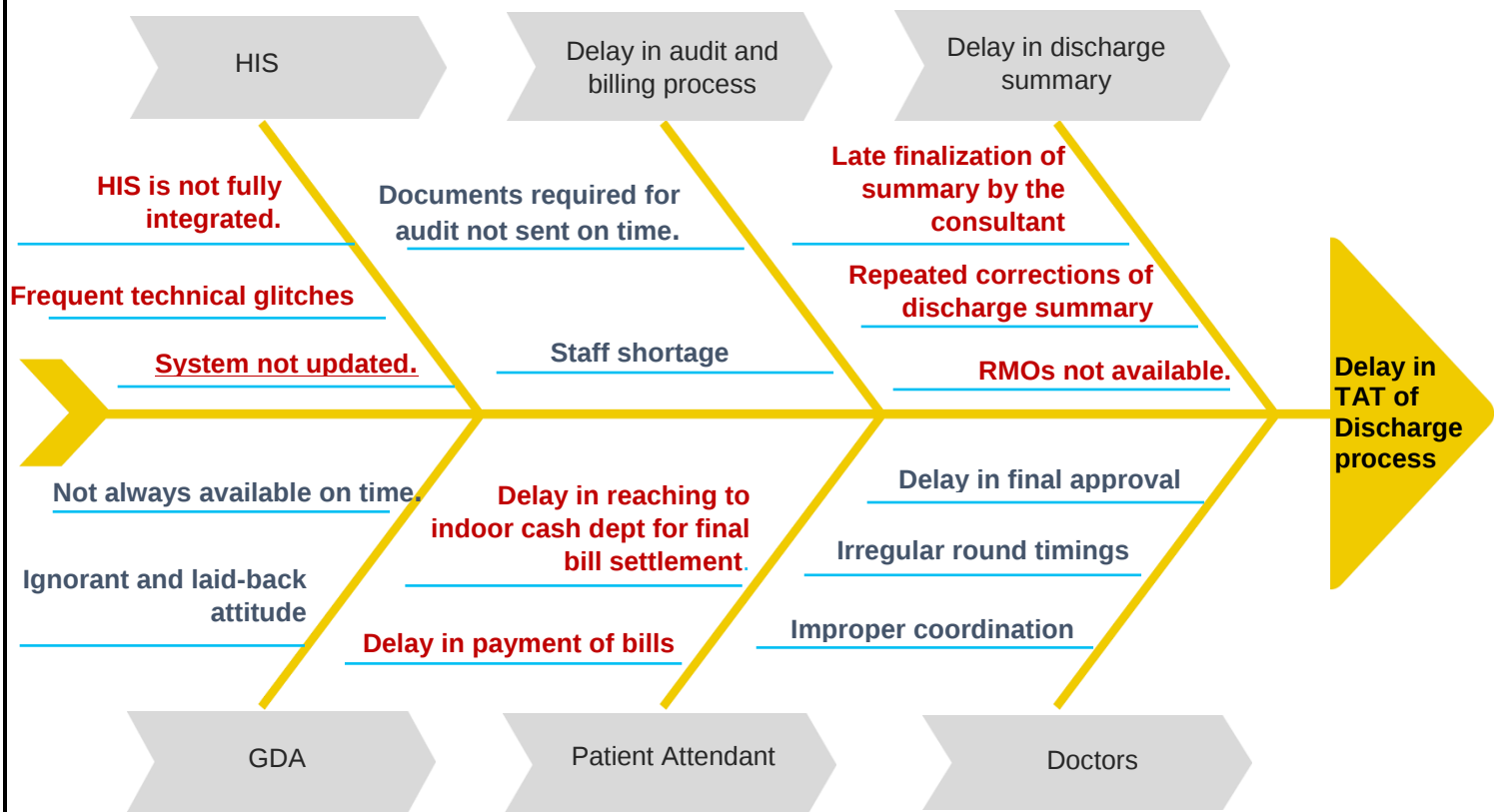


Fig 7. Root cause analysis diagram of Delay in TAT of Discharge process

## **DISCUSSION AND FINDINGS**

- ✓ By analyzing the collected data, it has been observed that the average TAT for planned cash patients was 228 minutes and for unplanned cash patients it was 280 minutes. The average TAT for planned TPA patients was 300 minutes and that for unplanned TPA patients was 440 minutes.
- ✓ It was observed that discharge summaries were not prepared on time. Consultants took excessive time to finalize the summaries. The frequency of corrections of the summaries is also of much concern. Many of the discharge summaries were sent for correction thrice which must have contributed to delaying TAT of discharge process.
- ✓ Improper coordination between the doctors and nursing staff is another reason for inefficient discharge process.
- ✓ 'After round discharge' cases are delayed the most in the hospital. It is because the round timings of the consultants are not fixed. The consultants coming after 12 pm are responsible for delaying the discharge process leading to increased TAT and patient dissatisfaction.
- ✓ The Audit department faces IT challenges frequently. Due to slow working of the software, the workflow of the department is hampered. GDAs are also not available to carry the discharge files back to the respective wards.
- ✓ Unplanned discharges consumed more time due to increased TAT at each step of the discharge process.
- ✓ The hospital runs on GDA dependent system. This factor is of high importance as most of the steps of discharge process are associated with GDA. It was observed that the GDAs were not available on time to carry out various steps of the discharge process.

## **CONCLUSION**

Delay in the discharge process has become one of the most problematic areas of the hospitals and hospital administrators to deal with. Since it is considered to be the final interaction of patient with the hospital, the process flow must be run smoothly to avoid causing any inconvenience to the patient.

