Study to Improve the Discharge Process by Applying Six Sigma Approach

By

Shakshi Jain

Dissertation submitted in partial fulfillment of the requirements of the degree

MBA Hospital and Health Management

Academic year, 2017-2019

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MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

TO WHOMSOEVER MAY CONCERN

This is to certify that Dr. Shakshi Jain, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at Rajan Hospital, Kotkapura, Punjab, from 4th February to 3rd May 2019.

The Candidate has successfully carried out the study assigned to her during internship training and her approach to the study has been sincere, scientific and analytical.
The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

Dr. Ashok Kaushik
Dean, Academics and Student Affairs
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Rajan Hospital & HEART CENTRE

NABH (ENTRY LEVEL)

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The certificate is awarded to

Dr. Shakshi Jain

In recognition of having successfully completed her Internship in the department of

Operations Department

And has successfully completed her Project on

"A Study to improve the Discharge Process by applying Six Sigma Approach"

Date: Feb 4th to May3rd, 2019

Organization: Rajan Hospital, Kotkapura, Punjab

She comes across as a committed, sincere & diligent person who has a strong drive and zeal for learning.

We wish herall the best for future endeavors.

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CERTIFICATE BY SCHOLAR

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled **A Study to improve the Discharge Process by Applying Six Sigma Approach** and submitted by Dr. Shakshi Jain Enrolment No 0662 under the supervision of **Dr. Alok Mathur** for award of MBA in Hospital and Health Management in Health and Hospitals of the University carried out during the period from 3/02/2019 to 4/05/2019 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.

Shakshi Jain

Signature of Student

ABSTRACT

Title: A Study to improve the Discharge Process by applying Six Sigma Approach

Author: Dr. Shakshi Jain

Background: Discharge from the hospital is the point at which the patient releases from the hospital and either returns home or is transferred to another facility such as one for rehabilitation or to a nursing home. A delay in hospital discharge affects the patient satisfaction and on other side it affects the financial aspects of the hospital. This Study describes the application of a five-phase Six Sigma define, measure, analyze, improve, and control (DMAIC) approach to streamline patient discharge at Rajan hospital.

Objectives:

- To study the process flow of discharge process
- To calculate the turnaround time of discharge process
- To diagnose the reasons for delay
- To apply six sigma techniques in discharge process for time reduction

Methods:

The study is Descriptive cross sectional study and was carried out over a period of three months duration at Rajan Hospital. Data was collected through direct observation and conversation with the department staff. A sample of 220 reports was taken up for the study. Out of 220, 160 sample was taken for pretesting and 60 sample was taken for post testing

Findings:

The standard time of discharge process in Rajan Hospital was 3 hours i.e. 180minutes but the actual time taken for completing the process is 4 hours 15minutes i.e. 255minutes. After implementing the recommendation in the discharge process the time taken for completing the discharge process was improved to 3hours 14minutes i.e. 192 minutes. The difference between pre -analysis and post analysis is 63 minutes.

Conclusion:

Hospitals need to follow management approaches to improve the functioning i.e. efficiency and effectiveness. The effective discharge of patients from hospital needs to move from a functional focus on symptom management to a negotiation of quality of life that seeks to promote health for all.

Keywords: Discharge, Hospital

ACKNOWLEDGEMENT

In the accomplishment of this project successfully, many people supported me without whom this project wouldn't have seen the light of the day. I am utilizing to thank all the people who have been concerned with this project.

I would like to thank my mentor **Dr. Rajan Singla** for their guidance and constant supervision, as well as providing necessary information regarding my project. Their suggestion and information have served as the major contribution in the completion of this project.

Also this project would have been incomplete without the support of all the HOD's, nurses, housekeeping staff who cooperated during the period of audit.

I would like to express my gratitude towards **Dr. Alok Mathur** (Mentor, IIHMR) to help me and gives me necessary guidance.

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Dr. Shakshi Jain

MBA-HM (2017-2019)

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ABOUT THE HOSPITAL

Rajan Hospital existence is the result of an 18-year tradition of caring the patients. Backed with the vision to offer the best in patient care and equipped with technologically advanced healthcare facilities, they are one of the upcoming names in the healthcare industry. A team of well-trained medical staff, non-medical staff and experienced clinical technicians work round the clock to offer various services. Their professional services make them sought after hospitals in Kotkapura, Punjab.

At Rajan Hospital, our strength is the team of highly qualified, well experienced senior consultants who are ably supported by high calibre nursing professionals and paramedical staff. With the focus on delivering most modern healthcare services, Raja hospital healthcare professionals are provided with advanced technologies in medicine and management. Rajan hospital is empanelled with Government and Semi-Government departments and various health insurance companies. Rajan hospital is a fully equipped medical centre situated in the centre of the city with covered area 18000 Sq. Feet and is a 100 bedded hospital.

Rajan hospital follow process driven quality systems that adhere to international standards of clinical care, safe environment, infection control and respect for patient rights & privacy. With state of the art multi-disciplinary capabilities and world-class infrastructure and technology, we enrich the quality of life of every patient in a caring and nurturing environment and greatest respect for human dignity and life.

Aim:

- Patient safety (Risk Management)
- Continuous Improvement (Quality Assurance)
- Maintaining organization's culture and standards

Vision:

Rajan Hospital and Heart Centre aspires to be most trusted and preferred healthcare provider in the region.

Mission:

To Provide Quality healthcare and access to latest medical technology at affordable cost.

Quality Policy:

Rajan Hospital is committed to provide value added, innovative and continually improving quality healthcare services consistently through learning, interfaced with futuristic technology.

Objectives:

- To focus on Quality of patient care
- To improve the performance of all professionals
- To monitor, measure, assess and improve performance and to enhance patient satisfaction.
- To guard, measure and improve patient safety
- To inculcate an excellent hygienic treatment process
- To involving all employees to participate in improving quality
- To search for patterns of non-compliance with goals, objectives and standard through problem identification, problem assessment, finding the root cause and solution generation, plan for solution implementation , implementation of corrective action and monitoring

CODES

CODES	SCOPE	
Blue	Individual disaster	
Orange	Internal disaster	
Violet	Trauma Response Team	
Black	Death	
Red	Fire	
Yellow	External Disaster	

FLOOR PLAN OF RAJAN HOSPITAL

- **Ground floor**

Reception and enquiry

Patient waiting area

OPD

Counselling

Emergency services

Rooms (Day care)

Pharmacy

HR, Account and billing office

Sample collection

X-ray, USG and Echo

ECG,

TMT

Cafeteria

BMW segregation room

- **1st FLOOR**

Nursing station

Private rooms

General wards

ICU

Isolation rooms

Attendants waiting area

- **2nd FLOOR**

Laboratory

MRD

Stores

OT

Private rooms

Nursing station

- **3rd FLOOR**

Electrical panel room

Stores

IT department

Administration

- **BASEMENT**

CSSD

BME Workshop

Specialty at the Hospital:

- Emergency & Acute Care Medicine
- Endocrinology And Endocrine Surgery
- Gynecology Obstetrics
- Pain management

