

Discharge Turn Around Time for IPD Patients with Six Sigma Approach

By

Kanika Arora

*Dissertation submitted for the partial fulfillment of the
MBA Hospital and Health Management*

Academic year, 2015-2017



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TO WHOMSOEVER IT MAY CONCERN

This is to certify that Dr. Kanika Arora, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at Bhagwan Mahveer Cancer Hospital from 6th February, 2017 to 5th May, 2017

The Candidate has successfully carried out the study designated to her during dissertation training and her approach to the study has been sincere, scientific and analytical.

The Dissertation is in fulfillment of the course requirements.

I wish her success in all her future endeavors.



Dr. Ashok Kaushik
Dean, Academics and Student Affairs
The IIHMR University, Jaipur



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Date 17.05.2017

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Dr. Kanika Arora** has done her Internship & Dissertation in Bhagwan Mahaveer Cancer Hospital & Research Center, Jaipur in department of "Operations" from 06th Feb. 2017 to 05th May 2017.

BMCHRC is an NABH accredited 200 bedded super specialty hospital with leading edge infrastructure, laboratories, utility services & specialties.

Her conduct during the tenure was good.

We wish her all the best.

For Bhagwan Mahaveer Cancer Hospital & Research Center, Jaipur


Renu Pareek
Manager - HR
MANAGER HR

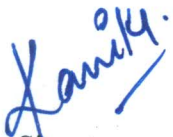
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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **“DISCHARGE TURN AROUND TIME FOR IPD PATIENTS WITH SIX SIGMA APPROACH”** submitted by **Dr. Kanika Arora** Enrollment No. **IIHMR-U/01/2015-17/0292** under the supervision of **Mrs. Geetika Goswami** for award of **MBA Hospital and Health Management** of the University carried out during the period from **6th February 2017 to 5th May 2017** 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.


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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: **DISCHARGE TURN AROUND TIME FOR IPD PATIENTS WITH SIX SIGMA APPROACH.**

A handwritten signature in blue ink, appearing to read 'Kavik'.

Signature of student

ACKNOWLEDGEMENT

I would like to express my gratitude to all those who gave me the opportunity to complete this study. I want to thank the Department of Quality and Department of Operations for giving me permission to commence the study in first instance to do the necessary research work and to use the departmental data. I further thank the Managing Director of organization Mr Subhash pareek who gave the permission and encouraged me to go ahead with my studies. I am bound to all the staff of Bhagwan Mahaveer Cancer Hospital who helped me in completing my studies.

Finally I would like to devote my thanks to my respected mentor Mrs. Geetika Goswami for her unconditional support and guidance throughout the project, without which this work would not have materialised.

Last but not the least, I express my admiration and thankfulness to my colleagues for their inspiration and support.

ABBREVIATIONS

BMCHRC –Bhagwan Mahaveer Cancer Hospital and Research Center

NABH- National Accreditation Board for Hospitals and Healthcare Providers

HIS - Hospital Information System

PCA- Patient Care Attendant

DPU- Defect per Unit

DPO- Defect per Opportunity

DPMO- Defects per Million Opportunities

OT- Operation Theatre

CEO- Chief Executive Officer

DGM- Dy. General Manager

GM- General Manager

PT- Patient

IPID- In-Patient Identification

OPD-Out-Patient Department

M.O.- Medical Officer

MIN.-Minute

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1.0 Introduction of the Project

‘DISCHARGE TURN AROUND TIME FOR AND IPD PATIENT WITH SIX SIGMA APPROACH’

Discharge process start when consultant will declare about discharge to the medical officer or nurse. And after that nurse or medical officer will tell to the ward incharge, and ward incharge starts the billing process.

Basically this project is mainly focus to the stream line of current various procedures of hospital and modifying in such a way that maximum output from minimum input of manpower & resources for best results.

In this I have done my projects on In Door Department for the Turn Around Time of Patient Discharge Process. This kind of project helps the organization to know the deficiency and to find out difficulties facing by the patients at various levels for getting discharge in the hospital. And it is more crucial to reduce discharge time because after getting cured no one want to stay in hospital and on other hand it has great impact on overall feedback to any hospital.

This study is focus mainly on how long a patient has to wait for getting discharge from the hospital. In the study I have concentrated time consumed at various levels for discharge procedure.

The delay in discharge is affects the Patient satisfaction and on other side it affects the financial aspect of hospital. Because after 1:00 O’clock the room rent started ,so if patient is declared discharge in morning and billing card sent to the billing department and till 1:00 O’clock the patient is not discharged the room rent is not considered and new patient cannot come to that ward. And other side if patient is declared discharge at 1:00 pm and then up to 3:00 pm the billing card not send to the billing department then the room rent is considered.

In standard ward there are four medical officer, one ward secretary, 7 nurses in each shift (total 21) , one in- charge nurse , one typist and one ward executive.

DISCHARGE TAT FORM

PATIENT'S NAME:

IPD NO:

UHID NO:

DOCTOR'S NAME:

SR. NO.	PARTICULAR	DATE/ TIME	RECORDED BY
1	Discharge declared by consultant		
2	Inform to ward incharge for discharge		
3	Discharge summary written by M.O.		
4	Discharge summary sent for typing		
5	Inpatient pharmacy return done		
6	Billing card to sent to billing		
7	Send the document to TPA desk		
8	Discharge summary finalized		
9	Received call from billing settlement		
10	Patient relative informed for billing		
11	Final approval received from TPA		
12	Final patient discharge time		

2.0 Introduction of Six Sigma

❖ Origin:

The” MOTOROLA” company invented the six sigma. Six Sigma is a business management strategy, originally developed by Motorola in 1986. Six Sigma became well known after Jack Welch made it a central focus of his business strategy at General Electric in 1995 and today it is widely used in many sectors of industry.

❖ What is six sigma ?

It is a methodology for continuous improvement. It is a set of statistical and quality tools arranged in a unique way. It is a way of knowing where you are and where you could be. It is a Quality Philosophy and a management technique.

A statistical concept that measures the process in terms of defects – at the six sigma level, there are 3.4 defects per million opportunities. A methodology and a symbol of quality.

Sigma Level (Process Capability)	Defects per Million Opportunities
2	308,537
3	66,807
4	6,210
5	233
6	3.4

Today, the concepts and methodologies of 6-Sigma are increasingly being used in the healthcare industry for improving the quality of services rendered, increasing efficiency, and eliminating human errors that can often prove fatal. However, the use of 6-Sigma in the healthcare industry is a relatively new phenomenon as compared to other service industries that have undergone some type of data-supported, systematic, quality-improvement process. With medical and technological advancements, the demand and expectations for improved medical care are continuously increasing. However, due to lack of effective management systems, inefficiency is increasing, which often leads to congested emergency rooms, customer complaints, and lost revenue.

Benefits

Six Sigma concept enable a healthcare organization to offer improved healthcare services to patients by streamlining business processes. In the healthcare industry, the nature of administrations depends a great deal on human abilities, which is frequently extremely hard to gauge and control. 6-Sigma is powerful on the grounds that it depends on a complete approach that spotlights on enhancing both human and value-based parts of a procedure. Despite the fact that actualizing this ideas in the healthcare industry is a testing assignment, it helps in getting outcomes.

In the healthcare industry, the variables that decide the quality and proficiency are normally the stream of data and collaboration between individuals. It helps" in streamlining the stream of data and accomplishing key business comes about by starting social moves all through the organization. it concentrates on enhancing forms as opposed to simply focusing on the improving process which helps in increasing the extent of changes. It gives the important devices and philosophies that assistance in breaking down and changing human performance, fundamental for accomplishing critical long haul upgrades.

Two Meanings of Sigma



The term “sigma” is used to designate the distribution or spread about the mean (average) of any process or procedure.

For a process, the sigma capability is a metric that indicates how well that process is performing. Sigma capability measures the capability of the process to produce defect-free outputs. A defect is anything that results in customer dissatisfaction.

❖ Why Six Sigma?

Six Sigma is about practices that help you eliminate defects and always deliver products and services that meet (customer) patient’s specifications.

Six Sigma is for :

(Customer) patient satisfaction

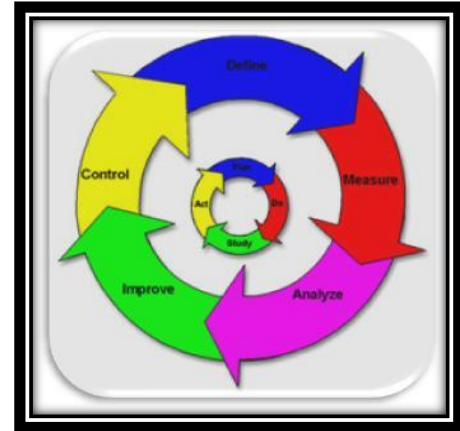
Growth

Quality Improvement

Competitive Advantage

Employee Pride

2.1 Methodology for Six Sigma



Six Sigma projects follow two project methodologies inspired by Deming's “PLAN DO ACT CHECK” These methodologies, composed:-

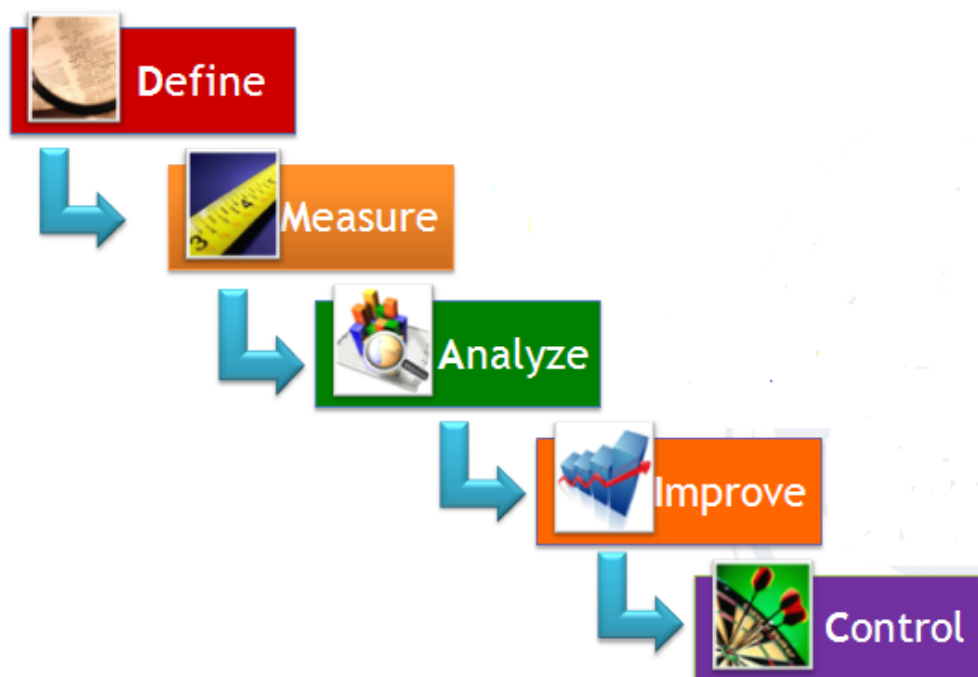
DMAIC - for projects aimed at improving an existing business and service process.

DMADV -for projects aimed at creating new product or process designs.

Here , I have taken the DMAIC six sigma improvement methodology.

WHAT IS DMAIC?

- A logical and structured approach to solve the problem and to improve the process .
- A continuous improvement process and quality tool with focus on change management.



- D** – *Define* the problem, the voice of the customer, and the project goals, specifically.
- M** - *Measure* key aspects of the current process and collect relevant data.
- A** - *Analyze* and determine the root cause(s) of the defects.
- I** - *Improve* the process by eliminating defects.
- C**- *Control* future process performance.

Tools for Six Sigma:

- **Process Mapping:**

Making flowcharts of the progression in the process –decision focuses, operations, improve, circles deferrals, developments and controls. A procedure guide is outlined depiction of how a procedure functions.

- **Design of Experiment**

DOE is a structured, organized method for determining the relationship between factors (Xs) affecting a process and the output of that process (Y).

- **XY Matrix:**

A gathering of lines and sections, with one arrangement of additions set apart along the X hub and another set apart along the Y pivot.

The purpose,of utilizing this framework is to contemplate and comprehend the connection between, what you are putting into a procedure and what your client is receiving in return.

The XY framework enables the group to distinguish the holes, ranges for development.

- **Failure Mode Effect Analysis:**

The manner in which a part or process can fail to meet a specification, creating a defect or non-conformance, and the impact on the customer if that failure mode is not prevented or corrected.

- **Cause And Effect Diagram:**

A cause and effect diagram, also known as “fishbone” diagram, is a graphic tool used to explore and display the possible causes of a certain effect., With a fishbone brainstorming approach, the session is conducted around categories of causes such as Methods, People, Machines, Equipment, Materials, Environment and Management. Use a process-type cause and effect diagram to show causes of problems at each step in the process.

- **Pareto Chart**

- **What is a Pareto Chart?**

A pareto diagram can be effectively characterized as a structured presentation with the bars sorted in decreasing way to identify the opportunity for improvement. The Pareto graph is one of the seven essential instruments of quality control.

A Pareto diagram, named after Vilfredo Pareto, is a kind of outline that contains both bars and a line chart, where individual values are explained in descending order by bars, and the cumulative by the line.

