

**A STUDY ON TURNAROUND TIME IN SHIFTING PATIENTS FROM
EMERGENCY DEPARTMENT TO ICU, WARD OR CATH LAB AT MEDANTA**

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

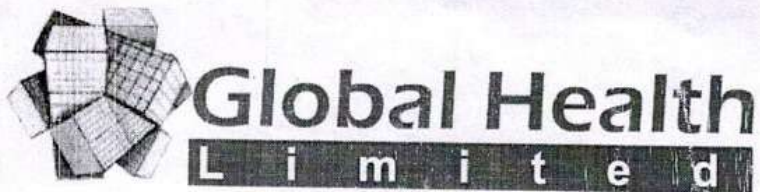
by

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2025



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TO WHOMSOEVER IT MAY CONCERN

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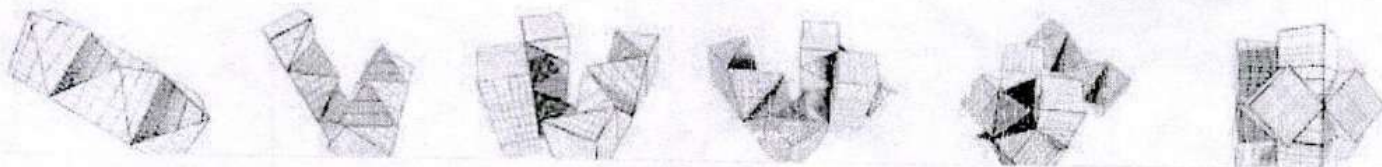
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DECLARATION BY STUDENT

I hereby declare that this dissertation titled is A Study On Turn Around Time (Tat) In Shifting Patients In Emergency Department At Medanta Hospital, Gurgaon, Haryana bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.



(Signature)

Name of Student

Date 16/6/25

ACKNOWLEDGEMENT

The internship and dissertation opportunity I had with Medanta Hospitals was an excellent opportunity for learning and professional development. In the first place, I thank my mentor, Tripti Bishwa (Assistant Professor at IIHMR University), for her support throughout the project. I'll take this opportunity as a big milestone in my professional and career development, and I'll use the skills and knowledge I have gained in the best possible way. I would like to express my sincere gratitude towards Dr. Sunil Dubey (Head of Emergency Department Medanta Hospital, Gurgaon) who gave me an opportunity to work on this project and for the guidance at every step that has been appreciated for my understanding and learning. I thank Dr. P. R. Sodani (President-IIHMR University), Dr. Sanjay Gupta (Dean- IIHMR University), and the whole IIHMR team for their continuous support. Last, but not least, I would like to thank my family and friends who were a constant source of motivational support and kept me persistent throughout my journey at IIHMR.

Sincerely,

Ishita Gupta

MBA HM 28 (2023-25)

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ABBREVIATIONS

S.NO .	ABBREVIATION	FULL FORM
1.	ATS	Australasian Triage Scale
2.	BSL	Blood Sugar Level
3.	CATH LAB	Cardiac Catheterization Lab
4.	CMS	Centers for Medicare & Medicaid Services.
5.	ED	Emergency Department
6.	ENT	Ear Nose Throat
7.	GCS	Glasgow Coma Scale
8.	GDA	General Duty Assistants
9.	GI	Gastrointestinal
10.	GRE	Guest Relations Executive
11.	HR	Heart Rate
12.	ICU	Intensive Care Unit
13.	IV	Intravenous
14.	LAMA	Leave Against Medical Advice
15.	LOC	Loss of Consciousness
16.	LOS	Length of stay
17.	MI	Myocardial Infarction
18.	NHS	National Health Services

ABSTRACT

TITLE-

A Study On Turnaround Time (Tat) In Shifting Patients In Emergency Department At Medanta Hospital, Gurgaon, Haryana

Author – Ishita Gupta

Advisors – Tripti Bishwa

KEYWORDS- Turnaround Time (TAT), Patient transfer, Emergency Department (ED), ICU, Cath Lab, Wards, Delay factors.

BACKGROUD

Efficient patient transfer from the Emergency Department (ED) to inpatient care units such as ICU and general wards is vital for timely medical intervention and overall hospital performance. Delays in this process can lead to increased patient morbidity, overcrowding in emergency areas, and suboptimal resource utilization. Medanta – The Medicity, Gurugram, with one of the busiest EDs, serves as an ideal case study for evaluating and enhancing the turnaround time (TAT) during such transitions. This study aims to identify bottlenecks, measure the average time taken for transfers, and recommend strategies to reduce delays and improve operational efficiency.

OBJECTIVE

- To study the current process of patient transfer from the ED towards /ICU/ Cath Lab at Medanta Hospital.
- To identify factors affecting TAT in patient shifting.
- To trace the reason for delays, if any.

METHODS:

The study is conducted over a period of three months from March to June 2024, and uses a mixed-methods approach, including qualitative analysis of literature, patient demographics, real time data collection of 100 patients was collected and recorded in excel sheet and causes of delay was analysed. Convenience sampling was employed, including patients arriving between 9:00 am and 5:30 pm, excluding those arriving outside these hours and on Sundays, as well as brought-in-death cases. Tools such as fishbone diagrams are used to identify and categorize the root causes of delay in shift time in emergency department.

RESULT

Of the 100 patients studied, 37% were shifted within one hour, 44% within 1–2 hours, and 19% took over two hours. The shortest TAT recorded was 9 minutes, while the longest was 368 minutes (6 hours and 13 minutes). The average TAT stood at 87.4 minutes. ICU transfers showed the shortest average TAT (78.9 minutes), followed by Wards (91.8 minutes), and Cath lab (109.1 minutes). Payment-wise, TPA and international patients had lower TATs (78.1 and 46 minutes respectively), whereas CGHS and corporate patients experienced longer delays (92.5 and 97.7 minutes respectively). The most common delay reasons included shortage of nurses and GDAs, lack of dedicated admission counters, prolonged panel approvals, and pending diagnostic reports.

CONCLUSION

The study concludes that while critical cases like ICU admissions are handled relatively efficiently, there is significant scope for improvement in overall TAT performance. Administrative bottlenecks such as manual paperwork, delayed panel approvals, and inadequate manpower contribute to shifting delays. Recommendations include digitization of approval workflows, staff reallocation during peak hours, creation of fast-track admission pathways, and establishment of SOP-based escalation systems. If implemented effectively, these interventions can reduce administrative delays, decongest the emergency department, and improve overall patient care and satisfaction.

About – MEDANTA The Medicity

Medanta-The Medicity, founded by Dr. Naresh Trehan, was established to address the urgent need for an advanced super-specialty medical facility in India. Medanta was born out of the problems Indian patients face because the treatment abroad was too expensive for them. Realising this necessity, Dr Trehan felt the need to provide high-quality healthcare, combining advanced technology with a mix of ancient Indian medicine and modern practices on one platform at an affordable price. The vision culminated into laying the foundation stone of Medanta, which emerged as India's first private hospital. Under the astute visionary leadership of Dr Trehan and institution's resolute quest to attain ideals, Medanta today has grown into being India's foremost private hospital.

Medanta aimed solely to provide affordable health services and on principles at the core of which lay an accessible provision of health services to all. Their vision is to help healthcare become within the reach of all sick. Its vision is to provide world-class health care through development of centres of excellence in integrated health care, medical education, and research.

Medanta's core values are the very centre of operations and ethos that would help in sustaining leadership and excellence. Outstanding outcomes can be delivered through exemplary actions and behaviors. Integrity and courage are essential, as the hospital sustains high ethical standards by safeguarding the interest of patients and showing the courage to do what is right. Building a culture in which everyone is committed to exceeding expectations in patient care and service to their families, compassion, and service also play a big role. Finally, Medanta encourages teamwork, embraces change, fosters creativity, and relentlessly seeks improved methods to achieve its goals through the promotion of collaboration, learning, and innovation.

Medanta's healthcare delivery model enables super-specialized doctors to provide the highest quality care through a collaborative, team-based approach. The hospital environment is designed to be safe and welcoming, with patient-centric features, advanced equipment, and technology to support complex diagnostics and treatments. The clinical team includes award-winning doctors, many of whom have received training at leading medical institutions and have been mentored in the Medanta way.

Medanta believes in teamwork; the culture here calls for cooperation with integrated multispecialty care. The departmental structure at Medanta allows subspecialization and integrates all departments

Specialties:

into one team with no lacuna. A full-time doctor engagement model, whereby most doctors practice exclusively through Medanta's hospitals promotes teamwork in care delivery, in part through a joint reward system.

