

Applying Quality Improvement Method to Address the Gap in Delay of Medicine from Pharmacy to Respective Department

By

Ruchika Narwat

*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 Ruchika Narwat, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at Sarvodaya Hospital, Faridabad from 6th February to 6th May, 2017.

The Candidate has successfully carried out the study designated 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 success in all her future endeavors.



Col. (Dr.) Ashok Kaushik

Dean, Academics and Student Affairs

The IIHMR University, Jaipur



Dr. Alok Mathur

Associate Professor,

The IIHMR University, Jaipur

TO WHOMSOEVER IT MAY CONCERN

This certificate awarded to

Dr. Ruchika Narwat

Student of Masters in Hospital Administration (MHA) of IIHMR University, Jaipur has successfully completed 03 (Three) months (From 6th February 2017 to 6th May 2017) long internship/Dissertation and completed her dissertation project under the guidance of Dr. Purnima Rao (Head of operations)

In the Department

Medical Operation

Organization

Sarvodaya hospital, Sec 8 Faridabad

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

I wish her all the best for future endeavor.



Authorized Signature

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled Applying quality improvement method to address the gap in delay of medicine from pharmacy to respective department and submitted by Dr. Ruchika Narwat Enrollment No. IIHMR-U/01/2015-17/0337 under the supervision of, Dr Alok Mathur (Associate Professor), for award of MBA in Hospital and Healthcare Management of the University carried out during the period from February 6, 2017 to May 6, 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.

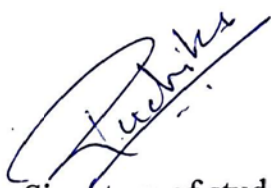


Signature

THE IIHMR UNIVERSITY, JAIPUR

CERTIFICATE BY SCHOLAR

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled Applying quality improvement method to address the gap in delay of medicine from pharmacy to respective department.

A handwritten signature in blue ink, appearing to read 'P. K. Sharma', is written over a horizontal line.

Signature of student

Acknowledgement

Dissertation is a golden opportunity for learning and self-development. I consider myself very lucky and honoured to have so many wonderful people lead me through in completion of this project.

I thankful to **my mentor, Dr. Purnima Roa, Head of Operations**, who allowed me to do project in the pharmacy department. I'm extremely thankful to her for attaching me to **Mr. Dalachand, Clinical Pharmacist, Mr. Surender Singh**, who in spite of being extraordinarily busy with his duties, took time out to hear, guide and keep me on the correct path during the training. Thank you ma'am for giving me necessary advices and guidance and arranging all the facilities to make my life easier.

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By:- Dr.Ruchika Narwat

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Abbreviation:-

IPD	In- Patient Department
IP	In-Patient
HIS	Hospital Information System
NABH	National accreditation's board of health and hospital
DMAIC	Define, Measure, Analyze, Identify, Control
PO	Per Oral
TAT	Turn around Time
ICU	Intensive care unit
MICU	Medical Intensive Care Unit
NICU	Neo- Natal Intensive Care Unit
PICU	Pediatric Intensive Care Unit
EMR	Emergency
KTU	Kidney Transplant Unit
GDA	Ground Duty Assistant
ROL	Re-Order Level
CAPA	Corrective Action Preventive Action

Applying quality improvement method to address the gap in delay of medicine from pharmacy to respective department

Abstract

Background: Medications are regularly prescribed on hospital wards as part of the on-going care for patients. These are prescribed at variable times which do not coincide with regular nursing drug administration times. Efficiency of the process relies on good communication and alertness of staff. Delays in drug administration can lengthen patient recovery time, prolong admission, and can compromise patient safety. In hospital there were often significant delays in transportation of medications from IPD pharmacy also nursing staff was not receiving medicine on time. Quite often staff was not available on nursing station. This phenomenon was observed over a period of 2 weeks' time which was supplemented by interviewing the staff.

Objectives: To identify the bottlenecks present in the process flow of indoor pharmacy.

Methodology: It was a Cross sectional study. Unstructured interview schedule was observed with pharmacy and nursing staff. Six-sigma DMAIC approach was used to identify the delay in medicine. To find the reason of delay in medicine, Fish bone analysis, 5W1H and 5WHY was conducted.

Results:- The average TAT of discharge, normal, immediate and urgent medicine in the month of January was 50 minutes, 10hour:49minutes and 10hour:40 minutes, 5 hour:30 minutes respectively which was quite high. The major problem was that there is stock out of medicine because re-order level was not fixed, layout of pharmacy was not linked with hospital information system, racks were not labelled, FIFO policy was not being followed, and formulary was also not followed by the doctors. Purchase requisition was generated based on physical counting all these factors lead in delay of medicine. The problem from the nursing staff of receiving the indent was a major issue due to non-availability of the medicine. The other problem faced was rising of normal indents in wards because indented time was not defined. The return of medicine was another issue which needs to be addressed as the returns came at any time which engages the pharmacist. After intervention it was noted that in April TAT was reduced to 46minutes, 1hour: 5minute, 5 hour: 11minute and 3hour: 13 minutes respectively.

Conclusion: The application of quality improvement methods i.e. DMAIC approach, FISH BONE analysis, 5W1H and 5WHY resulted in improvement in the pharmacy process. Time

of delivery of medicine from pharmacy to respective department was significantly reduced. At the end it also increased the patient satisfaction and improved the patient care. After implementing these actions there was remarkable improvement in IPD pharmacy.

1. Background

Medications are regularly prescribed in hospital as part of the on-going care for patients. Medicines are prescribed at any time that do not coincide with regular nursing drug administration times, this rely on good communication and alertness of staff to ensure that medicines are intended by system to IPD pharmacy and administered in a timely manner. Delays in drug administration can lengthen patient recovery times, prolong admission, and can lead to unavoidable patient harm and suffering.

While working in ward, I noticed that there were often significant delays in transportation of medications from IPD pharmacy. And nursing staff not received medicine on time because sometime they are not available on seat and busy in other work, which occurred on a regular basis. I therefore observe this by interviewing the staff over a two week period to assess the situation based on our current practice. After root cause analysis, it became clear that partial and no implementation of hospital information system in pharmacy and in ward by staff was a significant factor in delayed transportation. A solution was implemented by streamline the pharmacy process.

Objective of this study is:-1) To identify the bottlenecks present in the actual process flow of indoor pharmacy.

This study abet the system and process of pharmacy which improve the documentation and communication of medication requirements between pharmacy, nursing and medical staff with the intention to reduce delays by improving communication.

