

AN OPTIMIZING THE PATIENT DISCHARGE PROCESS USING LEAN METHODOLOGY IN OPERATION DEPARTMENT

Dissertation Submitted to



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in

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by

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Under the Supervision and Guidance of

Dr. Tripti Bisawa

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To Whom It May Concern

This is to certify that Mr. Mayank Khandelwal S/o Mr. Om Prakash Khandelwal a student of Masters in Business Administration (Hospital and Health Care Management), IIHMR University, Jaipur, Rajasthan has successfully completed training as Operation Management Trainee from 10th Mar 2025 to 30th May 2025 at CKS Hospitals. During this period of his training programme with us he was found punctual, hardworking and inquisitive.

We wish him every success in life.

For CKS Hospital
(A Unit of CKS Medicare Pvt Lt.)



Authorise Signatory

CERTIFICATE

This is to certify that dissertation titled **An Optimizing the Patient Discharge Process using Lean Methodology in Operation Department** is a record of the research work undertaken by **Dr. Mayank Khandelwal** in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and his approach to the research study has been sincere, scientific, and analytical.

A blue ink signature of Dr. Tripti Bisawa, consisting of stylized initials and a surname.

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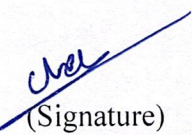
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DECLARATION BY STUDENT

I hereby declare that this dissertation titled **An Optimizing the Patient Discharge Process using Lean Methodology in Operation Department** is the 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 Information derived from the published or unpublished work of others has been duly acknowledged in the text.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)

Dr. Mayank Khandelwal

Date:

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ABSTRACT

Title:

Optimizing the Patient Discharge Process Using Lean Methodology in Operation Department

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Abstract:

The discharge process plays a critical role in hospital operations and patient satisfaction. At CKS Hospital, Jaipur, delays in discharging patients were found to cause not only dissatisfaction but also inefficiencies in bed utilization and resource management. This study was undertaken to analyse the existing discharge process and identify delays using Lean methodology, which emphasizes waste elimination and process optimization.

A prospective, cross-sectional study was conducted over three months, involving 140 discharged patients from various wards. Turnaround Time (TAT) was recorded from the moment of discharge intimation by the doctor to the physical exit of the patient and subsequent readiness of the bed for the next admission. The study revealed that delays were due to inefficient summary preparation, lengthy dressing procedures, and physical separation between key service points such as pharmacy and dressing rooms.

Using Lean tools like value stream mapping, Poka-Yoke (mistake-proofing), and the PDCA cycle, root causes of delays were identified and addressed with actionable recommendations. These included process redesign, better layout planning, staff reallocation, and digital intervention.

The study concludes that applying Lean methodology significantly improves discharge efficiency and enhances patient experience. Streamlining the discharge workflow not only shortens TAT but also boosts overall hospital performance.

Keywords:

Lean methodology, discharge process, patient satisfaction, turnaround time (TAT), hospital workflow, CKS Hospital, value stream mapping, healthcare efficiency

Background:

Efficient and timely patient discharge is essential for maintaining hospital workflow and ensuring patient satisfaction. Delays in discharges can lead to overcrowding, decrease patient satisfaction, and financial losses to the institution. The use of Lean methodology in hospital processes aims to eliminate inefficiencies and optimize patient flow. This study was conducted at CKS Hospital, Jaipur, to identify and resolve discharge delays using Lean tools.

Objectives:

- To study the current discharge process in the inpatient department (IPD).
- To identify the key areas causing delays in patient discharge.
- To implement Lean strategies to reduce discharge turnaround time and improve efficiency.

Methodology:

A cross-sectional, prospective, and analytical study was conducted over a period of 3 months at CKS Hospital with a sample size of 140 discharged patients. Data collection focused on steps from discharge intimation to patient exit, including discharge summary preparation, pharmacy clearance, billing, and nursing execution. Tools used included time-motion studies, value stream mapping, and Poka-Yoke for error reduction.

Results:

- Average Turnaround Time (TAT) ranged from 3.5 to 5.5 hours, depending on the patient category (Cash, ECHS, Insurance).
- Major delays occurred in summary preparation and patient dressing, especially in the deluxe wards due to the physical layout.
- Long distances between wards and the dressing/pharmacy areas added non-value-added time.

Recommendations:

- Reorganize the physical layout (e.g., move dressing room closer to wards).
- Use bedside linen storage and centralized nursing stations.
- Implement discharge management software and assign staff specifically for pharmacy clearance.
- Improve bilingual feedback forms and enhance communication during discharge.
- Regular training and staffing adjustments are necessary for sustainable improvement.

Conclusion:

Applying Lean methodology to optimize the discharge process can significantly reduce delays and enhance patient satisfaction. Process redesign, strategic staff deployment, and use of digital tools are essential to ensure efficient, patient-centred care delivery in a multispecialty hospital setting.

TABLE OF CONTENTS

SL. NO	TOPIC	PAGE NO
1	Introduction	1
2	Review of Literature	9
3	Methodology	16
4	Results	18
5	Discussion	24
6	Conclusion	26
7	References	28

CHAPTER 1

INTRODUCTION

Patient Satisfaction is a fundamental priority for any healthcare organization. Delays in the discharge process pose a significant challenge, as they not only impact the patient experience but also lead to financial strain on the hospital. This study focuses on identifying the causes of discharge delays within the hospital setting. It is a prospective study conducted on a sample of 140 patients, encompassing various patient categories admitted across all Inpatient Department (IPD) floors of the hospital. It covers cash, CGHS, international and TPA patients. To understand the discharge process and the delays involved in it, analysis has been done on the discharge process. After understanding the complete process of IPD, data was collected at various ends regarding the process initiation and the time it took to complete. The various parameters taken in consideration were the time for the discharge summary to be issued by the doctors, time taken for pharmacy clearance, time taken for billing and finally the time take by the nurses to execute this process. After collecting, compiling, and analysing the data, the areas of concern are highlighted for the optimum use of implementation to be done by the hospital.

Patient satisfaction had been recognized in the recent times as the most essential element of quality and that makes an excellent hospital different from the good hospitals. A streamlined discharge planning can shorten the average length of stay for a patient which is beneficial both for the hospital and the patient. When a patient is told they are being discharged, the first thought is not to stick around the hospital, but to go home as soon as possible.

The main principles for effective discharge and transfer of care are:

- A coordinated, system-wide approach for assessment, service planning and delivery will mitigate avoidable admissions and enable smooth and timely discharges.
- Involving patients and their caregivers as equal partners is vital to ensuring not just quality care, but also a safe and smooth discharge process that truly meets their needs and concerns.
- Discharge should be viewed as a process, not an event. Discharge is a process that should begin as early as possible, and should be coordinated across primary care, hospital services, and social care. Patients and their caregivers should be informed and engaged in care planning decisions, where able.
- A named person should be designated to oversee the discharge planning process. This person will be responsible for managing every step of the patient's journey from early communication with the community pre-admission coordinator to the transfer of care responsibility at discharge.
- All professionals should work within a structure that promotes integrated, multidisciplinary and multiagency teamwork when working through all aspects of discharge.
- Transitional and intermediate care services should be used to support the effective use of acute cares.

Lean Tools

Lean manufacturing is a systematic methodology focused on enhancing productivity, quality, and reducing lead time by identifying and eliminating waste. A key point of this philosophy is Kaizen, Japanese for "continuous improvement" or "change for the better." The goal is to deliver a defect-free product or service to the customer, at the exact time it is needed and in the correct quantity

Below are several essential tools and concepts used within Lean Manufacturing:

1. Cellular Manufacturing

This involves organizing workstations and equipment based on similar process requirements for a family of related products. The objective is to streamline the production process by minimizing cycle time and inventory, thereby improving responsiveness to market demand.

2. Takt Time

Takt time represents the pace at which goods must be produced to meet customer demand and consider the total number of available hours for production. The calculation for Takt time is:

$$\text{Takt Time} = \text{Available Time (T)} / \text{Customer Demand (D)}$$

Takt time is used to help regulate how fast you need to produce depending on customer needs.

3. Standardized Work

It includes materials, tools, methods, and time. It ensures consistency across the value stream and helps maintain production quality while meeting takt time.

4. One-Piece Flow / Continuous Flow

This concept promotes the movement of a single unit through various processing steps without delays. It helps in reducing batch sizes, eliminating bottlenecks, and ensuring a smooth workflow.

5. Pull System and Kanban

In a pull system, production is driven by customer demand rather than forecasts. Kanban cards or signals are used as visual tools to indicate when to produce or move items, thereby avoiding overproduction and waste.

6. The Five Whys

This root-cause analysis technique involves repeatedly asking "Why?"—typically five times to uncover the underlying cause of a problem, promoting deeper problem-solving.

7. Quick Changeover / SMED (Single Minute Exchange of Die)

Developed by Shigeo Shingo, this method reduces machine changeover time by separating internal and external setup tasks. It enhances flexibility and supports just-in-time production by enabling smaller batch sizes.

8. Mistake Proofing / Poka-Yoke

This technique involves designing processes or tools that prevent human errors from occurring. It ensures that mistakes are identified and corrected before they affect quality or safety.

