



Research Paper

Implementing Lean Quality Initiatives to Optimize Front Office Service Efficiency in a Tertiary Care Environment

Mrs Nirmala Kumari¹, Mrs Shwetha Pradeep² *

¹HOD & Professor, Department of Hospital Administration, Father Muller college of Allied Health science, Mangalore.

²Associate Professor, Department of Hospital Administration, Father Muller college of Allied Health science, Mangalore.

Abstract

Background:

Lean principles, originally developed in manufacturing, are increasingly being applied in healthcare to improve efficiency and patient satisfaction. By reducing waste and optimizing processes, Lean aims to enhance hospital operations. Inefficiencies, such as long wait times and errors, negatively affect patient satisfaction. Quality initiatives are essential for streamlining processes, and Lean offers a structured approach to addressing these issues. This study examines how Lean methodologies can simplify hospital registration and admission by eliminating unnecessary steps and delays, ultimately improving patient feedback and experience. Lean's application in healthcare can drive significant operational improvements.

Objectives:

- To improve the efficiency of the registration and admission processes by eliminating non-value-added activities.
- To streamline patient admission and registration processes, reducing time and resource wastage.
- To enhance patient satisfaction by optimizing workflow and minimizing delays during registration and admission.

Research Methodology:

This study uses a descriptive approach, combining process mapping and time studies to assess the registration and admission processes. A questionnaire was administered to patients to capture their feedback on their experience. Data were collected through observations, analyzing the hospital's real-time registration and admission procedures both before and after implementing Lean changes.

Results:

The study identified 11 steps in the pre-implementation phase, leading to the elimination of five processes. After implementing Lean principles, the total number of steps was reduced to six. However, no steps were eliminated in the registration procedure, though the duration was significantly reduced. The time for the registration unit decreased from 17 minutes to 7 minutes, and the time for the admission unit dropped from 40 minutes to 15 minutes following Lean implementation. Pre-implementation feedback indicated that approximately 75% of patients were informed that the admission process would exceed 20 minutes.

Conclusion:

The study concludes that Lean principles improve service efficiency and patient satisfaction by streamlining processes, eliminating waste, and optimizing workflows, leading to better quality care and enhanced patient experiences.

Keywords: Lean, Turnaround Time, Front office department, Quality of services, Registration, Admission, Fish Bone diagram, DMAIC

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I. Introduction

Hospitals are key elements in any healthcare system, acting as centers of specialized medicine and technology with large multidisciplinary teams. These institutions deliver a wide range of specialized services. The healthcare system aims to develop an efficient service approach for admissions and discharge processes.¹

Healthcare industries, from smaller to larger setups, are increasingly utilizing Lean standards to improve performance. Although many healthcare divisions may not use the term “Lean,” they apply the same principles under different frameworks. Lean is not a short-term program aimed at cost reduction but a way of executing healthcare services to eliminate waste or non-value-added activities. It represents a shift in thinking from traditional methods to a Lean mindset.²

Standardized output is an important goal, requiring a predefined connection between patients and service providers to ensure that strategy, plans, and day-to-day priorities align with patient needs. Capturing patient feedback and translating critical patient requirements into an effective management system is essential. The faster services are delivered and lengthy processes are eliminated, the better the quality of care, benefiting both patient-centered care and organizational benchmarks.³

Eliminating waste along value streams helps create processes that require less manpower, space, capital, and time, resulting in fewer defects. Healthcare organizations can respond to changing patient needs with high quality, low costs, and fast throughput times. Information management also becomes simpler and more accurate. Effective management of inpatient admissions is crucial to improving patient care quality across healthcare sectors. Teamwork and partnerships at all levels of healthcare service delivery are essential to ensuring patient-centered care, which guarantees quality and fairness for all.¹

The front office department is the first point of contact with the healthcare system. These services involve collecting data about patients to generate patient records and begin the admission process. To increase efficiency, quality tools such as Lean principles can be applied to eliminate waste and enhance service delivery. In this study, the DMAIC (Define, Measure, Analyze, Improve, Control) model was employed to guide the application of Lean principles in optimizing the registration and admission processes.⁴ Process mapping was used to identify value and non-value-added activities and assess the time taken for each step. Non-value-added activities were eliminated, reducing turnaround time in the post-implementation phase.⁵ The Fishbone Diagram was also used to identify and display factors affecting the admission process.⁶

Defining the Problem

In many healthcare organizations, particularly in the front office departments such as patient registration and admission, inefficiencies can lead to long wait times, errors, and a decline in overall patient satisfaction. These inefficiencies may include redundant steps, non-value-added activities, and poor coordination between departments, which can significantly delay the patient flow and the overall admission process. As a result, patients experience frustration, and hospitals face challenges in maintaining high-quality service and operational efficiency.

