Summer Training at
Zydus Hospitals, Ahmedabad, Gujarat
(April 3 to June 2, 2017)

Medication Turnaround Time in Hospital IP Pharmacy and Monitoring Medication Error

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IIHMR UNIVERSITY

CERTIFICATE

This is to certify that Ms. **Roma Agarwal** has undergone summer training in **Zydus Hospital, Ahmedabad** from 3rd April to 2nd June 2017.

The candidate herself completed the project assign to her during summer training. Her approach to the project was sincere and proactive. This summer training is in partial fulfillment of the course requirement recommended for the award of MBA in Hospital and Health Management.

I wish her success in all her future endeavors.

Col. (Dr.) Ashok Kaushik

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ZHHRPL/HR/INTERN/MS/2016
Date: 2nd June 2017

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Roma Agarwal**, a student of Institute of Health Management Research, Jaipur, has completed Summer Internship Programme (SIP) from our Hospital under the guidance of **Dr. Medhavini Ayachit– Lead, Medical Services**. The duration of SIP was of **60 days** effective from **3rd April 2017 to 2nd June 2017**.

During above period we found her very **sincere** and **hardworking**.

We wish her all the best for her future endeavor.

For, Zydus Hospitals and Healthcare Research Pvt. Ltd.

Rajiv Ranjan
Lead – Human Resources

HUMAN RESOURCES

ACKNOWLEDGEMENTS:

It has been a privilege to receive my Summer Training at Zydus Hospital, Ahmedabad. These two months of training has gotten me with an extensive knowledge on medical as well as non-medical departments in a hospital and the various duties involved within. Each day at training was filled with varieties of experiences and learnings and till the end of the day I was so much grateful for the entire day's experiences and lessons it got with it.

I would sincerely convey my gratitude to Mr. Rajiv Ranjan, Lead- Human Resources, for giving me the opportunity to do my Summer training here, at Zydus Hospitals, Ahmedabad.

I would also like to express my sincere greetings and thank Dr. Medhavini Ayachit, Lead Medical Services for being my mentor and for showing keen interest, encouraging appreciation and solemn advice throughout the project. . I would also like to thank Dr. Saurabh Chordia, Associate Medical Services, and Dr. Seema Singh, Associate Medical Services for guiding me throughout my training period on every step.

I would also thank all the staff of the hospital for being co-operative and helpful throughout my time here without which my project wouldn't have been successful.

I am highly obliged to my mentor at The IIHMR University, Dr. Mohan Bairwa for helping me from the beginning of this project throughout and till its completion, guiding me at every step. Thank you, Sir.

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Zydus Hospitals, Ahmedabad-

Zydus Hospitals is a 550 bed Super speciality medical institution spanning 16 floors and 2 basement floors. This world class & highly sophisticated medical establishment offers all major-medical specialities, subspecialties, investigation & diagnostics facility, rehabilitation & physical therapy care under one roof. Hospital's design ensures higher energy efficiency by allowing greater permeation of sun light throughout the day and harnessing solar energy for hot water provisioning throughout the hospital complex.

The hospital complex is in the posh western suburb of Ahmedabad, just 20 minutes from the airport and in close vicinity of most hotels and shopping malls. With vast open spaces around the hospital it's positioned & designed to ensure that patients and caregivers get a feel of the skyline of Ahmedabad city from their rooms and never feel claustrophobic. It's an attempt to give a feel of home @ hospital.

Features of The Hospital

- 160 ICU Beds equipped with facility for bed side dialysis
- GE 256 Slice Dual Energy CT Scan (first in Asia) - capable of performing Cardiac CT Angio at any heart rate and lowered radiation dosage for an array of CT Procedures
- GE 32 Channel Silent MRI - offers 30% reduction in scanning time and capable of detecting Micro Bleeds
- Philips Allura Clarity Fully Flat Panel Cath Labs with IVUS technology (first in Asia) - 2 side by side Cath units catering to Cardiac & Neuro Interventions with Zero Delay
- 3D & 4 D Capable Echo & Sonography Systems
- Tuttnauer Israel's Central Sterile Supply Services Units for fail safe sterility of surgical equipments, one of its kind system housing separate unmanned lifts for transfer of dirty & clean linen

- X-Ray with Fluoroscopy with Real Time Imaging (Casetteless / Plateless - console based system)
- C-Arm with Fluoroscopy with Real Time Imaging
- 17 Bed Dialysis Unit with advanced Fresenius Machines and an Isolation Dialysis Chamber
- 21 State of the Art Class 100 Operating Suits equipped with digitally controlled Mac Operating Led Lights with Color Deferential Mode & Schaerer Operating Tables from Switzerland and touch free entry & exit doors
- Choice of 5 accommodation classes - Standard, Sharing, Executive, Deluxe & Suite
- Dedicated Wellness & Preventive Health check department
- Emergency Room with Triage & Isolation Provisioning
- Single Floor Diagnostics for all Emergency needs (total Diagnostics at ground level)
- 12 High speed Elevators with enhanced ride quality comfort - all lifts capable of transporting Patient Beds

Our Specialties:

- Cardiology & Cardiac Surgery
- Joint Replacement
- Spine & Scoliosis Surgery
- Neurology & Neurosurgery
- Plastic, Reconstructive & Cosmetic Surgery
- Nephrology
- Urology
- ENT & Audiology
- Gastroenterology & Gastro surgery
- Minimally access surgery
- Bariatric, Metabolic & Hepatobiliary Surgery
- Transplant Medicine (Kidney, Liver, Bone Marrow & Heart) - planned for future
- Critical & Intensive Care
- Dentistry
- Dermatology

- Emergency Medicine
- Genetic Sciences
- Gynecology & Obstetrics
- Ophthalmology
- Oncology
- Paediatrics
- Orthopaedics & Trauma
- Pulmonology
- Health Check-up
- Investigation Services
- Specialty Clinic

Hospital layout:

FLOOR	DEPARTMENTS
00	A-ZYDUS HEALTH CHECK UP B-RADIOLOGISTICS & IMAGING C-EMERGENCY & ER OT D-ADMISSION & BILLING, CAFETERIA, PHARAMACY
01	A-OPD, EEG & EMG B-OPD, ECHO, TMT, & ECG C-PHYSIOTHERAPY & REHABILITATION, DENTAL D-OPD
02	A-ENDOSCOPY, LITHOTRIPSY & URODYNAMICS B-MOTHER & CHILD CARE C-DIALYSIS D-FOOD COURT
03	A-SURGICAL ICU-3A B-OPERATION THEATER COMPLEX C-OPERATION THEATER COMPLEX D-TRANSPLANTICU & SURGICAL ICU-3D

04	A-RELATIVE STAY AREA, STORES B-CENTRAL STERILE SUPPLY DEPARTMENT C-MEDICAL RECORD DEPARTMENT D-DEPT. OF LAB MEDICINE AND BLOOD BANK
05	A-OPERATION THEATER COMPLEX B- OPERATION THEATER COMPLEX C- OPERATION THEATER COMPLEX D-CVTS ICU-5D
06	A-CATH LAB & CARDIAC ICU-6A B-CARDIAC ICU C-CVTS ICU-6C D-CVTS ICU-6D
07	A-CRITICAL CARE UNIT-7A B-PEDIATRUC ICU & NEONATAL ICU C-LABOUR DELIVERY COMPLEX & OT, PREMIUM ROOMS D-NEURO ICU
08	A-EXECUTIVE (TWIN SHARING)801-820 B-EXECUTIVE (TRIPLE SHARING)821-844 C- EXECUTIVE (TRIPLE SHARING)845-868 D- EXECUTIVE (TWIN SHARING)869-888
09	A-STANDARD BEDS 901-919 B-STANDARD BEDS 920-935 C-AUDITORIUM D-ADMINISRATION
10	PREMIUM ROOMS
11	PREMIUM ROOMS
12	PREMIUM ROOMS
13	PREMIUM ROOMS
14	SUITS
15	A-PRESIDENTIAL SUITE

	B-PREMIUM SUITS 1501-1502 C-PREMIUM SUITS 1503-1504 D-PREMIUM SUITS 1505-1506

Purpose:

To define the scope of services provided by ZYDUS hospitals, Ahmedabad Gujarat.

Scope:

All departments of the hospital.

The hospital shall provide following services: -

SPECIALTIES	**SUB SCOPE**	**SERVICE AVAILABILITY**
Laboratory Medicine	1. Clinical Pathology 2. Haematology 3. Bio-Chemistry 4. Microbiology 5. Immunoassay 6. Serology 7. Cytopathology 8. Histopathology	Sample Collection Time: 24 hours x 7 days
Blood Storage	1. Red Blood Corpuscles 2. Fresh Frozen Plasma 3. Cryoprecipitate 4. Cryopoorplasma 5. Platelets 6. Whole Blood	24 hours x 7 days
General Medicine	1. Hypertension 2. Diabetes 3. Infectious Diseases	8 am to 8 pm (OPD)

	4. Endocrine problems & other metabolic disorder 5. Disease of CNS, ANS, CVS, Respiratory System, Inpatient Department 6. Intensive critical Care 7. Emergency Care 8. Basic and Advanced Life Support 9. Pleural & Pentoneal Tapping 10. Health Check up	24/7 IPD & Emergency Care Intensive Critical Care/ Emergency Care 24x7
Nephrology	1. Haemodialysis 2. Plasmapheresis 3. Renal Biopsy 4. Graft biopsy 5. USG guided aspiration	8 am to 8 pm (OPD) 24/7 IPD & Emergency care
Obstetrics & Gynecology	1. Obstetrics including high Risk Obstetric Cases 2. Laparoscopic Gynec Surgeries, Myomectomy 3. Hysterectomy 4. D&C, Hysteroscopy 5. Caesarean section 6. Normal deliveries 7. Menopause clinic	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
SPECIALTIES	SUB SCOPE	SERVICE AVAILABILITY
	8. Obstetric preventive health check up	
Orthopaedics	1. Trauma & fracture surgeries	

	2. Arthritis 3. Paediatric Orthopaedics 4. Osteoporosis & other bone diseases 5. Joint Replacement surgery	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
Ophthalmology	OPD Services	
General Surgery	1. Gastrointestinal Operations (oesophagus to anal canal, liver pancreas, biliary tree, gallbladder, spleen surgeries) 2. Trauma management 3. Limb soft tissue surgeries 4. Peripheral Vascular Diseases 5. Burns patients	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
Cardiology	Non-Invasive Cardiology 1. General cardiology patient management, ECG interpretation 2. Treadmill testing 3. Echocardiography procedures, 4. Holter Monitoring <u>Invasive Cardiology</u> 1. CAG 2. PTCA 3. COMPLEX PTA (POBA) 4. PAMI 5. CAROTID Angiography 6. BAS- Balloon Atrial Septoplasty	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care

	7. BMV- Balloon Atrial Valvotomy 8. PDA- Patent Ductus Arteriosus 9. CRT- Cardiac Resynchronization Therapy 10. CRT-D—Cardiac Resynchronization Defibrillator Therapy 11. PTA- Percutaneous Trans luminal Angioplasty 12. EPS Electrophysiology Study 13. 3D Mapping 14. RFA 15. Pericardial Tapping 16. PPI, Cath Oximetry 17. MAPCA Coiling 18. TPI 19. Stage PTCA 20. Check Angiogram 21. RHC- LHC 22. BAV 23. ASD Closure 24. Carotid Plasty, Renal Plasty 25. Cath Angiogram 26. VSD Closure 27. AICD	
SPECIALITIES	SUB SCOPE	SERVICE AVAILABILITY

Cardiac Vascular and thoracic Surgery	1. CABG 2. CABG+SVR 3. MVR/Repair 4. AVR/Repair 5. Coaction of Aorta 6. DVR 7. MICAS 8. ASD 9. VSD 10. TOF 11. PDA, Complex Congenital HD-ICR 12. Palliative Shunts 13. Arterial Switch 14. Aorta Femoral Bypass 15. Femoral Palliative Bypass 16. Aortic Root Replacement 17. Lobectomy 18. Pneumonectomy	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
Neurology & Neurosurgery	1. Brain Tumour & Neuro Oncology 2. Management of Head Injuries 3. Stroke 4. Epilepsy 5. Headache 6. Neuro-critical care 7. EEG & 8. Neuro and spinal surgeries for aneurysms	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care

Paediatrics and Neonatology	1. Comprehensive care to children from neonates, infants to young children 2. General Pediatric 3. Pediatric Surgery 4. Pediatric Asthma Treatment 5. Pediatric and adolescent Psychiatry, Early stimulation therapy for new born 6. Neonatal ICU 7. Immunization	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
Anaesthesia	a. General Anaesthesia b. Regional Anaesthesia c. Spinal Anaesthesia d. Epidural Anaesthesia e. Pain Management	24 hours x 7 hours
Gastro Intestine Surgery	a. Advanced Laproscopic Surgery b. Bariatric Surgery for Obesity c. Single port access Surgery d. Surgery for disease of Liver, Pancreatic, Hepato biliary etc.	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
Gastro Intestine Medicine	a. Upper GI Endoscopy b. Colonoscopy c. ERCP d. Sclerotherapy & band ligation of varices e. Oesophageal dilations f. Balloon treatment for achalasia cardia	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
SPECIALITIES	**SUB SCOPE**	**SERVICE AVAILBILITY**

	g. Prosthesis Placement h. Extraction of stone from CBD i. Stenting of CBD & Pancreatic ducts j. Percutaneous endoscopic gastrostomy	
Joint Replacement	a. Total knee replacement b. Total hip replacement c. Hip resurfacing surgeries d. Total shoulder replacement	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
Spine surgery	a. Surgeries for spinal fractures b. Cervical and Thoracic Spine c. Discectomy Anterior Lumbar puncture d. Spinal Injections	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
Urology	a. PCNL Percutaneous Nephro lithotomy, Urethroplasty b. VVF c. D.J Stenting d. TURP e. Hernias f. Hydrocele g. VIU, Prostatectomy h. Prostate Biopsy i. Pyeloplasty j. Hypospadias	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care

	k. Orchidectomy l. Orchiopexy m. Radical Cystectomy n. Neobladder Lap/Open o. Radical Nephrectomy p. Radical Prostatectomy q. Lithotripsy	
Pulmonology	1. Consultation 2. Diagnostic 3. PFT 4. Spirometry 5. Bronchoscopy- Flexible & Rigid	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
ENT	1. General Consultation 2. Tympanoplasty 3. Tonsillectomy 4. Sept rhinoplasty 5. Cochlear Implant 6. Thyroid Surgeries 7. Mastoidectomy 8. Microlaryngial Surgeries 9. Sinoscopy 10. Head and Neck surgeries 11. Speech Therapy 12. Vertigo Clinic 13. Snoring Clinic 14. Audiometry	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
Radiology and Imaging	1. X-Rays	8 am to 8 pm (OPD)

	2. Sonography 3. Mammography 4. CT scan 5. MRI 6. BMD	24/7 IPD & Emergency Care
Dentistry	1. Oral Medicine 2. Oral Radiology 3. Oral and Maxillofacial Surgery 4. Treatment of periodontal conditions 5. Cosmetic dental treatments 6. Endodontic procedures 7. Pediatric dental care 8. Orthodontic treatments 9. Orthographic surgeries 10. Prosthodontics treatments 11. Preventive dental care	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care
Physiotherapy	1. Cardiac rehabilitation 2. Neuro rehabilitation 3. Pain management 4. Physiotherapy in sports injury 5. Physiotherapy in Obstetrics & Gynaecology 6. Physiotherapy in Orthopaedics 7. Physiotherapy in Geriatrics 8. Physiotherapy in Pediatric patients	8 am to 8 pm (OPD) 24/7 IPD & Emergency Care

- The above services are provided on both Indoor and Outdoor basis as per the timings fixed by the hospital.
- Emergency services for all specialities are available round the clock all 365 days to all patients irrespective of their place of residence, paying capacity etc.
- Medico legal cases are accepted round the clock

Supplementary services

1. Central sterile and supplies department
2. Pharmacy
3. Dietary
4. Bio-medical engineering
5. Linen & Laundry (Outsourced)
6. Stores (General & Medical)
7. Medical gases (cylinders and piped medical gases)
8. Security (Outsourced)
9. Ambulance Services
10. Medical Record Department
11. Administrative office
12. Hospital management Information System

Services Currently Not available in the Hospital:

1) Nuclear Medicine
2) Radio Therapy
3) IVF
4) Psychiatric Services

1. INTRODUCTION

2.1 Medication Turnaround Time is the total time taken between the issue of indents at the pharmacy to the time they reach the respective station.

The main objective of IP Pharmacy is to maintain smooth flow of requisitions from the time they are ordered to the time the requested medications are sent. The following steps are involved in the entire process from requisition till receiving the drugs at the respective station.

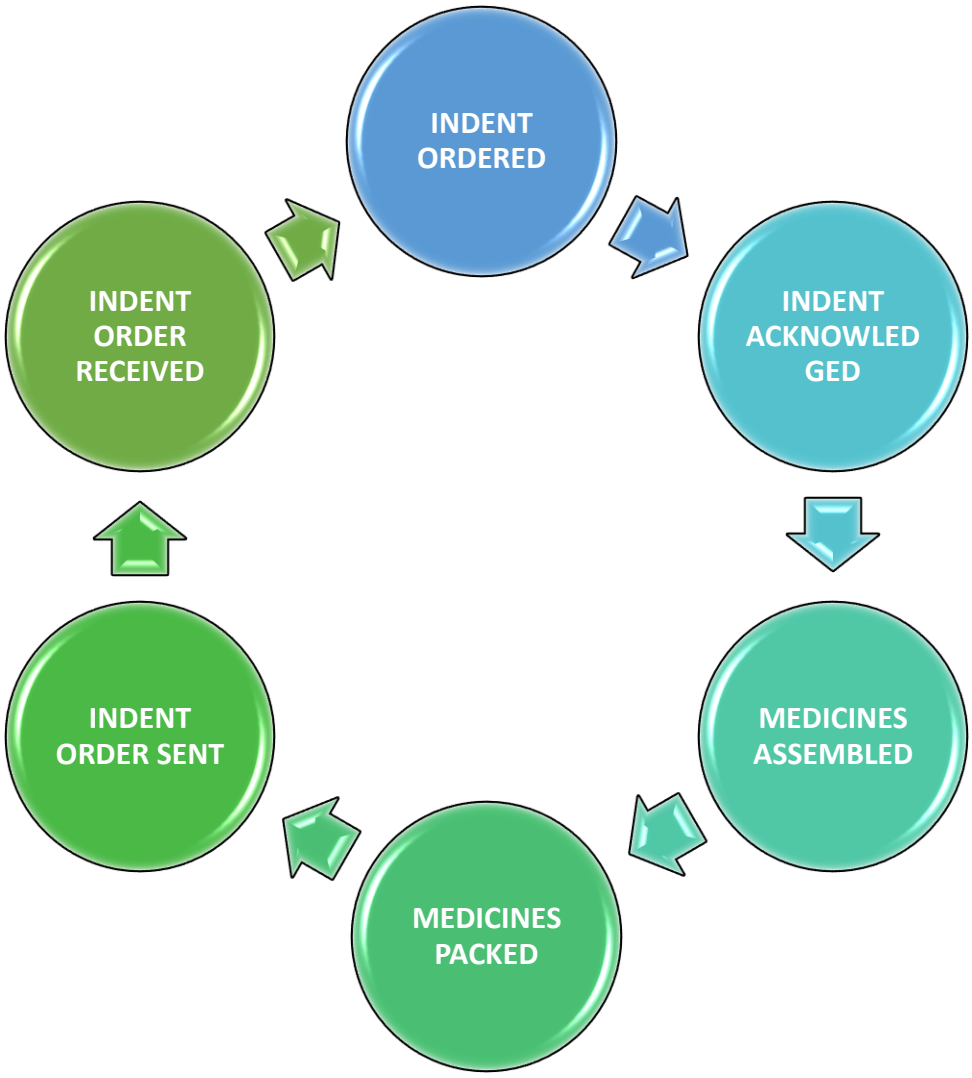


Fig 2.1 Process flow of TAT

2.2 Medication Error is any avertible event that may lead to unsuitable medication use or patient harm while the medication is governed by the patient, healthcare professional or consumer.

The errors may be linked to professional practice, healthcare products, procedures, and systems, including prescription, order communication, product labelling, wrapping, and nomenclature, compounding, dispensing, delivery, administration, education, monitoring and use.

Types of medication errors:

Prescription Error	Requisition Error	Administration Error
Order written in wrong patient's file	Order requested in wrong patient's MRN number	Drug administered to wrong patient
Drug is inappropriate for indication	Wrong drug, brand name, form of drug is requested.	Wrong drug, form of drug, dose, and time of the drug administered.
Wrong drug, brand name, form of drug route, dose, time.	To start drug is requested within 3 to 5 minutes	Drug administered through wrong route
Drug prescription is incomplete	Wrong dose requested	Drug administered which is inappropriate for indication
Patient has allergy to drug		Expiry date drug administered
Illegible writing	Dispensation Error	Documentation not done
Transcription Error	Drug dispensed in wrong patient	
Order transcribed in wrong patient's file	Wrong drug, brand name, form of Drug, quantity & strength	
Wrong drug, dose, form & route of drug transcribed	Drug not dispensed within the defined time frame	

The study conducted here is on "Medication Turnaround time of Hospital IP Pharmacy & Mapping Medication Error".

A study was conducted taking a sample size. The timing of each of the steps was noted as mentioned in the process flow and after all the data collected, analysis was carried out to calculate the overall turnaround time. All the patients that were included in calculating TAT, their medication errors were also mapped, checking for each category taking into account the following parameters:

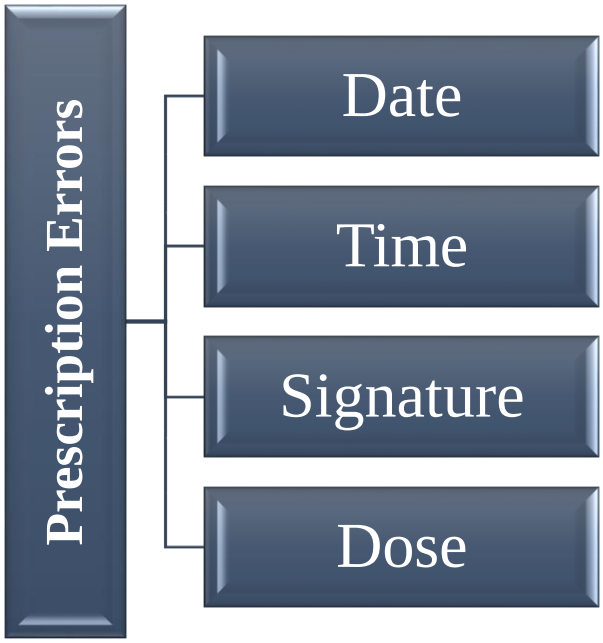


Fig 2.1.1 Categories included (Prescription Errors)

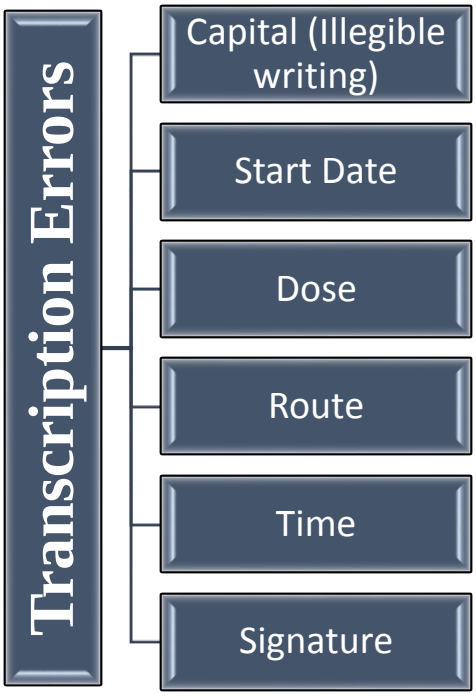


Fig 2.1.2 Categories included (Transcription Errors)

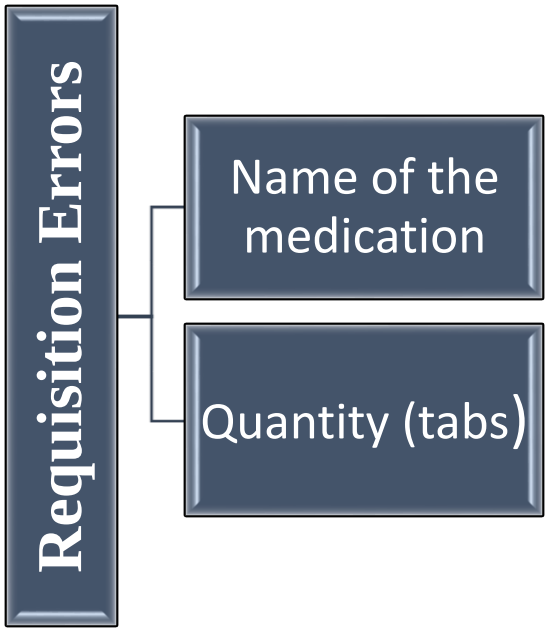


Fig 2.1.3 Categories included (Requisition Errors)

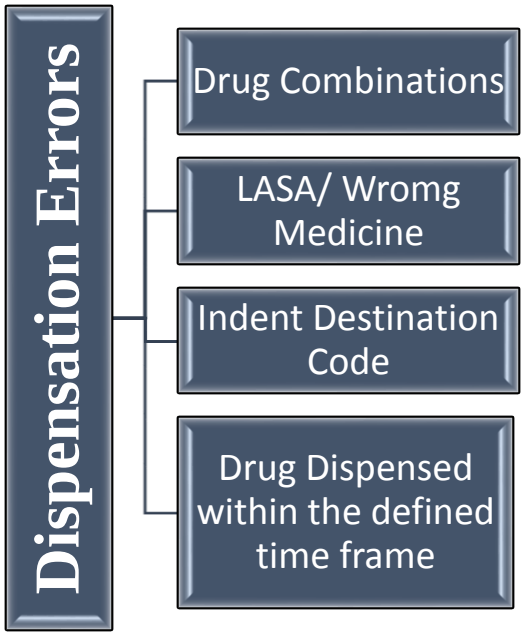


Fig 2.1.4 Categories included (Dispensation Errors)

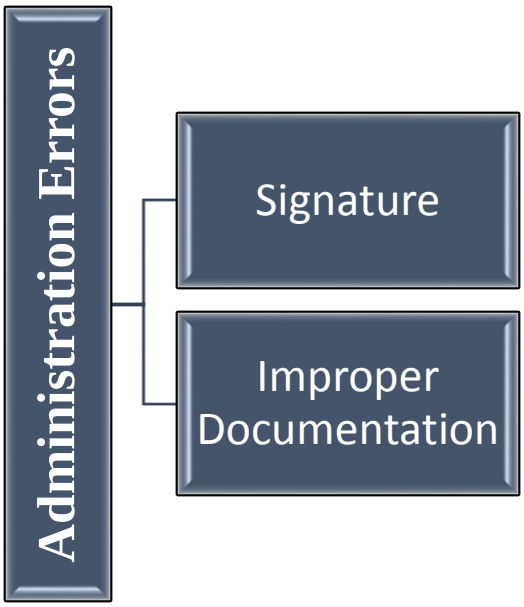


Fig 2.1.5 Categories included (Administration Errors)

3. REVIEW OF LITERATURE

Medication turnaround time can be defined as the total time taken in each of the processes step that are involved in the time when the medications are ordered at the nursing station to the time it reaches the respective station from the pharmacy. The anticipation from the in-patient pharmacy department in every hospital is to make right drugs available at the right time and of the right dosage ordered. The delay in the delivery of drugs and medical consumables create hindrances in the smooth running of pharmacy of the organisation. Dropping the medication turnaround time can improve efficiency, patient safety and quality of care which are very essential for the smooth functioning of the hospital. Turnaround time is one of the metrics that is used to assess the operating system arrangement algorithms. (1)

A medication error is defined as "any avertible event that may lead to unsuitable medication use or patient harm when the medication is in the regulation of the health care professional," according to the National Coordinating Council for Medication Error Reporting and Prevention. The council, involves of a group of more than 25 national and international organizations, that also comprises the FDA, they examine and evaluate medication errors and recommends strategies for error prevention and control. (2)

The public took notice of this event in 1999 when the Institute of Medicine (IOM) released a report "To Err is Human: Building a Safer Health System." Giving to the report that was published, the results were that in between 44,000 and 98,000 deaths may have resulted each year from medication errors in hospitals alone and more than 7,000 deaths each year are supposed to be related to medications. In response to the IOM's report all parts of the U.S. health system had put medication error decrease approaches in top notch speed by re-assessing and firming up checks and balances to avert errors that were believed to result in patient harm in a vast number of cases. (3)

In addition to the U.S. Department of Health and Human Services (HHS) and other federal agencies that formed the Quality Interagency Coordination Task Force in 2000 and delivered an action plan for dropping medical errors, in 2001, former HHS Secretary Tommy G. Thompson broadcasted a Patient Safety Task Force to manage a joint effort to advance data collection on patient safety. The lead agencies in the address to reduce the medication errors were the FDA, the

Centers for Disease Control and Prevention, the Centers for Medicare and Medicaid Services, and the Agency for Healthcare Research and Quality. The FDA heightened its efforts to decrease medication errors by devoting more resources to drug safety, which included creating a new division on medication errors at the agency in 2002. "FDA works to stop medication errors earlier a drug reaches the market and monitors any faults that may occur after that," says Jerry Phillips, D.Ph.., former director of the FDA's Division of Medication Errors and Technical Support. (4)

Medication errors can only be disallowed and abridged by focusing on the system as a whole, and not on the specific clinician or nurse. A national grave incident and near miss writing database which ensures the whole haematology community learns lessons about dormant conditions and vigorous errors is essential. This will only be positive in refining patient safety if the appropriate writing culture and feedback mechanisms are in place. (5)

4. AIM OF THE STUDY

- The aim of the study was to find out the turnaround time of hospital in-patient pharmacy taking indent entries of new as well as routine patients to check for delay in medications arrival for new patients and to map their medication errors to know the state of medication errors in files and suggest recommendations for the above.

5. OBJECTIVES

- To calculate the turnaround time of hospital IP Pharmacy indents
- To find out the medication errors of the sample taken w.r.t. the medications indented.

6. METHODOLOGY

6.1 STUDY DESIGN

The study design was a Descriptive Study.

6.2 STUDY SITE

The study site was Zydus Hospitals, Ahmedabad.

6.3 STUDY DURATION

- The duration of the study was from 15th April'17 till 20th May'17

6.4 SAMPLE SIZE

- The sample size taken was 300 patients' indent entry.

6.5 DATA COLLECTION METHOD

- Primary Data Collection:

The time of each step in the process flow of medication dispensation was recorded and then the files of respective patients were checked for mapping medication errors.

- Inclusion & