



A CROSS-SECTIONAL STUDY ON ENHANCING OPERATING THEATRE EFFICIENCY THROUGH TIME MANAGEMENT AND WORKFLOW OPTIMIZATION



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INTRODUCTION

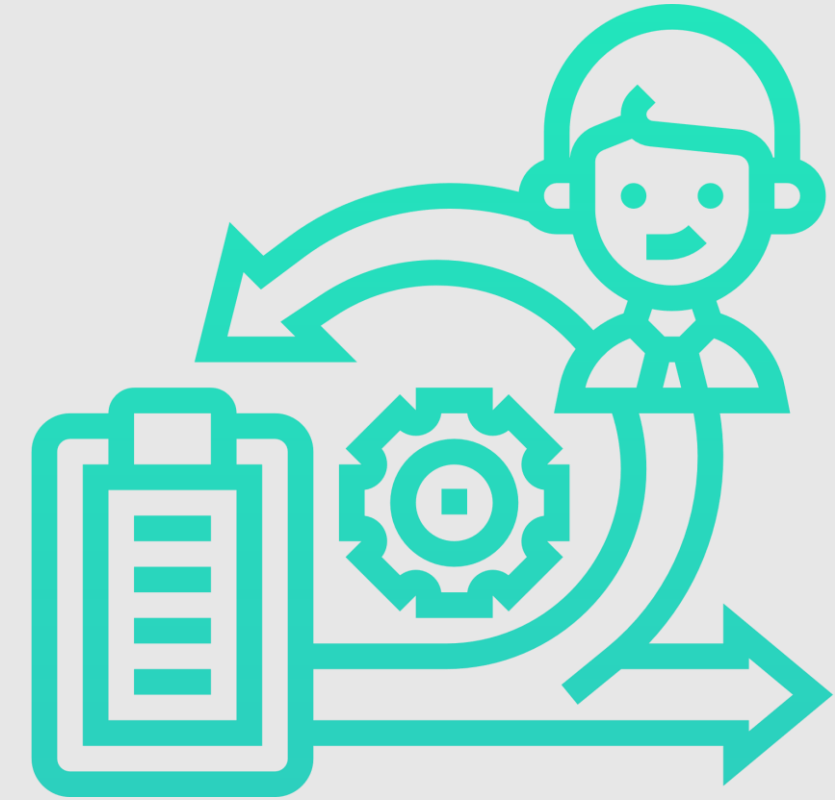
The efficient functioning of the Operation Theatre (OT) is essential for delivering high-quality surgical care, enhancing patient satisfaction, and ensuring the optimal utilization of hospital resources. Delays in turnaround between surgical cases can negatively impact throughout, escalate operational costs, and limit access to time-sensitive surgical services. Therefore, this study was conducted to evaluate the time intervals between consecutive surgeries and to identify the underlying causes of prolonged turnaround times.





OBJECTIVE

- To evaluate the average turnaround time between surgeries.
- To assess the justifications for time consumption in specific OT processes.
- To identify and analyze reasons causing avoidable delays.
- To recommend data-driven solutions for OT efficiency improvement.



METHODOLOGY

STUDY DURATION: 2nd April – 10th JUNE 2025

SAMPLE SIZE: 546 consecutive OT cases across various surgical departments.

DATA COLLECTION: Manual recording of time intervals between consecutive procedures and documentation of delay reasons.

ANALYSIS TOOLS: Frequency tabulation, root cause analysis, and delay attribution by role/responsibility.

KEY TIME METRICS CAPTURED

Process Interval	Definition	Average Duration (Minutes)	Remarks
1. Patient Preparation Time	Patient entry into OT to start of anesthesia induction	12	Efficient; well within expected range (10–15 mins)
2. Induction Start to Incision	Start of anesthesia to surgical incision	29	Relatively high; should ideally be <20 mins for routine cases
3. Surgery End to Extubation	End of surgery to reversal of anesthesia	10	Acceptable for recovery period

KEY TIME METRICS CAPTURED

Process Interval	Definition	Average Duration (Minutes)	Remarks
4. Cleaning and Setup Duration	Time for post-op cleaning and prep for next case	11	Slightly high; target benchmark is usually 5–8 mins
5. Total Turnover Time	Time from one patient exiting OT to next patient entering	62	Significantly high; optimal turnover is 30–35 mins

INTERPRETATION OF FINDINGS

- **Total Turnover Time of 62 minutes is 25–30 minutes longer** than best practice benchmarks (30–35 minutes).
- **Main Delay Contributor:**
The “**Induction Start to Incision**” duration at 29 minutes is disproportionately long and contributes heavily to the overall delay.
- **Cleaning & Setup taking 11 minutes** suggests that **housekeeping/OT tech** coordination may be improved.
- **Patient Preparation and Extubation Time** are within reasonable limits.