Delays in medication transportation leads to delay in giving medicine to patient have been identified by the national patient safety agency (NPSA) as being significant patient safety issue, as documented in their Rapid Response Alert – 1183 A. One example of avoidable harm resulting from medication administration delay documented in the report included a case of delayed antimicrobial administration. A patient with cellulitis did not receive timely

antibiotics due to delayed administration, leading her to become severely septic and subsequently die.

To reduce delay in medicine pharmacy, inventory management is an important step within the healthcare system because without proper inventory management, hospital will run the risk of not being able to provide patients with the most suitable medication when it most needed. Addressing pharmacy inventory management can enable organization to improve performance, reduce risk relating to patient care and ensure availability of drugs without frequent stock outs. Many organizations utilize pharmacy management systems as a means of ensuring appropriate responsibility over pharmaceuticals and ensuring the traceability of inventory from purchase through administration to the patient or disposal level. Effective and transparent tracking systems that allow pharmacies to accurately record inventory components, such as medication expiration dates and physical quantities, also have the potential to reduce adverse patient outcomes. And according to the WHO, A well-arranged store helps in easy identification of drugs and saves time while picking a drug from the shelves. The following process will assist in managing the drugs in the store. Fix all drugs on the shelves in alphabetical order corresponding to the essential drug list. This helps remove drugs quickly and makes for easy and comfortable inventory control. The rule of FIRST IN FIRST OUT (FIFO) should be applied always. So, drugs that were received first should be used first, except where the new stock has shorter expiration dates than the old stock. In this regard, the principle of FIRST TO EXPIRE FIRST OUT (FEFO) should apply. To have access to drugs with shorter expiration dates first, put these in front of the shelves. Those with longer expiration dates should be placed behind those with shorter dates.

Hospital Information Technology Systems:-

Technology within the pharmacy process is growing in importance with the number of prescriptions increasing. To address this problem, Sarvodaya Hospital, Faridabad sec 8, upgrades their old system. This new upgradation utilizes aspects of intending of medicine and barcoding technology. This system will allow prescription information to be passed between physicians and pharmacies through a hospital-wide network. This system helps by automating different processes in the hospital, including processes in the pharmacy. After a pharmacy technician enters the medication information and prints out labels with the name of the medicine and instructions on taking the medicine. HIS also assists with the accounting

aspect of the pharmacy. While the system is a help to hospital staff, it has not kept up with the growth and changes in the hospital.

Barcoding technology can be easily incorporated into the system; the barcoding system prevent in delaying of medication and save the time also during dispensing and reduce the dispensing error.

To solve the problem and to find the error in pharmacy process DMAIC approach of six-sigma is used to solve and identify the problem. The goal of Six Sigma is to aid people in their attempt to advance business processes to deliver defect-free products and services. Six-Sigma requires practitioners to consider both the “voice of the customer” and the “voice of the process,” it reduces the gap between the two voices. That leads to more satisfied customers, and that is what makes the Six Sigma initiative a profitable business plan.

Six-Sigma focuses on long and sustained success for improving each and every process in the organization. That gives organizations a way for improvement year after year and even provides a system that rewards “out of the box” thinking, which can accelerate the rate of improvement.

2. Review of literature:-

Many transportation errors are made during the various phases of pharmacy process usage in the hospital environment; dispensation is one of the most sensitive parts of the process. Safe, organized, and effective dispensing or timely transportation of medicine in system are therefore, essential to ensure that drugs will be correctly dispensed and reached to respective ward, according to the prescription order forms and to reduce the possibility of errors. The use of medication may present shortcomings due to the many mistakes which individually would not be enough to cause errors. These are latent mistakes, dynamic as the system is, and capable of variation as a function of different possible situations. The creation of delay for the system focuses on preventing these mistakes, either isolated or in synergetic action that result in errors. In a study carried out in 1994 in the USA, it was demonstrated that transcription and administration could be responsible for 50% of the medication errors, considering that 39% of the errors involved prescription order forms and 11% involved dispensation. A British study from 2002 reported a 2.1% rate of dispensation errors. The most frequent type of error was medication dispensed with an incorrect dose. The dispensation error rate found in an American study in 2003 was 3.6%. The differences between the rates reported in these

studies can be related to the different methodologies that have been applied. They can also be related to the improvement in the dispensation systems and actions to reduce dispensing errors implemented in these countries.

Today, there are different drug dispensing systems in hospital units, and a different expectation of errors is associated with each of them. It is known that in American, British, and Canadian hospital where the unitary dose (UD) system is used, the rate of medication errors has been reduced from 1 error/patient/day to 2 - 3 errors/patient/week. It has also been observed that the rates of drug dispensing errors in work environments with high levels of interruption, distraction, noise, and overload are higher (3.23%) compared with the environments with lower levels of these aspects (1.23%).

In Brazil, research regarding medication errors in hospitals is scarce. The 1990s and the first years of the current century saw the beginning of coordination among pharmaceutical groups. This occurred in an attempt to determine the realities of the work conditions and their effects on the quality of the provided services, as well as to overcome bureaucracy and master the techniques of efficient hospital pharmacy operation in the country. In a broad bibliographical research about the dispensing errors in Brazil very few reports mentioned the errors that occurred or that were related to failures in the drug dispensing system. In one of them, the errors totalled 26.8% of the procedures. Errors in the drug dispensing system included the following: delay in the dispensing time; medication with similar labelling and packaging; many drugs to be given at the same time, with the consequent delay in the administration; and drugs sent with the wrong identification. The present study undertaken in the pharmacy of a general hospital was the first in the country specifically planned to detect and to analyse drug dispensing errors. Its objective is to determine the rate of dispensing errors, to identify associated factors, and to suggest preventative actions.

A 1999 study in a Brazilian hospital based on reports of situations associated with drug delivery errors noted that 26.8% of procedures had errors related to failures in the dispensing system and drug preparation. Failures included delays in the delivery time, drugs with similar labels and packages, many drugs at the same time with resulting delays in drug administration, and drugs sent with the wrong presentation. One of the reports is a good example of how a dispensation error can lead to a drug administration error: "... it was an intravenous drug that came from the pharmacy, it was supposed to be PO, but as it came in ampoules, I administered it IV..."

Problems related to drug labeling and packaging

Problems related to drug labelling and packaging are the second most reported category in the most frequent medication delay reported to the USP-MERP and responsible for about 20% of notification. A common package design becomes an issue when purchasing many drugs from the same manufacturer. This becomes even more critical with injections, where ampoules and flasks may be similar in size, shape, and colour, in general containing similarly colour solutions. Confusion may occur with greater frequency during emergencies and urgencies.

Keeping in view various studies across the World done to tap delay in medicine from pharmacies of different hospitals, this study was carried out with help of DMAIC approach and 5W1H& 5 WHY and FISH BONE analysis to identify loopholes in the processes of in house pharmacy and improve its process of a tertiary care Sarvodaya hospital, Faridabad and also analyse the average TAT of normal, discharge medicine and immediate, urgent medicine TAT. According to the NABH normal TAT of normal medicine and discharge medicine TAT is 30 min, urgent 15 min, immediate medicine TAT is 10 min.

3. Objectives

- I. To identify the bottlenecks present in the actual process flow of indoor pharmacy.

4. Methodology:-

- I. **Setting:** *The study was carried out in the IP Pharmacy of a Sarvodaya hospital, Faridabad. It is located on the 2nd floor near. It has four computer systems two printers. There are two refrigerators, multiple shelves and a cabinet to store vaccines and various medicines. The pharmacy has eleven pharmacists who follow shift system and 1 GDA. The peak rush hours of the pharmacy were observed to be between 11:30 am to 1:00 pm and occasionally 3:00 to 4:00 pm.*
- II. **Research Design:** cross-sectional- qualitative study.
- III. **Study Responder:** sr. pharmacist, assistant pharmacist, Quality manager

- IV. **Time period:** The observation was carried for over a 2 week period where patients and nursing staff were observed at random in ward.
- V. **Tool:** To identified the problem, **six sigma approach** is used to identify the delay in the process i.e. **DMAIC approach** and problem solving technique/ Root Cause analysis is used that is **5W&1H and 5 WHY or Fish bone analysis**, and to check the improvement of process analyse the average TAT of pharmacy department month wise data of normal, urgent, immediate and discharge medicine in Microsoft Excel.
- VI. **Data collection procedure:-** Issue stock report from the hospital information system, and invoice pharmacy receipt

5. Process flow of pharmacy

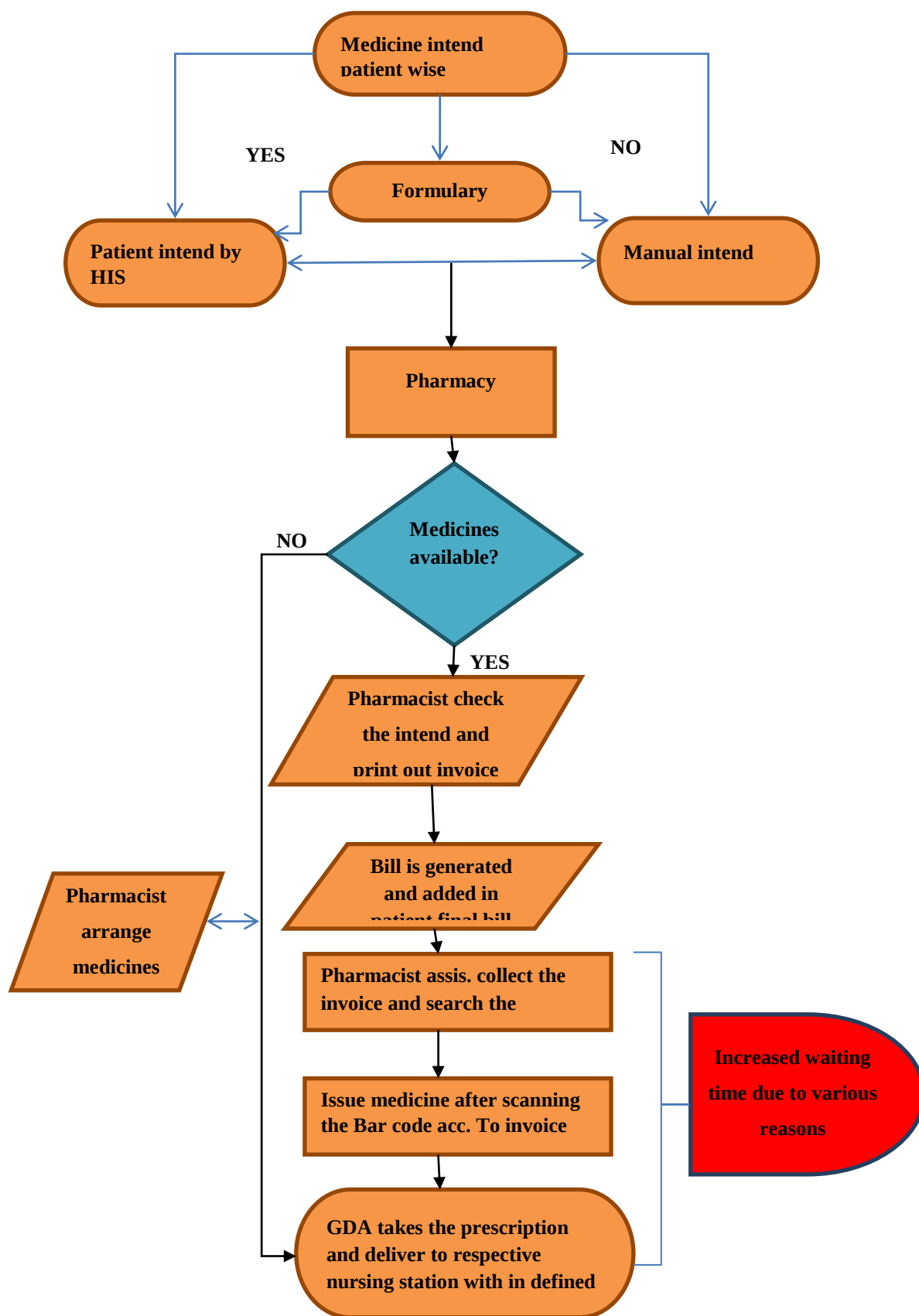


Figure 1 PROCESS FLOW OF PHARMACY

After that GDA give Original Invoice to nursing unit along with medicines and “receiving” in the form of signature is taken on duplicate copy after verifying or checking of quality and quantity and physical condition of medication. If they found any Error in dispensing then She/he will inform to Pharmacy directly, Duplicate Copy is filed serially for record purposes. Before patient intimation in HIS for discharge all balance medicines must be return to pharmacy those indented to pharmacy through return Register with Pharmacy return indent (SHRC/PHARMACY/04/01)slip.

6. Quality improvement process

It is an on-going response to quality assessment data about a service in ways that improve the process by which services are provided to the patients. To improve the process six-sigma DMAIC tool is used to identify the problem.

There are 6 steps through which this process is carried out

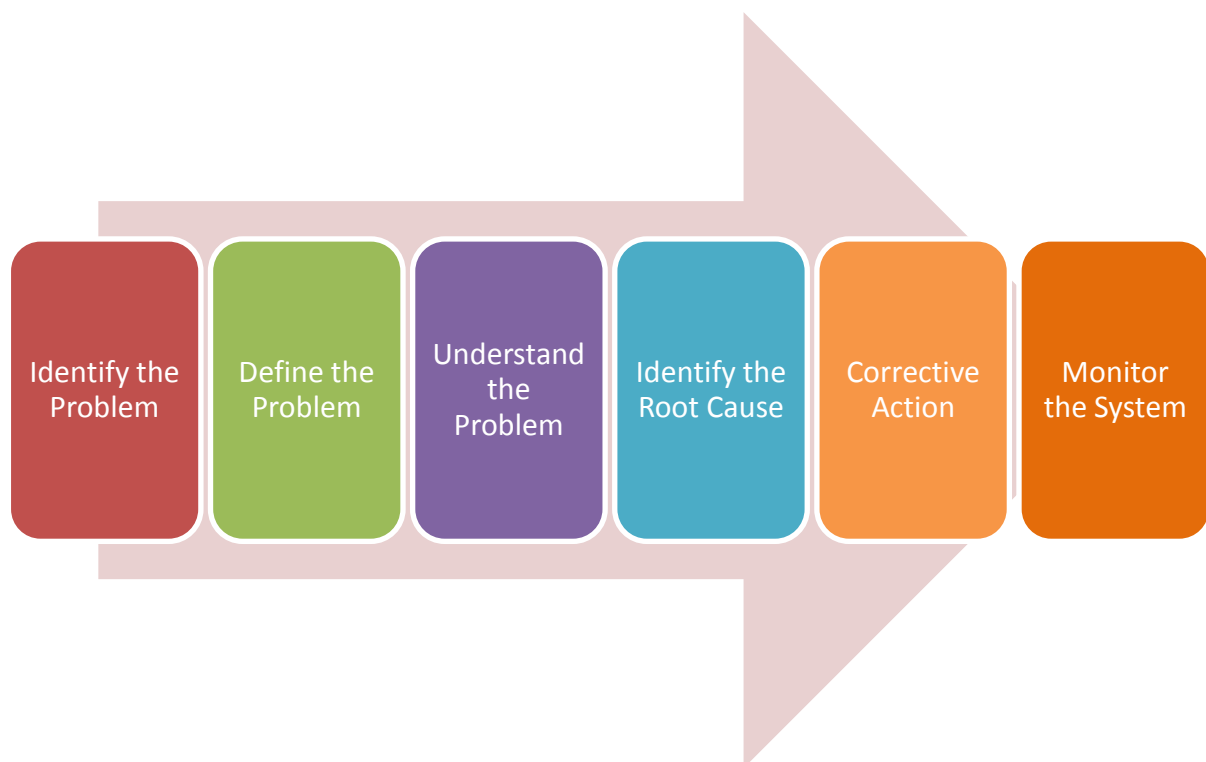


Figure 2 DMAIC STEPS

(a) Step 1: Identify the problem:

Delay in delivery of medicine from pharmacy to respective department.

(b) Step 2: Define the problem:

In order to define the problem better start collecting data at each point.

- I. Data collected from month of January 2017 to April 2017
- II. Data collected from the staff by interviewing in detail to know about the indent of drugs, transport of drugs from pharmacy to ward or respective department, carried out by them.
- III. In addition observation of the staff while working in the department was also done
- IV. Monthly census report was studied before and after applying the quality improvement methods in pharmacy process, of average TAT of pharmacy.
- V. Review with management monthly

(c) Step 3: Understand the problem

To understand and solve the problem a qualitative analysis is carried out, Root cause analysis is done in form of 5W&1H and 5 WHY, with Fish Bone to find out the main reason which causes delay in delivery of medicine that lead to delay in medicine administration ultimately it harm the patient care and increase dissatisfaction among the patients and attendants.

5W&1H of Six Sigma approach to be used for understanding and analysing the process or a problem for improvement.

“Six Sigma focuses on long and sustained success for every project, improving each and every process in the organization. That gives organization a way to continue improving year after year and even provides a system that rewards “out of the box” thinking, which can accelerate the rate of improvement”

Since it is a data-driven approach to problem solving, Six Sigma builds robustness in daily management. This starts a set of chain reaction in strategic, tactical and operational improvements, which compels the organization to set a stretch target for every business performance and set goals for everyone in the organization.

I Here is an outline of the 5W1H approach for Six Sigma.

1. This involves approaching a problem by developing a problem statement using the following; What, Where, Which, Who & How.

2. Each of the 5Ws & 1H above relate to the following questions to ask relating to the problem being investigated.

Clarification of 5W 1H & 5 WHY

5 Ws

What - Delay in delivery of medicines

Why - Partial Implementation of HIS

When - It was a running problem

Where - Pharmacy Department

Who - Pharmacy staff, nursing staff

1H

How -Effective use of HIS

1. By means of 5W &1H questioning technique above, it is likely to develop a problem statement which will lead to better understanding of the problem and hence solution. When problem statement has been developed it is needed to determine the potential cause of the problem.
2. To improve this process, “I write the problem statement, then undertaken to carry out a brainstorming exercise and hence produce a list of possible causes”

I. Brainstorming:

Table 1: BRAINSTORMING

<u>HIS</u>	<u>MANPOWER</u>	<u>STORE KEEPING</u>
1. Doesn't show reliable data	1.No supply chain manager	1. Stock available in HIS varies with the current present stock in department
2. ROL was not defined	2. Frequency of indenting is high	2. Formulary is not followed

3. Purchase requisition is generated based on physical counting	3. Poor communication between purchase department and pharmacy	3. FIFO policy is not being followed
4. Stock available in HIS varies with the current present stock in department	4. Lack of training(pharmacy & nursing)	
5. Bar coding is not used		
6. Shelves were not linked with HIS		
7. Near expiry is not followed		

3. Once a list of potential causes has been shaped, it is necessary to cluster them into one of four main categories as described underneath the “Fishbone Diagram or 4M Chart” as shown, where the major cause can be Manpower, Machines, Methods, Material.