- **Purpose Of A Pareto Chart**

Pareto outline is utilized to graphically summarize and show the relative significance of the contrast of data.

- **What Questions The Pareto Chart Answers**

1. What are the biggest issues confronting our team or business?
2. What 20% of sources are creating 80% of the issues (80/20 Rule)?
3. Where would it be a good idea for us to center our endeavors to accomplish the best upgrades?

Pareto diagram can likewise be utilized to decide how frequently reasons for issues happen. The issue or cause is recorded on the X pivot. The recurrence of event related with every issue or cause is plotted on Y pivot. The issues and causes on the X pivot are recorded in diminishing request. The issue or cause that happens most as often as possible is recorded first. This is normally the issue you need to take a shot at first. The issue or cause that happens slightest as often as possible is recorded last.

- **Histogram:**

A histogram is a show of measurable data that utilizes rectangles to demonstrate the recurrence of information things in progressive numerical interims of equivalent size. In the most widely recognized type of histogram, the autonomous variable is plotted along the level hub and the reliant variable is plotted along the vertical hub.

Key Roles for Six Sigma:

Executive Leadership: Includes CEO and other key top management team members. They are responsible for setting up a vision for Six Sigma implementation.

Champions: Are responsible for the Six Sigma implementation across the organization in an integrated manner. Champions also act as mentor to Black Belts.

Master Black Belts: Identified by champions, act as in-house expert coach for the organization on Six Sigma. They devote 100% of their time to Six Sigma.

Black Belts: Operate under Master Black Belts to apply Six Sigma methodology to specific projects. They primarily focus on Six Sigma project execution.

Green Belts: the employees who take up Six Sigma implementation along with their other job responsibilities. They operate under the guidance of Black Belts and support them in achieving the overall result

3.0 DEFINE PHASE

Statement of Problem :

To delay in discharge process of IPD patients.

Purpose of Project :

Now a days in the hospital , in the Operation part the main focus area in In-Patient department , particular on discharge process of cash and empanelled patient , because it is taken more time to discharge . So, my motto behind conducting such project is to diagnose the non value added process of discharge. This project helps hospital to reduce the Turn Around Time in discharge process which further leads to financial saving and most important part patient satisfaction.

Significance of Project :

This project provides analytic and valuable information to the top management certain managerial decision which can reduce Turn Around Time for the discharge. This will help them to increase the patient satisfaction and cost reduction.

As I mention earlier that my project is the first to study discharge process, my project provides guidance for others who want to do same project and above that they can correlate their output or condition with my study and conclude something which may crucial for the organization.

AIM:-

To reduce Turn around time of discharge patient in Bhagwan Mahaveer Cancer Hospital Jaipur.

RESEARCH QUESTION:-

Can TAT for discharge process be reduced by using six sigma approach?

HYPOTHESIS:-

Ho :-TAT cannot be reduced.

H_A :-TAT can be reduced.

METHODOLOGY:-

- **Study Setting:** Superspeciality Cancer care Hospital, Jaipur
- **Study Period:** 01 April, 2017 to 31 April, 2017
- **Study Population:** IPD Patients
- **Study design:** Interventional study
- **Data collection method:** Primary Data collected through direct observation and secondary data is Retrospective.
- **Sample size:** 200 in **control phase.**
Inclusion criteria:-All IPD cases except daycare,ICU cases.
- **Data Analysis:** Data is analyzed by different data analysis tools like Fishbone diagram, Pareto chart, Histogram.

OBJECTIVES:-

- 1) To study the current Discharge process
- 2) To determine the TAT in IPD.
- 3) To diagnose the reasons of delay and to find out the value-added and non-value added processes.
- 4) To implement interventions to reduce the TAT.
- 5) To carry out analysis of post intervention phase.

3.1 Critical to Quality (CTQ) :

- What is CTQ (Critical to Quality)?

In a simple term, it defines the customers and their requirements.

- Basic steps to identify the CTQ:



- So, first we have to identify the customer, the segment of customer (internal or external customer). So, according to my project the customer segment is internal, the patients who are admitted in to the ward.
- The second step is to identify the voice of customer. The voice of customer means to gathering the comments from the patients and translate them in to issue or measurable specification.
For e.g. Patient's complaints or dissatisfaction.
- The next step is to identify the quality characteristics: The quality characteristics are derived from an understanding of the voice of customer.
- Critical to Quality characteristics of service are those factors which have major impact on the satisfaction of the customer (Patients).
- I have done my project in Discharge Process in Standard Ward, so, as per my project I have observed many complaints during whole discharge process.

The characteristics or complaints that I observed are:

- **Admission desk**

At the time of admission according to Bed category the estimated cost will tell to the patient's relative but at the time of discharge due to some additional treatment or any complication the cost will be increased, so at that time some patients will dissatisfy and delay due to arrangement of money.

➤ **Corporate desk**

- Sometimes when patients comes in emergency, they don't have any authorization letter from the corporate company. Most of the times, the patient's relative is asked to collect and submit the authorization letter. The authorization letter may take time to come depending on the situation which eventually leads to a delay in discharge.

.

➤ **At ward level**

- Nurse mistake (they do not put the investigation reports in file on time and thus, discharge is delayed).
- Nurse mistake (they do not staple the strips/boxes of used medicines(above 1000)of empanelled patient in files on time or might get lost/displaced in shifting from one ward to another.
- Patient Care assistant not available at the time of discharge.
- Consultant and medical officer rounds don't happen on time.

➤ Consultant and medical officer round is remaining

➤ **Summary:**

- Summary is not finalized by consultant for discharge patient.
- The O.T. note is not written in the Operation Theater at the time of Operation. So, O.T. note remains pending which leads to delay in discharge.

.

➤ **Billing department:**

- Incomplete files – Failure of ward nurse to check all entries like sign, investigation report, seal stamps etc.
- There is a queue of attendants in billing department. Although there are specified counters, there is lack of manpower which leads to delay in discharge.
- Missing of medicine wrapper (above 1000) during discharge it leads to delay.
- Company tariff- For the corporate patients they have a company limit of 50000-100000 Rs. Sometimes, the bill may go beyond this limit for which the patient

will have to adjust or has to issue another credit letter from company, causing delay in discharge.

- Surgery code – The consultant forgot to write the surgery code in the billing card so at the time of final settlement of billing, waiting for the consultant for asking the surgery code.

➤ **From patient side:**

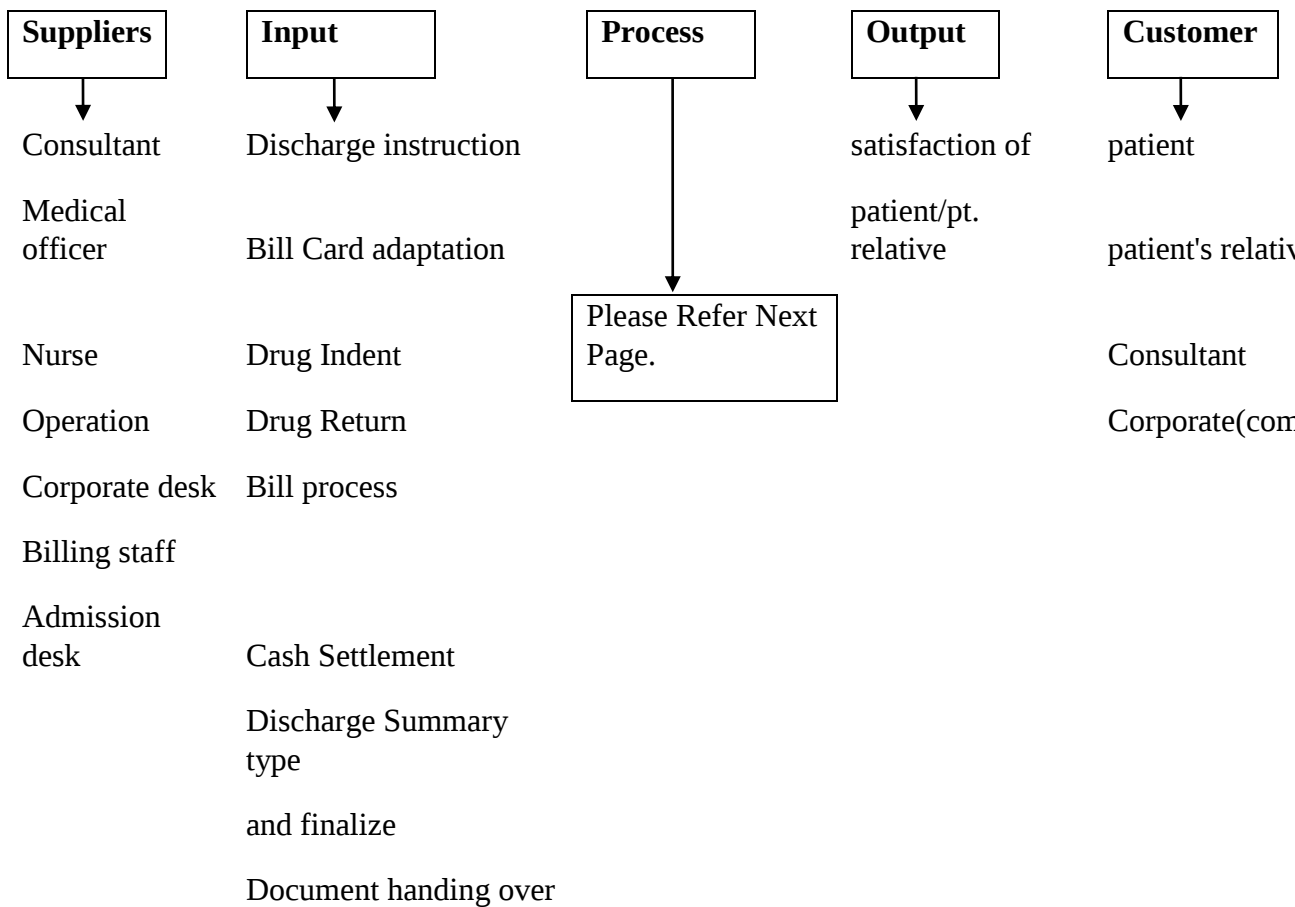
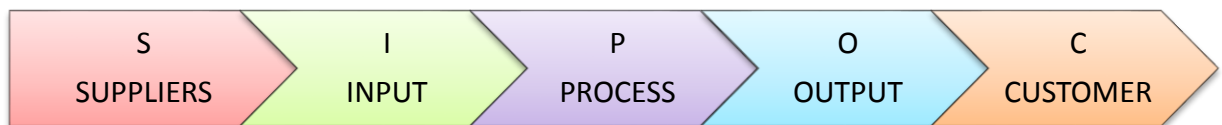
- Patients have some economic problem.
- Patient attendant takes signed discharge paper from ward incharge before discharge for photocopy because patient needs that discharge paper for medicine and for next time permission.
- When ward incharge goes to the patient for informing the billing details, at that time patient's relative is not available with the patient.

➤ And the last step critical to quality, means the most dissatisfying area in the whole discharge process is