The Calcutta Medical Research Institute, Kolkata was also facing the issues related to increasing unplanned discharges. The present study was aimed to understand, analyze and improve the efficiency of discharge process in the hospital. The study helped in understanding the roles of each stakeholder in the process and the bottlenecks affecting the turnaround time of the process. A thorough process mapping aided to identify the problems better. Accordingly, recommendations were given to reduce the TAT and to increase the overall efficiency of the discharge process.

### **RECOMMENDATIONS**

- ✓ The round timing for consultants must be fixed from 8 to 10 AM.
- ✓ Unplanned discharges must be reduced to minimum to avoid the risk of readmission of the patients with same diagnosis.
- ✓ A discharge tracking queue can be used through HIS to track the discharge process of all the patients. Any of the cases taking more time or exceeding the average TAT can be displayed in the system with a 'discharge alert'.
- ✓ A dedicated team of service care coordinators can be given the responsibility to monitor the discharge process. Delays or conflicts can be resolved by the team in coordination with all the stakeholders of the discharge process.
- ✓ All the pending reports, investigations, services, and the documents required for billing must be prepared a day before discharge to avoid unnecessary delay.
- ✓ Feedback related to the experience of discharge process must be taken from the patients. Their pain areas must be asked. Working on such deficient areas will improve both patient satisfaction as well as efficiency of the discharge process.
- ✓ Refund of medicines must be initiated a day before the discharge. This will help in reducing the TAT for pharmacy clearance.

# PROJECT REPORT 2

## **STUDY ON UTILIZATION AND TURNAROUND TIME OF OPERATION THEATRE**

### **ABSTRACT**

*Background:* Optimum utilization of OT time has always been the prime concern for healthcare providers. It is essential as heavy costs are incurred to run this unit of the hospital. Being a capital and resource intense unit of the hospital, OT requires maximum efficiency and utilization for optimum cost benefits. To achieve long-term benefits, the OT team must work in a cost-efficient manner to maximize productivity at all steps. The present study was conducted on 350 patients in a multispecialty hospital of Kolkata to analyze the current position of OT utilization, to identify the bottlenecks that contribute to increase in turnaround time and to suggest recommendations for its reduction.

*Methods:* According to the literature review done, the main reasons for delay in TAT of OT were found to be due to late shifting of patients from the wards and other administrative causes. The reasons responsible for cancellation of cases were insufficiency of operating rooms and unfavorable medical condition of patients. The most prominent reason for underutilization was deficient manpower.

The data collected for the study were analyzed using MS Excel through bar charts, pie charts and fish bone diagram.

*Results:* The mean TAT of OT was calculated to be 58.4 minutes and the OT Cancellation rate was 4%. The mean time for which patients are kept in holding area (pre-operative) was 42 minutes and the mean time for which patients are kept in post-operative recovery room was 39 minutes. Surgical and Anesthetic consent forms were often found incomplete. Patients' relatives did not arrive on time, leading to delay of the surgery. Surgeons arrived late for the surgeries and caused delay in first case starting time. The main intervention included incorporating of a transparent platform for the surgeons to book OT rooms with the help of HIS.

*Conclusion:* The low OT utilization rate and high turnaround time indicate that the hospital needs to focus more on enhancing the efficiency and productivity of OT by avoiding first case delays, reducing non-productive time and utilizing technical and human resources optimally.

The study helped in understanding the main causes for the increased turnaround time of OT. The overall utilization rate was also calculated to evaluate the efficiency of OT. Accordingly, recommendations were given to reduce the TAT and to optimize the utilization of OT.

*Keywords:* Operation Theatre (OT), Operation Theatre Utilization, Turnaround Time.

# **STUDY ON UTILIZATION AND TURNAROUND TIME OF**

## **OPERATION THEATRE**

### *Introduction*

An operating room or theatre is a vital part of the hospital where invasive, surgical procedures are performed under strict aseptic environment. Operation theatre has an important impact on patient's clinical pathways wherein high quality, safe and consistent care is pivotal (Cima et al., 2011)

The operation theatre complex in a hospital consumes around 9 to 10 percent of the total hospital budget expenditure and more than 40 percent of the hospital's annual budget. Thus, Operation theatres are the most expensive component as well as correspondingly the highest revenue generating part of the hospital facility. Being a capital and resource intense unit of the hospital, OT requires maximum efficiency and utilization for optimum cost benefits. The operation theatre can become a solid source of revenue for the hospital, if run efficiently. On the other hand, mismanagement and underutilization of the resources will lead to huge operational and financial drain.

In today's time, maximum hospital admissions are due to surgical or procedural interventions. The demand for surgical treatments has been increasing since a long time, but the efficiency and utilization of the surgical suites have not improved thus affecting the margins in surgical business. In such times of increasing demand for surgical services, failure to improve theatre output will lead to increased waiting lists and prolonged suffering of the patients. A highly efficient OT with improved theatre output will help in reducing waiting time and also in improving patient satisfaction.

According to Donham et al., OT utilization is defined as the quotient of hours of OT time used during elective resource hours and the total number of elective hours available. Streamlining of the processes and steps in OT will not only help in increasing productivity but also in curtailing the costs incurred. Analysis of operating room utilization will aid in assessing the current workload, optimizing facility functioning and scheduling of cases.

The Turnaround time (TAT) of Operating theatre (OT) has a broad and significant impact on hospital administrators, health care services and patients (Hoffman, 2018). It is defined as the duration in which the last patient is wheeled out of the OT room till the next patient is wheeled in for the next surgery. Factors related to operational layout, accessibility of equipment, personnel, scheduling of cases are considered to be inversely affecting TAT.

