



Dissertation Synopsis

Title: Identifying causes of delay and testing optimization strategies of preoperative procedures of scheduled surgeries

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Identifying causes of delay and testing optimization strategies of preoperative procedures of scheduled surgeries

Introduction:

The operation theatre is the most crucial area in a hospital setting. A Number of factors affect the utilization of the operation theatre including the procedures starting from the preoperative formalities to the post operative recovery and shifting of the patients back to the respective wards. In this study context, the work consisted first in defining a standard “Pathway” representing the preoperative process, defined as the sequence of all elementary steps involved between the “patient scheduled for surgery” to the “patient shifted to the operation theatre” and its specific duration.

This duration will include all the procedures including patient preparation, surgical site marking, financial clearance for surgery, etc.

Delays can be caused because of gaps in any of the above factors and the same will be noted in the study. The delays will be analysed and strategies to combat the same will be suggested.

Below is the figure describing the pre-operative procedures for a scheduled surgery at Jupiter Hospital, Pune.

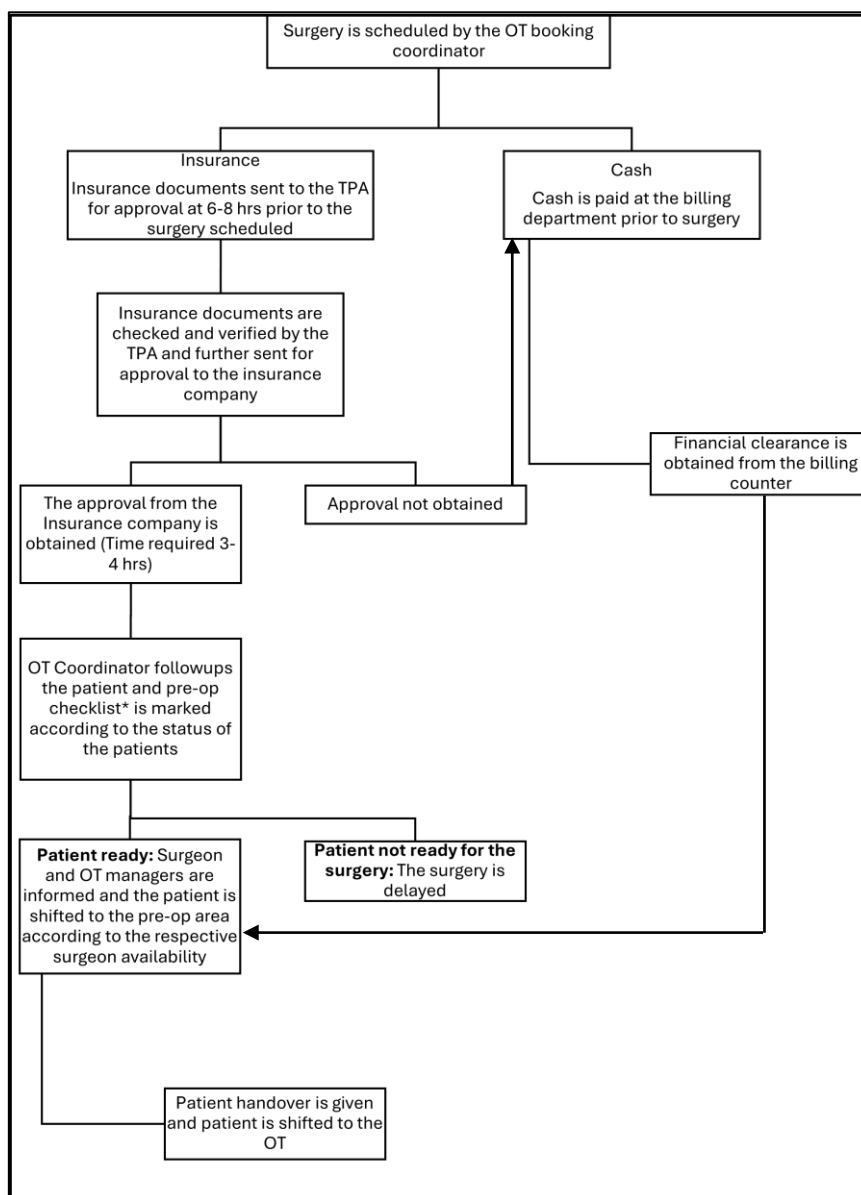


Fig.: Pre-Operative Procedures

Literature review:

The study by Bhaskar et al. aimed to prospectively analyse operation theatre (OT) utilization time and the most common causes of delays and cancellations of scheduled surgeries in a 1000-bedded tertiary care rural hospital over a 2-month period. The authors found that the most common reasons for postponement and rescheduling of surgeries were surgical factors (70.51%), particularly lack of OT time due to unrealistic scheduling or earlier surgeries taking longer than expected. Other factors included anaesthesia issues (12.18%), patient factors (10.90%), and hospital factors (6.41%). The authors concluded that most causes of delays and cancellations were avoidable with proper preoperative planning and patient optimization. Strategies to improve OT utilization included avoiding delays in starting the first case, improving communication between stakeholders, and realistic scheduling of cases. Attaining OT utilization rates of 70-80% is considered realistic in most hospital settings. The study highlights the importance of analysing OT utilization and identifying modifiable factors to optimize surgical workflow and minimize cancellations. Prospective audits and implementing targeted interventions can help improve OT efficiency and patient care. [\(1\)](#)

The study by Karki et al. aimed to analyse the efficiency of operation theatre (OT) functioning with regard to time utilization and cancellation of cases on the day of surgery in a tertiary care teaching hospital over a 3-month period. The authors found that the OT utilization rate was 57.08%, 71.48%, and 67.68% in October, November, and December respectively. The rate of surgery cancellation was 12.6%, 7.55%, and 8.96% in the respective months. The most common reasons for cancellation were surgical factors (70.51%), particularly lack of OT time due to unrealistic scheduling or earlier surgeries taking longer than expected. Other factors included anaesthesia issues (12.18%), patient factors (10.90%), and hospital factors (6.41%). The authors concluded that OT utilization and case cancellation rate are important quality indicators of OT functioning. Audits and reviews of these parameters can help identify problems and find solutions to improve efficiency. Attaining OT utilization rates of 70-80% is considered realistic in most hospital settings. The study highlights the importance of analysing OT utilization and cancellation rates to optimize surgical workflow and minimize avoidable cancellations. Prospective audits and targeted interventions based on identified modifiable factors can enhance OT efficiency and patient care. [\(2\)](#)

The study by Leroy et al. aimed to optimize and plan operating theatre activities by defining pathways and process modelling. The authors introduced a novel approach to optimize the utilization of operating theatres by identifying and streamlining the various steps involved in the surgical process. This included defining pathways for each type of surgery and modelling the process to identify bottlenecks and inefficiencies. The study concluded that the proposed approach can significantly improve the efficiency of operating theatre activities by reducing delays and cancellations and enhancing overall productivity. The authors suggested that this methodology can be applied in various healthcare settings to optimize the utilization of operating theatres and improve patient care. The study highlights the importance of optimizing operating theatre activities to ensure efficient use of resources and minimize delays and cancellations. The proposed approach can be a valuable tool for hospital administrators and healthcare professionals to improve the overall efficiency of their operating theatres. [\(3\)](#)

The dissertation by Persson aimed to model and analyse hospital surgery operations management using discrete event simulation. The author developed a simulation model to study the impact of various factors on operating room (OR) efficiency, such as patient prioritization rules, surgeon schedules, and resource allocation. The study found that the proposed simulation model can effectively capture the complexity of OR operations and evaluate the impact of different strategies on performance measures like OR utilization, patient waiting times, and on-time starts. The author concluded that simulation is a valuable tool for OR managers to test and optimize their policies before implementation. The dissertation highlights the importance of using advanced analytical techniques like simulation to support decision-making in complex healthcare systems. By modelling the intricate interactions between various components of OR operations, managers can gain insights into the impact of their policies and make informed decisions to improve efficiency and patient care. [\(4\)](#)

Problem Statement:

Efficient preoperative procedures are crucial for ensuring smooth workflow and timely commencement of surgical procedures in operation theatres. However, inefficiencies in preoperative processes can lead to delays, increased stress for patients and staff, and compromised patient safety. This study aims to fill this gap by conducting a two phase,

observational and experimental study to assess current preoperative procedures, identify areas for improvement, and propose strategies and implementing the proposed strategies to optimize the utilisation of the Operation Theatre.