- Internal Medicine
- General Surgery
- Orthopedic Surgery
- Cardiac Surgery
- Pathology
- Interventional Radiology
- Emergency and Acute care Medicine
- Anesthesiology

MANAGEMENT RESPONSIBILITIES AT RAJAN HOSPITAL:

- Top management of the hospital is a totally committed to development and implementation of an effective and efficient QMS for continual improvement.
- Top management has established vision, mission, policy and strategic objectives consistent with the purpose of the hospital, which leads to achievement of patient satisfaction.
- Top management provides its full support by participating in improvement projects, searching for new methods and solutions. Top management also ensures the availability of the resources that are necessary to support the hospital's strategic plans.
- Patient needs and expectations are determined and converted into requirements and fulfilled as documented in process map and procedures for service delivery process and management responsibility.
- Obligations related to the statuary and regulatory requirements are taken care as appropriate.
- Top management takes initiatives in communicating the hospitals values, vision, mission, policies and objectives and targets.
- Top management is highly committed towards process oriented approach

According all the processes are documented and implemented. Internal audits and management review meetings are used as effective tools to ensure the implementation of the laid down processes and also verifying their continuing suitability, effectiveness and adequacy of the system.

Various committees have been incorporated into the managements system of the hospital for the effective implementation of QMS.

OBSERVATIONAL LEARNING

1. Emergency Department:

- Emergency Department is located on ground floor facing the main road and has a separate entrance. It has emergency reception and a separate waiting lounge.
- The emergency department takes care of the ambulance services.
- It has been provided with its own Drugs and Stores.
- The emergency department is in vicinity to the laboratory and radiology departments.

2. Operation Theatres

- OT is committed to provide the highest standards of surgical care to the patients.
- 4 modular operation theatres with most modern facilities are present.

3. Intensive care unit

- An intensive care unit is a specially staffed and equipped separate and self-contained action of the hospital for management of patients with life-threatening or potentially life threatening clinical conditions.
- It consists of 10 critical beds equipped with most modern equipment.

4. Medical Record Department

- For storing and verification of all medical records.
- Issue of duplicate records.
- Receipts and reply of mails.
- Preparation and coordination in providing records for court cases and consumer cases.
- Maintenance of MLC, Birth and Death records.
- Coordination with IT department.

5. Radiology Department

- Provides complete diagnostic and imaging services
- Has developed standard operating procedures (SOP).
- Has established Goals, objectives and standards of performance that are consistent with both the hospitals philosophy of patient care and practice of professional service delivery and match International standards.

Services provided

- CT Scan
- MRI
- Ultrasound
- X-Ray
- TMT
- ECG

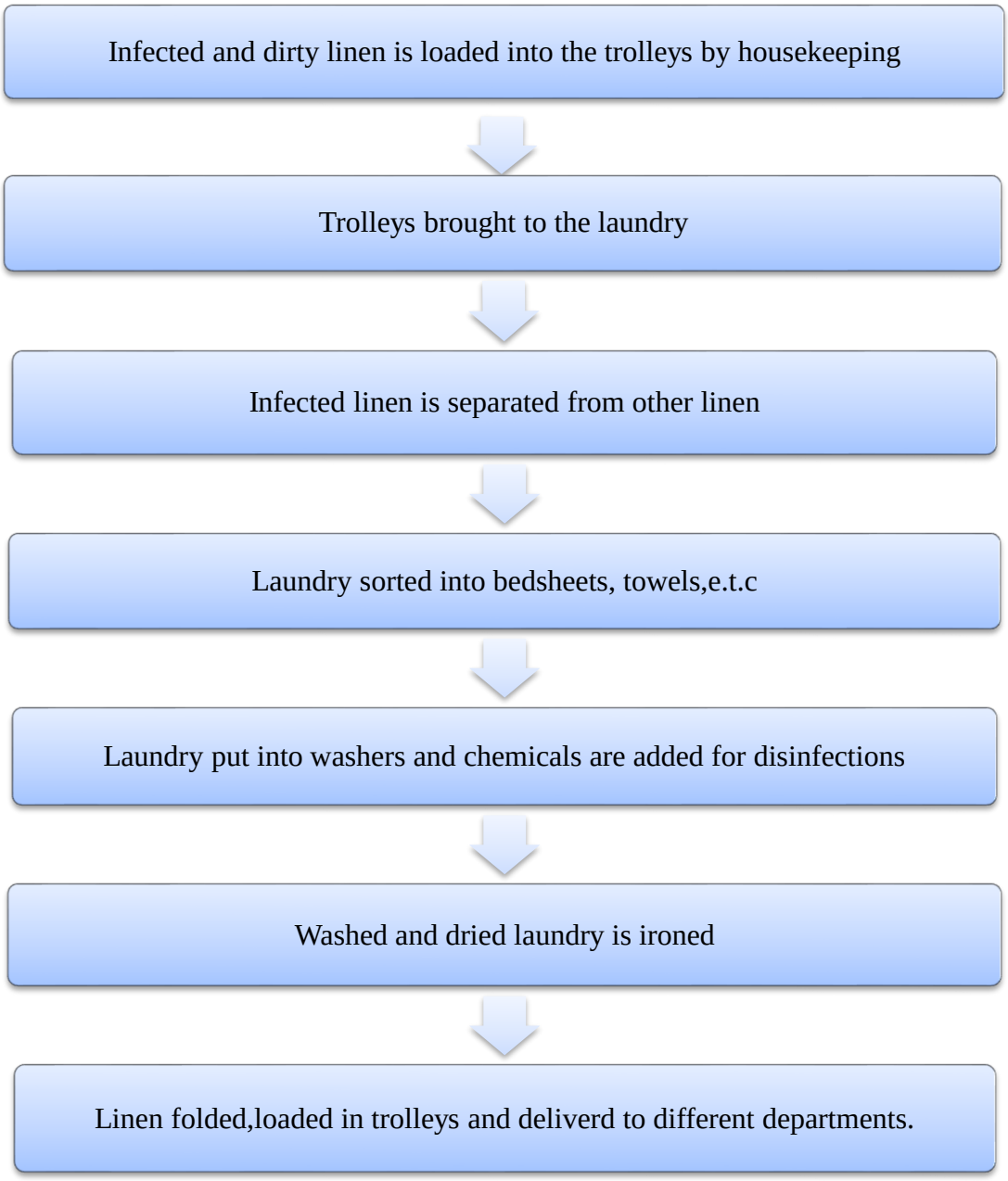
UTILITY SERVICES:

1. **CENTRAL STERILE SUPPLY DEPARTMENT**
   - It provides steady and efficient supply of sterile linen and instruments of all the functional departments of the hospital.
   - Sterile supplies are dispatched to the wards as required to them and used instruments are collected for autoclaving and cleaning.
   - Sterile supply to operation theatre and emergency department is a day prior before 8:00pm and as when required.