The registration and admission processes are critical touch points in the patient experience, and inefficiencies in these areas directly affect the hospital's ability to provide timely, patient-centered care. Long wait times, complicated procedures, and unclear communication can lead to negative patient feedback, lower satisfaction levels, and in some cases, a potential decline in patient retention and hospital reputation.

Given the complexity of hospital operations and the necessity for continuous improvement, addressing these inefficiencies becomes crucial. The problem lies in the fact that many healthcare systems still rely on traditional, outdated methods for registration and admission, which often involve unnecessary steps, time-consuming processes, and wasted resources. This study aims to identify and eliminate non-value-added activities in the registration and admission processes using Lean principles, with the ultimate goal of improving both operational efficiency and patient satisfaction.

By applying Lean methodologies, this study seeks to streamline these processes, reduce waste, and enhance overall service delivery, ensuring that patients receive timely and effective care right from their first point of contact with the hospital.

II. Methods

Study Design

This study employed a combination of observational, retrospective, and prospective methods to evaluate the impact of Lean principles on the hospital registration and admission processes. Data were collected over a six-month period, with three months dedicated to the pre-implementation phase and three months to the post-implementation phase, allowing for a comparative analysis of turnaround time (TAT), work efficiency, and patient satisfaction.

Source of Data

The study was conducted at a tertiary care hospital, which provided data from both the pre- and post-implementation periods. Data were gathered from various departments involved in the registration and admission process, including patient feedback, process audits, and time studies.

Method of Data Collection

- **Direct Observation:** Direct observations were conducted to assess the current state of the registration and admission processes. Observations allowed for the identification of inefficiencies, redundancies, and non-value-added activities within the workflow. These observations were carried out at different times of the day to ensure a representative sample of the patient admission process.
- **Retrospective Data Collection:** Historical data from the pre-implementation period (the first three months) were analyzed to establish a baseline for turnaround time, work efficiency, and patient satisfaction. These data were obtained from hospital records and internal reports detailing the time spent on patient registration and admission, as well as any documented patient feedback.
- **Prospective Data Collection:** In the post-implementation phase (the next three months), data were collected prospectively to evaluate the effects of Lean principles on the registration and admission process. This included measuring the turnaround time for registration and admission, as well as collecting real-time feedback from patients at the time of discharge.
- **Turnaround Time (TAT) Audit:** An audit was conducted to measure the time taken for each step in the registration and admission process before and after implementing Lean principles. TAT was specifically tracked for registration and admission units, comparing pre- and post-implementation periods.
- **Patient Feedback:** Feedback from patients was collected through surveys administered at discharge. The survey asked patients about their satisfaction with the registration and admission process, the clarity of communication, and their perceived wait times. The feedback was used to assess patient satisfaction and the impact of Lean changes on their experience.
- **DMAIC Model:** The DMAIC (Define, Measure, Analyze, Improve, Control) model was applied to guide the Lean methodology implementation. The "Define" phase involved identifying inefficiencies in the registration and admission processes, while the "Measure" phase involved quantifying turnaround times. The "Analyze" phase focused on identifying root causes using tools like Fishbone diagrams to identify contributing factors. "Improve" involved the application of Lean principles to eliminate non-value-added activities, and "Control" ensured the sustainability of improvements.
- **Fishbone Diagram:** A Fishbone diagram (also known as an Ishikawa diagram) was used to systematically identify and categorize potential factors contributing to delays in the admission process. This tool helped in understanding the root causes of inefficiencies by organizing contributing factors into categories like people, process, environment, and equipment.

Sample Size

The study sample comprised 20% of the daily patient registrations and admissions. A random selection of patients was included from both pre- and post-implementation phases to ensure a representative sample of the hospital's patient population.

Inclusion Criteria

Patients who were part of the registration and admission process during the study period and who completed the discharge survey were included in the study.

Exclusion Criteria

Night-time admissions were excluded from the study due to differences in staff availability and potential variations in the registration and admission process. This exclusion was necessary to avoid confounding factors that could distort the study's results.