- Institute Of Musculoskeletal Disorders and Orthopedics
- Cancer Institute
- Breast Cancer
- Head and Neck: Oncology
- Medical and Haematoma Oncology
- Radiation Oncology

- Institute of Critical Care and Anesthesiology
- Institute of Digestive and Hepatobiliary Sciences
- Gastroenterology
- GI Surgery, GI Oncology and Bariatric Surgery
- Institute of Chest Surgery-Chest Onco Surgery and Lung Transplantation
- Heart Hospital
- Institute of Obstetrics and Gynaecology
- Clinical and Preventive Cardiology
- Cardiac Surgery
- Electrophysiology and Pacing
- Interventional Cardiology
- Kidney and Urology Institute
- Nephrology
- Urology and Andrology
- Institute of Liver Transplantation and Regenerative Medicine
- Institute of Neurosciences
- Ayurvedic Medicine
- Clinical Immunology and Rheumatology
- Dental Sciences
- Dermatology
- Emergency and Trauma Care
- Endocrinology and Diabetology
- Gynaecology and Gynae Oncology
- Internal Medicine
- ENT, Head & Neck Surgery Hospital
- Laboratory Medicine. Pathology and Blood Bank
- Ophthalmology
- Internal Medicine
- ENT, Head & Neck Surgery Hospital
- Laboratory Medicine. Pathology and Blood Bank
- Ophthalmology
- Paediatrics
- Peripheral Vascular and Endovascular Sciences
- Radiology and Imaging
- Respiratory and Sleep Medicine
- Plastic, Aesthetic and Reconstructive Surgery Facilities and Services offered:
- Emergency & Trauma Care
- Critical Care Units
- Lab Tests & Diagnostics
- Wards & Rooms
- eCLINIC-Telemedicine Services
- Day Care
- Home Sample Collection
- Patient Support Services

- Homecare Services
- Medicine Delivery

Medanta Mediclinic is basically an extended arm of Medanta with the vision to bring super-specialized healthcare to people conveniently through a network of outpatient clinics. The hospitals, with state-of-the-art medical technologies and skillful medical professionals, offer services regarding consultation, diagnosis, and medication for different diseases. These clinics would treat patients whose problems, though not serious enough to warrant hospitalization, would call for specialized treatment by doctors within the comfortable ambience of formal consultation, examination, diagnostic testing, and minor operations. Fully equipped with the latest state-of-the-art medical facilities and state-of-the-art 16

technology, the clinics are fully equipped to obtain accurate diagnostics and execute effective treatment plans to uphold the excellence of practice set by Medanta—The Medicity.

These medical disciplines include Cardiology, Endocrinology, Gastroenterology, and Orthopedics, Neurology, and Pulmonology, among many others. With the strong team-based approach to treatment of patient conditions, specialists in this clinic look at the whole aspect and treat the patient according to his or her needs. This model brings better care quality to the patient and helps him or her benefit from the collective expertise of truly world-class clinicians at Medanta. This is where visitors to Medanta Mediclinics will get personalized attention for a comprehensive range of services, from routine checkups and specialized consultations to follow-up care. Taking the much-adorned healthcare services offered by Medanta beyond the hospital, Medanta Mediclinic increases ease of access to quality healthcare for more people

CHAPTER 1

INTRODUCTION

An emergency department is essential to any healthcare system and may be viewed as the first line of care for acute and urgent medical conditions. This specialized hospital unit is designed to deliver immediate assessment, diagnosis, and treatment for patients with various medical conditions, from minor injuries to critical emergencies. The primary purpose of an ED is to stabilize patients, address urgent health problems, and ensure quick transfer to appropriate inpatient units, like hospital wards or the Intensive Care Unit (ICU), for those needing further treatment.

The Emergency Department at Medanta Hospital, Gurgaon, is a state-of-the-art facility providing 24 X 7 Emergency and Trauma Care. It is subdivided into several sections to ensure efficient patient handling and care:

- **Emergency Reception:** This area is manned 24X7 by receptionists and facilitators responsible for admission and billing processes.
- **Triage:** The triage section consists of 18 beds, with 2 beds designated for Category-1 patients (resuscitation beds) and 16 beds allocated for patients in Categories 2, 3, 4, and 5.
- **Observation:** This section includes 14 beds and 1 isolation bed for patients requiring continuous monitoring.

For emergency access, Medanta Hospital provides a dedicated number: 0124-4141414, with extensions 2411 and 2197. The Ambulance Base Station can be reached at 0124-1068 or via mobile at 9560398953.

The purpose of this study is to investigate the factors influencing the turnaround time (TAT) in shifting patients from the ED to the ward or ICU at Medanta Hospital, Gurgaon, and to propose strategies aimed at enhancing the efficiency of this process. There are several reasons why effective transfers from the emergency department need to be facilitated.

Timely patient shifting is an extremely important determinant in reducing morbidity and mortality rates by ensuring that the initiation of treatments, interventions, and monitoring protocols programmed for the patient are carried out in time. Delaying the process of patient transfer may worsen current medic

conditions, enhance the possibility of contracting complications, and worsen the prognosis of a patient at admission. Expedited transfers may, therefore, reduce the intensity of various illnesses and participate in improving general patient prognosis.

Besides improving patient safety, it is essential to reduce ED congestion for eased financial pressure on patients and health systems. With increased ED stay, healthcare becomes more burdensome to the patients and a waste of hospital resources, which in turn affects resource allocation and utilization. Optimizing patient flow with minimum turnaround time will streamline resource utilization, improve operational efficiency, and reduce avoidable healthcare costs.

Timely transfers of patients to the Intensive Care Unit significantly impact the length of stay. This ensures access to specialized care that enables timely interventions, which would have helped prevent a worsening disease process and thus reduce the high mortality associated with extended critical care. This will not only optimize the chances of patient

survival but also ensure good utilization of ICU beds, so they are available for more critically ill patients requiring such urgent care.

Decongesting the Emergency Department (ED) improves the overall patient experience by cutting down wait times, reducing overcrowding, and ensuring timely, appropriate care. Efficient transfers allow patients to receive the necessary attention and treatment more quickly, leading to higher satisfaction and better interactions with healthcare providers.

By creating more space in the ED, hospitals can better accommodate incoming patients who need urgent medical attention, ensuring prompt access to care and reducing the risk of treatment delays or adverse outcomes. This enhances the delivery of comprehensive and timely healthcare services to all patients, ultimately contributing to improved population health outcomes and the sustainability of the healthcare system.

A variety of factors may influence TAT in patient disposition, including the availability of resources in a hospital, ED crowding, staffing levels, and communication protocols, and bed availability in receiving units, as well as the complexity of patients' conditions. Each one of these variables is able to interact with each other in complicated ways, consequently having an impact on the efficiency of the transfer process at large. All these factors need scrutiny if effective strategies for reducing TAT and smoothing patient flow are to be designed.

Overview of Patient flow in Emergency Department

The patients come to the Medanta Hospital ED either by ambulances, from other hospitals or private clinics, or directly by walking in. The patient would then be quickly assessed by the doctor and assisted by the GDA staff members who facilitate an initial triage process.

Triage is an important step in ED where a doctor, assisted by GDA staff, assesses the condition of the patient to gauge the seriousness and urgency of his or her medical requirement. One of the attendants of the patient goes for registration formalities at the registration desk and billing counter simultaneously. All this should be taken care of so that the details of the patient get recorded in the hospital's database and administrative work is tackled efficiently.

Based on the triage assessment, the doctor decides how urgent the case is. This is followed by an initial evaluation by a nurse and a doctor that goes with measurements of vital signs, taking a history, and preliminary physical examination. Medication-related initial interventions are carried out to stabilize the patient.

Further diagnostic tests and intervention follow the initial evaluation, based on the patient's needs. This might include performing laboratory tests and imaging studies and other investigative procedures to develop a proper diagnosis of the patient's condition. If necessary, the ED staff contacts other professional, medical specialty departments to cross-refer patients for complete treatment.

Once the emergency treatment and diagnostics are completed, the patient's disposition is determined based on their condition. If the patient has stabilized and no longer requires immediate medical attention, they may be discharged from the ED with appropriate follow-up instructions. In cases where the patient or their family decides not to pursue further treatment despite medical advice, the patient is processed for Leave Against Medical Advice (LAMA).

Patients who need urgent surgical intervention or cardiac procedures are immediately transferred to the Operating Theatre or the Catheterization Lab. Those that require further medical care are transferred to appropriate inpatient units. Stable patients are sent to the general ward, while patients who need close monitoring and treatment are referred to the Intensive Care

OVERVIEW OF PROCESS IN THE EMERGENCY DEPARTMENT

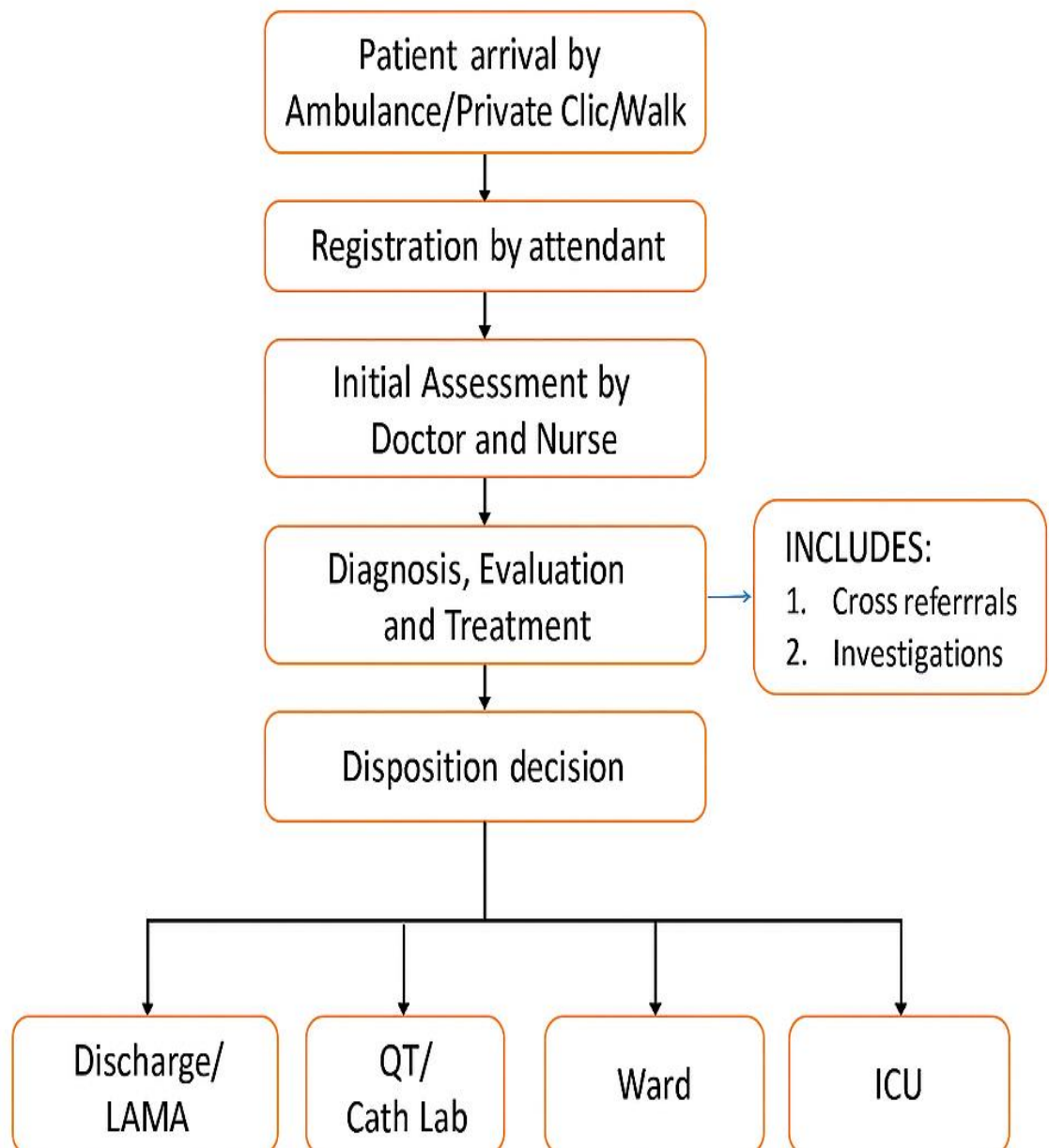


Fig.- 1 overview of process in ER

AUSTRALASIAN TRIAGE SCALE

The Australasian Triage Scale is a triaging tool used to sort patients upon presentation into levels of acuity requiring treatment in the emergency room. It consists of a five-level triage scale developed by and supported the Australasian College for Emergency Medicine. The categories of ATS are set with respect to physiological acuity, for example, airway, breathing, circulation, and disability, together with the waiting time within which treatment must commence.

ATS CATEGORY	RESPONSE	CATEGORY DESCRIPTION	CLINICAL DESCRIPTORS
Category 1	Immediate simultaneous assessment & treatment	Immediately life-threatening Conditions that endanger life and necessitate prompt, intensive intervention.	Conditions that pose an imminent threat to life, requiring prompt and intensive intervention. Examples include: • Cardiac arrest • Respiratory arrest • Imminent airway risk, such as respiratory rates below 10 breaths per minute • Severe respiratory distress • Blood pressure below 80 in adults or signs of severe shock in children/infants • Unresponsiveness or only responding to painful stimuli (GCS less than 9) • Prolonged ongoing seizures • IV overdose resulting in unresponsiveness or hypoventilation • Severe behavioural disorder posing an immediate threat of violent behaviour.
Category 2	Assessment & treatment within 10 mins	Imminently life-threatening conditions"	Airway concerns, such as severe stridor or drooling with associated distress,

	(assessment & treatment often simultaneously)	those wherein the patient's condition is either severe or rapidly deteriorating with a potential threat to life or threat of organ failure if not treated within ten minutes of arrival, including conditions wherein immediate treatment, in the nature of thrombolysis or antidote administration, for instance, can make a profound difference in clinical outcomes when it is begun within a short time after the patient's arrival in ED. This principle underlines that alleviation of extreme pain or distress should take a maximum of 10 minutes and forms the guiding factor for humane practice.	severe respiratory distress, circulatory compromise (e.g., clammy or mottled skin, poor perfusion, heart rate below 50 or above 150 in adults, hemodynamically impactful hypotension, severe blood loss), chest pain likely originating from cardiac issues, intense pain of any origin, low blood sugar levels below 3 mmol/l, drowsiness or reduced responsiveness (GCS less than 13) due to any cause, acute hemiparesis or dysphasia, fever accompanied by lethargy (in any age group), suspected meningococemia, eye exposure to acid or alkali requiring irrigation, major multi-trauma necessitating a swift and coordinated team response, severe localized trauma like major fractures or amputations, high-risk medical histories, significant ingestion of sedatives or other harmful substances, and severe or dangerous envenomation.
Category 3	Assessment and treatment start within 30 mins	In the "Potentially Life-Threatening" category, patients face conditions that could progress to life-threatening situations or result in significant harm to limbs if assessment and treatment do not begin within thirty minutes of arrival. This category also	This category encompasses conditions such as severe hypertension, moderate blood loss from any cause, moderate shortness of breath with SAO2 levels between 90% and 95%, blood sugar levels exceeding 16 mmol/l, seizure with the patient now alert, fever in immunosuppressed patients (such as those

		covers cases where timely intervention within this timeframe is crucial to prevent adverse outcomes. Moreover, addressing severe discomfort or distress within thirty minutes is a fundamental aspect of compassionate medical care.	receiving oncology treatment or steroid therapy), persistent vomiting, dehydration, head injury with brief loss of consciousness but now alert, moderately severe pain necessitating analgesia, moderately severe chest pain not cardiac in origin, moderately severe abdominal pain in patients over 65 years old without high-risk features, moderate limb injuries including deformity, severe laceration, or crush injury, limbs with altered sensation or acutely absent pulse, trauma with a high-risk history lacking other significant risks, stable neonates, children at risk of abuse or suspected non-accidental injury, and behavioural or psychiatric issues like severe distress and risk of self-harm, acute psychosis or thought disorders, situational crises or deliberate self-harm, and agitation or withdrawal.
Category 4	Assessment & Treatment start within 60 minutes	In the category of "Potentially serious," the patient's condition may worsen or lead to adverse outcomes if assessment and treatment is not initiated within one hour of arrival at the ED. Symptoms in this category are typically moderate	Here are examples within this category: mild haemorrhage, foreign body inhalation without breathing problems, chest injury without rib pain or breathing difficulties, difficulty swallowing without respiratory distress, minor head injury without loss of consciousness, moderate pain with some risk

		or prolonged. There is also urgency for timely treatment to prevent adverse outcomes within the hour. Additionally, cases in this category often involve significant complexity or severity, requiring thorough evaluation, consultation, and possibly inpatient care. Moreover, it is considered essential within humane medical practice to alleviate discomfort or distress within one hour.	factors, vomiting or diarrhoea without dehydration, eye irritation or foreign object with normal vision, minor limb injury such as a twisted ankle, possible fracture, or simple laceration requiring assessment or treatment, normal vital signs with low to moderate pain, snug cast without nerve or blood flow issues, swollen, warm joint, nonspecific abdominal discomfort, and behavioral or psychological concerns such as semi-urgent mental health problems and individuals under observation with no immediate threat to themselves or others.
Category 5	Assessment and treatment start within 120 minutes	This category denotes situations where the patient's condition is either chronic or minor, allowing for a delay of up to two hours in assessment and treatment without significantly affecting symptoms or clinical outcomes. It also encompasses administrative tasks such as reviewing results, issuing medical certificates, and handling prescription requests. Examples include: • Minimal discomfort without high-risk attributes	• Minor discomfort without significant risk factors • Patients with a low-risk medical history and no current symptoms • Mild symptoms associated with a stable, ongoing medical condition • Minor symptoms related to conditions of low risk • Small wounds such as minor abrasions or lacerations that do not necessitate stitches • Scheduled follow-up appointments for wound assessments or dressing changes • Immunization appointments exclusively • Patients dealing with behavioural or

		• Low-risk medical history • symptoms • Minor manifestations of a stable, ongoing medical condition • Minor symptoms associated with conditions of low risk • Trivial concern	psychiatric issues, such as those with established chronic symptoms or experiencing a stable social crisis.
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Table 1 – Australasian Triage Scale

AIM- To determine the key factors influencing the turnaround time (TAT) in shifting patients from the Emergency Department to the ward at Medanta Hospital, Gurgaon.

OBJECTIVES

1. To study the current process of patient transfer from the ED towards /ICU/ Cath Lab at Medanta Hospital.
2. To identify factors affecting TAT in patient shifting.
3. To trace the reason for delays, if any.

RESEARCH QUESTION:

What are the factors that contribute to turnaround time in the emergency department and how can these be reduced to improve efficiency and patient outcomes?

CHAPTER 2

LITERATURE REVIEW

S.No.	AUTHOR	YEAR	TITLE	finding
1.	Thakur A, Gupta S, Sharma R	2020	Study of patient flow and turnaround time in the ER in a tertiary care hospital	This was a retrospective study conducted using data from 1,128 patients over a period of six months. The authors have identified delays in triage, inadequate staffing during peak hours, longer waiting times for diagnostic tests, and delays in decision making regarding patient disposition, all accounting for an increased TAT. Interventions such as optimizing staffing levels, streamlining triage processes, improving communication and coordination, and expediting diagnostic testing and decision making associated with improving TAT changed the efficiency of care in ED.
2.	La Vonne A. Downey and Leslie S. Zun	2007	Determinates of Throughput Times in the Emergency Department	It investigates the determinants of throughput times in an inner-city level 1 adult and pediatric trauma emergency department. The setting is in the contexts of a global challenge of long ED wait times, perceived as a result of increased volume of patients visiting the emergency room and system-wide problems. Previous studies indicate an increase in emergency department visits, with a corresponding decrease in emergency department availability, causing

				overcrowding and long wait times. Patient perceptions of the quality of care often relate to waiting times, staff attitudes, and provision of information. Satisfaction is more often linked to perceived rather than actual throughput times. This is a retrospective study that estimates the various factors that affect throughput: presenting illness type, triage level, waiting time, and patient demographics. The results obtained in this study demonstrate significant differences in times to discharge between different priority groups, indicating increased waiting time among some subgroups of patients who require greater reliance on ancillary services.
3.	Diercks DB, Roe MT, Chen AY, et al	2007	Prolonged ED wait time and length of visit	Liew D and Kennedy MP (2003) have highlighted that extended wait times and prolonged visits in the Emergency Department (ED) can reduce the quality of care and elevate the risk of adverse events for patients with serious conditions. Similarly, a study by Diercks DB, Roe MT, Chen AY, et al (2007) found that patients with non-ST-elevation myocardial infarction (MI) who spend more than 8 hours in the ED face a higher risk of recurrent in-hospital MI compared to those with shorter stays.
4.	Renaud, Santin, Coma, Camus, Van	2009	Association between timing of intensive care unit admission	Renaud et al. (2009) found that patients with delayed transfers had a

	Pelt, Hayon, Gurgui, Roupie, Herve, Fine, BrunBuisson, &Labarere		and outcomes for emergency department patients with community-acquired pneumonia	significantly higher 28- to 16-day mortality rate (23.4% vs. 11.7%) and a longer median hospital stay (13 days vs. 7 days) compared to those who were transferred directly. Notably, patients moved directly to the ICU from the ED had a mortality rate of 13.6%, while those experiencing a transfer delay of at least 3 days faced a mortality rate of 19.6%.
5.	Alison Day and Carol Oldroyd	2012	Attempting to reduce the maximum emergency waiting time to 4 hours in England: was the initiative successful?	Alison Day and Carol Oldroyd (2012) in their study stated that "Long wait times in the emergency department have been recognized as a concern throughout the world demand on services increases. A prolonged ED wait time reduces quality of care and can adversely affect outcome for patients with serious illness. In addition extended wait times and ED crowding contribute to patient dissatisfaction and staff frustration. In response to these issues, The Department of health, England proposed, as a part of National Health Service (NHS) Plan, a maximum waiting time of 4 hours to admission, transfer or discharge."
6	Puneet Freibott DNP, RN, NEA-BC, CCRN-K'S	2017	Optimizing Emergency Department Throughput Using Best Practices to Improve Patient Flow	The project aimed to enhance Emergency Department (ED) efficiency at a tertiary acute care hospital by addressing overcrowding and operational inefficiencies. It

				implemented evidence-based interventions and structural changes, including training ED charge nurses as patient flow coordinators to prioritize evaluations in the waiting room, supported by improved communication and collaboration strategies. Structural adjustments involved creating an assessment area within the ED waiting room and reallocating resources. The project emphasized collaborative efforts, cultural shifts among ED physicians, and strategies to overcome barriers. It underscored the global challenge of ED overcrowding and emphasized the critical role of throughput in enhancing care quality.
7	Thakur A, Gupta S, Sharma R	2020	Study of patient flow and turnaround time in the ER in a tertiary care hospital	This was a retrospective study conducted using data from 1,128 patients over a period of six months. The authors have identified delays in triage, inadequate staffing during peak hours, longer waiting times for diagnostic tests, and delays in decision making regarding patient disposition, all accounting for an increased TAT. Interventions such as optimizing staffing levels, streamlining triage processes, improving communication and coordination, and expediting diagnostic testing and decision making associated with improving TAT changed

				the efficiency of care in ED.
8	Gupta S, Singh S, Kashyap A	2020	Reducing turnaround time for critical patients in the emergency department.	The study aimed at enhancing the efficiency of ED workflow to deliver care at the right time to critically ill patients and The interventions aimed at reducing TAT for critical patients in the ED were implemented, which showed major improvement. These interventions resulted in a significant decrease in TAT and better management of critical patients. It emerges from the findings that process optimization and targeted interventions are important in enhancing emergency care delivery in the ED.
9	Ramani S, Devi L, Yedidi RS	2019	Analysis of factors affecting emergency department turnaround time: a study from a tertiary care hospital in South India	The study analyzed data from 1,300 patients over a one-year period. Identified several factors that significantly impacted TAT, including the mode of arrival (ambulance arrivals had longer TAT) patient category (referrals from other hospitals had longer TAT), time of arrival (night-time arrivals had longer IT), and time of physician assessment (assessments during night shifts led to longer TAT). Challenges related to staffing, diagnostic testing delays, and patient referrals were also identified. The study recommended interventions such as optimizing staffing during night shifts, improving coordination with referring

				hospitals and expediting diagnostic testing to reduce TAT and enhance the efficiency of care in the ED.
10	George M, Jose J, Varughese	2019	Determinant of emergency department turnaround time in South India	The study showed that patients arriving by ambulance, high triage category had longer TAT. Here age and gender did not impact TAT

Table 2- Literature Review

CHAPTER- 4

METHOD

3.1 Research Design

This is a cross-sectional observational study conducted in the Emergency Department (ED) of Medanta – The Medicity, Gurugram. The data was collected for a sample of 100 patients admitted in March 2025, specifically tracking the timeline from the admission advice to the actual time of patient shifting to ICU or Ward. This time interval, referred to as Turnaround Time (TAT), was analyzed to identify delay patterns and operational bottlenecks. Both quantitative metrics and categorical delay factors were studied.