IMPROVEMENT OPPORTUNITIES

Streamline Anesthesia Induction-to-Incision

Phase:

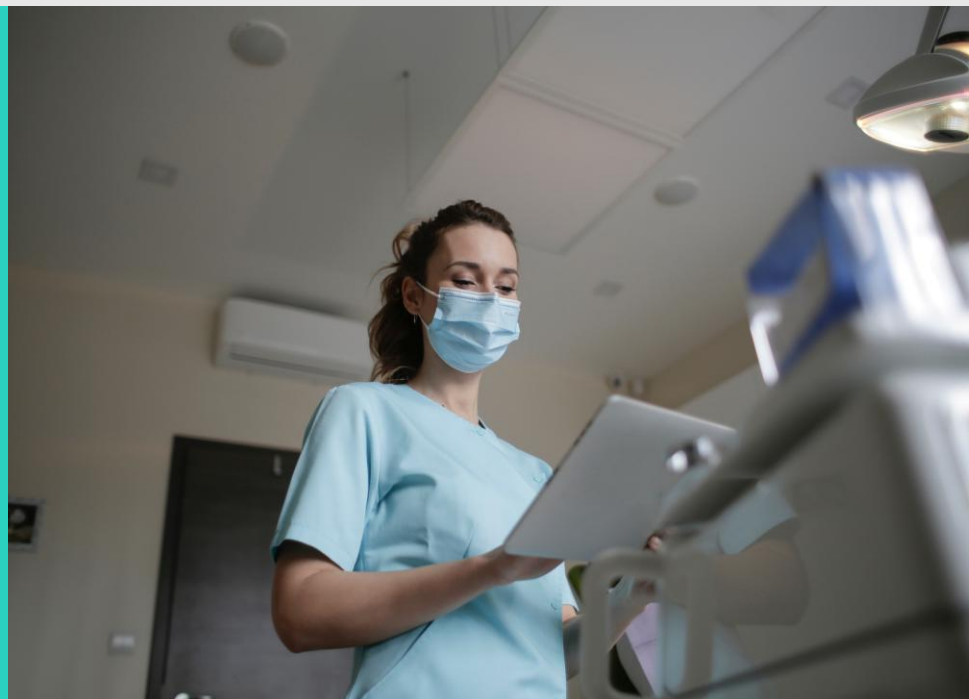
- Pre-op readiness huddles to confirm all documentation, consent, and equipment.
- Ensure availability of anesthesiologists, assistants, and surgeons before patient enters.
- Explore rapid induction protocols for suitable patients.

Optimize Cleaning & Setup:

- Introduce parallel processing where staff prepare for cleaning before the case ends.
- Cross-train team to reduce dependency on specific staff.
- Use of checklist-based turnover protocols to speed up.

Monitor Delays per Specialty:

- Identify patterns among specific teams/specialties/surgeons for targeted improvement.



Delay Reasons – Root Cause Categorization

Total Delay Instances Documented:

238 (across 546 cases)