II. Fishbone diagram:-

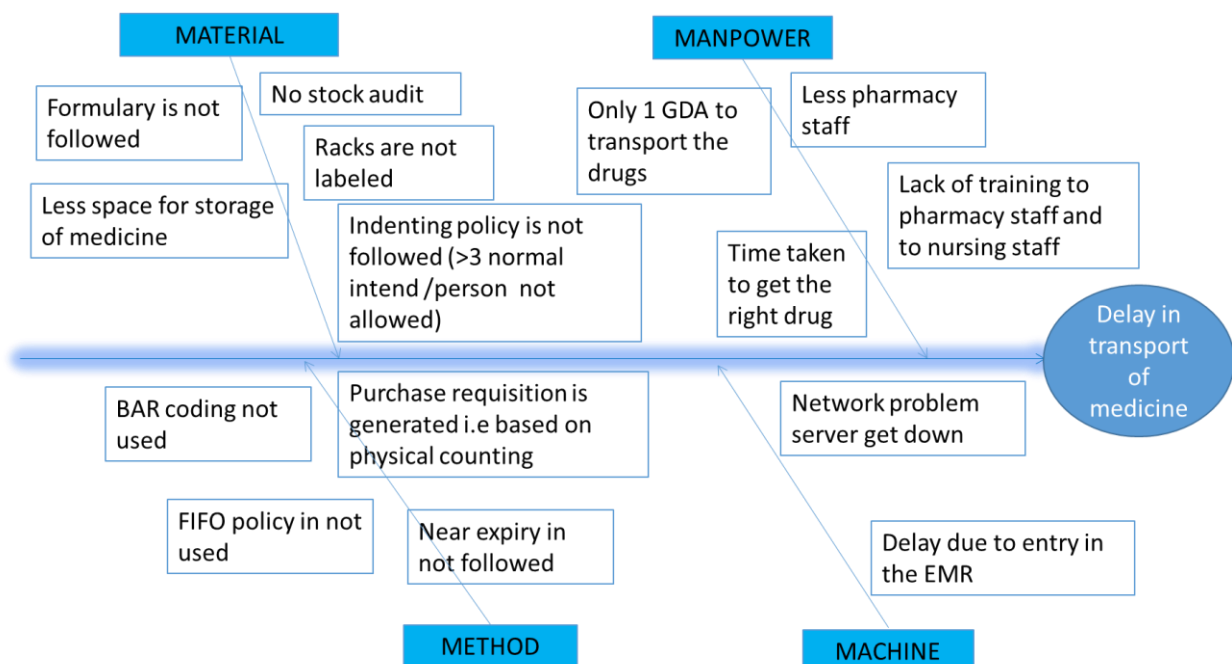
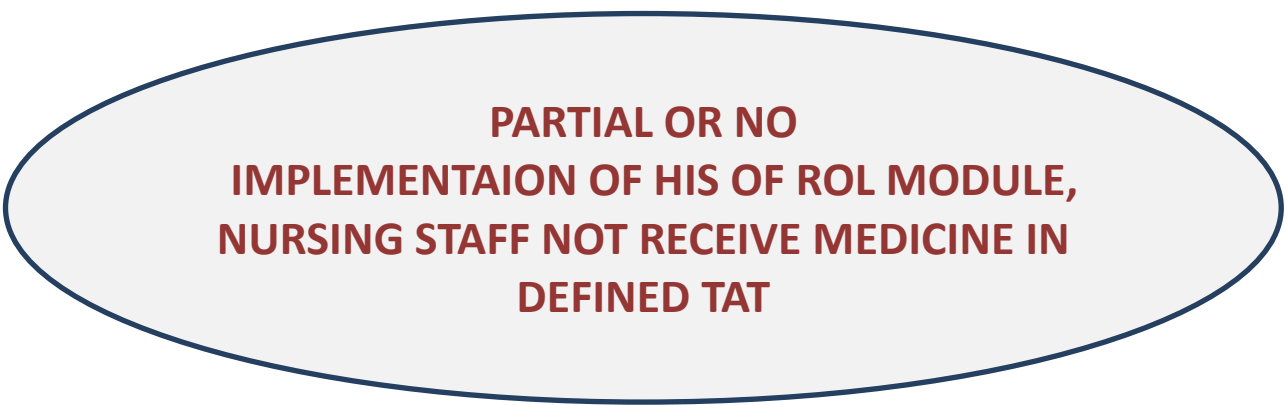


Figure 3 FISH BONE ANALYSIS

4. Once the root cause analysis has been applied, it is necessary to address all those causes identified as having significant impact on the problems statement and therefore need to be analysed using 5Why Analysis.
5. 5Why analysis involves taking the causes and asking why five times so as to get to the root cause of the problem.
6. Once the root cause for all the causes has been determined from 5Why Analysis, they are then compiled on sheet which indicates the action, person responsible.
7. Applying this process will ensure that every success is achieved in resolving the problem identified.

(d) Step 4: Identify the problem



**PARTIAL OR NO
IMPLEMENTAION OF HIS OF ROL MODULE,
NURSING STAFF NOT RECEIVE MEDICINE IN
DEFINED TAT**

Figure 4 IDENTIFY THE PROBLEM

- **WHY?** :- No stock audit is performed
- **Why?** :- Delay in finding the right drug

- **Why?** :- Process is user dependent
- **Why?** :- Formulary is not being followed
- **Why?** :- Re- order level is not defined

(e) Step 5: Corrective Action:

Table 2 corrective action

<u>Sr. no</u>	<u>Corrective action</u>	<u>Corrected by</u>
1.	ROL is fixed item wise	Sr. pharmacist, Purchase dept. IT dept.
2.	Daily basis stock audit is performed	Assistant pharmacist, pharmacist
3.	HIS is updated with the layout of complete store	Sr. pharmacist, IT department
4.	All the racks were labeled	Pharmacist
5.	Only 3 indents are allowed per patient in a day excluding urgent medicines	Nursing supervisor, team leader of nursing staff
6.	FIFO has being followed in the department	Pharmacist, k dispensing desk pharmacist
7.	Communication has been improved between pharmacy and purchase department, monthly inventory report is send to the finance department	Sr. pharmacist, purchase head

ROL is fixed item wise:-

File Edit View History Bookmarks Tools Help

http://172.168.0.120/sarvodaya/Untitled Page

172.168.0.120/sarvodaya/Design/Purchase/AutoPurchaseRequest.aspx?access=2ecb2e2a-ec15-4546-b395-aa676dabf67f050420171648585

HIS Online Medicine Store... Mail - netCORE Log In

DATE FROM : 4 MAY 2017 DATE TO : 4 MAY 2017 General Item Medical Item

Sub-Groups :

NEURO CONSUMABLES FILMS CARDIAC STENTS GASTRO CONSUMABLES
 BLOOD BANK CONSUMABLES CHEMICALS CARDIAC PACEMAKERS DISINFECTANTS
 CARDIAC PATCH SUTURES ORTHO IMPLANTS ONCO INJECTION
 SURGICALS CONSUMABLES BIOCHEMISTRY REAGENTS RESPULES OT CONSUMABLES

On The Basis of Indent On The Basis of Min Stock Level On The Basis of ROL On The Basis of Consumption ROL