Ethical Considerations

Patient privacy and confidentiality were prioritized throughout the study. Only demographic information and patient feedback were collected to evaluate the registration and admission process, with no personal health or diagnosis details required. Participation was voluntary, and patients were informed that their decision to participate or decline would not affect their healthcare. All data were anonymized, and identifiable information was kept confidential and accessible only to the research team. Patients could withdraw from the study at any time without penalty. The study was approved by the Institutional Ethical Committee, and informed consent was obtained from all participants.

Statistical Analysis

Data analysis involved comparing turnaround times and patient feedback between the pre- and post-implementation phases. Descriptive statistics were used to summarize patient feedback and time data.

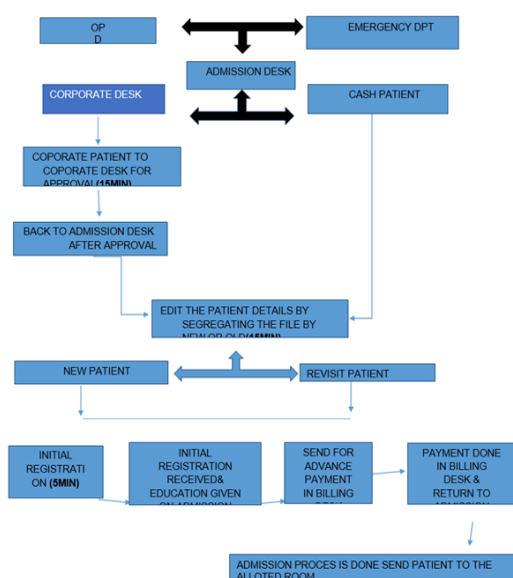
III. Data Analysis

Lean Management for Admission Process:

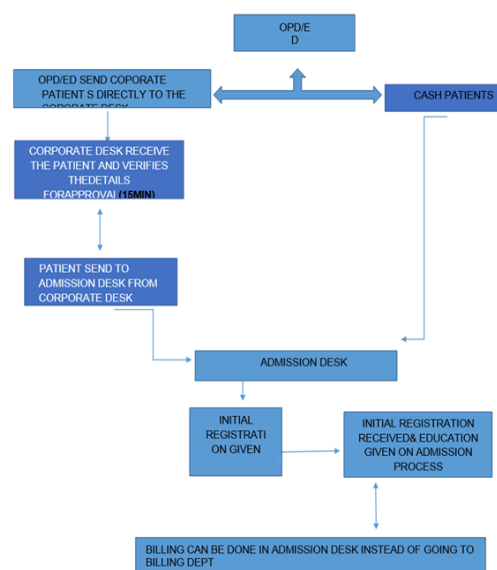
1. Insurance patients can go directly to the insurance section after receiving the admission form in the outpatient department. After receiving approval, they can proceed to the admission desk, saving a lot of time (20 minutes, varying).

2. Clear guidance should be provided in the outpatient department for patients with insurance or schemes. Adequate display boards or regular announcements should be made.
3. File audits can be done since the patient's file already contains the registration form. Only necessary documents like address proof need to be scanned.
4. The Medical Records Department scans the files, and these scanned files can be integrated into the hospital's information system (HIS).
5. A second printer/scanner would help speed up the process during high patient volumes, avoiding errors from incorrect document handling.
6. To avoid delays, the advance payment can be collected at the admission desk rather than at the billing counter.