9. Heijunka / Workload Levelling

This strategy focuses on maintaining a consistent production schedule, even when customer orders are irregular. It smooths out workflow by distributing product variations and volumes evenly over time.

10. Total Productive Maintenance (TPM)

TPM is a team-driven approach to enhance Overall Equipment Effectiveness (OEE), focusing on availability, performance, and quality. It promotes shared ownership of equipment maintenance, improving both productivity and employee satisfaction.

$$\text{OEE} = \text{Availability} \times \text{Performance Efficiency} \times \text{Quality Rate}$$

11. 5S

5S stands for

Sort, set in order,

Shine,

Standardize,

Sustain. It is a type of method for workplace organization that can help you maintain cleanliness, order, and discipline to improve efficiency and safety.

12. PDCA / PDSA Cycle (Problem Solving)

The PDCA (Plan, Do, Check, Act) or PDSA (Plan, Do, Study, Act), is an iterative process for identifying and implementing solutions to problems, and for facilitating continuous improvement.

- Plan: Choose a goal and develop a strategy.
- Do: Implement the plan on a small scale.
- Check/Study: Analyse the results to determine whether the strategy was successful.
- Act: Refine the process based on what you learn, to continue to improve.

Problem Statement:

A delay in the discharge process results in patient dissatisfaction.

Research Questions:

1. What is the average time taken by the hospital for discharging a patient?
2. Key areas of improvement required to avoid delay in discharge process?
3. What are the possible recommendations that can be done to avoid delay?

Objectives:

- To study the process flows within the Inpatient Department (IPD) and other related departments.
- To identify the areas of delay in the discharge process and analysed the underlying reasons.
- To streamline the discharge process by reducing the time taken for patient discharges.

CHAPTER 2

REVIEW OF LITERATURE

The patient discharge process is a critical component of hospital operations, directly impacting patient satisfaction, bed availability, readmission rates, and overall hospital efficiency. Numerous studies have examined the inefficiencies in discharge processes and proposed methods to optimize them, with Lean methodology emerging as a prominent approach.

Lean Methodology in Healthcare

Lean thinking, originally developed by Toyota, focuses on eliminating non-value-added activities (waste) and enhancing process flow and efficiency. In healthcare, Lean has been widely adopted to streamline operations and improve patient care. According to Kim et al. (2006), Lean interventions in hospitals can reduce waiting times, improve resource utilization, and enhance communication among departments.

Discharge Process Inefficiencies

Discharge delays are often caused by multiple factors, such as late decision-making by physicians, delays in medication preparation, pending diagnostic reports, lack of coordination among departments, and inefficient documentation. Van Sluisveld et al. (2012) noted that poor discharge planning contributes to increased patient length of stay and potential readmissions. These issues not only affect patient outcomes but also contribute to bed-blocking and reduced operational throughput.

Application of Lean in Discharge Planning

Lean tools such as Value Stream Mapping (VSM), 5S, root cause analysis, and standard work processes have been successfully employed to identify bottlenecks and redesign workflows in the discharge process. A study by Abdelhadi and Shakoor (2014) demonstrated that using VSM in the discharge process helped identify time-consuming steps and led to process standardization, reducing discharge time by up to 40%.

Role of Interdepartmental Coordination

Effective discharge planning requires collaboration among physicians, nurses, pharmacists, case managers, and administrative staff. Carter et al. (2009) highlighted

that team-based approaches, supported by Lean practices, foster better communication and help in early identification of discharge-ready patients, thereby reducing last-minute delays.

Impact on Patient Outcomes and Satisfaction

Implementing Lean-driven discharge processes has shown to improve patient satisfaction scores due to timely communication, clear discharge instructions, and reduced hospital stay. According to a study by Toussaint and Berry (2013), patient-centered Lean initiatives contributed to a 25% improvement in patient satisfaction related to discharge procedures.

Challenges in Lean Implementation

Despite its benefits, implementing Lean in healthcare, especially in discharge processes, poses challenges such as staff resistance, lack of training, and variability in clinical decision-making. Womack and Jones (2003) suggest that leadership commitment, continuous staff engagement, and a culture of quality improvement are essential for sustained Lean adoption.

CHAPTER 3

METHODOLOGY

Data Source:

The data was collected consistently from the inpatient department of CKS Hospital, Jaipur, focusing on patients who were being discharged during the study period. The data analysis and graphical representations were performed using Microsoft Excel.

Type of Study:

Cross-sectional, prospective, and analytical study.

Study Area:

CKS Hospital, Jaipur.

Study Duration:

3 months.

Sample Size:

140 discharged patients.

Sampling Method:

Purposive sampling with elements of simple random sampling.