3.2 Study Setting

The study is conducted in the Emergency Department of Medanta – The Medicity, Gurugram. The ED is a high-footfall unit handling acute and critical care patients, and transfers to inpatient care (ICU/Ward) are routine and time-sensitive.

3.3 Duration

The study was carried out over the month of March to June 2025.

3.4 Study Population

The study population includes patients who were registered and admitted through the ED and transferred to an ICU or general ward within the hospital during the study period. Only patients whose transfer times and details were recorded in Excel.

3.5 Inclusion Criteria:

- Patients are admitted to ICU, Ward or Cath lab through ED between 9:00 AM and 5:30 PM.
- Age above 18 years.
- Complete time log details available.

3.6 Exclusion Criteria:

- Brought-dead or LAMA cases were not part of study.
- Patients who were getting discharged.
- Patients transferred on Sundays.
- Patients transferred at night.
- Patient shifted after 5:30 pm.

3.7 Research Procedures

The study followed these procedures:

- Dashboard Data Review: Collected data from Medanta's internal ER dashboard.
- Data Points Captured: Time of arrival, admission advice, billing, physical shift, and disposition.
- Delay Categorization: Checklist fields for common delay causes (panel approval, staff, documentation, etc.)

- Observation and Workflow Mapping: Indirect observation of nurse stations and admission desks during peak times.

3.8 Sample Size

A purposive sample of 100 patients was selected from the total pool of ED admissions in March 2025. These patients were tracked end-to-end from admission advice to actual transfer to ICU, Ward or Cath lab.

3.9 Sampling Technique

Purposive sampling was used, based on availability of complete time logs and representation across ICU and Ward admissions.

3.10 Statistical and Qualitative Methods

- Descriptive Statistics: Mean TAT, frequency of delay causes, distribution by mode of payment and disposition.
- Comparative Charts: TAT across ICU vs Ward and Panel vs Cash patients.
- Root Cause Overview: Delay reason flags tallied from checklist.
- Tools: MS Excel

3.11 Ethical Considerations

No patient identifiers were collected. Data was used solely for academic research. Observations were non-intrusive and did not disrupt ED operations. Institutional and department-level permissions were obtained.

CHAPTER 4

RESULTS

This chapter presents updated results using consolidated categories for both patient disposition and mode of payment. Turnaround Time (TAT) metrics and delay reasons are reported accordingly for better clarity and operational planning.

Metric	Value
No. of Patients (≤ 1 hour)	37.0
No. of Patients (1–2 hours)	44.0
No. of Patients (> 2 hours)	19.0
Minimum TAT (excluding 0) (min)	9.0
Maximum TAT (min)	368.0
Average TAT (min)	87.4

Table 3- findings

Data for 100 patients was collected in April 2025. The key time intervals observed are as follows:

- 37 patients (37%) were shifted to ICU, Ward, or Cath lab in less than 1 hour.
- 44 patients (44%) were shifted between 1–2 hours.
- 19 patients (19%) required more than 2 hours to be shifted.

The minimum observed TAT was 9 minutes, and the maximum reached 368 minutes (6 hours 13 minutes). The overall average TAT was approximately 87.4 minutes, or 1 hour and 45 minutes.

According to Medanta's ED policy, the permissible TAT for shifting patients is 4 hours. However, this excludes clinical exceptions such as patients with kidney stones, GI pain, or requiring extended stabilization. From arrival to actual shifting, the patient undergoes triage, emergency doctor consultation, cross-references if needed, admission request, and final shifting.

This study focuses specifically on delays from the Request for Admission (RFA) generation to the physical transfer of the patient, with a target baseline time of 1 hour for administrative efficiency.

Of the 100 patients observed, 63 patients (63%) experienced delays beyond the 1-hour baseline, highlighting significant scope for administrative process improvement in the ED. Hence proving the need of our study in this department because timely shifting specifically in ED is very important in the case of critical patient for the specialized care needed by them.

4.1 Average TAT by Disposition (ICU, Ward, Cathlab)

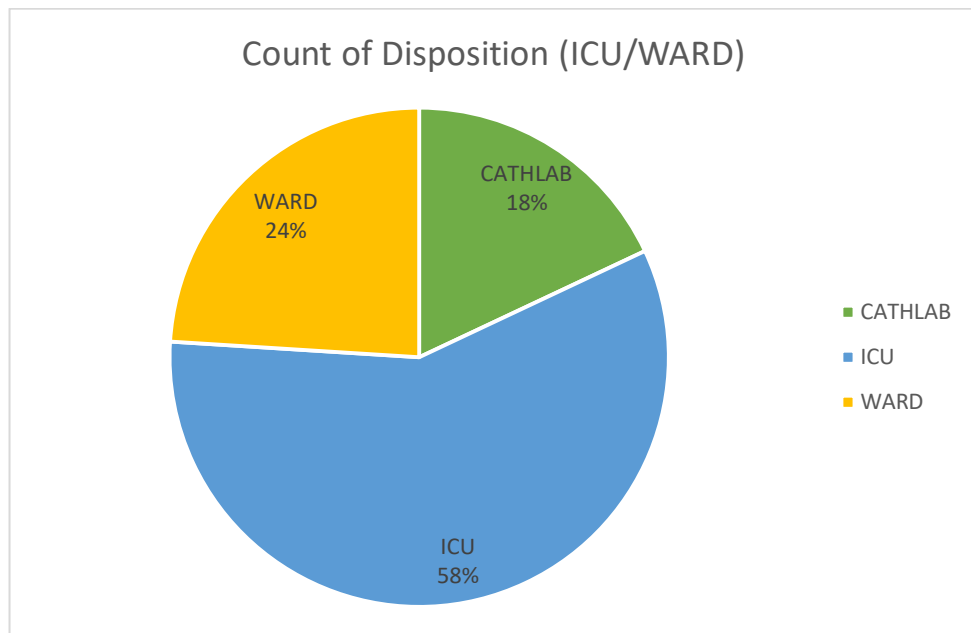


Fig- 2- Avg TAT by disposition

The analysis of Turnaround Time (TAT) by destination highlights distinct trends in patient movement within the Emergency Department. **ICU transfers** were the most frequent, accounting for **58% of the total cases (n = 58)**, and recorded the **shortest average TAT at 78.9 minutes**. This category includes transfers to multiple critical care units such as **ICU 1 to 12, the Heart Command Centre, and HDU**, reflecting that patients in life-threatening or rapidly deteriorating conditions are given immediate attention and are prioritized in the shifting workflow.

Ward admissions represented **24% of the cases (n = 24)** and had an **average TAT of 91.8 minutes**. These admissions included a wide range of specialties such as **GI Surgery, Nephrology, Cardiology**, and other general wards. Delays in this group were typically due to waiting for bed readiness, staff unavailability, or concurrent admissions and discharges.

Cath Lab transfers, although the least frequent at **18% of cases (n = 18)**, had the **longest average TAT at 109.1 minutes**. These delays are likely the result of complex **pre-procedural coordination**, such as aligning with the cardiology team, preparing catheterization equipment, obtaining informed consent, and ensuring immediate post-procedural ICU availability if needed.

The data confirms that **ICU transfers are effectively prioritized**, while **Cath Lab and Ward admissions face higher procedural and logistical hurdles**. Addressing these through better interdepartmental communication, advanced scheduling, and bed management protocols could significantly improve overall patient throughput.

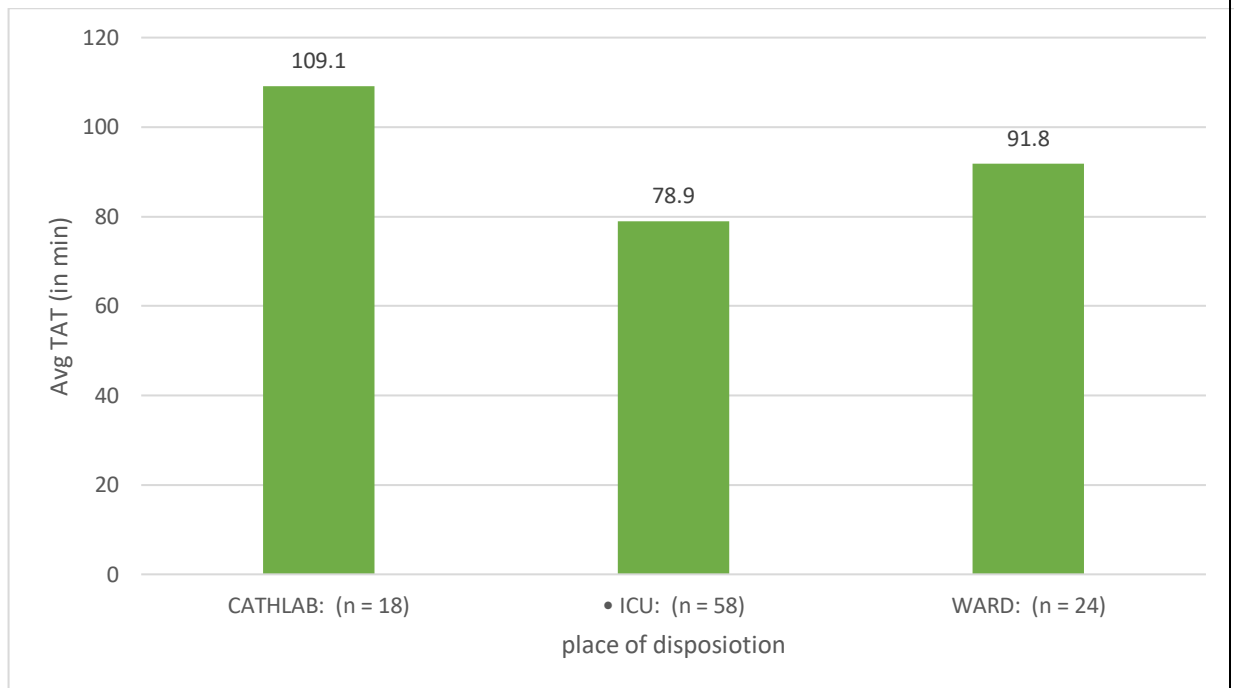


Fig 3– avg TAT in disposition

By destination, ICU admissions recorded the shortest average Turnaround Time (TAT) at approximately 79.1 minutes, indicating prioritization due to the critical nature of these cases. Ward transfers followed with an average TAT of 91.8 minutes, while Cath Lab transfers experienced the highest delays, averaging 109.1 minutes. The extended time for Cath Lab transfers is likely attributed to procedural coordination requirements, including the availability of specialized staff, equipment preparation, and procedural slot scheduling.

Several recurring delay factors were observed during the shifting process. Among the most frequent were the **unavailability of General Duty Assistants (GDAs)** and other portering staff during key hours, which directly impacted the timely movement of patients. **Delays in cross-consultations**, where opinions from specialty departments were needed before final admission clearance, also contributed to prolonged stays in the Emergency Department. Additionally, **pending diagnostic investigations**, such as lab tests and imaging, frequently held up the admission process when clinical teams awaited confirmation before proceeding with transfers.

Another major contributor to delay, particularly in ICU and Ward transfers, was the **unavailability or unpreparedness of inpatient beds**. In several instances, patients had to wait until the discharge or transfer of existing occupants was completed, resulting in bed turnover delays. The absence of a proactive bed allocation system led to last-minute communication gaps and inefficient transitions between departments. These infrastructural and communication barriers added significantly to the cumulative TAT.

These findings underscore the need for a structured and proactive approach to managing emergency transfers. **Implementing SOP-based escalation matrices** can help ensure accountability and timeliness at each stage of the process. **Digitizing the panel approval workflow**, particularly for patients under CGHS and corporate panels, would reduce administrative turnaround time. Moreover, strengthening the **nurse-portering system** by optimizing shift-wise staffing and assigning dedicated shift coordinators could help alleviate delays caused by staff shortages. Collectively, these interventions have the

potential to significantly enhance patient throughput and improve outcomes across critical care services.

4.2 Average TAT by Mode of Payment

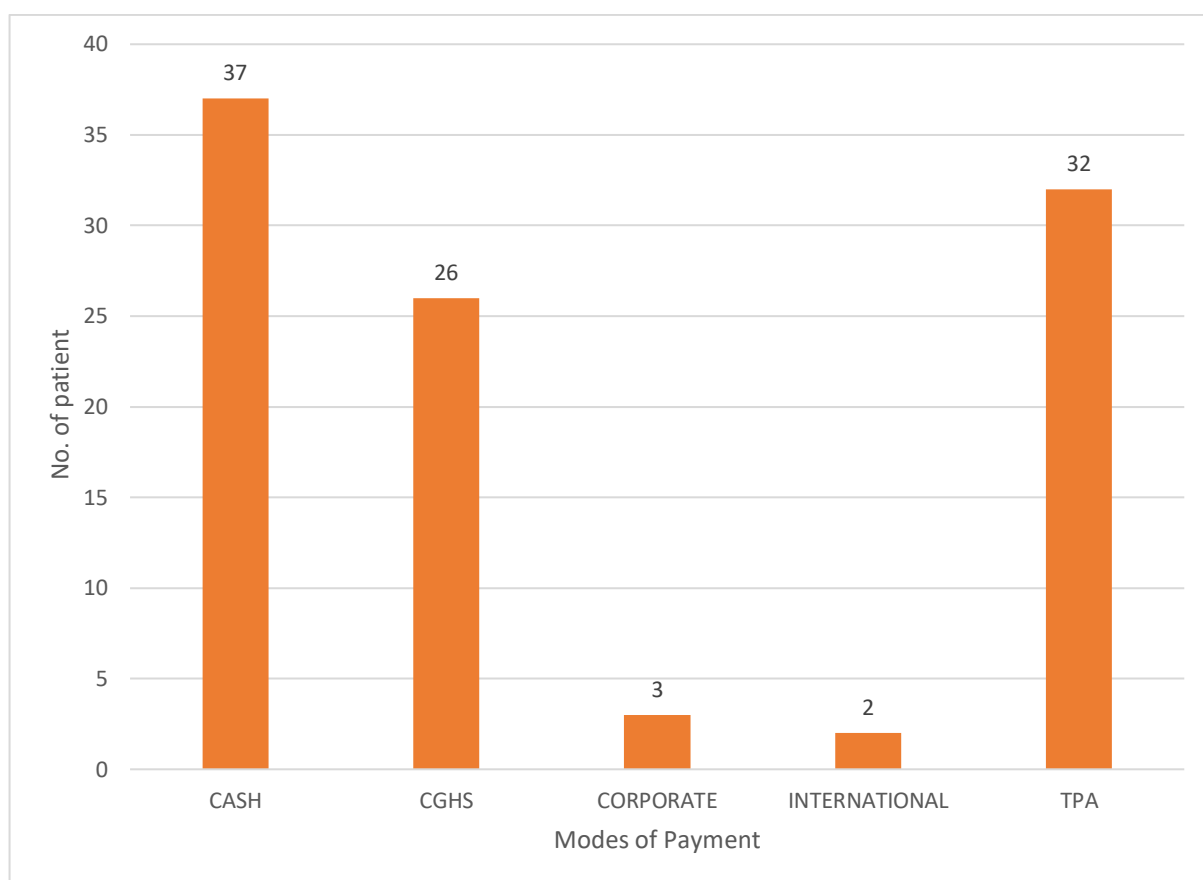


Fig 4 – count of modes of payment

An analysis of Turnaround Time (TAT) based on mode of payment reveals significant variation across different patient categories. **Cash-paying patients** recorded an average TAT of **93.1 minutes** (n = 37), while those under **Government schemes (e.g., CGHS)** had a comparable average TAT of **92.5 minutes** (n = 26). **Corporate patients** had the highest average TAT at **97.7 minutes** (n = 3), likely due to inconsistencies and delays in panel verification and documentation processes. In contrast, **TPA patients** (n = 30) had a comparatively lower average TAT of **78.1 minutes**, possibly due to better-established workflows and dedicated support staff managing insurance cases.

Interestingly, **International patients** recorded the shortest average TAT at **46.0 minutes** (n = 2), reflecting low patient volume and the presence of dedicated coordinators or concierge teams that facilitate faster admissions. Meanwhile, two patients categorized under ICU-related direct admissions also showed a moderate average TAT of **82.0 minutes**, indicating prioritized handling due to clinical urgency.

