# DESIGNING SURGICAL BILLING PACKAGES AND THEIR IMPACT ON BILLING AND DISCHARGE TAT FOR KIMS HOSPITAL

DISSERTATION SUBMITTED TO

**THE IIHMR University, Jaipur**

for the partial fulfilment for the award of the degree of
Master of Business Administration (MBA)

in

Hospital and Health Management/Pharmaceutical Management/Development Management

by

Rashi Gupta

Under the supervision and guidance of

Dr. Piyusha Majumdar

2023

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# DECLARATION BY STUDENT

I hereby declare that this dissertation ‘designing surgical billing packages and their impact on billing and discharge TAT for KIMS Hospital’ is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

(Signature)

Name of the student Rashi Gupta

Date

# CERTIFICATE

This is to certify that Rashi Gupta in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management)/MBA (Pharmaceutical Management)/MBA (Development Management) from the IIHMR University, Jaipur has successfully completed her/his internship at (name of the organization) during February 20- May 19, 2023.

Place: HYDERABAD Preceptor/ Head of the organization

Date: Name of the organization- KIMS HOSPITAL

# CERTIFICATE

This is to certify that ‘designing surgical billing packages and their impact on billing and discharge TAT for KIMS Hospital’ is a record of the research work undertaken by Rashi Gupta in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and his/her approach to the research study has been sincere, scientific, and analytical.

Faculty Guide
IIHMR University, Jaipur
Date

School Dean
IIHMR University, Jaipur

## ABSTRACT

**INTRODUCTION-** Automation of the billing procedure is presumed to make the billing process and in turn discharge process less time consuming and simpler at hospitals. Efficient packages for insurance cases and automation of their billing can help speed up the billing and discharge process of insurance cases. This can be measured by checking for a decrease in the billing and discharge TAT of the hospital after complete automation of billing procedure.

**METHODOLOGY-** This study is a descriptive observational study. Study population selected includes surgical patients and floor billers. Surgical patients of insurance case were only chosen for this study. Purposive sampling technique was adopted to collect the sample from HMIS. The study duration is of 90 days (from March 2023 to May 2023).

**RESULTS & DISCUSSIONS-** An increase in the number of insurance cases has been observed after automation of prepared packages and package billing procedure which can be attributed to an addition of insurance companies to the hospital network. It has been observed that after completely automating the insurance billing procedure, the billing TAT has decreased by 40 minutes and the discharge TAT has decreased by 1 hour 18 minutes. Therefore, it can be assumed that automation of billing procedure has a direct association with the billing and discharge process.

**CONCLUSION-** Billing process is a tedious process which affects both billers and the patients. It increases the waiting time for patients and increases the workload on a biller. Manual billing has been found to contribute to increase in the waiting time of the patient. In our study, we automated the billing procedure to see if it has an impact on the billing and discharge process of the hospital. It was found that there was a decrease in the billing TAT and discharge TAT after complete automation of the billing procedure.

## Acknowledgement

The Internship at the KIMS has provided me with enormous knowledge and has given me sufficient experiences on how a hospital runs and how they implement the protocols set by them. I would like to extend my gratitude to my college IIHMR University, Jaipur for providing me with this opportunity to work at an esteemed organization such as KIMS. I want to thank Dr. Piyusha Majumdar, my faculty mentor, for her timely advice and guidance. I owe, my sincere regards to my organization mentors, Dr Ayushi Umesh Devi, and Mr. Prabhu Gangapatnam at KIMS for their consistent support & guidance. I sincerely thank them for the time & effort that they have dedicated for the completion of this internship and for giving me an insight as to how a hospital works. I thank my parents & friends for their continuous support & motivation. I perceive this internship as vital part of my professional development.

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| TAT | Turnaround time |
| MIS | Management Information System |
| MOUs | Memorandums of understanding |
| CAG | Coronary Angiogram |
| CABG | Coronary artery bypass graft surgery |
| PTCA | Percutaneous transluminal coronary angioplasty |

# CHAPTER 1- INTRODUCTION

## HOSPITAL BILLING

Hospital billing is the process of creating medical claims to be submitted to payers in order to receive payment for healthcare services rendered by hospital and medical facilities including in-patient and out-patient services. Hospital billing, often referred to as institutional billing, is the process of charging claims for each kind of in-patient and out-patient care rendered by a hospital or other healthcare facility. The hospital billing process, which is essential to a hospital's revenue cycle, also includes billing payers for the medical services they offer, such as laboratory tests and the use of specialized medical equipment.

Medical billing often involves the patient, their insurance company, or both paying for services rendered by the hospital to the patient. This process comprises of a third-party payer, usually the patient himself or the insurance company.

### TYPES OF HOSPITAL BILLING

There are 4 types of billing processes followed all over the world in hospitals

1. Open billing- Complete health data of a patient is transferred to more than one practice through electronic health records (EHRs). This provides easy access to information to more than one provider, patients, chief stakeholders, insurance payers, medical billing teams etc
2. Closed billing- A closed medical billing system focuses on a single practise and tracks health records using digital tools.
3. Isolated billing-An isolated system is one that is separated from medical institutions, practises, and doctors. They keep a complete record of each patient.
4. Package billing- Package billing is a type of billing in which a group of services are included in the package for which the patient will have to pay in advance.

TYPES OF BILLING

Based on use of software to bill a patient, billing at hospitals can be classified into

a) Manual billing- In this type of billing, the biller manually enters all the patient related investigations and procedures into the database. This type of billing allows the biller to make changes in the bill at any given moment of time.
b) Automated Billing- In this type of billing, the biller will have to just put in the code into the software while billing the patient. The biller, unlike in manual billing, cannot make any changes in the bill at any given moment of time.

**AUTOMATION OF BILLING**

Charge input, claim scrubbing, and remittance are all processes that can be automated using timers and natural language processing on a daily, weekly, and monthly basis. Automation of billing is a process when charge entry, claim scrubbing and remittance are all performed automatically through timers and natural language processing every day, week, or month accordingly. Automation helps improve patient outcomes by supporting technological advancements, making processes more efficient and effective.

Benefits of Automating manual processes

1. Higher efficiency and productivity- Implementing automated processes reduces errors and redundancies, resulting in much more efficient work.
2. Reduced time and costs saving- By reducing the time employees need to complete their work, as well as the number of employees needed on each task, automation translates to more hours focused on doing work that brings profit.
3. Automating billing process reduces stress- Explaining to patients the delay in making payments of claims can cause mental stress on the patient by the thought of paying through their pocket what they expected to be covered by their insurer.
4. Improving compliance- Automated processes empowers compliance with regulations and audit trails

5. Financial insight- Automation allows a user to get more information quickly when compared to manual process.
6. Makes the business more scalable- Manual processes make scaling difficult in response to increase in demand.

**PACKAGE BILLING**

A type of billing in which a group of services are included within the package for which the patient will have to pay in advance.

Package billing comprises of two lists-

a) Includes-
   - These are services and items which are included within the package.
   - They are usually those investigations and procedures that a patient will have to undergo either before, during or after the surgery.
   - It also comprises of room charges, quantity of drugs required and their charges

b) Excludes-
   - Anything that is conducted outside of the includes will automatically be billed as an exclude.
   - Commonly excludes comprises of additional room charges for days in addition to those in includes, implants, special dyes, and drugs etc.

BENEFITS OF PACKAGE BILLING

1. It helps speed up billing process.
2. In case of insurances, it eliminates the step where billers must confirm tariffs (since room tariffs vary from company to company) and direct apply the package while billing.
3. It explains patients in advance about the procedures involved and gives them an estimate of the cost of the procedure.
4. Package billing also contributes to efficient use of manpower and resources
5. Package billing is cost effective for patients when compared to open billing.

TYPES OF PATIENTS

Patients can also be classified, based on the duration of their stay at hospitals, into

a) Out-patients- These patients only visit the hospital for a few hours to get a diagnosis and then leave the hospital premises within that day.
b) In-patients- These patients stay at hospitals for more than a day to get treated.

Patients can be categorised, based on the type of treatment they require, into

a) Medical patients- Patients whose treatment remain non-invasive.
b) Surgical patients- Patients whose treatment will involve invasive procedures.

Patients can also be classified, based on the mode of payment used, into

a) Cash patients- Cash patients are those that make the payment themselves.
b) Insurance patients- Payment for the treatment is done via insurance companies depending upon the type of policy the patient has.
c) Corporate patients- These patients are eligible for certain government schemes and those schemes cover for the payment of the treatment.

**PROBLEM STATEMENT**

It has been observed at hospitals that discharge process of a patient has becomes very time consuming. The reason behind this is because waiting time of patient increases due to tedious billing procedure. In general, when a patient is given the clearance to go home by the treating physician, nurses/sisters initiate the discharge process. For a patient to be discharged, he/she will have to settle their pending dues with the hospital. The biller is supposed to prepare the bill and hand it over to the patient for him/her to settle it. A major delay is observed in this procedure. The delay can be due to

- Time consuming billing procedure- A biller while billing will account for every procedure and investigation performed, every drug and instrument used in the treatment. This procedure sounds simple but turns out to be very time consuming as the biller will have to cross check and confirm with the respective departments about the quantity used, for him/her to bill the patient. All this is performed

manually. Therefore, it is time consuming and increases patient waiting time and in turn delays the discharge process. This delay in discharging the patient causes a revenue loss to the hospital as the delay caused will make the hospital lose on revenue that could have been generated by allotting that bed to another patient.

- Partial automation of billing- It is observed at this hospital that only for cash patients, the billing is completely automated. In case of insurance patients, the billing process is partially automated.

**MAGNITUDE OF THE PROBLEM**

This is a common problem observed in hospitals.

It is observed at this hospital that cash patients that follow package billing is completely automated but package billing for insurance patients is not completely automated.

Delay in billing results in (to the patients)

- Mental distress to the patients and their attenders.
- It makes them feel that their time is not valued for.
- These procedures that are performed at patients, are usually expensive procedures. For a patient and his attender, it is necessary to have an estimate given to them beforehand so that they will not feel financially burdened after the completion of the procedure.

Delay in billing issue results in (to the hospital)

- Manual billing can be time consuming as the biller will have to add each procedure and investigation manually in the system.
- Manual billing increases the amount of manpower allotted to the process and there by reduces the efficiency.
- Billers also lose morale and patience if this process takes longer time than required.

Delay in discharge results in (causes to the Patient)

- After staying at hospital for a certain duration, especially after getting extensively treated patients in general want to vacate the room as soon as possible. Billing delays leads to delays in this process.
- These procedures that are performed at patients, are usually expensive procedures. For a patient and his attender, it is necessary to have an estimate given to them beforehand so that they will not feel burdened after the completion of the procedure.

Delay in discharge results in (causes to the hospital)

- In a hospital, there is always a need for an empty bed for a patient. Delay in vacating one patient leads to loss of availability of bed to the next patient which in turn leads to the delay in start of the treatment of the patient.
- Delay in discharging a patient also leads to loss of revenue as the no. of hours the room remains with the previous patient will lead to loss of rent that could have been collected from the next patient.

**RESEARCH QUESTIONS-**

a) Can efficient package improve and accelerate the billing/ discharge process for patients?
b) Can automation of insurance package billing reduce the billing and discharge turnaround time (TAT)?

**OBJECTIVES**

a. To design surgical billing packages- Design a surgical package such that it would make the process of explaining the patient about all the procedure and investigations involved in the surgery easier and gives the patient an estimate about the cost involved in the procedure.
b. To completely automate the billing procedure for insurance cases of surgical packages- Automating the billing process will make it easier for the floor billers to bill and reduce the waiting time. (For both billing and discharge)

# CHAPTER 2- LITERATURE REVIEW

*Table 2.1- Literature Review*

| SNO | TITLE | AUTHOR NAME | OBJECTIVE | METHODOLOGY | RESULT |
|---|---|---|---|---|---|
| 1. | Predictive modelling for turnaround time (TAT) of discharge process for insured patients in a corporate hospital of Pune city [Predictive Modelling for Turn Around Time (TAT) of Discharge Process for Insured Patients in a Corporate Hospital of Pune City - Kasturi Shukla, Shrishti Upadhyay, 2018 (sagepub.com)] | Kasturi Shukla, Shrishti Upadhyay | This study was conducted to find out the reasons for delay in discharges. | A cross sectional study was adopted to conduct this study. The in-patients who were using insurance were taken as sample. | It was observed that submission of discharge summary to TPA and final bill approval from insurance company seemed to sway the discharge TAT. |
| 2. | A study of the causes of delay in patient discharge process in a large multi-speciality hospital A Study of the Causes of Delay in Patient Discharge Process... : QAI Journal for Healthcare Quality and Patient Safety (lww.com) | Kumar Jatin | This study was conducted to analyse and evaluate the reasons for delay in discharge process of cash and insurance patients. | Pareto analysis and descriptive statistics was employed to conduct this study. | Results showed that delay in every process of discharge was caused because of delay in billing mainly due to delay in obtaining clearances from lab, pharmacy, and radiology. |
| 3. | Insured patients' discharge delays: causes and solution Final-Malhotra- | A Singh, P Ravi, K Lepcha | This study focused on finding out the time taken to | A cross sectional study was carried out. A sample size of 174 patients was | This study finds that the major delay in |

| | | | | | |
|---|---|---|---|---|---|
| | Journal-Book-2019-20.pmd (researchgate.net) | | discharge insurance patients. | collected using systemic random sampling technique. | discharge is due to delay in sending discharge summaries to TPA or insurance companies and delays in receiving post-auth approvals. |
| 4. | Application of predictive modelling to improve the discharge process in hospitals KoreaMed Synapse | Sayed Hisham, Shahina Abdul Rasheed | This study was conducted to find out the factors that sway discharge process TAT. | Multiple linear regression was used to predict TAT. | The factors that could sway the discharge process were found to be the treating doctors and pending evaluations of the day. |
| 5. | A study of the discharge process of a multi-speciality hospital Cardiac-markers-Meghna-Jun-2019.pdf (researchgate.net) | Anil Pandit, Savita Prashar | This study was conducted to assess the discharge process and determine the average time taken for the patient to be discharged in a multi-speciality hospital. | A descriptive observational study was conducted. Data was collected from HIS and by observation. | It was found that the time taken for discharges of insurance patients were 7 hours while those of cash patients was 5 hours. |
| 6. | Study on turnaround time of out-patient billing services at super speciality hospital-Chennai https://www.indian | Vigneshwaran S Devi Bhooma | This study was conducted to estimate out-patient billing | A descriptive study was opted to conduct this study. | It was found that delay in billing was because of delay in obtaining |

| | | | | | |
|---|---|---|---|---|---|
| | journals.com/ijor.aspx?target=ijor:ijmss&volume=2&issue=2&article=007 | | time | | doctor's prescription, phone calls to other departments and cashier billing. |

# CHAPTER 3- METHODOLOGY

According to the problem posed in this study, a hypothesis is proposed as a solution to this problem. It is observed that there is a delay in billing time and discharging the patient which is thought to be due to arduous billing procedure. While billing a patient, the biller manually enters in the details of all the procedures and investigation performed on the patient along with the quantity of all the drugs, instruments used. Since the billing is partially automated, it is proposed that the automation of the entire billing procedure can contribute to fast-forwarding the billing of a patient and reduce the time taken to discharge the patient.

Open billing is known as the type of billing in which the patient pays for every investigation and procedure as when the treatment proceeds according to hospital tariffs. Billers at KIMS Hospitals are manually billing patients under open billing. Open billing is also believed to contribute to the increased billing and discharge time and therefore it was proposed that a patient should be provided with an alternative. It is proposed that patients will be given another option to choose for when opting for surgeries. In a package billing, the patient is explained beforehand about the procedures and investigations that will be included within the surgery and within the package, where the package will have certain includes (Investigations and procedures commonly performed) and excludes (any other investigations or procedures performed in addition to the package). It is hypothesized that automating package billing will contribute to the reduction in the delays while billing and discharging the patient.

Therefore, the key research questions of this study are

a) Can efficient package improve and accelerate the billing/ discharge process for patients?
b) Can automation of insurance package billing reduce the billing and discharge turnaround time (TAT)?

## STUDY DESIGN

To perform this study a descriptive observational assessment has been adopted. A descriptive observational study describes the patterns of occurrences of one variable in relation to other variables.

In this study, since we want to find out if the billing TAT and Discharge TAT have reduced upon automation and introduction of package billing for insurance patients, the ideal study design adopted is descriptive observational assessment.

The variables under examination in this study are Surgical package billing, billing TAT and discharge TAT.

This study was conducted for a duration of 90 days (March, April & May 2023). This data is being compared to data of December 2022, January & February 2023.

## STUDY POPULATION

The study population selected for this study are

1. Floor billers
2. Surgical patients

Inclusion criteria- Since this study focuses on surgical package billing, the patients included will be cash and insurance surgical patients with a length of stay of more than 1 day and floor billers.

Exclusion criteria- All medical patients are excluded from this study.

## SAMPLING TECHNIQUE

Purposive sampling method was adopted to collect the sample. Since this study focuses on finding out if the complete automation and updating of package billing of insurance patients leads to a reduction in delay in billing and in turn discharge of the patient, the data for this study is obtained from hospital's information system (MIS). Therefore, the data

collected to perform this study is from a secondary source. Therefore, this data will be secondary data.

## STUDY INSTRUMENTS

Since this study includes finding out the changes in the waiting time, the data is collected from hospital's information system. Therefore, in this study the study instrument used is secondary data, as the data is collected from MIS.

## OPERATIONAL DEFINITIONS

**Billing TAT**- It is calculated from the time the biller starts preparing the bill to the time he closes the bill prepared and converts it into final bill.

**Discharge TAT**- It is calculated from the time the nurse initiates discharge to the time the patient has settled the bill and has checked out from the hospital.

**Surgical billing**- Certain procedures and investigations that will be conducted during the treatment of a surgery are clubbed into one single unit called as a package. And preparation of bills of these packages is called as package billing.

**Manual billing**- Billing procedure where the biller will enter all the investigations and procedures manually into the billing database to prepare the final bill.

**Automated billing**- Billing procedure in which the biller will have to enter certain codes within the billing database to prepare the final bill.

## STATISTICAL METHODS

For analysis of the data obtained, Microsoft excel was used. Tools on Microsoft excel such as formulas (such as VLOOKUP, averages etc) were used to extract the required data and charts (such as line graphs, bar charts) were used to represent and analyse the data.

## ETHICAL CONSIDERATIONS

Taking ethical issues into account while conducting the study is as important as choosing suitable research approach and methodology. Since the study involves utilizing patient records, hospital's approval and consent was taken from respective authorities to use them for this study. To maintain confidentiality, patient details and insurance companies involved have not been disclosed in this study. The details of each package and their amounts have not been disclosed as they are classified.

# CHAPTER 4- RESULTS

The sample size is collected from Hospital's information system. This data is collected for three surgical packages mainly Coronary artery bypass graft (CABG), Coronary Angiogram procedure and Percutaneous transluminal coronary angioplasty (PTCA). The results are obtained after comparing the data for these three surgical packages for the months December, January and February with the data collected for these three packages for the months of March, April, and May 2023.

The data shown in this study are for insurance patients only. It has been observed that manual billing was applied for insurance patient. For cash patients, packages were billed under package billing and the process has been automated. For insurance cases the, billing is partially automated. Therefore, this data focuses on analysing the prepared and updated insurance packages and their automation on insurance patients.
We will also focus on how introduction of automation affects the billing and discharge TAT.

DESIGNING PACKAGES

As already discussed, hospitals in India, commonly follow two types of billing which are open billing and package billing.

Package billing is a type of billing in which a group of services are included as one entity for which the patient will have to pay in advance. For insurance cases, packages are prepared based on memorandum of understanding (MOUs). MOUs are mutually signed agreements between hospitals and insurance companies.

Packages were prepared for three surgeries-

a) Coronary Angiogram procedure (CAG)
b) Percutaneous transluminal coronary angioplasty (PTCA)
c) Coronary artery bypass graft surgery (CABG)

Each package comprises of a set of includes and excludes.

Includes comprises of

1. Room tariffs- Based on the length of stay of the patient
2. Pharmacy supplies
3. Lab investigations
4. OT charges
5. Instrument charges
6. Professional fees- Surgeon and his/her team's fees, Anaesthesiologist's fees

Excludes comprises of

1. Additional room charges- Due to any complication in the surgery, the patient will have to stay a little longer
2. Implants
3. Stents
4. Special drugs- Special dyes
5. Additional procedures- In case of any complications, surgeons may perform additional procedures.

The main objective of packages is that it is cost effective to the patient and reduces the time taken to prepare the bill.

Data obtained can be divided into cases before automating the billing process and cases after automating the billing process.

The data collected is of 3 packages mainly

- Coronary Angiogram procedure (CAG)
- Percutaneous transluminal coronary angioplasty (PTCA)
- Coronary artery bypass graft surgery (CABG)

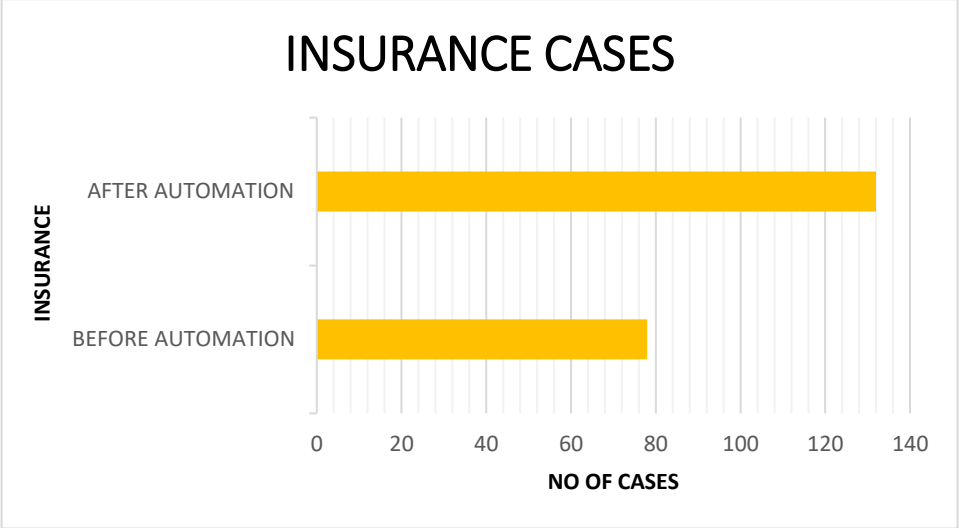


*Figure 4.1- A clustered bar graph depicting the no. of insurance cases before automating the billing process and after automating the billing process*

INTERPRETATION

In Figure 4.1, the data shows a comparison between no of insurance cases before automating the billing process and no of insurance cases after automating the billing process. It can be observed that there has been an increase in the number of insurance cases after the billing procedure has been automated. This increase can be attributed to increase in tie ups with more insurance companies and addition of those insurance companies to the hospital network. In addition to this, it can be attributed to the general increase in the patient flow of respective surgeries.

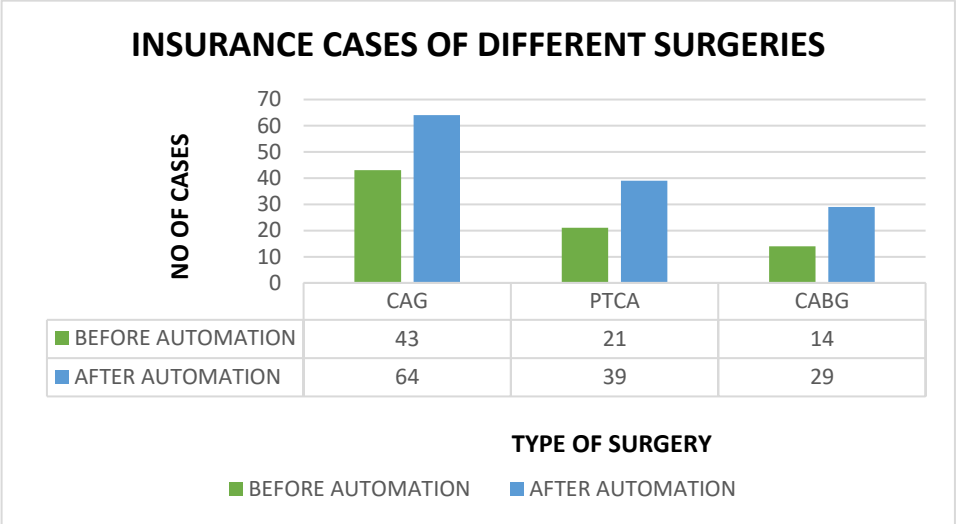


*Figure 4.2- A clustered column bar graph depicting the no. of insurance cases of CAG, PTCA & CABG before automation and after automation*

INTERPRETATION

In figure 4.2, data shows a comparison between the number insurance cases of various surgeries. The comparisons are drawn for insurance cases of coronary angiogram procedure (CAG), percutaneous transluminal coronary angioplasty (PTCA), coronary artery bypass graft surgery (CABG). It shows an increase in the number of insurance cases for all three surgeries and procedures. This can be attributed to increase in tie-ups' with more insurance companies and addition of these insurance companies to the hospital network. In addition to this, it can be attributed to the general increase in patient flow of respective surgeries.

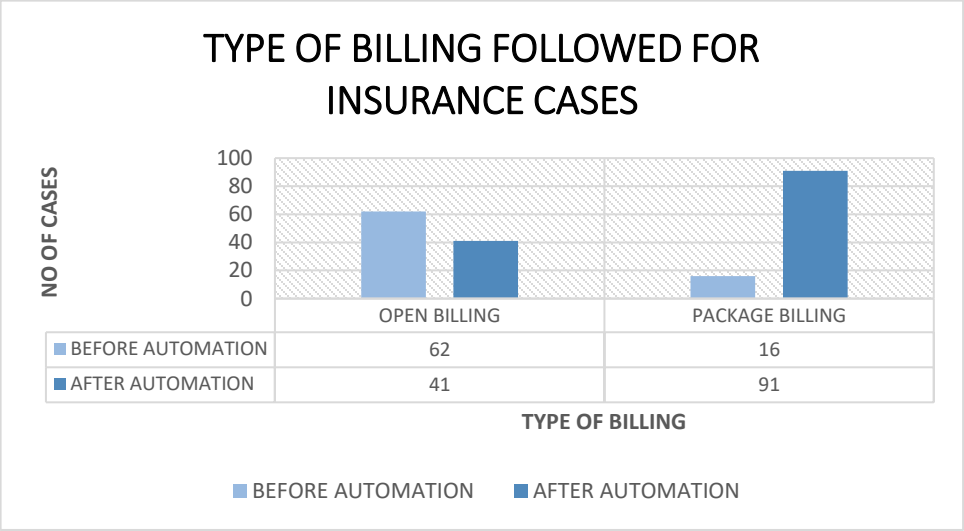


*Figure 4.3 - A clustered column bar graph depicting the no. of insurance case that have been billed under open billing and package billing, before automation and after automation.*

INTERPRETATION

In Figure 4.3, data of insurance cases are being compared. It can be understood from the figure that before automation majority of insurance cases were being billed under open billing. Only a few cases were being billed under package billing. This difference is attributed to manual billing of the surgeries. Moreover, automation was being followed for open billing only. Packages were being billed manually which is why after automation, a rise has been observed in package billing.

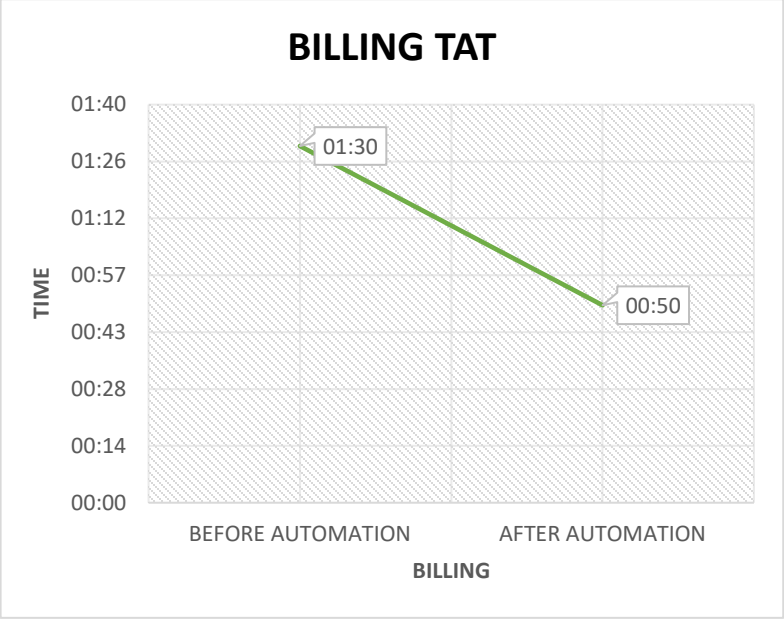


*Figure 4.4 A line graph depicting a decrease in billing TAT before automation and after automation*

INTERPRETATION

Figure 4.4 depicts the data of billing TAT of insurance cases. It can be observed that there has been a decrease in billing TAT by 40 minutes after complete automation of the billing procedure.

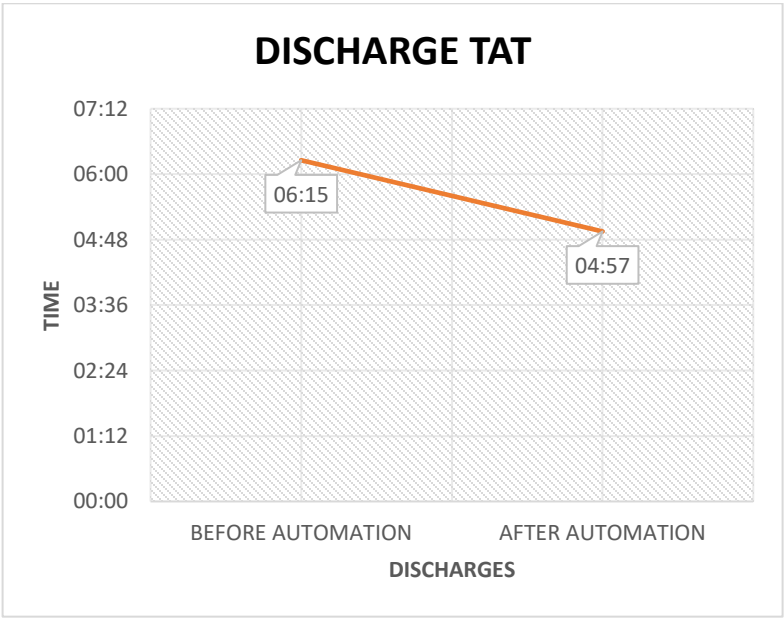


*Figure 4.5- A line graph depicting a decrease in discharge TAT before automation and after automation*

INTERPRETATION

Figure 4.5 depicts the data of discharge TAT of insurance cases. It can be observed that there has been a decrease in discharge TAT by 1 hour 18 minutes after complete automation of billing procedure.

## DISCUSSION

As we have understood that billing plays a major role in the discharge process of a patient. When a patient is being discharged from a hospital, he/she will settle their dues and then leave the hospital premises. Since billing a patient is a tedious process. When a biller starts preparing the bill of a patient, biller will have to obtain clearances from every department that has provided the patient with any service. When they receive the clearance, the biller will then add that service bills to the main bill. This entire process of addition of services after receiving the confirmations from respective departments is time consuming and usually ends up being one of the reasons for a higher billing TAT and discharge TAT.

When a biller bills the patient using manual automation, the biller will have to enter manually all the services in the bill. This process is very tedious to the biller and also adds on to the waiting time of the patient. In our study, complete automation of the billing procedure was done to see if it would have an affect on the billing and discharge process of the patient.

Every hospital categorizes their patients into cash patients, insurance patients and corporate patients. For our study, we have considered only insurance patients because at the hospital where this study was conducted, the billing of cash patients were completely automated while that of insurance patients was not automated. Therefore, they followed a partial automated billing system.

As it can be observed from *figure 4.1*, there has been a general increase in the number of surgical insurance cases. This can be explained due to an increase in tie-ups of hospital with other insurance companies. When a policy holder is in need of availing their policy, they contact their insuracne company and enquire about hospitals where they can avail their treatment. Insurance companies then suggest their policy holders hospitals with whom they have signed MOUs. This can be one of the reasons for increase in number of insurance patients in this duration. It can also be due to the general increase in the number of surgeries taking place at the time.

As explained above, insurance companies and hospitals sign memorandums' of understanding, also known as MOUs. These MOUs are used to prepare billing packages of surgical procedures. Based on the MOUs and hospital tariffs, surgical packages were prepared for three surgeries which are CABG, PTCA and CAG and their data has been used in our study. The packages prepared will be billed under package billing and their billing procedure will be automated. *Figure 4.2* depicts the number of surgical insurance cases of CABG, PTCA and CAG. It shows a rise in the number of cases. This can be attributed to the addition of insurance companies to the hospitals' network.

When a patient approches a hospital for a surgical treatment, the patient is explained that he/she can get the surgery done by either opting surgical packages or via billing as and when the investigations and procedures are conducted (Open billing). The decision is always of the patient to opt for a package or not for the surgery. Insurance companies also influence the patients decision to choose packages as they are more cost effective when compared to open billing. At the end, it is the patient's decision to opt for packages.

*Figure 4.3* depicts the number of cases that were being billed under open billing and package billing. As observed from the chart, a major chunk of cases before automation were being billed under open billing. This could be attributed to patient's choice of not opting packages.

At that time, major cases of insurance were being billed under open billing since only open billing procedure of insurance cases was completely automated. Therefore, the billers were billing a majority chunk of insurance surgical cases under open billing. Few cases that were being billed under package billing were those that were being billed manually for certain surgeries. After automation, there has been a rise in the increase of number cases being billed under package billing. The cases that were initially billed under open billing were now being billed under package billing.

*Figure 4.4* depicts a decrease in the billing TAT. The billing TAT at this hospital is calculated from the time the biller starts preparing the bill to the time he closes the bill prepared and converts it into final bill. Before automating the billing procedure, billing TAT was 1 hour 30 minutes on an average. After automating the billing procedure, the billing TAT has gone down to 50 minutes on an average. A decrease of 40 minutes has been observed in billing TAT. Similarly, *figure 4.5* depicts the discharge TAT. It is calculated from the time the nurse initiates discharge to the time th patient has settled the bill and has checked out from the hospital. A decrease of 1 hour 18 minutes is observed after automation of the billing process.

Therefore, automation of billing process is beneficial to all the parties involved. It helps speed up the billing process which in turn speeds up the discharge process.

# CHAPTER 5- CONCLUSION

Hospital billing is a tedious process. Billing process is a multi-step process which plays an important role in discharge process. It has been observed that billing process is a very time consuming process which in turn delays the discharge process of a patient. Billing process can be carried out either by manual billing or automatic billing. In manual billing, the biller will have to enter each and every procedure into the billing database. In automatic billing, the biller will have to enter just the codes for the surgical procedure within the system and the final bill will be prepared.

Automation of billing is a process that hospitals are commonly adopting these days. It provides hospitals with various benefits such as

1. Accelerates the billing process
2. Brings higher efficiency and use of manpower and resources.
3. Reduces stress of work load on the billers.
4. Reduces patient's waiting time

A delay in bill preparation and discharge process of a patient is common to all types of patients. Our study focuses on the affect automating insurance billing process has on billing and discharge process.

Our study focuses on the effects after complete automation of the billing process of insurance surigcal packages. Efficient and cost effective packages were prepared for insurance surgical patients which were opted more by patients as shown in result section. It was proposed that automating of insurance surgical billing process will have a positive affect on the billing and discharge processes. This can be measured using turnaround time (TAT).

It was observed that there was a decresease of 40 minutes observed in billing TAT and a decrease of 1 hour 18 minutes in the discharge TAT after the complete automation of package billing. Therefore, it can be concluded that automation of surgical package billing has shown a positive effect on billing process which in turn has shown a positive effect on discharge process.

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## TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Dr. Rashi Gupta, ID No: 90402943** has undergone the **Internship** in the department of **Corporate Projects** at **Krishna Institute of Medical Sciences** from **27-02-2023** to **26-05-2023.** During the course of her work, found to be good.

We wish her all the best for her future endeavors.

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