Research Question:

What are the predominant factors contributing to delays in preoperative procedures of the scheduled surgeries, and what measures can be implemented to mitigate these delays, thereby enhancing the efficient utilization of operating theatre resources?

Research Objectives:

1. To identify and categorise the causes of delays in preoperative procedures of the scheduled surgeries.
2. To develop and propose strategies for minimising these delays based on identified causes and contributing factors.
3. To implement the proposed strategies and compare the effectiveness in reducing delays.

Material and Methods:

Study Design: The study will be done in two phases: The study will initially use an observational design to identify causes of the delays, an intervention will be proposed to combat the same, followed by an experimental design to implement and evaluate the proposed intervention.

Setting: Jupiter Hospital, Pune, a 400 bedded multi-speciality hospital.

Duration of the study: 2 Months- 8th April 2024 – 15th June 2024

Study Population: Patients scheduled for elective surgical procedures within the duration of the study.

Study Tool:

Observation checklist: A structured checklist will be used to observe and document various preoperative procedures, including patient preparation, surgical site marking, and preoperative timings until the patient is taken in the operation theatre for the surgery.

Sample Size: 300 elective surgeries in the pre-implementation phase and 300 elective surgeries in the post-implementation phase.

Sampling technique: Convenience sampling

Data Collection procedure: The data will be collected by direct observation of the elective surgical patients per day and will solely be based on primary methods by drafting a preoperative checklist and observing patients based on that checklist.

Operational definitions:

1. **Preoperative Procedures:** The specific tasks and activities conducted prior to the commencement of surgical procedures, including patient preparation, surgical site marking, financial clearance for surgery, NBM status (Min. 6 hrs), and so on.
2. **Efficiency:** The extent to which preoperative procedures are conducted in a timely manner, with minimal delays or disruptions, and optimal utilization of resources (e.g., time, personnel, equipment).
3. **Workflow:** The sequence of steps involved in preoperative procedures, including the organization of tasks, coordination among surgical team members, and flow of patients and equipment within the operation theatre.
4. **Delay:** Any deviation from the planned timeline for preoperative procedures, including waiting time for patients, late start of procedures, or interruptions in workflow due to unforeseen circumstances.

Data Analysis Plan:

The daily and weekly average of the preoperative surgery timings will be calculated from the dataset and the graph of the same will be compared to gain the required insights. T-tests will be used to compare means between two groups viz. comparing preoperative surgery timings before and after implementing optimization strategies.

Ethical Considerations:

Permission from the management of the hospital is acquired to observe the patients and collect the data required for the study.

The implications of the research on the healthcare industry:

Implementing optimized procedures enhances the efficiency of operation theatres, reduces waiting times, improves workflow, and better utilizes resources, thereby increasing patient throughput. Additionally, this efficiency leads to cost savings for healthcare facilities by minimizing overtime, optimizing staff utilization, and reducing resource wastage. Healthcare staff benefit from reduced stress, enhanced teamwork, and a more organized work environment, which increases job satisfaction. Hospitals prioritizing these procedures gain a reputation for high-quality care, resulting in higher patient satisfaction and loyalty. Optimized preoperative processes also mitigate risks like medication errors, surgical site infections, and patient safety incidents, ensuring compliance with regulatory standards. Furthermore, these research findings may drive innovation in preoperative processes, leading to modern technologies, tools, and protocols that further enhance efficiency and patient outcomes.

References:

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3. Leroy, R., Scholl, C., Lanconi, N., Krug, B., & Vasilakis, C. (2015). Optimization and planning of operating theatre activities: An original definition of pathways and process modeling. BMC Medical Informatics and Decision Making, 15, Article 38. <https://doi.org/10.1186/s12911-015-0161-7>
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