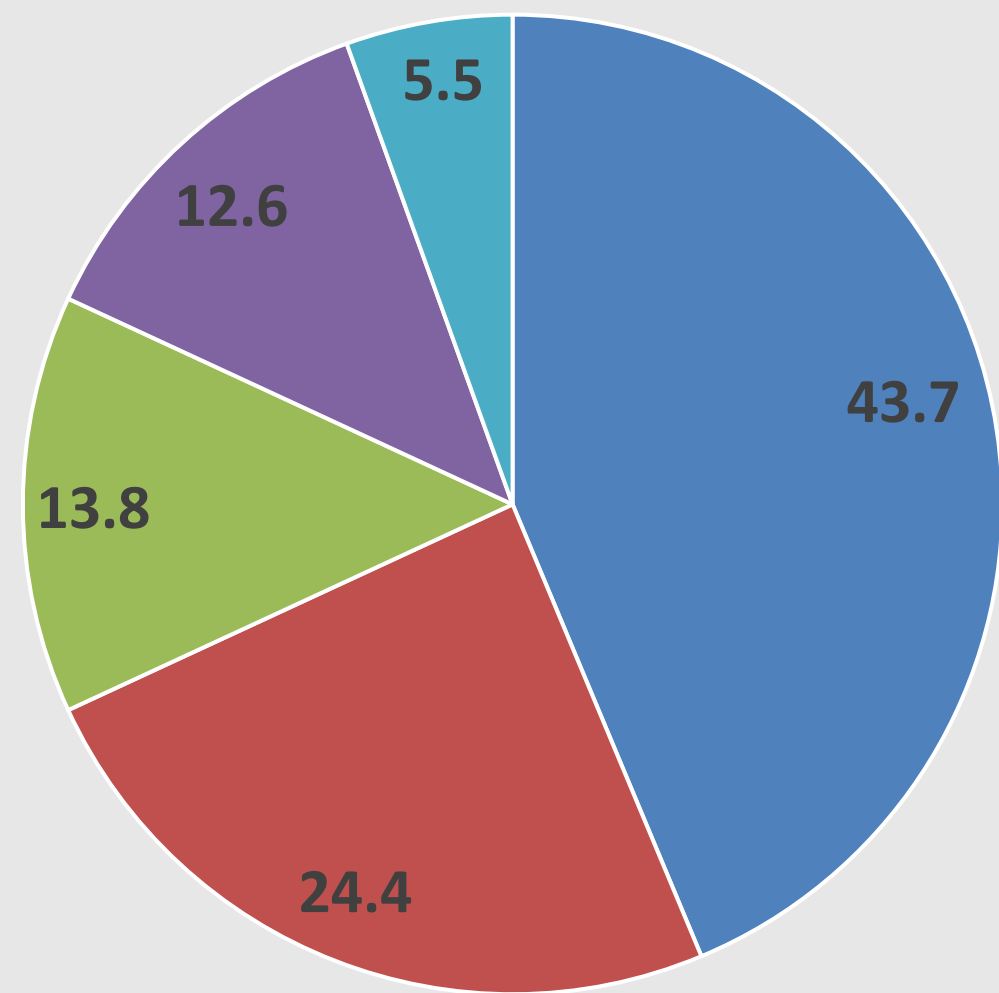
Categorized Summary:

- Surgeon/Team Related Delays: 104 cases
- OT Resource Constraints: 58 cases
- Anesthesia/Clinical Complications: 30 cases
- Add-on / Emergency Procedures: 13 cases
- Coordination & Logistics Issues: 33 cases



Categorical Breakdown of Delay Reasons

Percent of Delays



- Surgeon/Team Related
- OT Resource Constraints
- Coordination /Logistics
- Anesthesia/ Clinical Issues
- Add-on/EmergencyCases



DETAILED INSIGHTS ON HIGH-FREQUENCY DELAY REASONS



Reason	Frequency	% of Total Delays	Category
Surgeon arrived late	77	32.4%	Surgeon Related
OT busy with previous procedure	60	25.2%	OT Resource Constraint
Difficulty in intubation	20	8.4%	Anesthesia/Clinical
Add-on case	13	5.5%	Add-on/Emergency
Extra hands not available	10	4.2%	OT Resource Constraint
Difficulty in extubation	9	3.8%	Anesthesia/Clinical
Patient arrived late	9	3.8%	Coordination/Logistics
Housekeeping staff busy elsewhere	9	3.8%	OT Resource Constraint
Surgeon busy in another OT	8	3.4%	Surgeon Related
Frozen section report delay	3	1.3%	Coordination/Logistics

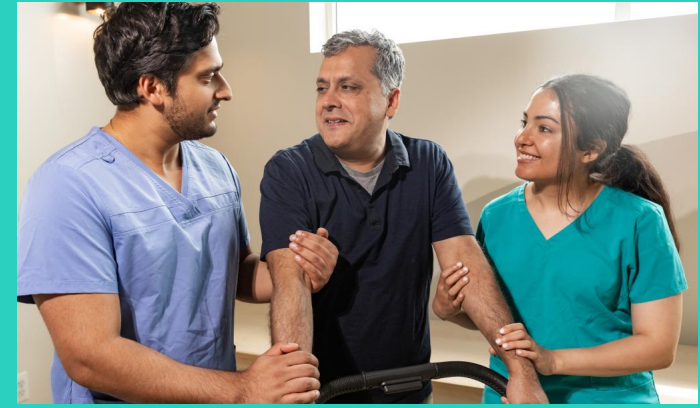
Observations & Patterns

Human Dependency is High: 62% of delays were due to surgeon/team delays—indicating a need for stronger accountability and scheduling discipline.

OT Utilization Overlap: Around 24% of delays occurred because the OT was occupied, highlighting inefficient scheduling and lack of buffer time.