1. Billing department
2. Ward area
3. Patient side.

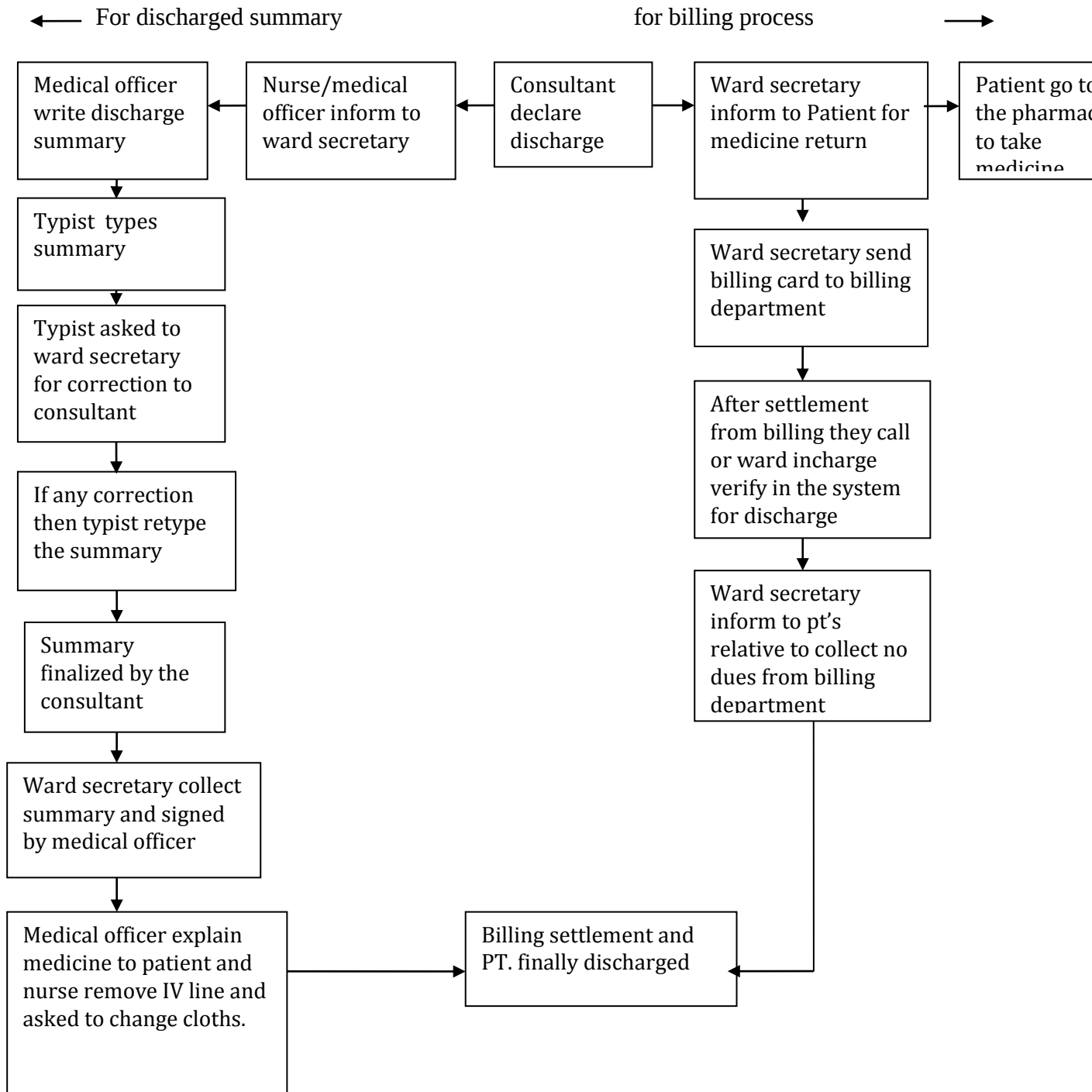
3.2SIPOC

The following SIPOC diagram describes the in-patient process.



❖ DISCHARGE PROCESS

The actual discharge process is shown as below.



4.0 MEASUREPHASE:

❖ Format of Data Collection:

SR . NO .	F IL E N O.	DISCHA RGED DECLA RED BY CONSU LTANT	INFO RME D TO WAR D INCH ARGE	SUMM ARY WRITT EN BY M.O.	SUMM ARY SENT FOR TYPE	IP OK	BILLI NG CAR D SEN D	SUM MARY FINLI SED	RECEIV E CALL FROM BILLIN G	PT. INF. FOR NO DUE S	FINAL PT.DISCH ARGE TIME

7.0 ANALYSIS PHASE:

Here following analytical tools are used for the data analysis.

7.1 Fish Bone Diagram (Root Cause Analysis):

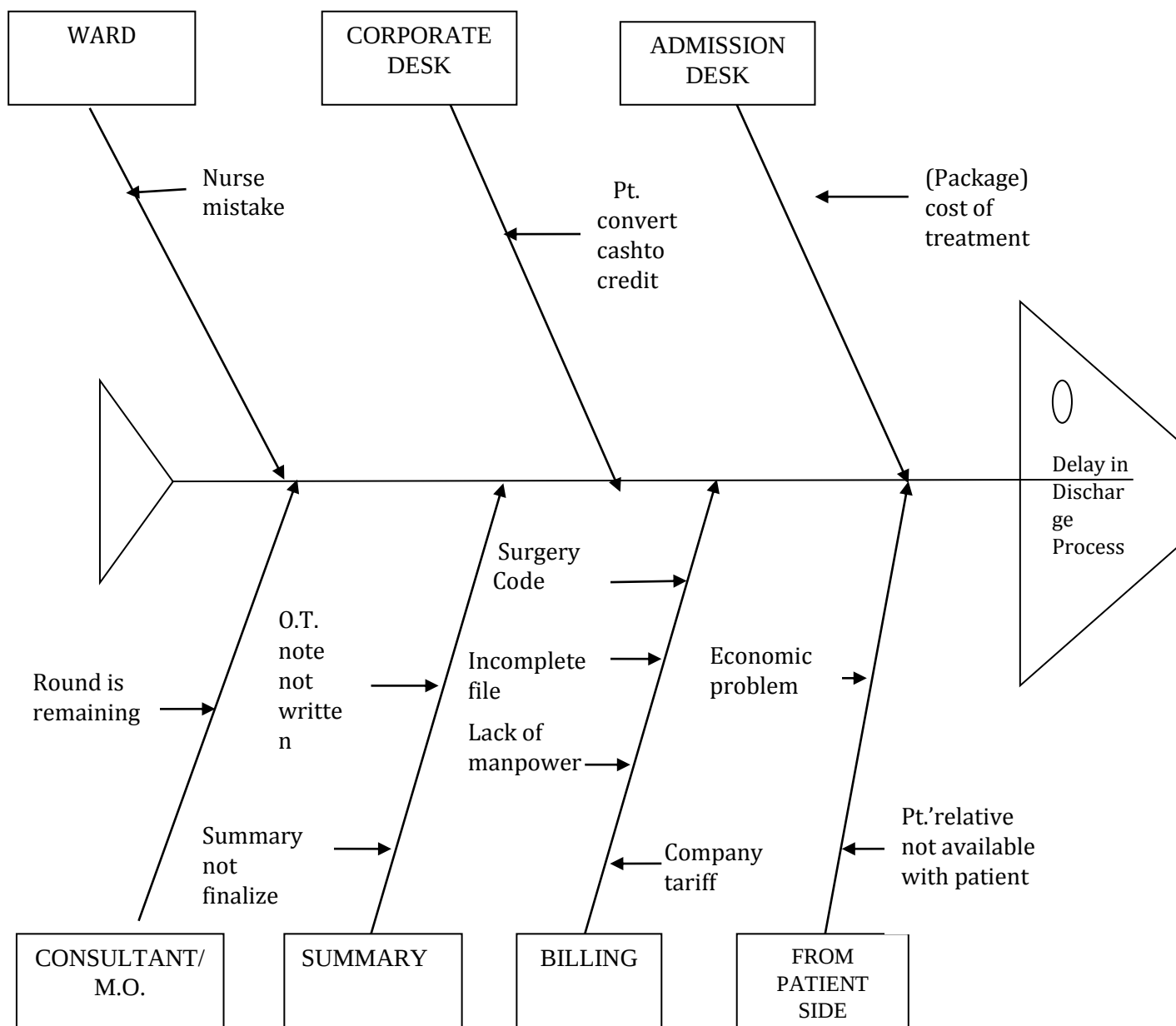


FIGURE: 1 FISH BONE

Fish bone diagram gives some basic root cause responsible for Delay in Discharge Process in IPD. It identifies potential causes for particular problems. It looks like the bones of fish so it called fishbone diagram. The “head” of the fish is the main problem, such as Delay in Discharge Process. A fishbone analysis plots major classification of potential causes. Each of these possible causes can then have smaller “bones” that address specific issues that relate to each cause. These causes are as per following:

A) BILLING DEPARTMENT

- **Incomplete file** -.Failure of ward nurse to check all entries like sign, investigation report, seal stamps etc
- **Company Tariff** – For the corporate patients they have a company limit of 50000-100000 Rs. Sometimes, the bill may go beyond this limit for which the patient will have to adjust or has to issue another credit letter from company, causing delay in discharge.
- **Surgery Code** –The consultant forgot to write the surgery code in the billing card so at the time of final settlement of billing, waiting for the consultant for asking the surgery code.
- **Lack of manpower**-There is a queue of attendants in billing department although there are specified counters but there is lack of manpower so it leads to delay in discharge.
- **Loss of expensive wrappers**- there is rule for empanelled patients that they have to submit the medicine rappers above 1000 to the billing department before discharge and sometimes during shifting from one ward to another they lost their rappers without those rappers they do not discharge the patient then billing department call in ward they search the wrapper or replace it then it takes time so there is delay.

B) FROM PATIENT SIDE

- Patient has some economy problem- sometimes they have to arrange money for payment at the time of discharge.
- When Ward incharge goes to the pt. for informing about billing at that time pt.’s relative is not available with patient, so no one is there for going to pay bill and issue discharge slip.

C) WARD :

- Nurse mistake (they do not put the investigation reports in file on time and thus, discharge is delayed).
- Nurse mistake (they do not staple the strips/boxes of used medicines(above 1000)of empanelled patient in files on time or might get lost/displaced in shifting from one ward to another.
- Patient Care assistant not available at the time of discharge.
- Consultant and medical officer rounds don't happen on time.

D) SUMMARY :

- Summary is not finalized by consultant for discharge patient.
- The O.T. note is not written in the Operation Theater at the time of Operation. So, O.T. note remains pending which leads to delay in discharge.

E) ADMISSION DESK:

- **Cost of Treatment:** At the time of admission according to Bed category the estimated cost will tell to the patient's relative but at the time of discharge due to some additional treatment or any complication the cost will be increased, so at that time some patients will dissatisfy and delay due to arrangement of money.

F) CORPORATE DESK :

- Sometimes when patients comes in emergency, they don't have any authorization letter from the corporate company. Most of the times, the patient's relative is asked to collect and submit the authorization letter. The authorization letter may take time to come depending on the situation which eventually leads to a delay in discharge.

G) CONSULTANT/M.O. :

- Sometimes treating consultant was busy with another patient or might be in any procedure/surgery, so he could not visit the patient and resulting delay in discharge information. Same as ward medical officer was busy with another patient or in round with another consultant, it resulting delay in discharge.

4.2 Pareto Chart

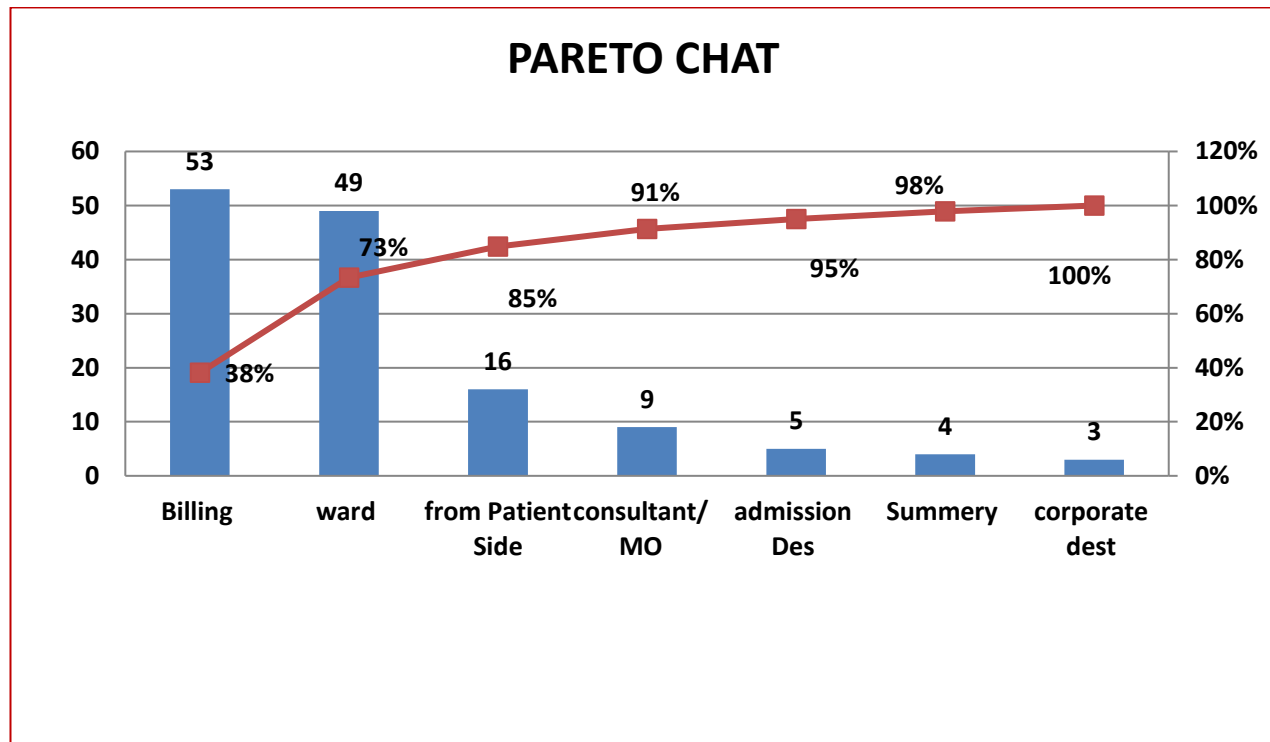


FIGURE: 2 PARETO CHART OF DELAY IN DISCHARGE PROCESS AS PER CAUSE

- In this Pareto chart ,the X-axis (horizontal line) ,Bar graph shows the reasons for delay.which is in decreasing order.
- Y-axis (vertical line) shows the defects.
- And the line shows the cumulative frequencies.
- Pareto chart shows that billing is the highestreason for the delay discharge process.
- Second one is from ward side need attention.
- And then, patient side, admission desk, summary. Corporate desk and consultant/M.O.
- So, by this visual graph we can get idea that in which area we have to focus.
-

4.3Histogram:

Reason of Delay	No of Patient
Billing	53
ward	49
from Patient Side	16
consultant/ MO	9
admission Des	5
Summery	4
corporate desk	3
Total	139