2. **LAUNDRY**

   - It provides fresh linen to the hospital and has a major role in maintaining hygienic environment and infection control

WORK FLOW


Infected and dirty linen is loaded into the trolleys by housekeeping
Trolleys brought to the laundry
Infected linen is separated from other linen
Laundry sorted into bedsheets, towels,e.t.c
Laundry put into washers and chemicals are added for disinfections
Washed and dried laundry is ironed
Linen folded,loaded in trolleys and deliverd to different departments.

ADMINISTRATIVE SERVICES

- Medical
- Superintendent office
- Finance office
- Material department
- Marketing department
- IT department
- HR department
- Quality department

PROJECT

A Study to Improve the Discharge Process by applying Six Sigma Approach

CHAPTER 1

1.1 INTRODUCTION

Discharge is defined as, “a process by which an episodes of treatment and care to a patient is formally concluded by the health professional”.

Six sigma continuous to be the interest in the corporate world and has been used to address number of problems including decreasing length of stay, decreasing medication errors, improving the admission process and improving the quality of care.

Hospital is a complex organization which provides health to peoples through specialized scientific equipment and a team of trained staff who are educated in the problems of modern medical science. They are all co-ordinate together for the common goal of restoring and maintaining a good health of the people for relief from the pain, suffering and disease.

The demand of the people for the health services starts from the moment when they are born and the demand for the services varies time to time. The completion of the demands of the people will lead to patient satisfaction. If a patient’s perception of their hospital experience meets or exceeds the expectation, there will be a corresponding degree of satisfaction and if the perception does not meet the expectation, there will be dissatisfaction.

1.2 INPATIENT CARE

Inpatient care is the care of the patients whose condition requires admission to the hospital. Modern medicine ensures that patients are only admitted to the hospital when they are extremely ill or have severe physical trauma.

Patient enters the inpatient care from the previous ambulatory care like any referral from family doctor or through emergency departments and it is formally ended by writing a discharge note.

1.3 PLANNING FOR PATIENT DISCHARGE

Discharge planning is a process that involves the patient, family and any staff involved in the patient's care. The aim of discharge planning is to ensure a safe and smooth discharge from hospital to home, residential care, other hospital or another location.

In general, the discharge plan are:

- **Evaluation** of the patient by qualified personnel
- **Discussion** with the patient or his/her family member
- **Planning** for sending the patient to home or transfer to another care facility
- **Determining** whether caregiver training or other support is needed
- **Referrals** to a home care agency or appropriate support organizations in the community
- **Arranging** for follow-up appointments or any tests

1.4 DISCHARGE PROCESS

When a patient leave a hospital after treatment, he/she go through a process called hospital discharge. A hospital will discharge a patient when he/she no longer need to receive inpatient care and can go home or a hospital will discharge him/her to send to another type of facility.

Hospital care is for people who need a special medical attention. It is also expensive and uncomfortable. Once a person is getting better and does not need special care, a hospital stay is not needed. When the person is discharged, that makes a bed available to another person who needs a special care.

There are three types of discharge:

- **Discharge on advice:** The consultant will discharge on satisfaction with the patient condition. Discharge information shall be given to the resident or staff nurse and after that the resident will prepare discharge summary in written form and approved by the consultant signature.
- **Discharge on request:** The patient request for discharge while further treatment is advised due to financial or any other reason.
- **Discharge against Medical Advice (DAMA):** The process for patient leaving the hospital in DAMA is same as the discharge on advice. The consent from the patient is recorded in DAMA form.

Unnecessary occupation of hospital beds results in wastage of healthcare resources and heavy organizational costs. A fast discharge process will ensure the early availability of patient beds, which in turn will reduce in waiting time of patient admission. Poor care condition will results in increase in length of stay of the patients.

Discharge is planned and coordinated with the patient, family and relatives. As the date for discharge approaches, all the patients will be assessed weekly or monthly to evaluate their progress.

Discharge process need to addresses the safety challenge of hospital discharge, elaborating this as a problem of co-ordination and collaboration among various health and social care agencies. Attention is given to major policy changes and interventions aimed at enhancing discharge, as well as research evidence on clinical risk and patient safety. The hospital discharge process studied in the project is divided into 4 stages:

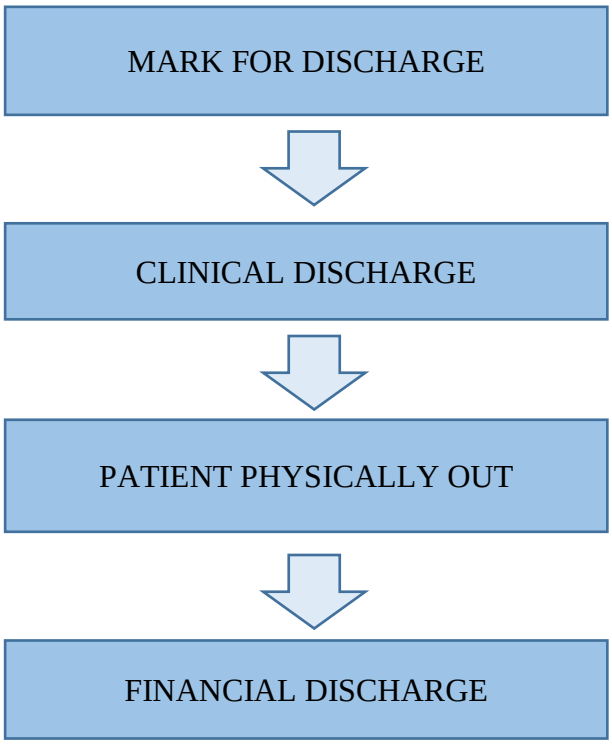


Figure 1.1

CHAPTER 2

2.1 LITERATURE REVIEW

- **Study on Using Six Sigma DMAIC Methodology and Discrete Event Simulation to Reduce Patient Discharge Time in a Cancer Treatment Hospital, by Mazen Arafeha Mahmoud A. Barghasha, Norman Hadaka, Nadeem Mushairas, Dana Nashawatib, Adnan Al–Bashir , and Fatima Assay.**

  This study was done for 'Six Sigma process improvement methodology to reduce patients discharge time' in a cancer treatment hospital. Data on the duration of all activities, from the physician signing the discharge form to the patient leaving the treatment room, were collected through patient entrance. These data were analyzed using detailed process maps and cause and effect diagrams.

  Fragmented, unstandardized processes and procedures and a lack of communication among the stakeholders were among the leading causes of long discharge times. Categorizing patients by their needs enabled better design of the discharge processes. Discrete event simulation was utilized as a decision support tool to test the effect of the improvements under different scenarios. Simplified and standardized processes, improved communications, and system-wide management are among the proposed improvements, which reduced the patient discharge time by 54% from 216 minutes. Cultivating the necessary ownership through stakeholder analysis is an essential ingredient of sustainable improvement efforts.

- **Study on Six Sigma Approach on Discharge Process Turnaround time, by L. Kalyan Viswanath Reddy, Fares Al Shammari (February 2014)**

  This study was done for stream line the current discharge process of King Khalid hospital and suggest solution in such a way that maximum output can be attained from minimum input of man power and resources for the best results. This study helps the organization to know the deficiency and to find out the difficulties facing by the patients at various levels for getting discharge from the hospital.