Tools used:

Value stream mapping-

Avoiding non-value-added activities from the process i.e., eliminating extra steps taken by staff to complete the process because of distance.

Poka-yoke (mistake proofing)-

Errors in summary typing need to be reduced to make the system mistake proof, by rechecking it before printing.

THE APPROACH-

The approach involves 4 steps-

- Project design
- Data collection

- Data Interpretation
- Data analysis

Discharge Summary prepared by residents with concerned doctor guidance

Discharge Intimation by Doctor

Intimation to the nursing staff

CASH Patient

TPA Patient

ECHS Patient

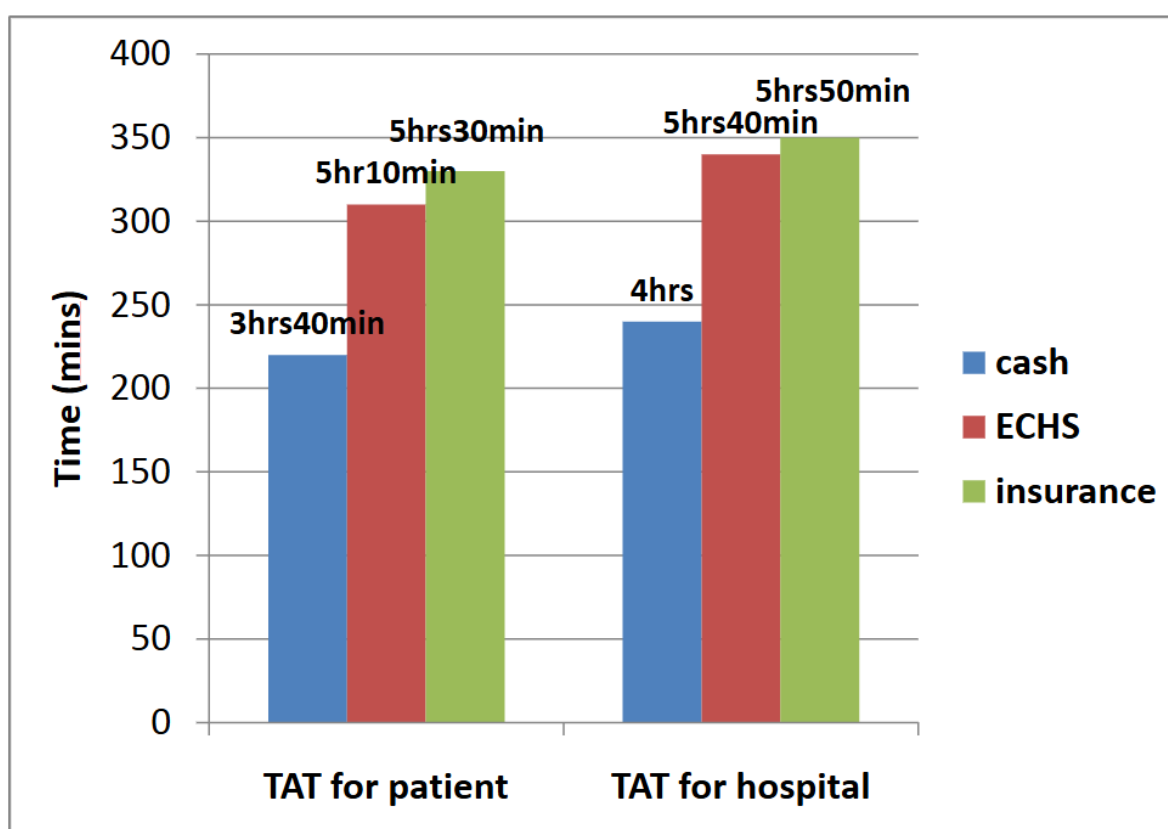
CHAPTER 4

DATA ANALYSIS:

Bed distribution in inpatient department of hospital:

Male General Ward	14 male beds
Female General Ward	10 female beds
Post-Operative Ward	26 beds
Oncology Ward	23 beds
Medical ICU	18 beds
NICU	6 beds
Deluxe, Twin Sharing Room	22 rooms

1. Distribution of Beds in IPD



TAT for the patient:

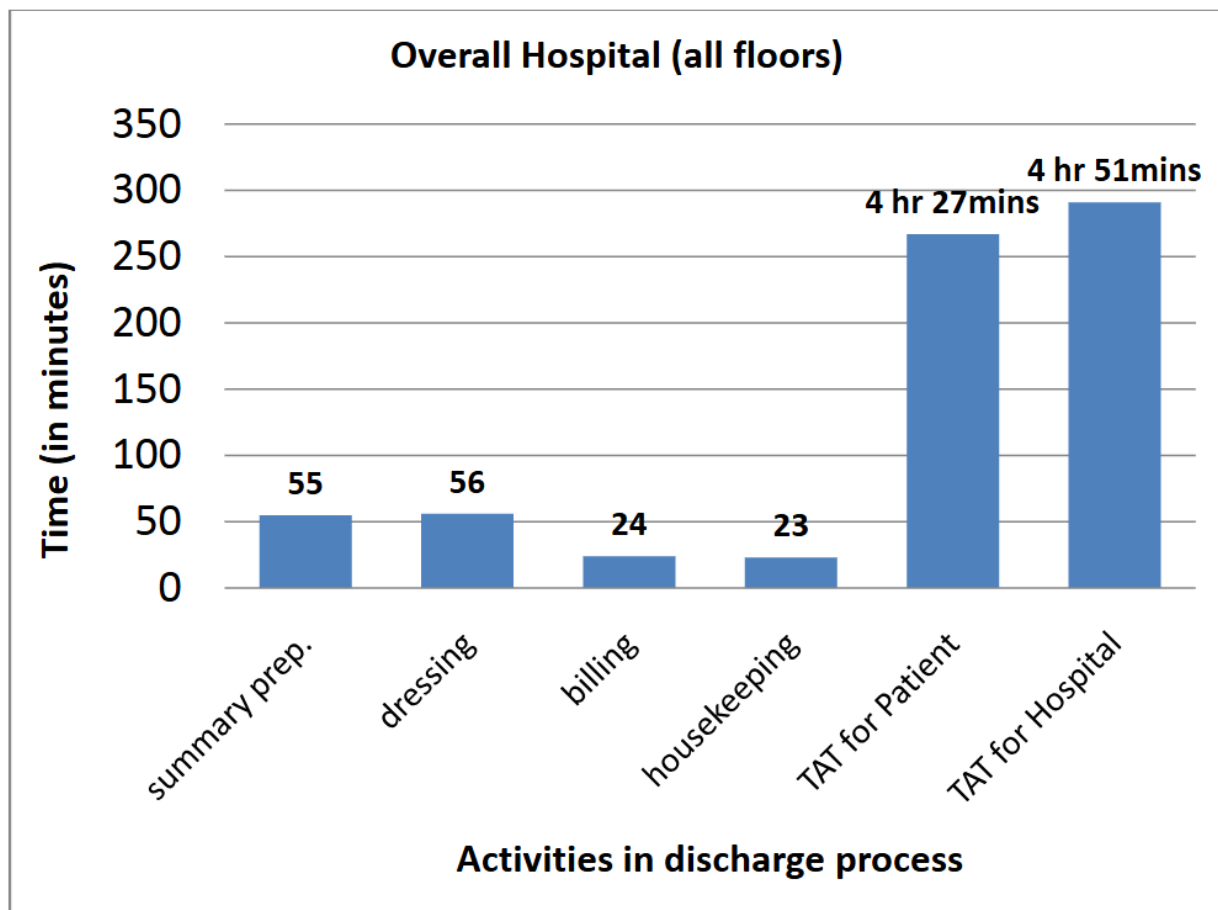
It is the Total turnaround time from doctor's intimation for discharge to physical movement of the patient.

TAT for the hospital:

From intimation till bed is cleaned by housekeeping and been ready for the next patient, after Patient's physical movement.

Observations:

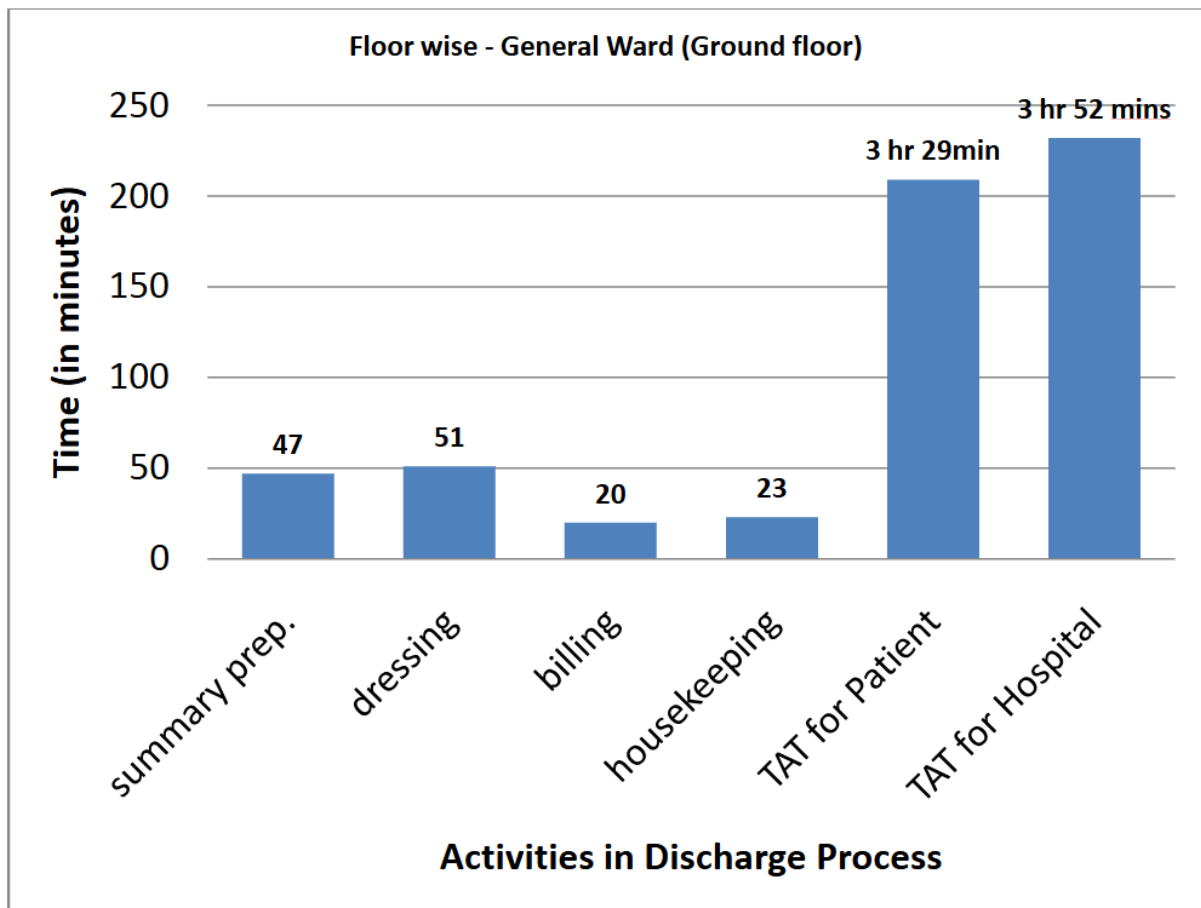
- 1.TAT for the patients in cash patient is 3 hrs 40mins and TAT for hospital is 4 hrs.
- 2.TAT for the patient's in ECHS patient is 5 hrs 10 min and TAT for hospital is 5 hrs 40 min.
- 3.TAT for the patients in insurance patient is 5 hrs 30 min and TAT for hospital is 5 hrs 50 min.



Time taken to prepare summary is a matter of concern for the hospital, as it is taking a long time to prepare.

Time taken in Dressing of a patient is also exceptionally long, which needs exceedingly high attention to improve it.

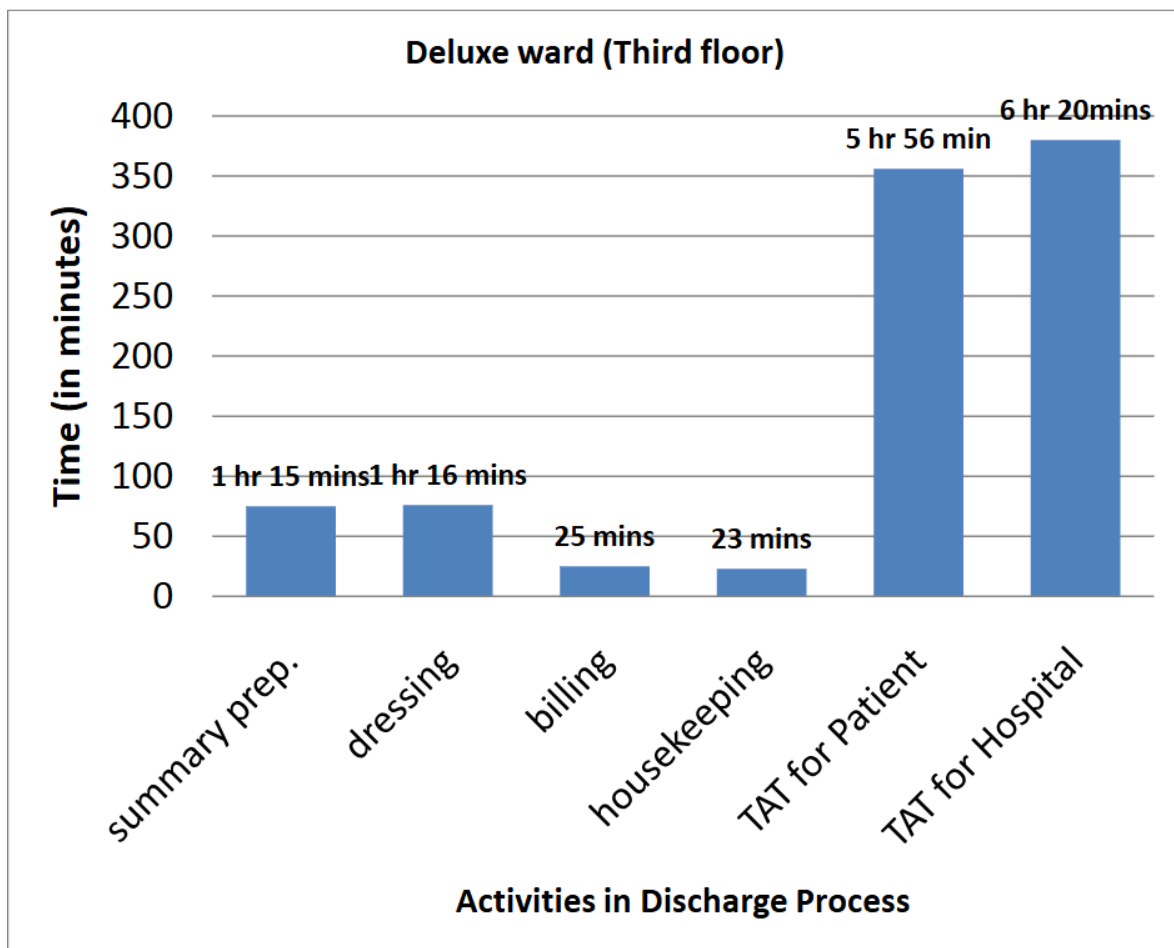
Turnaround time need to be reduced, as in this current scenario, patients are highly dissatisfied.



TAT for the patients is 3 hrs 29 mins and TAT for hospital are 3 hrs 52 mins.

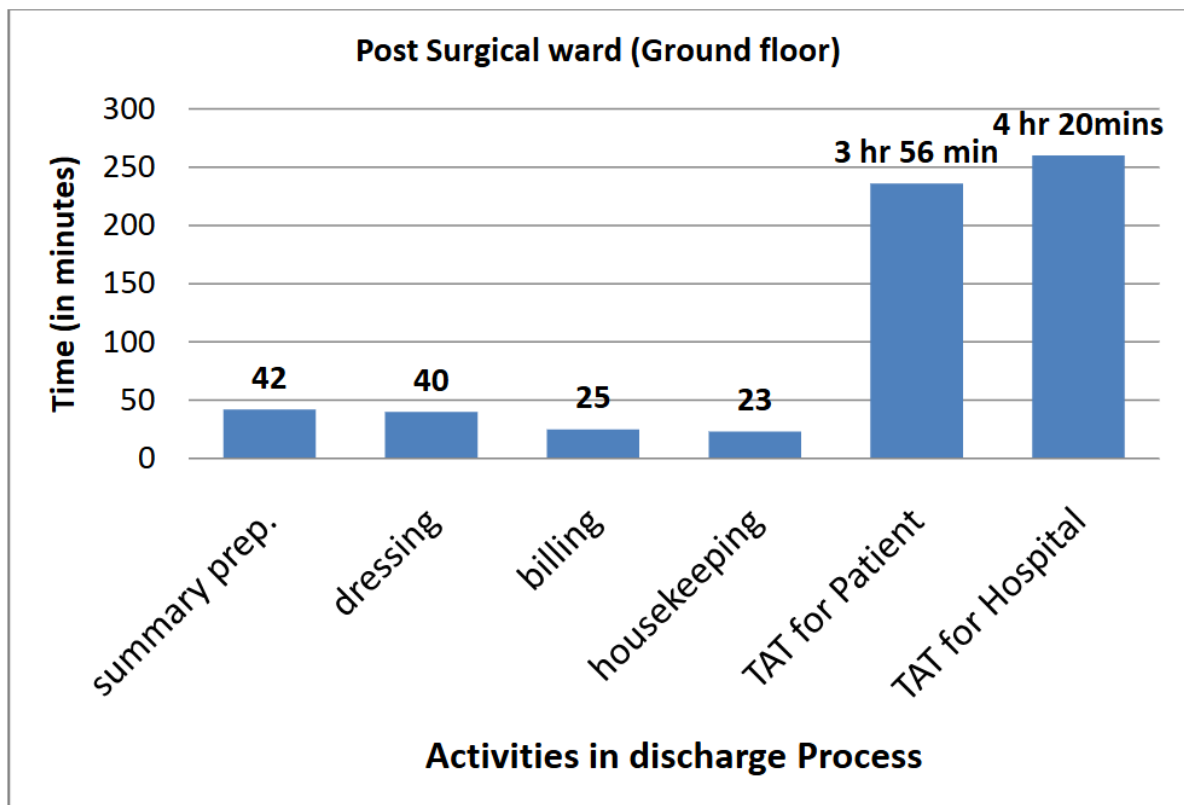
Dressing of the patients is taking an exceedingly long time i.e., 51 mins.