Table: 1 No. of patient as per reasons

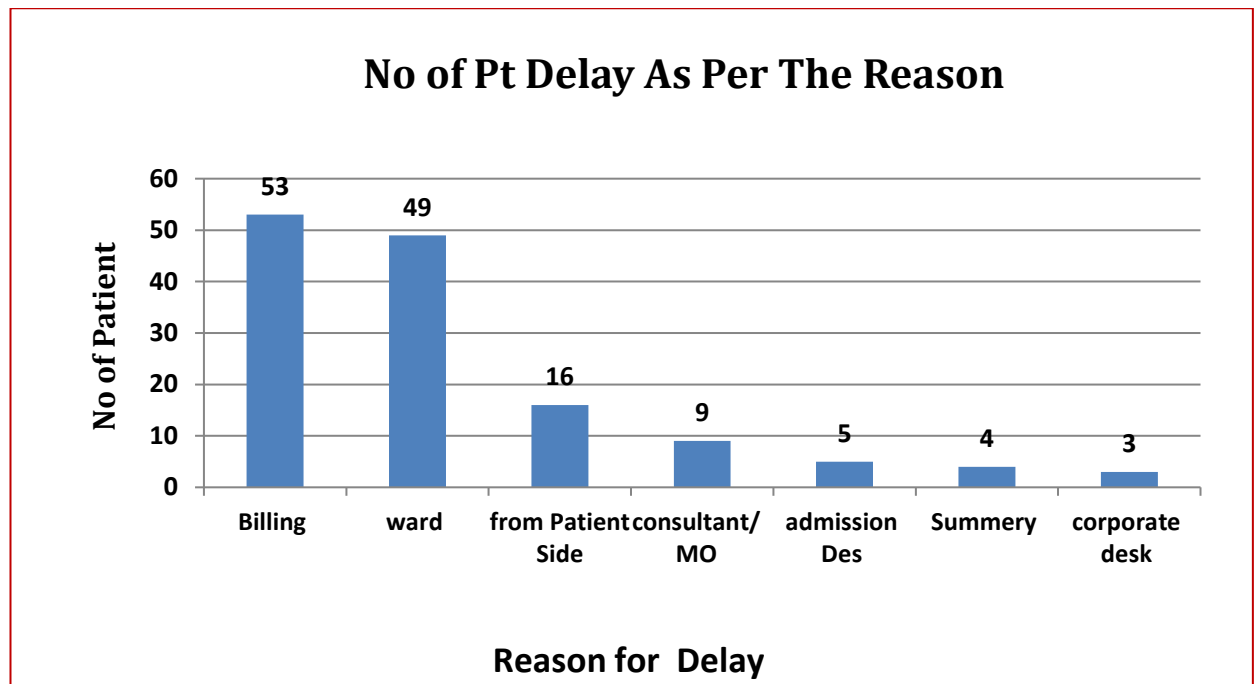


FIGURE: 3 No. of Patient Delay in Discharge According to Reasons

- According to above Histogram Analysis, 53 were delay due to billing.
- And after that the second one bar shows that 49 are delayed from the ward end. So, this data is in decreasing order. It is shown that highest no. of patients (53) delay due to billing reason and then it is decreasing and last due to consultant reason 3 patients are delayed.

❖ **According to Data Sheet (TAT- FORM):**

1. Table 1 Format of average turnaround time

No. of Patients	Total TAT(Min.)	Average TAT(Min.)
200	45084	225.4

2. Table 2 Average time

	Time (min.)
Patient ideal discharged time	180
patient average discharged time	225.42

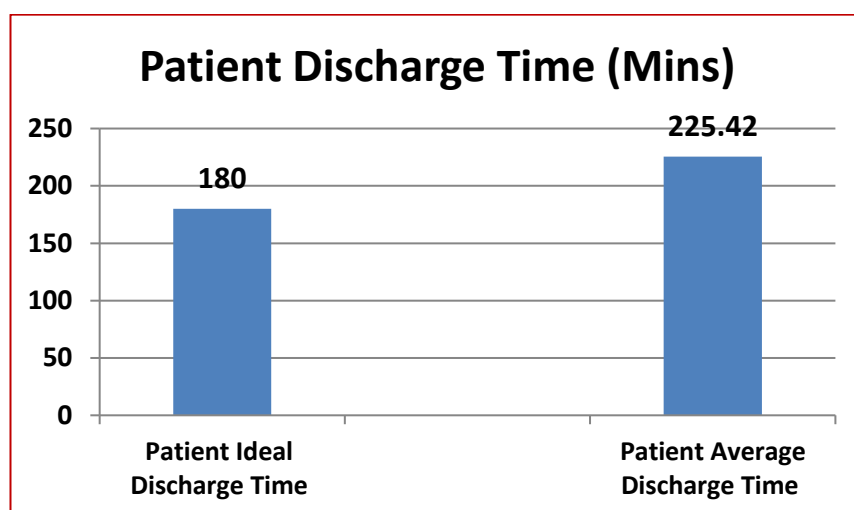


Figure: 4.1 Patient Discharge Time

The above figure shows that the average discharged time of the patients is 225.42 min.

3. Table : 3 No. of patient discharge

	No of patients discharge
within standard time 180min.	61
Above 180 min.	139

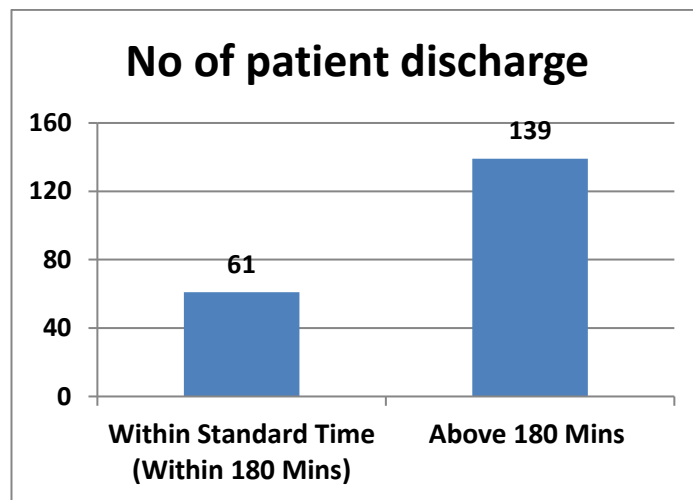


Figure: 4.2 No. of patient discharge in time

- This is shown that out of 200patients, 61 patients were discharged within time, and 139patients are delay.

4.4Defect Analysis:

DEFECT PER MILLION OPPORTUNITY:

DPO = Defect per Opportunity

$$\text{DPO} = \text{Total No. of Opportunity} / \text{Total No. of Unit} * \text{No. of Opportunity}$$

$$\text{DPO} = 139 / 200 * 7$$

$$= 0.0992857143$$

$$\text{DPMO} = \text{Total No. of Defects} * 10,00,000$$

$$\text{DPMO} = 0.0992857143 * 10,00,000$$

$$\text{DPMO} = 99285.71$$

Sigma Level (Process Capability)	Defects per Million Opportunities
2	308,537
3	66,807
4	6,210
5	233
6	3.4

$$\text{Defect (\%)} = 9.9$$

$$\text{Yield (\%)} = 90.05$$

$$\text{Process Sigma} = 2.74$$

5.0IMPROVEMENT PHASE

❖ Recommendations and Suggestions :

➤ Billing:

- The billing department should update and audit the billing card on daily basis. If the cost increases, they should inform the patient relatives.
- Message system should start for the intimation of discharge by the concerned ward executive to patient relatives for the settlement of bill.
- Billing dept has to verify the Authorization letter for the credit billing and incase the letter is not available, they should pre-inform the concerned ward executive and corporate desk for getting Authorization letter.