Search Export To Excel

S.No	Name	Last PRQty	MS Stk	Hosp Stk	Min Limit	RO Level	RO Qty	Req Qty	Purpose	Specification	Reject
1	ACTIDE (OCTREOTIDE) 100 MCG INJ_SAMARTH	0	1	296	0	15	30				X
2	ADRENALINE INJ MAKE- RATHI	0	172	6254	25	400	300				X
3	ADRENOR (NOR-ADRENALINE) 4.MG INJ MAKE-SAMARTH	0	0	4287	20	200	300				X
4	ALDOPAM INJ	0	15	45	0	30	25				X
5	AMBIOCIN (AMIKACIN) 250MG INJ	0	0	3451	50	200	350				X
6	AMBIOCIN (AMIKACIN) 500 MG INJ	0	0	13252	25	670	1400				X
7	AMBIOCIN 100 MG INJ	0	0	2100	25	103	200				X
8	AMBISTRYN-S 1GM INJ	0	7	44	0	8	25				X
9	AMINOVEN 10% 500ML	0	13	188	0	15	30				X
10	AMPHY 1.5 GM INJ MAKE- PROFIC	60	9	695	10	20	34				X
11	AMPILOX 500 MG INJ	0	5	165	5	10	14				X
12	ANAFORTAN 2 ML INJ	0	6	650	0	12	20				X

tablets Highlight All Match Case Whole Words 2 of 2 matches

Figure 5 ROL IS FIXED ITEM WISE

Layout is defined item wise:-



Figure 8 NEW ADDED RACKS

(f) Step 6: Monitoring the system

- By physical random check of medicine receiving time on the invoice receipt which was signed and have to write time by the nursing staff at what time medicine is received in the respective department.
- By analysing the average TAT of pharmacy on monthly basis of normal, immediate, urgent and discharge medicine.
- Track the processing till medicine is received in the ward by noting the intend, issue time and receiving time from the hospital information system.
- To cross-check the real receiving time, double-check the invoice receipt time and HIS updated time.
- Physically verified the layout of the pharmacy on weekly basis by noting the real position of the drug in racks.
- Regularly in evening usually after 4'o clock check the daily basis issue report from the HIS for finding an error in the intend, issue or receiving process of the medicine.
- After double check from invoice receipt or from HIS; error is found at any step corrected by the concern staff for the next.

- To improve the TAT of pharmacy receiving percentage is calculated monthly and shared by the respective department incharge and with nursing supervisor or with quality manger.

Table 3 MEDICINE RECEIVING PERCENTAGE

Month	Not received	Received	Grand Total	% not receiving	% receiving
March	8457	2387	10844	78.0	22.0
April	4988	6307	11296	44.2	55.8



Improvement
in receiving

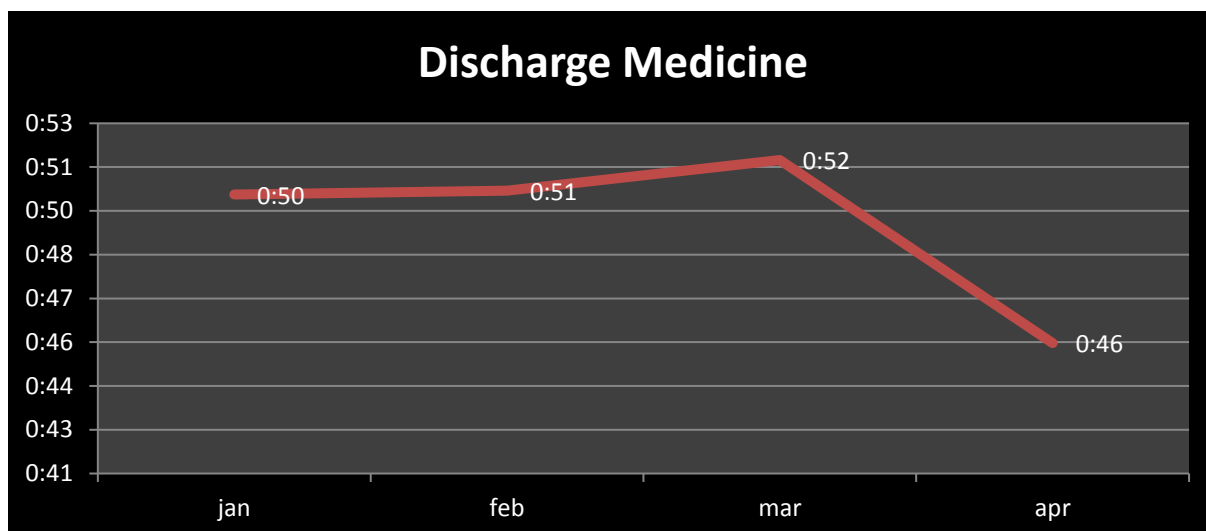
- There is remarkable improvement in the receiving of the medicine from the nursing station which aid in improving the pharmacy TAT.
- Data is analysed by taking the average TAT of the pharmacy.

7. Analysis :-

Month wise analysis of average TAT of pharmacy process before and after implies the quality improvement method.

1. DISCHARGE MEDICINE:-

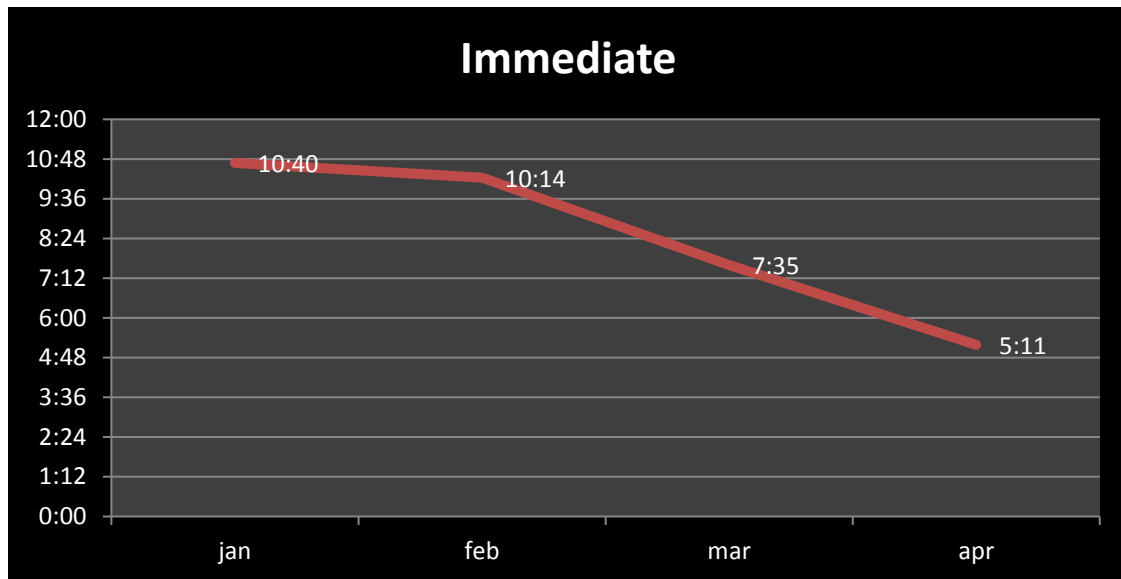
<u>Discharge Medicine average TAT (Hr:min)</u>	
January	0:50
February	0:51
March	0:52
April	0:46



Interpretation:- Before applying the quality improvement method in pharmacy department turn-around time of the discharge medicine is 50 minute in January and in February it is 51 minute which is approximately on same level and after analysing the problem and implementing i found that there is improvement in the discharge medicine process which is touching nearly the ideal TAT defined by the NABH that is 30 min, and this needs further improvement and mainly monitoring.

2. IMMEDIATE MEDICINE:-

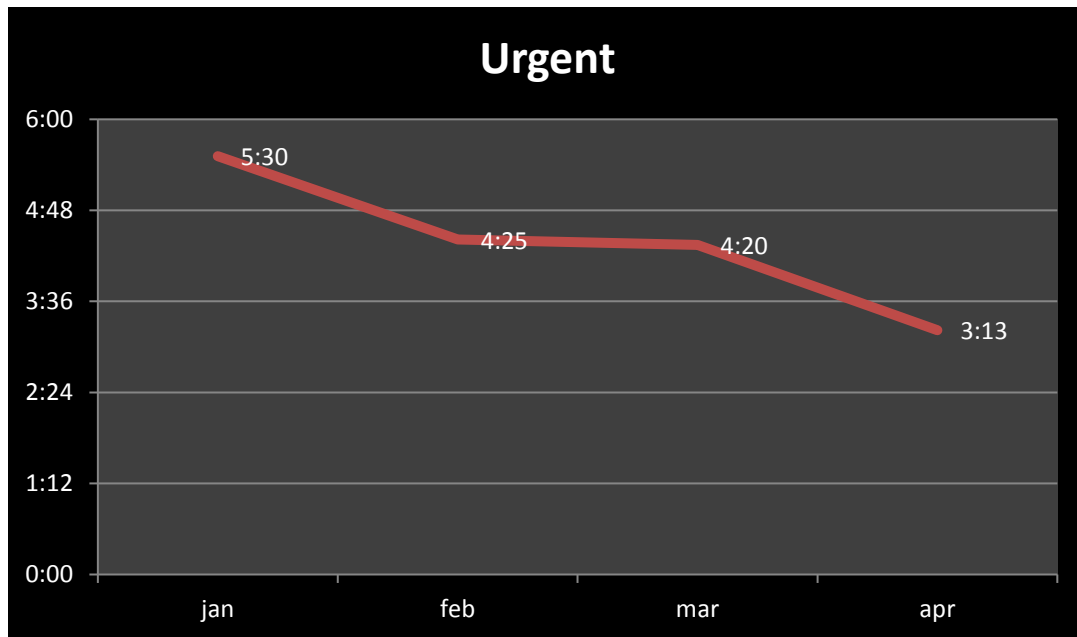
<u>Immediate medicine average TAT (Hr:min)</u>	
January	10:40
February	10:14
March	7:35
April	5:11



Interpretation:- Before applying the quality improvement method in pharmacy department turn-around time of the immediate medicine is 10 hour 40 minute in January and in February it is 10 hour 14 minute which is approximately on same level and after analysing the problem; i found that nursing staff not received the medicine on time in system even after getting medicine on time but they receive it later in system after administered to patient; there is need of improvement and monitoring in the immediate medicine process then it will touch the ideal TAT defined by the NABH that is 15 min.

3. URGENT MEDICINE:-

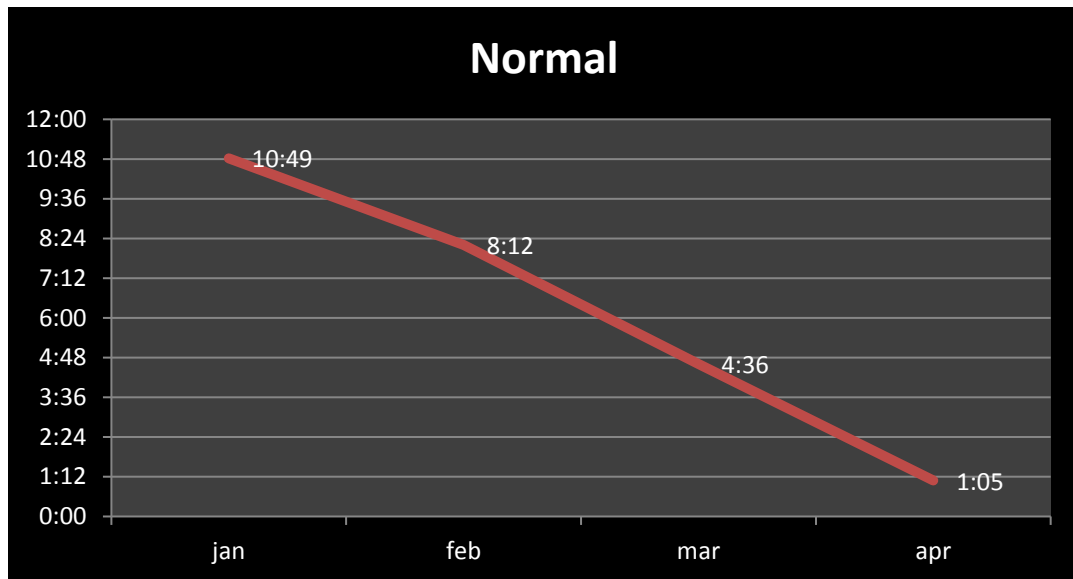
<u>Urgent Medicine Average TAT</u>	
<u>(Hr:min)</u>	
January	5:30
February	4:25
March	4:20
April	3:13



Interpretation:- Before applying the quality improvement method in pharmacy department turn-around time of the urgent medicine is 5 hour 30 minute in January and in February it is 4 hour 25 minute which is approximately on same level and after analysing the problem; i found in ward that nursing staff not received the medicine on time in system even after getting medicine on time but they receive it later in system after administered to patient; there is need of improvement and monitoring in the urgent medicine process then it will touch the ideal TAT defined by the NABH that is 10 min.

4. **NORMAL MEDICINE:-** Medicine which are intended on the basis of patient admitted in ward after advised by the concern doctor.

Normal Medicine Average TAT (Hr:min)	
January	10:49
February	8:12
March	4:36
April	1:05



Interpretation:- Before applying the quality improvement method in pharmacy department turn-around time of the normal medicine is 10 hour 49 minute in January and in February it is 8 hour 12 minute which is approximately on same level and after analysing the problem; i found in ward that there is no defined time for intending the normal medicine and frequency is very much even after making the policy of intending; that is 3 intend per patient for normal medicine and nursing staff not received the medicine on time in system even after getting medicine on time but they receive it later in system after administered to patient; there is need of improvement and monitoring in the normal medicine process then it will touch the ideal TAT defined by the NABH that is 30 min.

Now that all the process and the errors in the process of the pharmacy have been discussed, strengths of the OP pharmacy department should also be mentioned.

8. Strengths

1. Good team work among staff on professional level.
2. Technically well versed, pharmacists as well as data entry operators.
3. Work efficiently during peak hours.
4. Friendly rapport with each other.
5. Able to maintain their calm during stressful situations (peak hours, fewer staff, howling customers)

6. Maintain a register to note down out of stock medicines side by side.
7. Respectful to other staff.
8. Frequently bought medicines (except psychotropic drugs), placed on one counter to save precious time.
9. Dedicated shelves for look-alike drugs, sound-alike drugs, psychotropic drugs, high alert medication (assigned specific colours), syrups and creams with their information written on same coloured paper for reference at any time.

Other than CAPA some more recommendation also prepared for every step under these headings.

9. Recommendations

I. Materials:

1. An extensive list should be worked out with the help of pharmacists and doctors of frequently prescribed medicines and their alternatives- approved by doctors' signatures to ensure formulary is followed and not waste valuable time in going back to the doctor to get the alternative approved.
2. A laminated list of banned medicines should be made available in the pharmacy for reference at all times.
3. Prescriptions should be computerized/ printed pan hospital to avoid delays due to illegible handwriting in case of manual intend.
4. Medicines near expiry should be identified and replenished well in time.
5. Editable templates can also be made for set of medicines frequently prescribed together.
6. Medicines should be stocked in correct slots within 5 hours of procurement to avoid inconsistency between their HIS and physical quantity. This will also reduce the out of stock medicines incidents as the medicines will be replenished timely.
7. Bags of different sizes can be introduced to give different amount of medicines to avoid wastage of materials. Giving just one pack of medicines in a medium sized bag wastes a lot of money and material.
8. Bags of colour other than green (yellow and red) were seen being used in the OP Pharmacy. Red bag is generally used for high alert medication while yellow is used

for stat and now orders. These should not be used to give general medicines to the customers.

II. Machine:

1. Printers should be serviced time to time to avoid sudden/untimely breakdowns.
2. Extra printer can be provided in the pharmacy as two billing systems share one printer.
3. Database should be cleaned and updated regularly with new medicines and discontinued/banned medicines should be removed.

III. Process:

1. In case of manual Prescriptions with incomplete information (Patient's name/ Doctor's name/ Doctor's signature/ Date/ Dose etc.) should immediately be corrected and the concerned physician should be immediately warned/penalized.
2. Logs should be maintained for entry and exit of pharmacists/data entry operators to keep in check their break times. No staff should be allowed to be outside the pharmacy for more than 5 minutes under any circumstances, except during lunch break. Proper justification should be given if the time exceeds 5 minutes.
3. In spite of maintaining a log of out-of-stock medicines, non-availability of medicines needs to be checked. Re-Order Level (ROL) of at least frequently prescribed medicines in IP Pharmacy can be calculated and stocked accordingly.
4. Doctors who prescribe banned medicines or need to be consulted for any matter during dispensing medicines should be contacted through phone first. In case the consultant is unreachable, only then should a pharmacist/data entry operator be allowed to go to the doctor directly. This will help keep a check on long, unexplained breaks by staff.

IV. Methods and People:

1. There would be addition of the GDA staff during the peak hour of intend time that is 11:00 am – 1:00 pm and usually 4:00 pm- 5:00 pm to reduce the delay.
2. The medicines they dispense should be checked by a pharmacist before sending in ward. They can also be further trained to increase their efficiency.
3. A pharmacist can be deployed exclusively for monitoring and to take rounds in wards. However, with only 7 pharmacists with at least one always on leave, this may be difficult. Addition of pharmacists in the already existing team would ease the load to a great extent.

4. It is logical to assume that the IP-pharmacy is less busy at night. Therefore, tasks like inventory checking, stocking and restocking, checking for expired medicines, maintaining the Schedule H1 drugs file can be included in the job profile of pharmacists working in the night shift and should be checked daily to ensure their proper fulfilment of duties.
5. Things which need to be brought from the store should first be intimated there. A staff member should leave to get it only when the OP pharmacy/store staff member says that the item is ready to be taken. Since the OP pharmacy is located just a ground below, it should not take more than five to ten minutes.

V. Environment:

1. Space in the pharmacy should be properly utilized. Unnecessary boxes should be removed as soon as they are empty.
2. A lighter weight staircase should be provided to access the medicines lying at top shelves, apart from the existing staircase.
3. Dustbin of the pharmacy should be covered to improve aesthetics and working environment.

9. Result:

The average TAT of discharge, normal, immediate and urgent medicine in the month of January was 50 minutes, 10hour:49minutes and 10hour:40 minutes, 5 hour:30 minutes respectively which was quite high. The major problem was that there is stock out of medicine because re-order level was not fixed, layout of pharmacy was not linked with hospital information system, racks were not labelled, FIFO policy was not being followed, and formulary was also not followed by the doctors. Purchase requisition was generated based on physical counting all these factors lead in delay of medicine. The problem from the nursing staff of receiving the indent was a major issue due to non-availability of the medicine. The other problem faced was rising of normal indents in wards because indented time was not defined. The return of medicine was another issue which needs to be addressed as the returns came at any time which engages the pharmacist. After intervention it was noted that in April TAT was reduced to 46minutes, 1hour: 5minute, 5 hour: 11minute and 3hour: 13 minutes respectively.

10. Conclusion:

The application of quality improvement methods i.e. DMAIC approach, FISH BONE analysis, 5W1H and 5WHY resulted in improvement in the pharmacy process. Time of delivery of medicine from pharmacy to respective department was significantly reduced. At the end it also increased the patient satisfaction and improved the patient care. After implementing these actions there was remarkable improvement in IPD pharmacy.

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