The TAT can vary from 5 to 60 minutes depending upon the time spent in various tasks like counting of used instruments, disinfecting and cleansing of the OT room, and arranging equipment for the next surgery.

## **LITERATURE REVIEW**

Efficiency of OT depends on well-structured planning and scheduling of cases including emergencies at a reasonable time.

1. **SHRADDHA VIDYADHAR NAIK, R.H.S.**

A prospective study was conducted in rural Maharashtra in a tertiary care teaching hospital with 1000 beds for 2 months. It was observed that TAT of OT was highest for Obstetrics followed by the departments of general surgery and oncosurgery. General surgery had the maximum case delays whereas the least were found in Ophthalmology. The main reason for delay was due to late shifting of patients from the wards and other administrative causes. The prominent reasons responsible for cancellation of cases were insufficiency of operating rooms and unfavorable medical condition of patients. It was suggested that the causes of delays and cancellations can be avoided with proper planning prior to surgeries, better optimization of resources and patients, reducing communication gaps among surgeons, anesthesiologist, and nursing team.

2. A study was conducted in 2018 in the operation theatre complex of a tertiary care hospital. The results showed that the utilization time of existing OT complex was 40.37%. The highest possible OT utilization according to the global standards ranges from about 85% to 90%. Thus, a gap of 45-50% was present in the OT utilization. It was suggested that these gaps can be fulfilled by scheduling TPA cases properly, starting cases on time, increasing the number of multi-purpose trolleys. The TAT of OT for the hospital came out to be 3 hours and 37 minutes. The TAT can be reduced by reducing time spent by patient in pre op and post op areas.
3. D. C. Haiart, et al., investigated utilization of OT in their hospital and concluded that there was underutilization of the OT of the same rate as stated by the National Audit Office, i.e., 50-60%. The results showed that 25% of the theatre sessions were not being allocated for use, 23% of cancelled cases were under general surgery, and a further 23% of theatre time was not utilized for the operating cases. The most prominent reason for underutilization was deficient manpower.
4. F. A. Jan, et al., suggested that the OT utilization can be maximized by reducing first case delays, by anesthetizing the patient in anesthesia room rather than in OT itself, and by placing all sterile instruments in the lay-up room in place of operating room.

## **RATIONALE**

Healthcare providers all around the world are under enormous pressure pertaining to costs and clinical care outcomes. Due to the financial risk associated with unlikely outcomes, the healthcare organizations are now adopting cost-effective procedures that have positive impacts on both quality and costs. Thus, there is an utmost need of using the existing resources with maximum efficiency.

Optimum utilization of OT time has always been the prime concern for healthcare providers. It is essential as heavy costs are incurred to run this unit of the hospital. In the era of rapid technological advances, minimally invasive surgeries have become common due to the emergence of robotic technology and advanced tools. Use of such high-cost equipment, discounted service charge, standardized payment based on diagnosis-related group and limited administration costs all together contribute to reduced margins in the surgical business. The OT unit is thus set aside by many hospitals as a place to minimize costs.

To achieve long-term benefits, the OT team must work in a cost-efficient manner to maximize productivity at all steps. This requires a reliable source of data to guide all the stakeholders including administrators, nursing staff, surgeons. Maintaining important records, analysis of the recorded data will be advantageous for both the OT team as well as the management to identify the flaws in the system so that proper action can be taken on time. For efficient functioning of OT, specific protocols must be established and strict adherence to such regulations must be continued. Making investment on new technologies and tools will not help in gaining efficiency if the correct procedure for each step is not followed.

Thus, the study is carried out to analyze the current position of OT utilization, to identify the bottlenecks that contribute to increase in turnaround time and to suggest recommendations for its reduction.

### **OBJECTIVES AND AIMS**

- To assess the overall utilization and TAT of OT
- To identify bottlenecks causing delay in surgeries
- To suggest measures to improve utilization of OT

### **RESEARCH QUESTION**

What are the factors affecting the turnaround time and utilization of Operation Theatre?

### **RESEARCH METHODOLOGY**

- Study area- OT Complex located on 2<sup>nd</sup> floor of CMRI, Kolkata
- Study design- Descriptive Cross-sectional study
- Duration of study- 4 weeks
- Sampling method- Convenience sampling
- Sample size- 350 elective surgical cases, out of which 27 cases were cancelled
- Data type- Quantitative
- Source of data- Primary and Secondary
- Mode of data collection- The primary data was collected by observing the routine surgeries performed in the 9 operation theatre units from 7<sup>th</sup> June to 26<sup>th</sup> June 2021 (9AM – 5:30PM).

Data was collected based on the following headings:

| Sl No. | Bed No. | OT No. | Scheduled time of surgery | Time spent in holding area or pre-operative area | Wheel-in time | Induction begin time | Incision In-time | Wheel-out time | Time spent in post-operative recovery area |
|--------|---------|--------|---------------------------|--------------------------------------------------|---------------|----------------------|------------------|----------------|--------------------------------------------|
|        |         |        |                           |                                                  |               |                      |                  |                |                                            |

Secondary data comprising of patient's name, surgical procedure, surgeon's name, anesthetist's name was collected from the OT records.