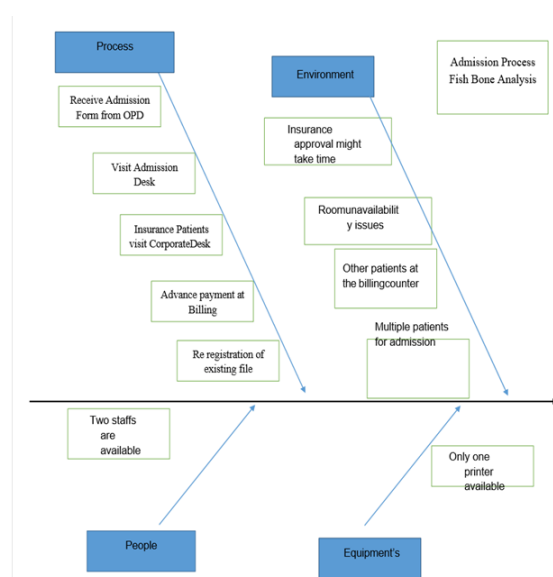
Current Admission Process



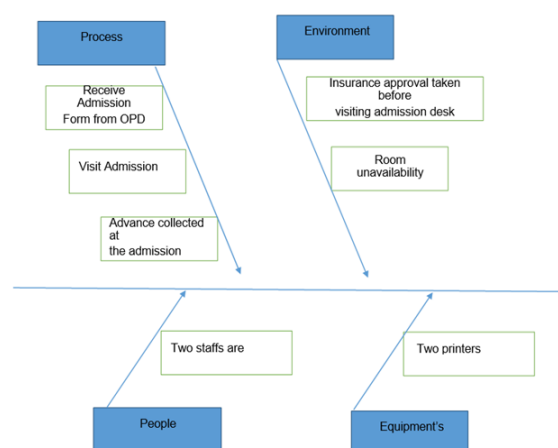
Renewed Admission Process



Current Admission process by using fish bone diagram



Renewed Admission process by using fish bone diagram



Renewed Admission Process:

- Directing the patient to the cooperative desk from the outpatient department instead of going to the admission desk first.

- Eliminating the new/old/edit file process.
- Collecting advance payments at the admission desk to avoid unnecessary wait times.

Patient Satisfaction Using Feedback

Patient feedback data collected during the pre-implementation phase showed that patient satisfaction was around 75% (January to March 2021).

Pre-implementation of the Admission Process (Patient Feedback Forms):

Month	Total Sample	Less than 20 min	More than 20 min	% Patient Satisfaction
January 2022	778	200 (26%)	578 (74%)	74%
February 2022	855	207 (24%)	648 (76%)	76%
March 2022	811	203 (25%)	608 (75%)	75%

After Lean management implementation, patient satisfaction improved to 87% in the post-implementation period.

Post-implementation of the Admission Process (Patient Feedback Forms):

Month	Total Sample	Less than 20 min	More than 20 min	% Patient Satisfaction
July 2022	658	563 (86%)	95 (14%)	86%
August 2022	715	625 (87%)	90 (13%)	87%
September 2022	682	595 (87%)	87 (13%)	87%

IV. Results

The study in the front office department identified 11 steps in the pre-implementation phase, reducing them to 6 steps post-implementation. Although no steps were eliminated from the registration procedure, the time was significantly reduced. Registration time decreased from 17 minutes to 7 minutes, and admission time dropped from 40 minutes to 15 minutes. Pre-implementation feedback indicated that approximately 75% of patients were informed that the admission process would take more than 20 minutes. After Lean principles were implemented, most patients provided positive feedback, appreciating the faster service in the front office department. Patient satisfaction increased from 75% to 87%, with many patients expressing higher levels of satisfaction regarding the efficiency and speed of the registration and admission processes.

Overall, the study provides a comprehensive analysis of how Lean principles were successfully applied to streamline hospital admission and registration processes, improving both patient satisfaction and operational efficiency.

V. Discussion

In the current study, Lean methods improved the department's ability to handle patients effectively by optimizing work processes, streamlining workflows, and reducing unnecessary delays. However, the study emphasizes that these improvements would not have been sustained unless the entire workplace culture and work philosophy underwent a gradual transformation. It mentions the use of various Lean tools, such as value stream mapping, root cause analysis, and dashboards, to assess and monitor real-time developments and guide the changes.

Similarly, the study on Lean principles in radiology departments focuses on improving operational efficiency and eliminating waste in patient flow, equipment function, and staff involvement. The current study also emphasizes the application of Lean principles to improve operational efficiency and patient satisfaction. It focused on implementing Lean Quality Initiatives to optimize the front-office service efficiency in a tertiary care environment, with objectives to streamline the patient registration and admission processes, eliminate non-value-added activities, reduce resource wastage, and improve patient satisfaction by minimizing delays.⁷

Both studies highlight the importance of adopting Lean methodologies to optimize processes and reduce inefficiencies. In our study, Lean tools such as value stream mapping and root-cause analysis helped identify bottlenecks in the registration and admission processes, leading to targeted solutions. The radiology study similarly relied on Lean tools to enhance patient flow and ensure uninterrupted equipment function, underscoring the relevance of Lean in both administrative and clinical settings.^{8,10,11.}

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