  In the analysis phase of DMAIC, 32 defects are found in the turnaround time of discharge process and the Defect Per Million Opportunity (DPMO) is calculated as 91428.57 in which defect is 9.14%, yield is 90.86% and Process Sigma level is 2.83. After the improvement phase, the defects reduced from 32 to 2. So, DPMO reduced to 5390.83 in which defect is

decreased to 0.54%, yield is increased to 99.46% and Process Sigma level increased to 4.05. Conclusion: Six sigma approaches saved the money to organizations, by reducing errors, increased customer service and satisfaction and improved productivity

- **Study on Improving the Hospital Discharge Process with Six Sigma Methods by Theodore T. Allen, Shih-Hsien Tseng, ,Kerry Swanson & Mary Ann McClay (December 2018).**

  This article describes the application of a five-phase Six Sigma define, measure, analyze, improve, and control (DMAIC) approach to streamline patient discharge at a community hospital.

  Within the context of the five phases, the team applied statistical process control (SPC) charting, process mapping, Pareto charting, and cause-and effect matrices to make decisions. The findings suggested that focusing on physician preparation for discharge order writing would have the greatest impact. A significant reduction in the average discharge time from 3.3 to 2.8 h was realized and missing chart data was reduced by 62%.

- **Improving hospital discharge time: A successful implementation of Six Sigma methodology by El-Eid GR, Kaddoum R, Tamim H, Hitti EA (March 2015)**

  The aim of this study was to assess the effectiveness by using Six Sigma methods to improve the patient discharge process. This is a quantitative pre and post-intervention study in three hundred and eighty-six bed tertiary care hospital over a 10-month period. The primary outcome was discharge time (time from discharge order to patient leaving the room). Secondary outcome measures included percent of patients whose discharge order was written before noon, percent of patients leaving the room by noon, hospital length of stay (LOS), and LOS of admitted ED patients.

  Discharge time decreased by 22.7% from 2.2hours during the preintervention period to 1.7hours post-intervention. A greater proportion of patients left their room before noon in the postintervention period, though there was no statistical difference in before noon discharge. Hospital LOS dropped from 3.4 to 3.1 days postintervention. ED mean LOS of patients admitted to the hospital was significantly lower in the postintervention period (6.9±7.8 vs 5.9±7.7hours).

- **Improving Hospital Discharge Time: A successful Implementation of Six Sigma Methodology** by Harris, KevinEl-Eid, Ghada R., Kaddoum, Roland, Tamim, Hani; Hitti, Eveline A. (March 2015 - Volume 94 - Issue 12 - p e633)

  Delays in discharging patients can impact hospital and emergency department (ED) throughput. The discharge process is complex and involves setting specific challenges that limit generalizability of solutions. The aim of this study was to assess the effectiveness of using Six Sigma methods to improve the patient discharge process. This is a quantitative pre and post-intervention study. Three hundred and eighty-six bed tertiary care hospital. A series of Six Sigma driven interventions over a 10-month period. The primary outcome was discharge time (time from discharge order to patient leaving the room). Secondary outcome measures included percent of patients whose discharge order was written before noon, percent of patients leaving the room by noon, hospital length of stay (LOS), and LOS of admitted ED patients. Discharge time decreased by 22.7% from 2.2 hours during the preintervention period to 1.7 hours post-intervention ($P < 0.001$). A greater proportion of patients left their room before noon in the postintervention period ($P < 0.001$), though there was no statistical difference in before noon discharge. Hospital LOS dropped from 3.4 to 3.1 days postintervention ($P < 0.001$). ED mean LOS of patients admitted to the hospital was significantly lower in the postintervention period (6.9 ± 7.8 vs 5.9 ± 7.7 hours; $P < 0.001$).

- **Reducing And Optimizing The Cycle Time Of Patients Discharge Process In A Hospital Using Six Sigma DMAIC Approach** by S. Arun Vijay published on 17 May, 2014

  A lengthy and in-efficient process of discharging inpatients from the Hospital is an essential component that needs to be addressed in order to improve the quality of Health care facility. Even though, several quality methodologies are adopted to improve such services in Hospitals, the implementation of Six Sigma DMAIC methodology to improve the Hospital discharge process is much limited in the Literature. Thus, the objective of this research is to reduce the cycle time of the Patients discharge process using Six Sigma DMAIC Model in a multidisciplinary hospital setting in India. This study had been conducted through the five phases of the Six Sigma DMAIC Model using different Quality tools and techniques. This study suggested various improvement strategies to reduce the cycle time of Patients discharge process and after its

implementation; there is a 61% reduction in the cycle time of the Patients discharge process. Also, a control plan check sheet has been developed to sustain the Improvements obtained. This Study would be an eye opener for the Health Care Managers to reduce and optimize the cycle time of Patients discharge process in Hospitals using Six Sigma DMAIC Model.

CHAPTER 3

3.1 AIM

A study to improve the discharge process by applying six sigma approach

3.2 OBJECTIVE

- To study the process flow of discharge process
- To calculate the turnaround time of discharge process
- To diagnose the reasons for delay
- To apply six sigma techniques in discharge process for time reduction

3.3 RESEARCH QUESTION:

- What is the actual turnaround time of the discharge process at Rajan Hospital, Punjab?
- What are the possible reasons for delay?

3.4 RESEARCH METHODOLOGY

SAMPLE SIZE: 220

Out of 220, 160 sample was taken for pretesting and 60 sample was taken for post testing

SAMPLING: Non Probability Convenient sampling

RESEARCH DESIGN: Descriptive Cross sectional study

RESEARCH APPROACH: Observation of turnaround time (Pre and Post intervention)

3.5 SIX SIGMA APPROACHES:

Delay in discharge of patients is one of the organization's top most concerns and it leads to patient dissatisfaction, delay in further availability of beds which impacts on ultimate revenue generation for the organization.

The methodological framework adopted in this study is DMAIC Model (Define, Measure, Analyze, Improve and Control Model). The Quality tools, techniques and the strategies adopted in each phase of DMAIC to reduce the patient discharge process is described below:

3.5.1 PHASE 1- DEFINE THE PROBLEM

The critical issue is based upon three key parameters:

1. Patient centered hospital mission
2. Past complaints of the patients
3. Historical patient satisfaction survey results

By analyzing the above three factors with attention to the voice of the customer (patient feedback form), it was inferred that there is need to reduce the patient discharging time, which had been identified as one of the most critical factor contributing to patient dissatisfaction.

This phase aimed at describing the problem quantifiably and the process to determine how the process will be measured. The process was documented and to understand the process of the discharge of the patient from the time when the doctor decides when the patient should be discharged to the time patient leaves the room.

The tool used for defining the problem is Process Mapping. It is a planning and management tool that visually describes the flow of work. It's a pictorial representation which identifies the steps, inputs and outputs and other related details of the process. Process mapping is typically a knowledge about process.