▪ Study tools-

- ✓ Data analysis was done using MS Excel to calculate delay rate, cancellation rate, average TAT and OT Utilization

- ✓ OT Utilization was calculated by using the formula:

$$\frac{\text{Total hours of cases performed}}{\text{Total hours of OR time allocated}} \times 100$$

- ✓ OT cancellation rate was calculated by using the formula:

$$\frac{\text{Total number of cases cancelled during the study}}{\text{Sample size}} \times 100$$

- ✓ Fishbone diagram was used to perform root cause analysis

### **BRIEF DESCRIPTION OF OT COMPLEX UNDER STUDY**

The Operation theatre suite at The Calcutta Medical Research Institute, Kolkata is located on the second floor. The OT complex comprises of 10 OT units out of which, OT 6 and 7 are dedicated for Orthopedic, Neurology, Nephrology and OT 1,8 for Urology. The OT complex includes:

- 9 OT units
- Central Sterile Store Department
- Disposal zone
- OT Office
- OT Pharmacy
- Pre-operative and post-operative recovery room
- Patient holding area
- Surgeon's lounge

The OTs are equipped with state-of-the-art technology and equipment to carry out various minor, major and emergency surgical cases. HEPA filters are installed in the OTs along with Medical gas supply system.

The OT manager oversees the whole workflow in OT and helps in smooth running of all the OT procedures. The responsibilities of the OT manager mainly include scheduling of cases, coordinating with surgeons, OT technicians and nursing staff, monitoring the surgeries performed and resolving conflicts.

## **DEFINITIONS**

***Scheduled time-*** It is the time that was planned for the patient to be wheeled in the OT room. Scheduled time is planned by the OT manager in advance in coordination with the concerned surgeon and checking time availability. The probable time by which the surgeries will be completed is also mentioned.

***Pre-operative time-*** The time gap between the time when the patient enters the OT complex till the patient is wheeled-in the OT room.

***Wheel-in time-*** It is the time when the patient is shifted inside or wheeled-in the OT room for initiation of surgical procedure.

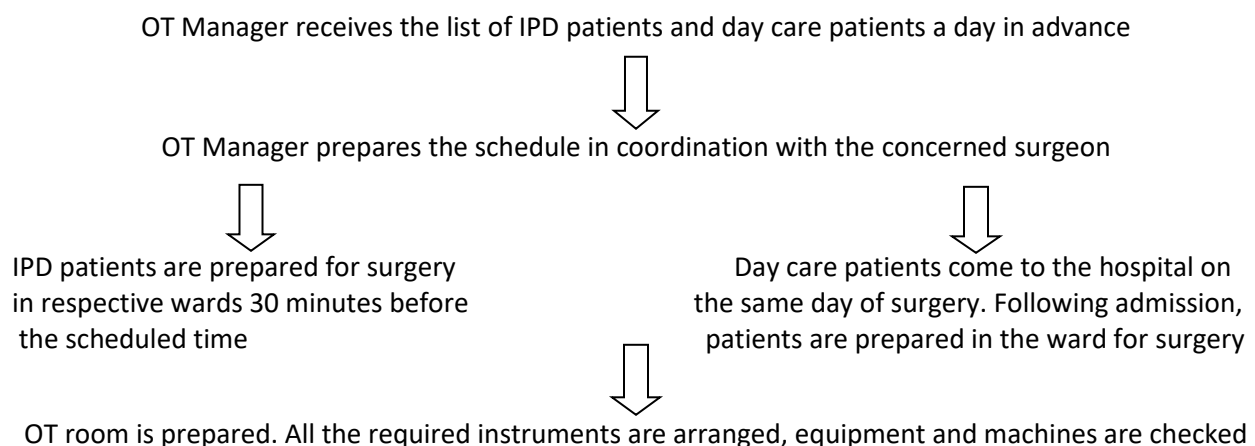
***Induction begin time-*** It is the time when the Anesthetist induces the patient with anesthesia.

***Incision in-time-*** It is the time when the Surgeon gives incision on the patient's skin to initiate the surgical procedure.

***Wheel-out time-*** It is when the patient is shifted out of the OT room after completion of surgery.

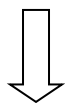
***Post-operative recovery time-*** It is the time for which the patient is kept under observation in the post-operative recovery room till the time the patient is shifted to the respective ward or ICU.

### **OT Process Flow**

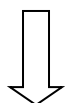




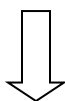
After the arrival of patient's relatives and getting bill clearance, patient is shifted to the OT complex accompanied by the assigned nursing staff and GDA



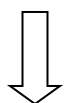
OT nursing staff checks consent forms including Preadnestic consent (PAC), surgical consent, perioperative check list is filled, medications are checked



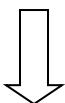
Patient is taken to the OT room and then shifted to the OT trolley with high precaution



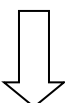
Patient is induced with anesthesia depending upon the type of surgery



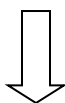
Surgery is performed



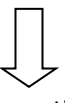
Patient is shifted to post-operative recovery room



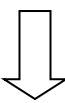
Used instruments are counted and sent to C.S.S.D, housekeeping team is informed to clean the OT room