Understaffing During Peak Hours: Unavailability of extra hands, housekeeping delays, and overlapping anesthesia coverage are signs of staff pooling challenges.

Inter-Department Coordination Gaps: Frozen reports, patient unavailability, and support service delays (CSSD, Blood Bank) accounted for nearly 13%—indicating a breakdown in handover and pre-case readiness.



Recommendations Based on Data

Focus Area	Recommendation
Surgeon Reporting	Enforce sign-in log; penalize repeat delay offenders through OT Committee review
OT Scheduling	Stagger start times with 15-min buffer, review high-traffic OT slots
Support Staff Pooling	Create float pool of housekeeping and anesthesia assistants
Dashboard Alerts	Introduce real-time OT dashboard to highlight patient readiness and next-up case
Preoperative Briefing	Morning huddle with all departments to identify pending requirements
Emergency Protocols	Prepare parallel induction and prep area for emergency cases





Interpretation & Insights

The **top surgeons** from (Orthopaedics, Neurology, CTVS, Urology) together account for **62 out of 78 surgeon-related delays** — that's over 60% of total team-related delays.

Senior Consultant of Orthopaedic department alone is linked to **17% of surgeon-related delays** — the highest individual contributor.

While some delays may be justifiable due to emergency commitments or case complexity, recurring instances from the same individuals indicate a need for targeted intervention.

The **'Others' category (10 surgeons)**, each with one incident, suggests occasional or one-off delays which might be circumstantial.



Recommendations

Area	Suggested Action
Repeat Offenders	OT Committee to provide feedback to top 3–5 surgeons with frequent delays. Implement escalation after threshold breach (e.g., 3/month).
Surgeon Orientation	Conduct orientation on OT discipline and time-bound scheduling expectations.
Case Pre-Intimation	Require all surgeons to pre-confirm availability 30 minutes before scheduled OT slot.
Buffer Allocation	Introduce buffer OT slots for surgeons handling multiple concurrent procedures.
Transparency	Monthly delay dashboard shared with surgical teams to foster accountability.

DISCUSSION AND INSIGHTS



- The average **total turnover time of 62 minutes** is above the desired benchmark of 30–35 minutes.
- **High-impact contributors:** Surgeon arrival delays, OT scheduling overlaps, anesthesia team bottlenecks, and coordination issues.
- **Repeat patterns:** Late arrival and unavailability of surgeons and support staff were the most recurrent.
- Cleaning and housekeeping delays were noted primarily during shift changes or OT saturation.

RECOMMENDATIONS FOR PROCESS IMPROVEMENT

A. OPERATIONAL IMPROVEMENTS

Block Scheduling & Accountability: Enforce OT slot discipline through OT Committee.

Float Pool Staffing: Maintain a pool of support staff for cleaning and patient transfers.

Advance Readiness Roster: Surgeons and teams must confirm case preparedness at least 30 mins prior.

B. TECHNICAL AND IT INTERVENTIONS

Real-time OT Dashboard: Display turnover status and readiness alerts in OT control room.

Delay Logging System: Each delay event to be electronically logged with timestamp.



RECOMMENDATIONS FOR PROCESS IMPROVEMENT

C. TEAM COORDINATION & ESCALATION

Surgeon Delay Escalation: Escalate repeated delays to OT Coordinator, DMS and Unit Head.

Pre-Case Briefing: Implement mandatory daily OT coordination huddle.

D. TRAINING AND AWARENESS

Orientation for Anesthesia and Surgical Teams: On timing and accountability.

Housekeeping Training: Rapid turnover techniques and inter-OT collaboration.



FOLLOW-UP ACTION PLAN

Action	Owner	Timeline
Implement OT Delay Register	OT Manager	Immediate
Deploy OT Dashboard	IT & Admin	Within 30 Days
Launch Pilot for Float Support Staff	HR & Nursing	Within 15 Days
Prepare and share Monthly Delay Report	OT Manager	Monthly



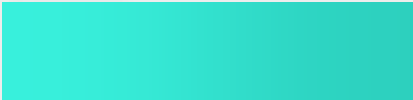


CONCLUSION



The study reveals systemic inefficiencies in the current OT turnaround cycle, heavily impacted by human factors, communication gaps, and workflow overlaps. A combination of digital tools, better scheduling discipline, team collaboration, and leadership accountability is essential to reduce delays and improve surgical throughput without compromising patient safety.

OT Committee to provide feedback to top 3–5 surgeons with frequent delays. Implement escalation after threshold breach (e.g., 3/month).



 **THANK YOU** 
 