The main objective of the project is to improve and optimize the discharge process. The target was fixed to hand over the discharge summary to the patients within two hours (i.e. 180 minutes). The key process output was the average time taken for patient discharging the patient in that department.

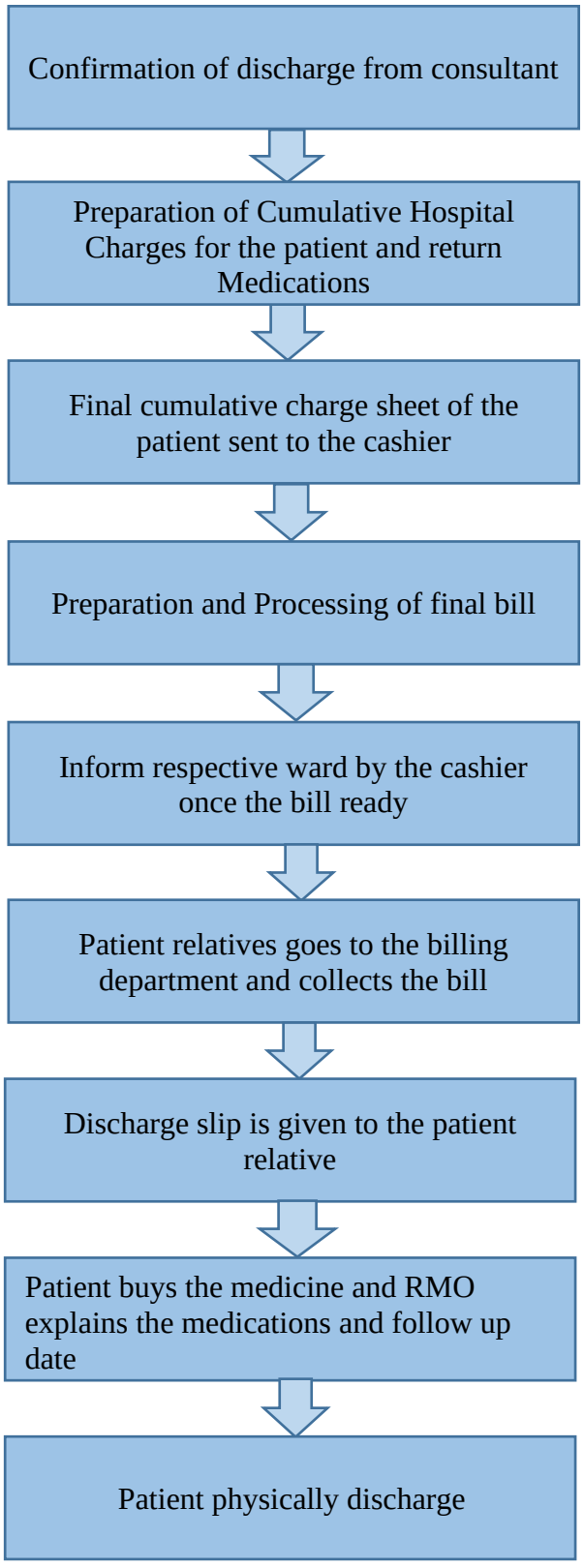


Figure 3.1

The above process map depicts the various phases and sub processes involved in the discharge process.

The sub-processes described as below:

- **Pharmacy Clearance:** The doctor informed the nurse regarding the discharge of the patient and the nurse collects the unused medicine from the patient bedside and put a request for return in the HIS system. The unused medicine is packed in one carry bag and labelled and sent to the IPD pharmacy.
- **File preparation:** The RMO and the assigned nurse completes the file of the patient by attaching all the investigation and documents.
- **File checkup:** The file is checked by the billing department. The status is updated in HIS as the bill is ready.
- **Summary check:** The clinical pharmacist check the summary
- **Bill Clearance:** Once the status is updated about the bill on HIS system, the patient is informed and requested to clear the bill.
- **Physically out:** After submitting the discharge slip to the nurse, RMO explains the discharge summary to the patient relatives and after that the wheelchair is arranged and the patient is physically left on the ground floor.

3.5.2 Phase 2- Measure

This phase aimed at measuring the problem. The measure phase in the six sigma method involves the documentation and evaluation of the system that exists prior to any changes. The investigator measures what characterize the current problem in terms of defined process or parameters. The objective of this phase is to establish a current state before making any changes. The current state become the standard against which any improvement after the implementation will be measured.

The baseline of measurement was defined as, the turn- around time for the entire discharge process starting from the time physician decide that the patient can be discharged till the time the patient leave the room. This time was defined as the Total Cycle Time.

The benchmark time was taken as 180 minutes since this was the desired TAT were defined after studying the process map which despite the various sub-process involved as follows:

- **Total cycle time:** It is defined as a time from the doctor decision of the discharge of the patient to the time patient vacated the bed.
- **Summary finalization time:** It is the time from the decision of the doctor to discharge the patient to the finalization and handling over the discharge summary at the nursing station.
- **Pharmacy clearance time:** It is the time between the discharges orders by the physician to the drug return to the pharmacy.

- **File preparation rate:** It is the time from the discharge decision to the time the file is checked by the billing department.
- **Bill clearance time:** It is the time when the bill is updated on the HIS system to the time the patient clear the bill.
- **Patient Physically out:** It is the time between the final bill receipts and the patient vacates the room.

3.5.3 DATA COLLECTION

Primary Data: Data was collected for the four parameters- Summary finalization, Pharmacy return, File preparation, Bill clearance, Patient physically out sample for 160 patient discharges from IPD floors as per convenience sampling. The investigation recorded the start time and the end time of every parameter for daily discharge.

Methodology: Observation is the method for the collection of primary data.

Average TAT for Cash Payments				
Measurement	**Average TAT for the month of February**	**Average TAT for the month of March**	**Average TAT for the month of April**	**Mean TAT**
Total time cycle	4.48	3.99	4.14	4.20
Summary Finalization	1.43	0.96	1.55	1.31
Pharmacy return	0.99	1.15	1.47	1.20
File preparation	0.30	0.19	0.31	0.27
Bill clearance time	3.64	2.57	2.32	2.84
Patient Physically Out	0.73	0.81	0.49	0.68