Surgeons, anesthetists, nursing staff fill the required documents of the patient



Nursing staff informs the respective ward to take the patient



Assigned nursing staff arrives and patient is shifted back to ward or ICU

## DATA ANALYSIS AND INTERPRETATION

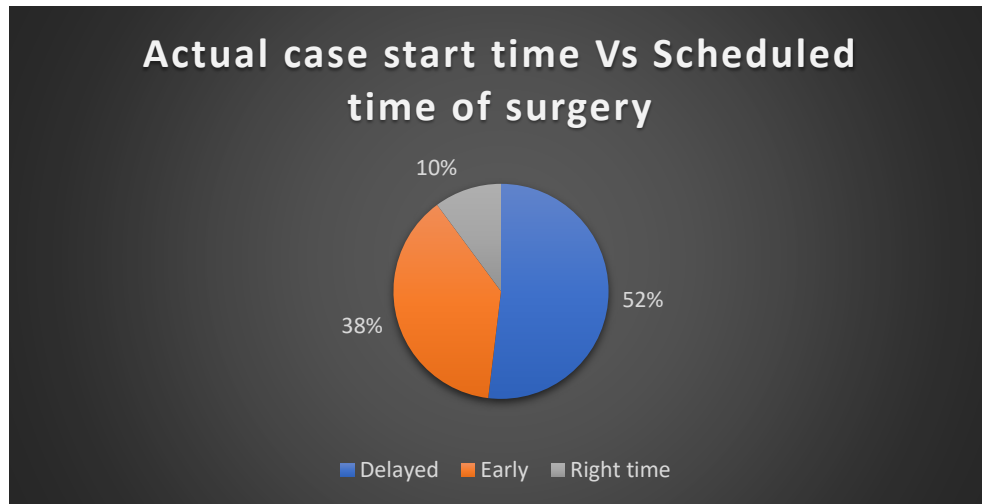


Fig 8.

Interpretation: The above pie chart shows that around 52% of the surgeries were delayed i.e., they were started after the given scheduled time. 38% cases were started before the scheduled time and 10% cases were started at the right time.

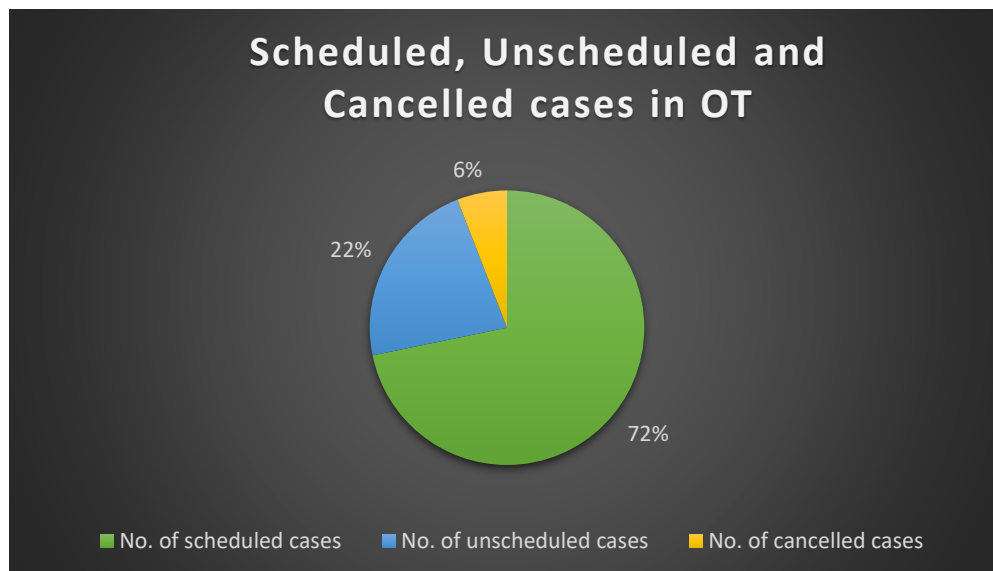


Fig 9.

Interpretation: The above pie chart shows that 72% of the cases were scheduled, 22% cases were unscheduled (add-ons and emergency cases), and 7.71% cases were cancelled.

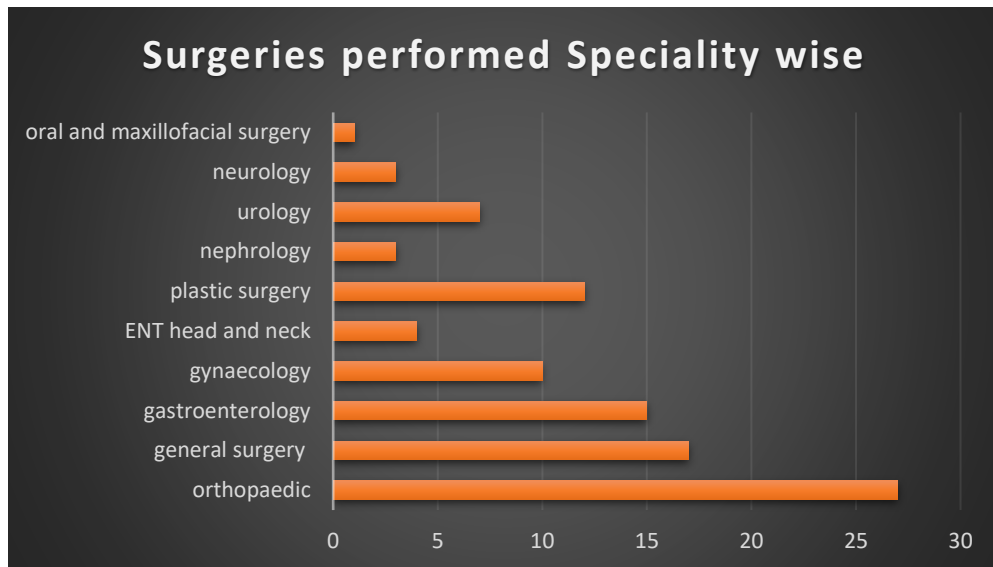


Fig 10.

Interpretation: The above graph shows that 27% of the surgeries were of Orthopedic specialty, 17% surgeries of General Surgery, 15% surgeries of Gastroenterology, 10% surgeries of ENT head & neck, 12% surgeries of Plastic surgery, 3% surgeries of Nephrology, 7% surgeries of Urology, 3% surgeries of Neurology and 1% surgeries of Oral and Maxillofacial Department.

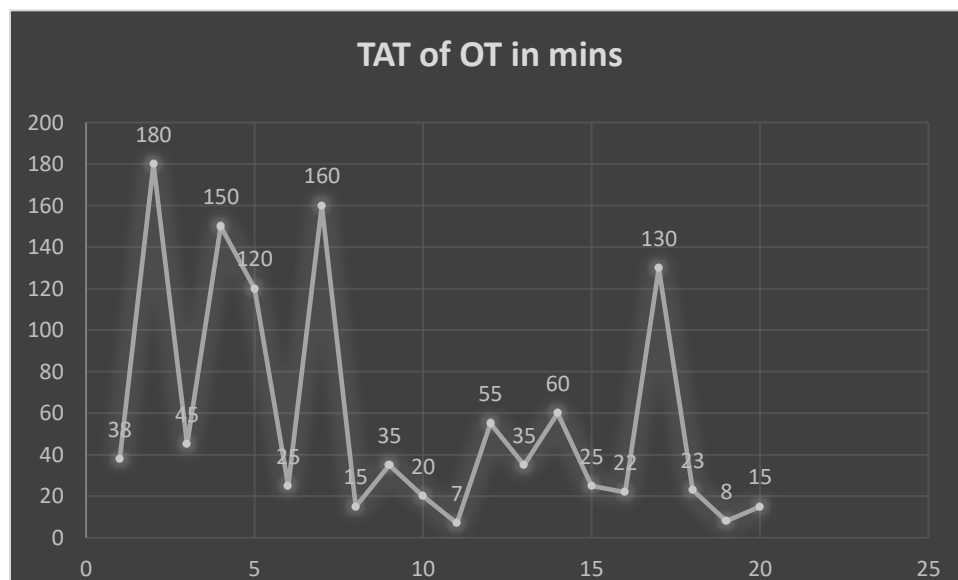


Fig 11.

Interpretation: The above graph shows that the average TAT of the OT is 54.8 minutes. The highest TAT being 180 minutes and the least being 7 minutes.

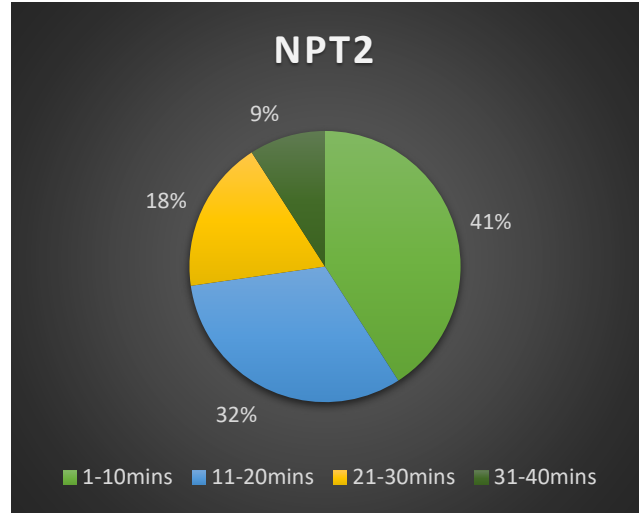
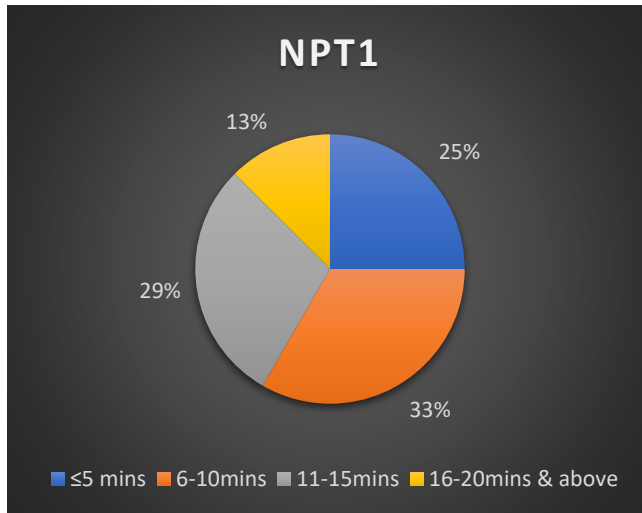


Fig 12 and 13.

Interpretation: NPT1: Nonproductive time  $T1 = (\text{Induction begin time}) - (\text{Wheel-in time of patient in OR})$

NPT2: Nonproductive time  $T2 = (\text{Incision in-time}) - (\text{Induction end time})$

From Fig 12., it can be inferred that the maximum number of cases had NPT1 of 6-10 minutes whereas the lowest number of cases had NPT1 of 16-20 minutes.

From Fig 13., it can be inferred that maximum number of cases had NPT2 of 1-10 minutes and the least number of cases had NPT2 of 31-40 minutes.