Despite lower averages for TPA and international patients, **panel approval delays and limited nursing staff availability** continue to be leading contributors to extended TAT across most categories, particularly for government and corporate patients. These administrative challenges delay the finalization of the admission process even after clinical decisions are made. Therefore, streamlining panel workflows, ensuring real-time

approval systems, and reinforcing staff availability can help minimize TAT and improve admission efficiency, especially for high-volume and panel-dependent patient groups.

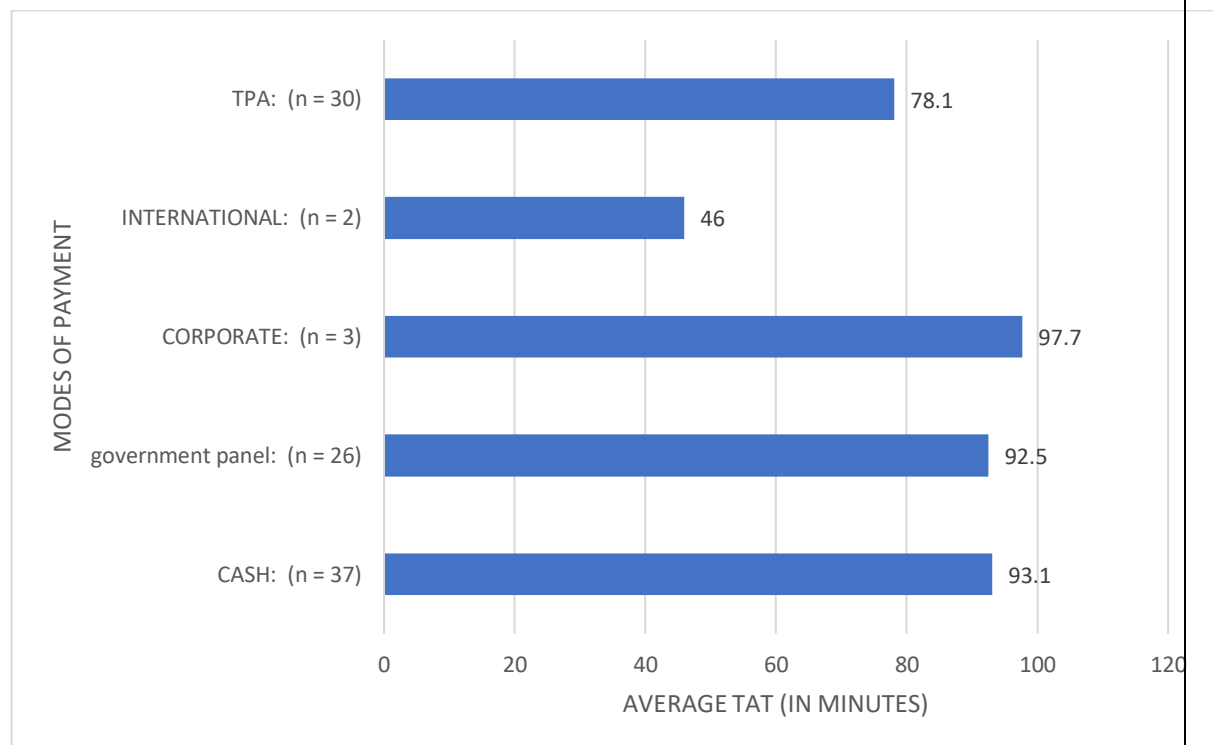


Fig 5- avg TAT of modes of payment

The chart shows that international and TPA patients had the shortest average TAT (46 and 78.1 minutes respectively) due to streamlined processes and low volumes. In contrast, cash, CGHS, and corporate patients experienced longer delays (over 90 minutes), largely due to manual approvals, financial counseling queues, and panel coordination issues. This highlights the need for digitized workflows and dedicated fast-track systems to improve patient transfer efficiency in the Emergency Department.

4.3 Delay Reason

1. Shortage of nursing staff, especially during peak hours, leading to delays in assessment, treatment initiation, and follow-up care and chaos during shift change of staff.
2. Unavailability of beds in ICU, Wards, or Cath lab, forcing patients to wait in the ED beyond the necessary period.
3. Absence of a dedicated admission counter for the ED, resulting in long queues and admission delays.
4. Prolonged wait to meet the financial counselor, delaying the payment process and final admission approval.
5. Non-availability of GDAs or porters for shifting patients, particularly during shift changes or high patient load.

6. Delay in availability of diagnostic reports (lab, radiology), hindering timely medical decision-making.
7. Manual and paper-based panel approval process, requiring multiple verifications and physical movement between desks.
8. Attendant-related delays, such as absence or unawareness about shifting formalities.
9. Cross-consultation delays due to unavailability or delayed response from specialty teams.
10. Complex cases requiring multidisciplinary coordination before final admission clearance.
11. Overcrowding in the Emergency Department, limiting space and slowing down workflows.
12. Lack of guidance or SOP training for attendants and support staff on ED admission processes.

Chapter 5 Discussion

In this section we have conducted the root cause analysis to find out the reasons for delay in emergency department. Fish bone analysis was used for the same.

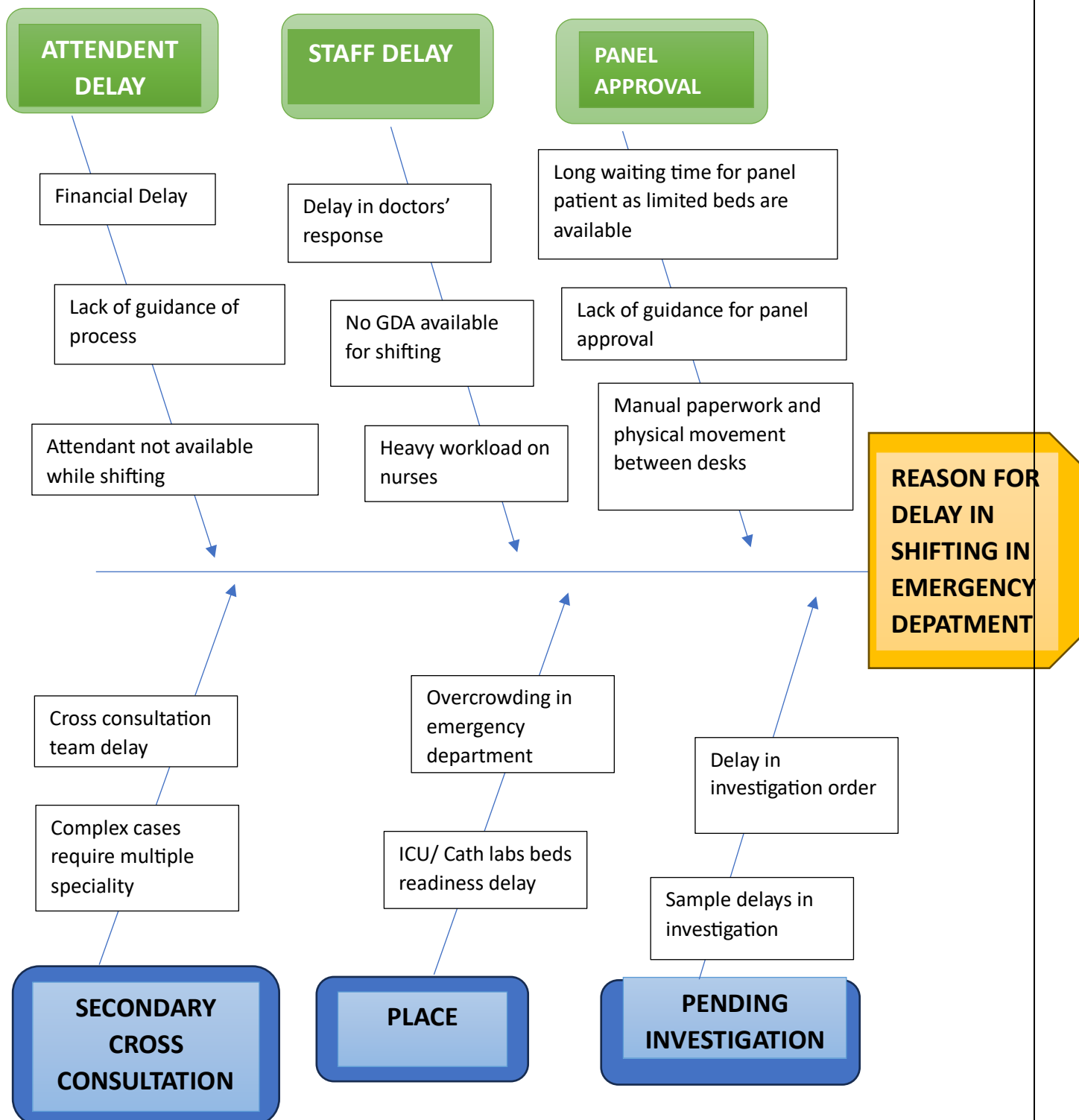


Fig – 6 Fishbone diagram

The main issue was identified for the delay in shift in the ED and sub issues were also identified .the main issue that were casing the delays .