Table 3.1 Average TAT for Cash Payment

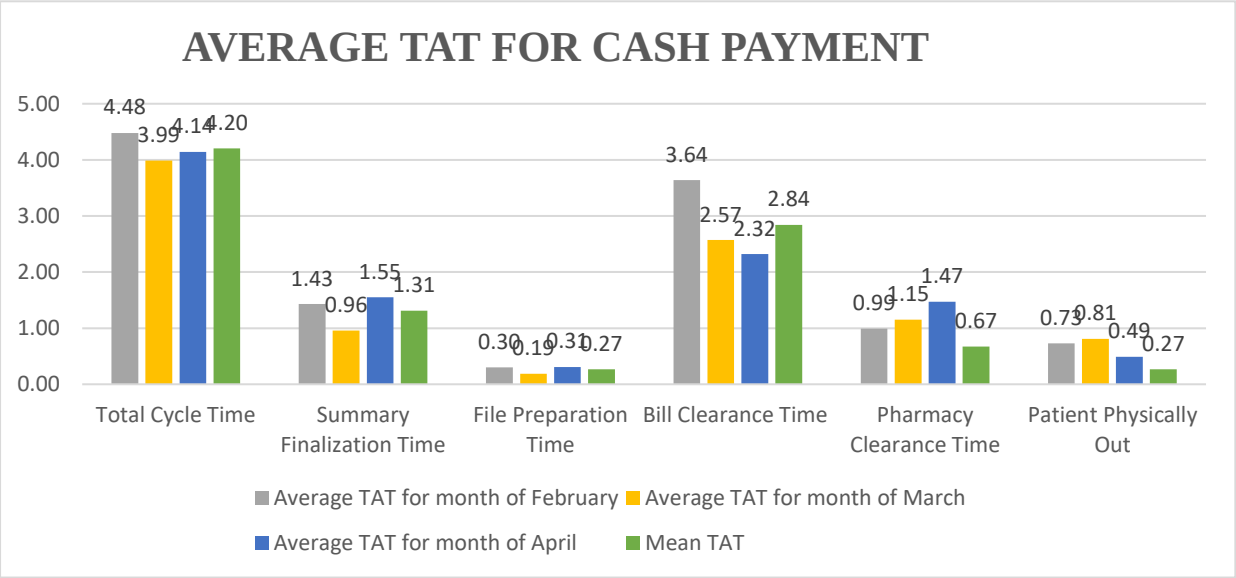


Figure 3.2

In the above data, the mean TAT for discharge process is 4.20 hours which is more than the benchmark. The maximum time taken for completing the process is in summary finalization and bill clearance.

3.5.4 PHASE 3- ANALYZE

This phase aims at analyze the current problem and find out the root cause of the problem through analysis (both statistically and qualitatively).

The root cause analysis was formulated and analysis was done in three steps:

1. Calculating the percentage of discharge of those who were within the benchmark of TAT of 180 minutes.
2. Cause and effect analysis was done by using the cause and effect diagram.

Percentage of Discharge in Time Range	

Mode of Payment	No. of cases within 90 minutes	No. of cases within 150 minutes	No. of cases within 180 minutes	No. of cases within 210 minutes	No. of cases beyond 210 minutes
CASH	6	23	13	21	97