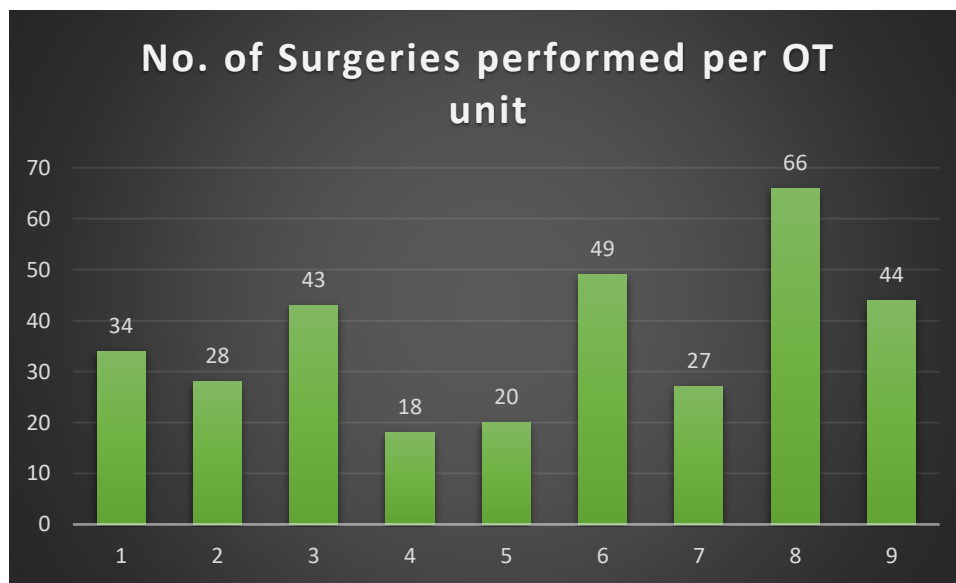


Fig 14.

Interpretation: The above chart shows that maximum number of surgeries were done in OT 8 and the least number of surgeries were performed in OT 4.

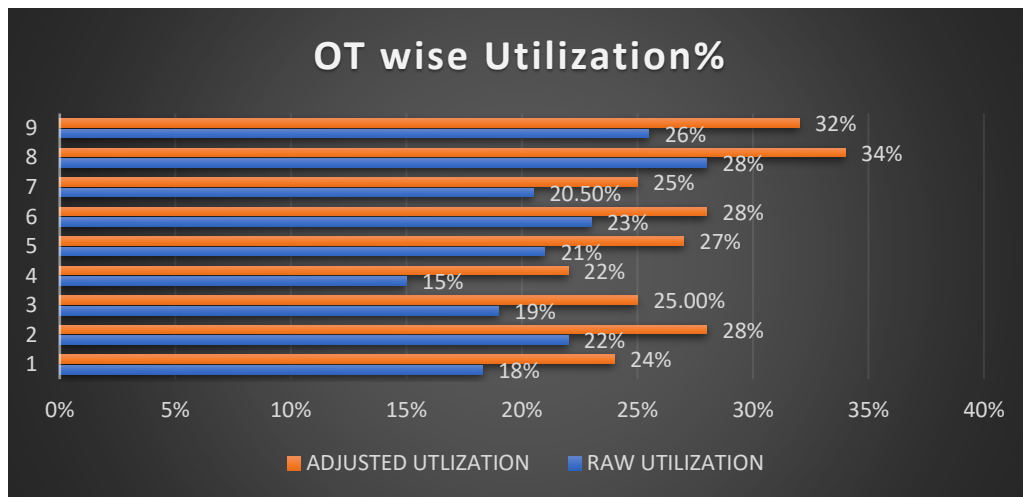
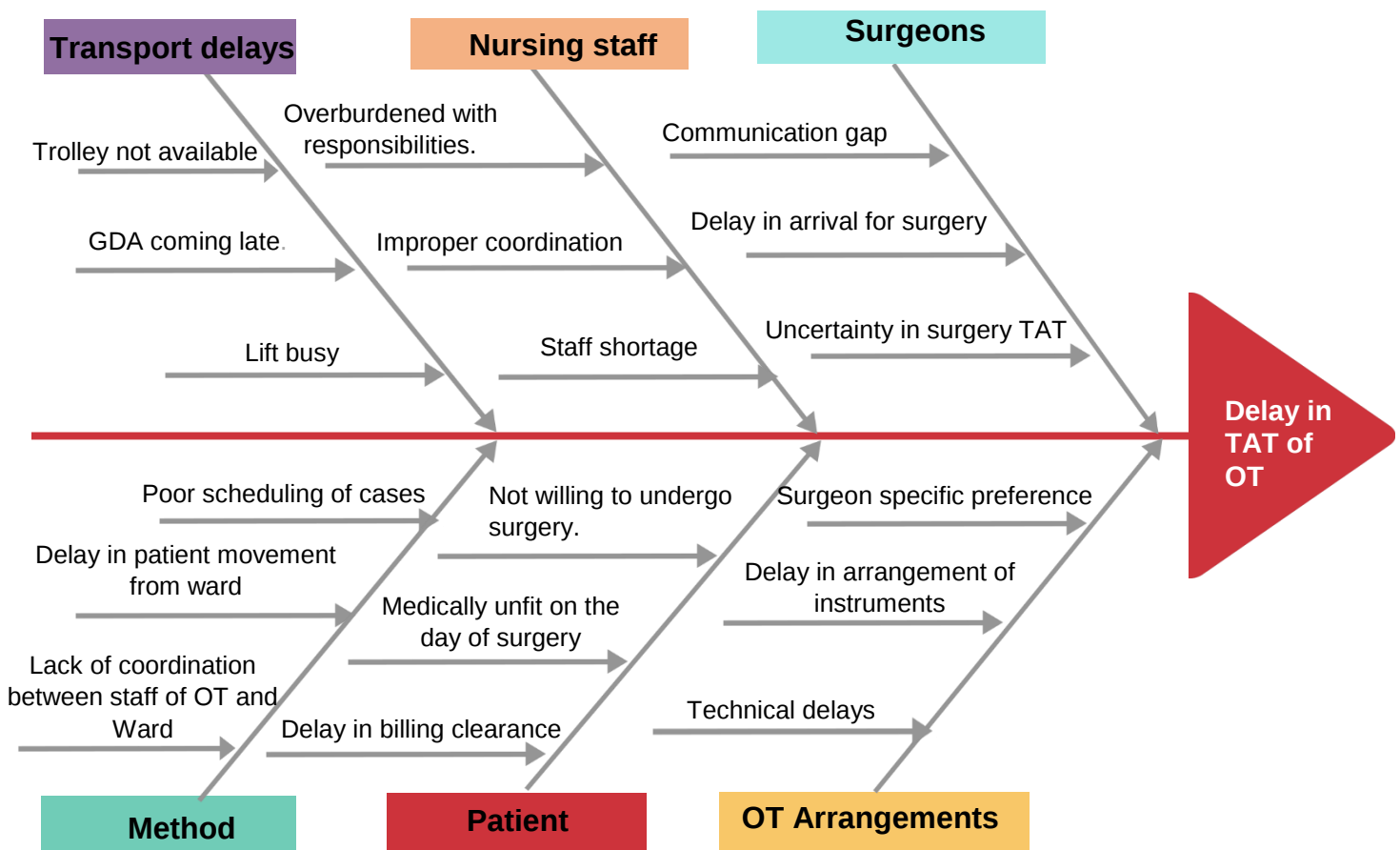