The **Fishbone Diagram**, also known as the Ishikawa Diagram, was utilized in this study to systematically explore the various root causes contributing to delays in patient shifting within the Emergency Department (ED) at Medanta Hospital, Gurugram. This visual tool is designed to categorize complex, interrelated problems into clear thematic areas, thereby aiding structured problem-solving. In the context of this study, six main domains were identified as key contributors to Turnaround Time (TAT) delays:

Attendant Delay, Staff Delay, Panel Approval, Secondary Cross Consultation, Place, and Pending Investigation.

Attendant Delay was one of the most prominent non-clinical barriers. It involved issues such as the financial dependence of the patient on the attendant, delays due to attendants being unavailable at the time of admission, or lack of clarity about documentation and procedural steps. These factors often led to postponed consents and missed communication between support staff and the family. **Staff Delay** included a shortage of nursing personnel during peak hours and the unavailability of porters (General Duty Assistants – GDAs), particularly during night shifts or high-load situations. Heavy nurse workload also caused delays in completing required assessments before admission.

The **Panel Approval** process was another significant source of delay, especially for patients under government or corporate schemes. The approval pathway was largely manual and involved physical form submissions, multiple counters, and repeat verifications. These steps prolonged the shift timeline, particularly when panel desk representatives or financial counselors were unavailable. **Secondary Cross Consultation** also contributed to delays, especially for complex or multispecialty cases. Patients requiring evaluation by two or more departments—such as surgery and cardiology—experienced time losses due to scheduling gaps, consultant availability, and inconsistent communication.

Further, **Place**-related constraints included overcrowding in the ED, lack of admission bay turnover, and delays in ICU or Cathlab bed readiness. These issues were particularly visible during high-volume days. **Pending Investigation** delays also played a role when admission decisions were put on hold until lab or imaging results arrived, further extending the patient's stay in the ED. Collectively, the Fishbone Diagram enabled a holistic view of the problem by mapping operational inefficiencies across multiple departments. The findings underscore the need for digitized workflows, staffing optimization, and coordinated communication to improve the overall efficiency of patient transitions in the emergency care setting.

The identified issues in patient transfer at Medanta Hospital, Gurgaon, reflect common challenges faced by emergency departments (EDs) globally, as highlighted in various studie The analysis of 102 patients revealed that only 36% were shifted within one hour of admission advice, with 19% facing delays exceeding two hours. These findings are supported by Thakur et al. (2020), who identified triage delays, inadequate staffing, and diagnostic testing bottlenecks as major causes of increased TAT in tertiary hospitals. In our study, similar patterns were seen, particularly with nursing delays and prolonged panel approvals.

Downey and Zun (2007) further emphasized that patient satisfaction is closely related to perceived waiting times, staff behavior, and coordination. These challenges are

particularly evident in our dataset among CGHS and corporate patients, where administrative complexity contributed to delays.

Diercks et al. (2007) highlighted those extended stays in the ED correlate with poorer outcomes for cardiac patients. Our findings of prolonged Cathlab transfer times support this concern. Improving procedural coordination and prioritizing Cathlab transitions could mitigate these risks.

Renaud et al. (2009) found that delays in ICU transfers increase patient mortality. Although our data showed ICU transfers were fastest on average, with 79 minutes, improvements are still needed to reduce delays from diagnostics, billing, or unavailability of porters.

Day and Oldroyd (2012) introduced a four-hour maximum emergency wait benchmark in the UK NHS. Though our patients didn't cross this threshold, nearly 20% exceeded 120 minutes, warranting process enhancements for urgent transfers.

Freibott (2017) and Gupta et al. (2020) emphasized the use of flow coordinators, restructuring waiting areas, and communication improvements. These measures align well with the identified causes in our fishbone analysis, and could be piloted in Medanta's ED.

In light of the findings, several targeted recommendations can be made to reduce delays in patient shifting from the Emergency Department. First, implementing **SOP-based escalation matrices** with defined thresholds (e.g., alerts after 60 or 90 minutes) can prompt timely intervention. The **digitization of panel approval workflows**, especially for CGHS and corporate patients, would help eliminate paperwork-related delays and streamline admissions. Reinforcing **staffing during peak hours**, including dedicated GDAs and nurse coordinators, can address manpower shortages that currently hinder prompt patient movement. Additionally, establishing **fast-track admission counters** for ED patients and improving cross-consultation tracking through digital dashboards will enhance coordination and reduce procedural lag. Collectively, these measures can significantly improve TAT performance and optimize patient flow in critical care areas.

CONCLUSION

This study was conducted to evaluate the Turnaround Time (TAT) for patient transfers from the Emergency Department to ICU, Ward, or Cathlab at Medanta Hospital, Gurugram. The analysis covered a sample of 102 patients tracked over the month of March 2025, examining timelines from admission advice to physical transfer along with contributing delay factors.

The average TAT across the cohort was found to be 87.4 minutes, exceeding the target benchmark of 60 minutes. Approximately 36% of patients were transferred within one hour, while nearly 20% experienced delays beyond two hours. ICU transfers showed the shortest TAT (approximately 79 minutes), indicating prioritization of critical cases. On the other hand, Cathlab transfers required the longest time (around 109 minutes), largely due to coordination complexity and procedural readiness. Ward transfers averaged 91.8 minutes.

Payment mode analysis revealed that international patients had the shortest average TAT, while CGHS and Corporate patients experienced extended delays. Panel approval and nursing staff delays emerged as the most frequent causes of delay, followed by issues with shifting staff, pending investigations, and unavailability of attendants at critical moments.

The study also reviewed findings from national and international literature which corroborated the influence of factors such as staffing patterns, diagnostic bottlenecks, and interdepartmental communication gaps on TAT. Using tools like the Fishbone diagram, this study further broke down these delay categories into actionable problem areas such as lack of digitization, over-reliance on manual paperwork, and absence of SOP-based coordination.

In conclusion, while Medanta's Emergency Department has strengths in managing critical cases with relative efficiency, systemic interventions are necessary to streamline workflows for all patient categories. Recommendations include the digitization of panel approval workflows, prioritization protocols in diagnostics, SOP-based escalation for delays, and manpower adjustments during high-volume shifts. Implementing these measures is expected to enhance throughput, reduce congestion, and ultimately improve patient satisfaction and clinical outcomes.

RECOMMENDATION

Based on the findings of this study and comparison with published literature, the following recommendations are proposed to reduce Turnaround Time (TAT) in the Emergency Department at Medanta Hospital:

1. Attendant-Related Delays

- Establish a separate helpdesk/counter at the ED specifically for resolving attendant queries and guiding them through admission steps.
- Provide clear visual guides or handouts at entry points to improve attendant awareness of hospital workflows.
- Offer financial counselling at the point of admission to help patients and attendants understand billing and payment requirements.

2. Staff Delay

- Introduce an online GDA/porter request system to avoid manual dependency and ensure timely patient movement.
- Deploy dedicated shift coordinators in the ED to oversee patient movement and manage staff tasks effectively.
- Increase nursing and portering staff during peak hours (e.g., 12 PM–5:30 PM) to match patient load.

3. Panel Approval

- Assign dedicated panel assistance staff for CGHS, TPA, and corporate patients to streamline form submissions and approvals.
- Implement a digitized panel workflow integrated with the hospital's information system to reduce paperwork and desk-to-desk delays.

4. Pending Investigation

- Boost sample collection and diagnostic staff strength during peak hours to reduce delays in receiving lab/radiology reports.
- Prioritize ED patient investigations in the diagnostic queue by flagging cases based on triage severity.

5. Cross Consultation

- Use real-time dashboards or internal alerts for pending cross-consultations to improve specialist response time.
- Implement turnaround targets for internal consults (e.g., within 30–45 minutes) for ED-originated requests.

6. Place (Bed Readiness)

- Use a bed management dashboard to ensure that availability and readiness are confirmed before initiating shift.
- Create buffer zones or holding areas to ease bed transfer congestion during peak hours or shift transitions.

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