Table 3.2

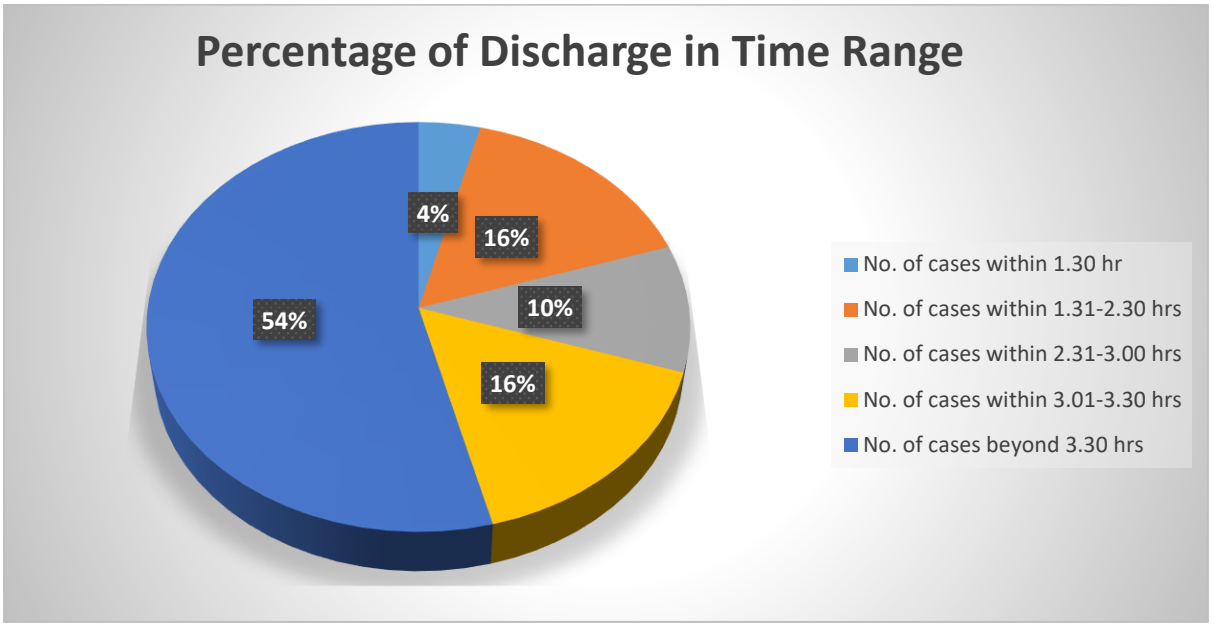


Figure 3.3

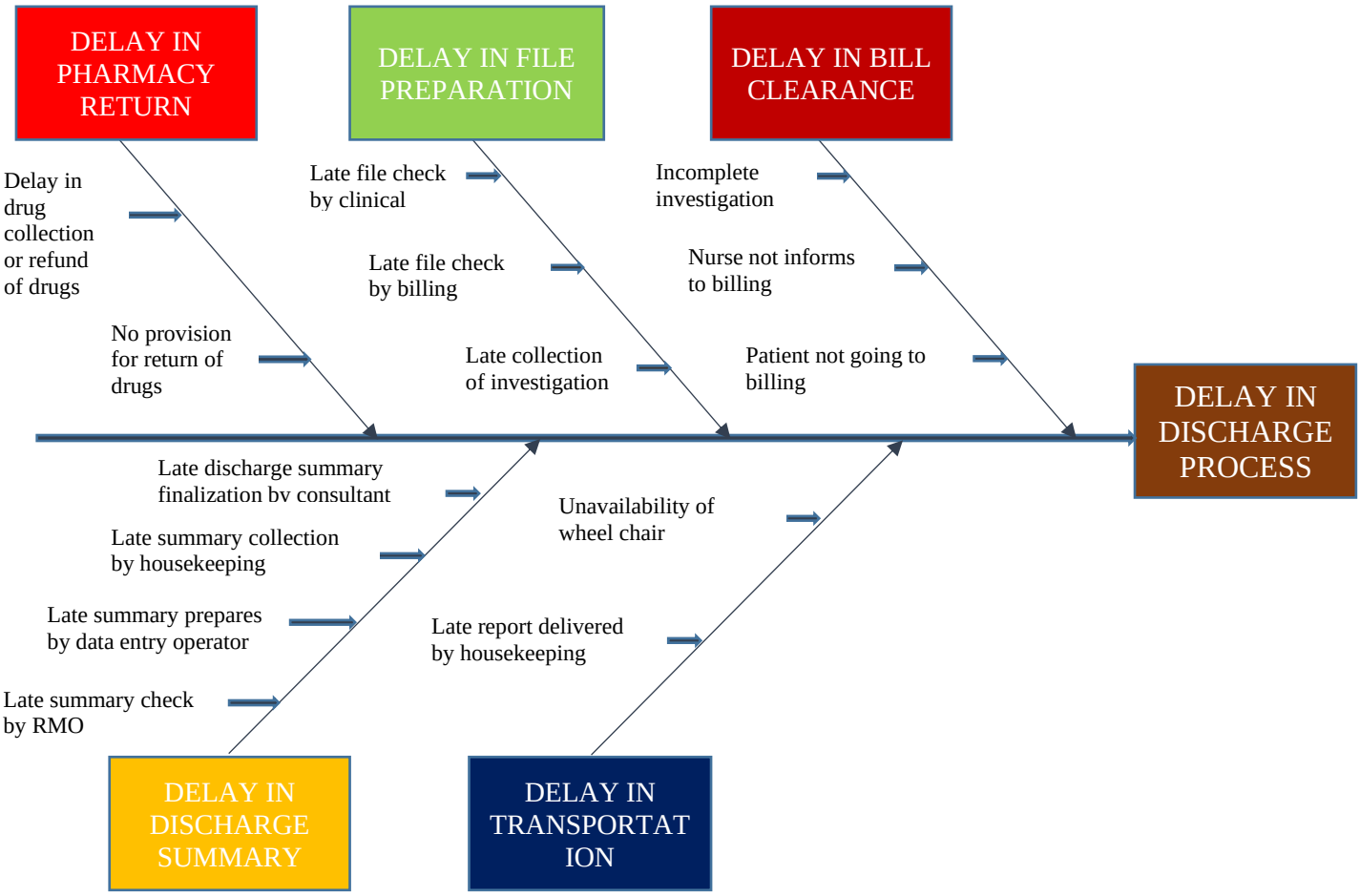
The above data shows, the discharge completing within the benchmark time of 180 minutes was only 30%. 70% of the discharge took more than 180 minutes.

CAUSE AND EFFECT ANALYSIS:

Cause and effect analysis is a tool or technique which helps to identify the cause of the problem. It is a graphical illustration that represents the relationship between a given outcome and all the factors that influence outcome. This diagram is called as an “Ishikawa Diagram” because it was invented by Kaoru Ishikawa, or a “Fishbone Diagram” because a completed diagram looks like a skeleton of fish.

For instance, Cause and effect analysis can be used it to:

- Discover the root cause of the problem
- Uncover bottlenecks in the processes
- Identify where and why the process is not working
- Identify where the data should be collected for further study



Following were the major cause of delay in discharge process:

<u>Delay in Discharge Summary:</u> was due to the following reasons:

- **Delay by Consultant:** in finalizing the discharge summary due to being occupied in the morning rounds of the patient process.
- **Delay by data entry operator:** in completing the discharge summary after the decision of the doctors.

- **Delay in transporting final discharge summary:** After the discharge summary is finalized by the consultant, the delay is due to unavailability of the transport to the nursing station or delay by the housekeeping.

Delay in Pharmacy return: was an effect of the following causes:

- Delay in the collection of the drugs from the nursing department by the housekeeping and returning to the pharmacy department
- Pharmacy department taking long time in updating the clearance on HIS system.
- Incomplete return is sent by the nurse.

Delay in File Preparation: The sub-cause of this effect could be:

- Late file checked by the billing department
- Documents and the investigations were not updated in the patients file
- Incomplete notes by the RMO or late file checked by the RMO
- Housekeeping department not available on the floors

Delay in Bill Clearance: The causes are

- Delay in informing the patient relative by nursing staff to clear the bill
- Delay caused by attendant in clearing the bill due to delay in arranging money or waiting for patient relatives
- Delay in completing the investigations

Analysis of the percentage contribution of various MEAN CYCLE TIME of the sub process to the discharge process.

For all the cause that were identified in the diagram, the sub- Process were divided into 2 categories:

- **Correctable Factor-** are the factor which can be not controlled by any intervention and are dependent on the situation or the external factor.
- **Non – Correctable Factor –** are those which can be controlled by any introducing intervention as these are independent of the external factor.

CORRECTABLE REASONS FOR DELAY ARE:

Reasons	No. of cases
Late summary finalization	65
Delay in billing	11
Delay in file updating	9
Delay in file transportation	7
Housekeeping not available	15
Not informed to patient	7
Delay in drug return	7
Late intimation time	8
Wheel chair not available	7

Table 3.3

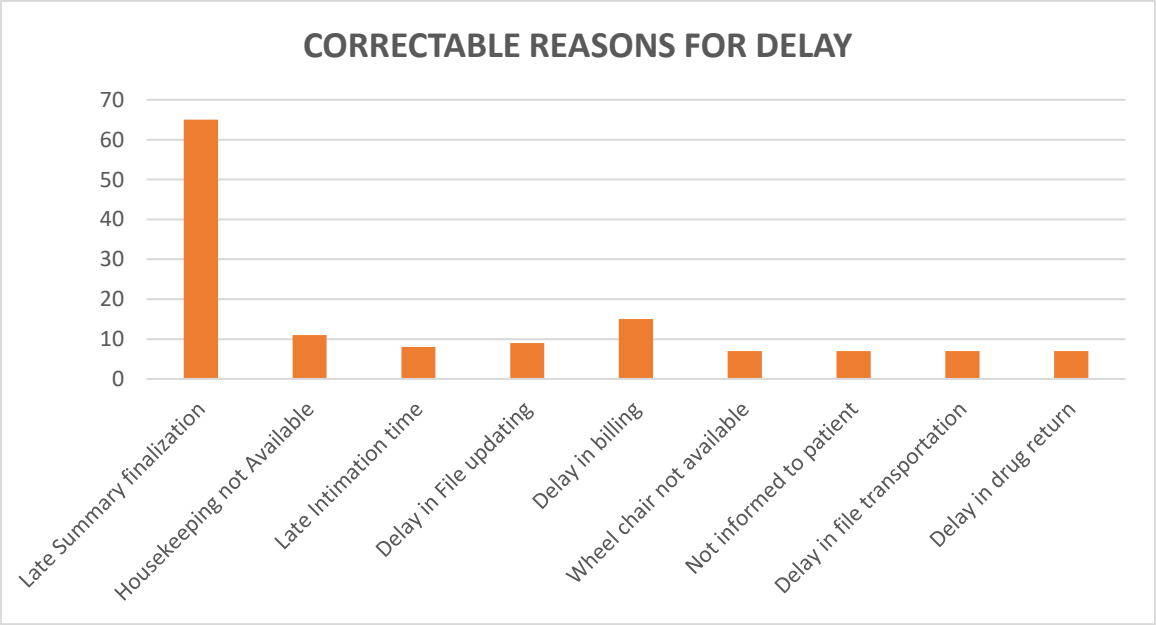


Figure 3.4

In the above data, the main reason for the delay of the discharge summary is late summary finalization.

NON CORRECTABLE REASONS FOR DELAY ARE:

Reasons	No. of cases
Late bus, train	12
Patient condition	4
Patient financial issue	8

Table 3.4

PHASE 4: IMPROVE

The focus of this phase to determine a solution which was based on the uncovered problem in the first three phases.

This phase requires three things:

- Brainstorming to create a solution that will address main problem.
- Testing the solutions
- Assessing the outcome of the solutions

ACTION TAKEN ON THE BASIS OF FISHBONE ANALYSIS:

a. The discharge summary was updated a day prior to the expected date by the doctor and typist, so that when the doctor go on rounds they are able to complete the process of discharge summary and sign it in the nursing station, immediately after the rounds.

b. After the assigned nurse has finalized the pharmacy which is to be returned, the return material was counterchecked by in charge. This will decrease the waste of time in returning medicine several times due to minor error.

c. After requesting for drug return the housekeeping collects the drug from the Nursing station.

d. The documents was updated in the file on daily basis by the typist.

e. The doctors filed investigation and treatment on daily routine basis.

f. The attendant was provided with a printed provisional bill a day prior to the expected date of exchange, so that the verification at the consumers end are done and any correction to be done can be completed before the time for final bill clearance.

g. The assigned nurse goes and coordinate with Patient and billing department.

PHASE 5 CONTROL:

The focus of this phase is to make sure that the action item created in the improve phase is well implemented and maintained.

Control phase focused on the loop hole of the problem.

Control process was done on 60 patients.

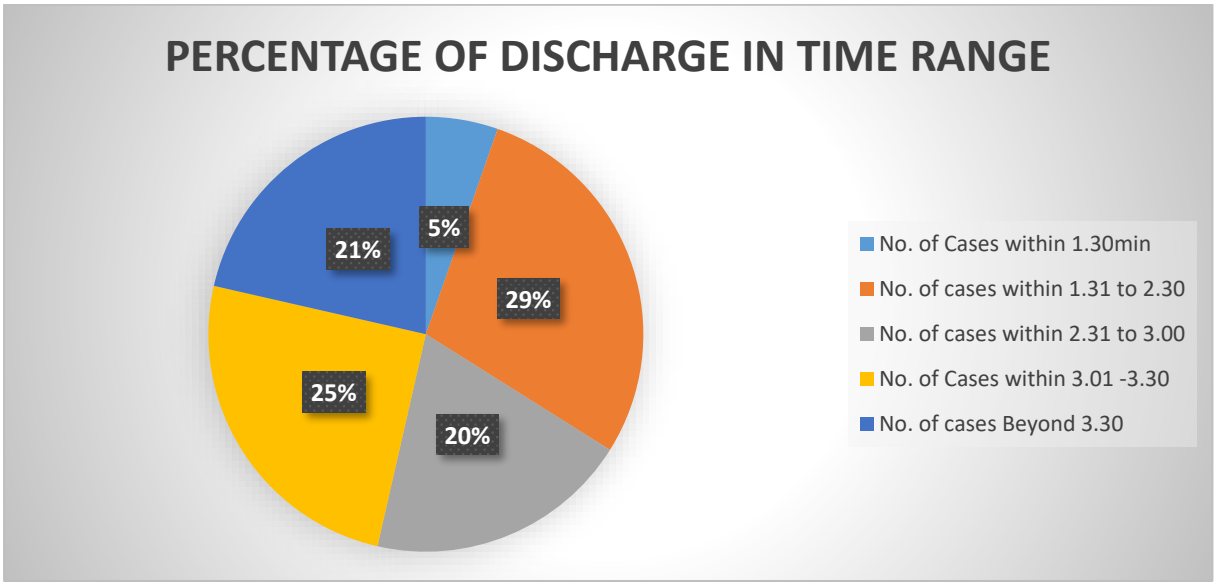


Figure 3.5

In the above data, the discharge completing within the benchmark time of 180 minutes is 54% which is more than the pretesting.

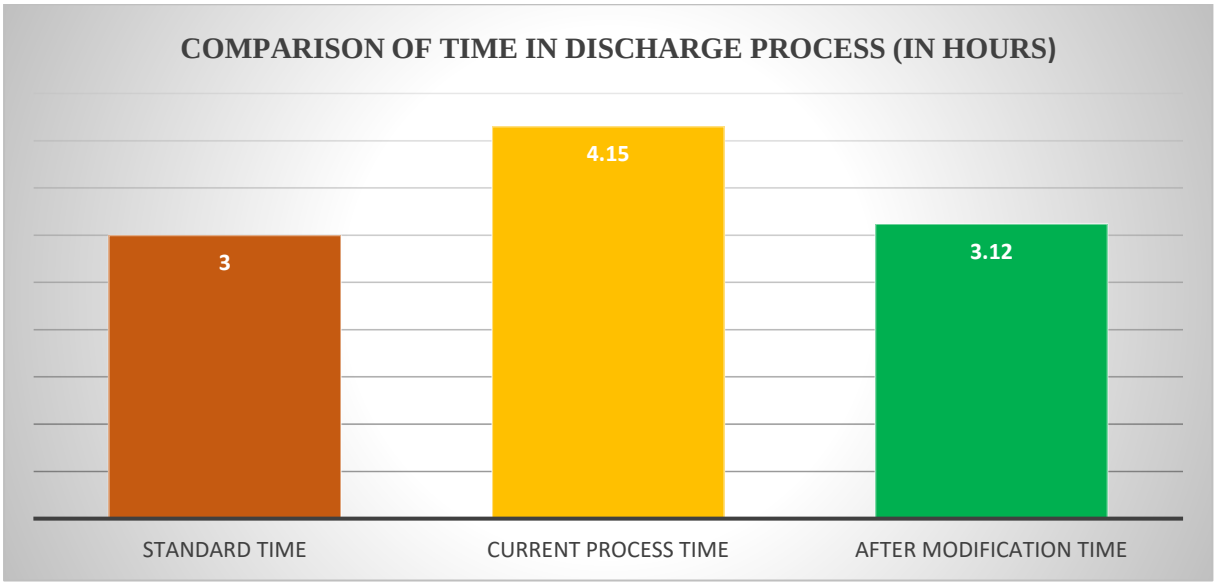


Figure 3.6

As the above data shows the standard time of discharge process in Rajan Hospital is **3 hours i.e. 180minutes** but the actual time taken for completing the process is **4 hours 15minutes i.e. 255minutes**. After implementing the recommendation in the discharge process the time taken for completing the discharge process **is 3hours 14minutes i.e. 192 minutes**. The difference between pre -analysis and post analysis is **63 minutes.**

CONCLUSION

- Regular follow up of Discharge process should be taken by word coordinator.
- Assigned the Responsibility to Nurse for completing discharge process within 3 hrs.
- Appreciate the Nursing staff who completed the process within time.
- Make the software which will give the discharge Message to every Department.
- Distribute the proper work to every department
- Present the Data of discharge at the end of the month.

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