Fig. 15

Interpretation: The above chart shows the raw and adjusted utilization rates of each OT Unit. The average raw utilization rate was found to be 20.3%, and the average adjusted utilization rate was calculated to be 32.4%. OT 8 had the highest raw utilization rate of 28%, whereas OT 4 had the lowest raw utilization of around 15%.

### FISHBONE ANALYSIS, Fig 16.



## **DISCUSSION AND FINDINGS**

- Mean OT Utilization rate- 26.35%

Time taken for actual surgery- 59.7%

Time taken for supportive services- 40.29%

The OT Utilization rate is quite low compared to the standard of 75% utilization rate. Thus, there is a gap of 48.65% in the utilization rate. The main reason behind this underutilization of OT is drop in the surgery cases due to Covid pandemic.

- Mean TAT of OT- 58.4 minutes
- OT Cancellation rate= 7.71%
- Mean time for which patients are kept in holding area (pre-operative)- 42 minutes  
Mean time for which patients are kept in post-operative recovery room- 39 minutes
- Surgeries performed after 5 PM face maximum challenges due to unavailability of nursing staff, OT technicians. Improper distribution of nurses in each OT adds more to the problem. The main reason behind this is staff shortage.
- Surgeons arrive late for the surgeries and cause delay in first case starting time.
- Cancellation of OT cases are not updated by the OT manager on time. The concerned surgeon is not informed about the cancellation. Moreover, this was the main cause behind frustration of the surgeons as they had arrived on time to perform the surgery without having informed about the cancellation.
- The surgeons at CMRI book the OT rooms prior to the day of surgery through Telephonic booking. It creates conflicts and difficulty in proper scheduling of cases.
- Surgical and Anesthetic consent forms were often found incomplete.
- Patients' relatives did not arrive on time, leading to delay of the surgery. The bill clearance was also not done on time for many cases causing delay.
- Patients were not sent on time from the respective Wards. Delay in arriving of trolley, preparing the patient for surgery, filing of the Pre-Anesthetic Consent by the doctors were the most prominent reasons.

## **CONCLUSION**

The OT Utilization rate at CMRI was found to be much lower than the standard rate. Due to the Covid-19 pandemic, the number of surgeries performed per day has significantly reduced thus inversely impacting the overall OT Utilization rate. Further, the Turnaround time is quite high with a mean of 58.4 minutes. It should be reduced to improve the overall OR utilization. Many add on cases were added in between the scheduled cases which led to rescheduling of cases which is also responsible for increasing TAT. In many cases, it was observed that there was delay in arrival of the nursing staff to take the patient back to the respective ward, which is the main reason why the patients are kept in postoperative recovery room for excessive time. Surgeons came late for the first scheduled surgeries thus causing delay in the first as well as the next scheduled cases.

The low OT utilization rate and high turnaround time indicate that the hospital needs to focus more on enhancing the efficiency and productivity of OT by avoiding first case delays, reducing non-productive time and utilizing technical and human resources optimally.

The study helped in understanding the main causes for the increased turnaround time of OT. The overall utilization rate was also calculated to evaluate the efficiency of OT. Accordingly, recommendations were given to reduce the TAT and to optimize the utilization of OT.

## **RECOMMENDATIONS**

- All the instructions and information must be given to the patients and the attendants prior to the day of surgery. The attendants must be told strictly to come to the hospital 1 hour before the scheduled time of surgery.
- PAC sheet must be filled by the doctor one day before the surgery to avoid delays on the day of surgery.
- Patients must be sent to the OT complex at least an hour before the scheduled time of surgery.
- Status of the OT cases to be performed on next day must be checked. Any cancellation of case must be informed to the concerned surgeon and Anesthetist immediately.
- The first case should always be started on time. Otherwise, it forms a chain reaction causing delay in the next surgeries.
- Billing clearance must be done one day prior to the day of surgery to avoid delays.
- All the consent forms must be filled and signed one day prior to surgery.
- Number of Unscheduled cases should be reduced. Proper to scheduling of cases must be done to avoid overutilization of OT.
- Booking of cases prior to the day of surgery should be done in a transparent platform. The HIS of the hospital should include a platform for the surgeons to book OT rooms. This can be done to avoid any conflicts. The system will show the OT rooms booked by the surgeons and the time to be taken for the surgery. A surgeon willing to book OT room for his case will be able to see the updates from the system after which he can book the available slot.

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