Summaries need to be generated fast to save the time.



An exceedingly long Time has been taken in dressing of a patient, mostly in deluxe ward because of location of dressing room at ground floor, which is too far from deluxe ward which is on third floor.

Same with summary preparation, as it is also at ground floor.



TAT for patients is 3 hr 56 mins and TAT for hospital is 4hr 20 mins.

Dressing of patients is taking an exceedingly long time, which needs attention.

CHAPTER 5

DISCUSSION

Based on my research, to facilitate a more timely and patient friendly discharge process, for other types of discharge, it is recommended that:

- 1) Location of dressing room can be made near to ward.
- 2) Linen set can be store at bedside to save time.
- 3) Nursing station can be made in centre of the ward to save steps of staff in going from station to bed.
- 4) All departments are sufficiently staffed to manage the discharge process, as supported by the hospital s patient throughput. The staff affiliated with these departments are to be trained regarding the discharge process and the communication skills necessary to interact with patients/relatives.
- 5) As a permanent 'business as usual' activity hospital management should seek patient feedback on the service they received, including their discharge. Management should engage with the feedback seriously as it pertains to practice changes.
- 6) Software to expedite the discharge process are available as a purchase, payment can be agreed upon once intended individual department usage is identified and agreed upon. Sufficient funds must be obtained to purchase discharge software and training also requires many staff to be trained outside of this report.
- 7) A GDA can be specially assigned for pharmacy collection and will help in reducing the time of pharmacy clearance.
- 8) Feedback form needs to be bilingual as currently it is only in Hindi.
- 9) Discharge summary should have time printed on it.
- 10) Bell needs to be there at patient's bed side in the ward, to call the nurse.

- 11) All the beds present in the ward, should have bed cover.
- 12) One housekeeping staff should be always present in the ward to have rapid action whenever required.
- 13) Resident doctor should clearly explain the patient about medicines, diet, and exercise, etc.
- 14) Filled Feedback form must be taken up by staff in a closed box.
- 15) Drugs should not be sent in last during discharge, as this causes delay in discharge.
- 16) Staff at dressing room should record the patient in and out time details, along with other details.
- 17) Font size is too small on the feedback forms, which creates difficult in reading by elderly patients.
- 18) The billing for international patients should be simultaneously and updated every day as the treatment continues to avoid last minute delays in settlement.

CHAPTER 6

CONCLUSION

The effective management of the discharge of patients is a critical component in hospital administration that directly affects patient experience, bed turnover rates, and health outcomes of care delivery. This research clearly illuminates that delays and difficulty in managing the discharge process, not only affects the care that patients can experience but adds institutional pressure, restricts admissions, and decreases the service efficiency of the institution.

Using the Lean methodology, and using tools including value stream mapping, Poka-yoke, and the PDCA cycle, the research identified limiting factors, including extended time for summary preparation, time dressing patients due to layout and geographical organization, and pharmacy and billing issues. The information was corroborated by time-motion studies on three patient categories (Cash, ECHS, Insurance) using Turnaround Times (TATs) more than acceptable limits, especially in deluxe wards.

Lean may improve the discharge process for patients by creating a system that is more responsive, patient-centred, and outcomes-based. Actions such as relocating service areas, implementing discharge management software, offloading nursing tasks associated with discharge, and developing interdepartmental coordination are plausible actions toward continuing improvement.

Additionally, including patients/surrogates in the discharge planning process – while utilizing bilingual communication tools, and providing timely feedback – can improve communication and trust while ensuring improved transitions of care that support safe and timely transitions.

This dissertation has illustrated the value of operational redesign in healthcare environments. By incorporating Lean thinking into a hospital's discharge processes, healthcare organizations such as CKS Hospital can create positive, quantifiable impacts in efficiency, patient satisfaction, and quality of care, while developing a

culture of continuous improvement. Future research may examine the long-term impacts of these types of interventions and the potential for scalability across departments and organizations of different sizes and specialties.

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73

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Canadian Journal of Nursing Informatics: Vol.3 No 4 Pages 28 to 51. Page 1

of 24 by Shahina S Pirani, BSN