➤ Ward:

- Discharge order should be intimated to all stake holder as soon as Consultant has declared.
- Wardincharge should counsel the patient relative about the current status on daily basis.
- Ward incharge should check all investigation reports in file on daily basis.
- Ward incharge should staple the expensive wrappers of empanelled patients in file just after administering the medicine so that patient does not loose it and time is saved at the time of discharge.

➤ From patient side:

- Patient relative must arrange the funds as per the cost of treatment and timely updated by the billing dept.
- In case of admissions of Emergency Department, the relatives must ensure about their Authorization letter and should submit within stipulated time.
- At least one relative should be available at the time of discharge for settlement of bill.
- One photocopy machine should be placed in every ward for the comfortability of patient as well as to save time.

➤ Summary :

- Tentative summary should be made.

- O.T. note should be written in the O.T. as soon as surgery is done. So, the typist can type the OT note and finalized the summary.
- At the time of discharge MO should ask to the treating consultant about the final diagnosis and discharge medication for the finalization of discharge summary.
- If tentative summary is ready, it should be verified by the consultant during round.

➤ **Consultant/M.O. :**

- Consultant should give the estimated treatment cost to the patient and relatives before admission.
- Consultant must fill all details of admission form like estimated cost, approximate length of stay and other instructions. So, the ward staff should plan the discharge from the day of admission.
- Consultant round timing should be fixed, so discharge intimation and discharge process should start as ordered.
- Medical officer should complete their files with sign and seal stamp before sending the file for billing.

➤ **Corporate desk:**

- At the time of admission, corporate desk should ensure about the receiving of Authorization letter from respective corporate. In case of emergency admission corporate desk should inform to respective corporate for sending their Authorization letter.
- Corporate desk should verify the billable status of the patient as per the Authorization letter and they should inform to patient and relative if any non approved procedure or highly expensive medicine used for further approval or cash payment.

➤ **Admission desk:**

- At the time of admission, admission desk ensure that all details of admission form like cost of treatment and probable stay are filled by the consultant or not? If not, they should call to the consultant and ask for the same and as per consultant ordered they should write in to the admission order form.
- Changing in to the billable tariff as per the Authorization letter.

6.0CONTROL PHASE:

- I have taken randomly 200 samples for control phase from 1st to 30th April 2017.
- **DEFECT PER MILLION OPPORTUNITY:**

DPO = Defect per Opportunity

$$\begin{aligned} &= \frac{\text{Total no. of Defect}}{\text{Total no. of Unit} \times \text{No. of Opportunity}} \\ &= \frac{87}{200 \times 7} \\ &= 0.062143 \end{aligned}$$

$$\text{DPMO} = \frac{\text{Total No of Defects} \times 1,000,000}{\text{Total no. of Unit} \times \text{No. of Opportunity}}$$

$$= 0.062143 \times 1,000,000$$

$$\text{DPMO} = 62143$$

Sigma Level (Process Capability)	Defects per Million Opportunities
2	308,537
3	66,807
4	6,210
5	233
6	3.4

$$\text{Defect (\%)} = 6.2$$

$$\text{Yield (\%)} = 93.76\%$$

$$\text{Process Sigma} = 3.03$$

So, here the defect is **6.2%** , efficiency is **93.7%** and sigma process is **3.03**. Still it is not six sigma because for six sigma the yield must be **99.9997%**.

- **According to Data Sheet (TAT- FORM):**

Table : Format of average turnaround time

No. of Patients	Total TAT(Min.)	Average TAT(Min.)
200	45084	225.4

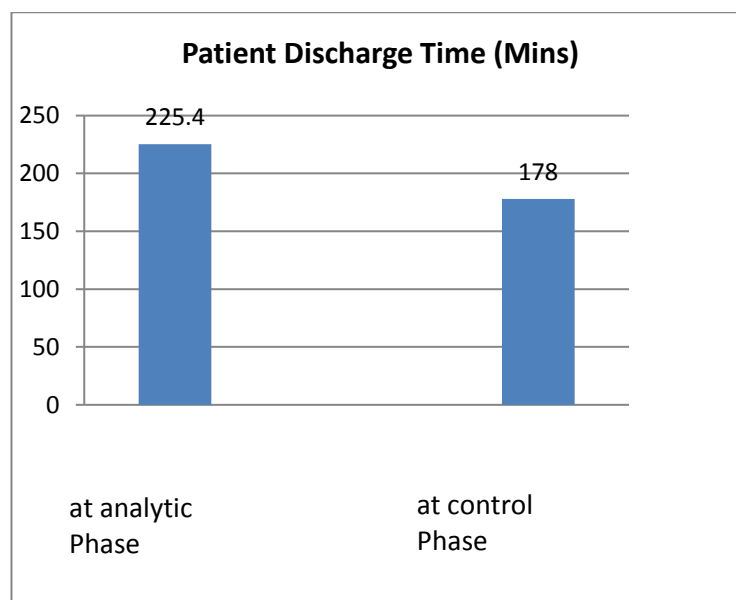
➤ At the analysis phase average total time is 225.4 min.

After control phase:

Table: Format of average turnaround time

No. of Patients	Total TAT(Min.)	Average TAT(Min.)
200	35524	117.62

➤ The total average time is 178 min.



❖ Results

PHASES	AVERAGE TIME	SIGMA
ANALYTIC PHASE	225	2.7
CONTROL PHASE	178	3.03

RESULTS

The discharge time in the analytic phase was 225 min and in the control phase was 178 minutes. The sigma value in the analytic phase was 2.7 and in the control phase was 3.03.

CONCLUSION

This project has provided analytic and valuable information to the top management and certain managerial decision which can reduce more Turn Around Time for the discharge. Thus, this will help us to increase the patient satisfaction and cost reduction.

Scope :

This project provides analytic and valuable information to the top management and certain managerial decision which can reduce more Turn Around Time for the discharge. And it will help to reach up to Six Sigma level. This will help them to increase the patient satisfaction and cost reduction.

7.0 Limitation of Project:

- I have excluded private insurance companies where we need to take approval after discharge which normally takes 3-4 hours and which is not under control of hospital process.
- I had very less time for control phase and for six sigma atleast 6 months is required.

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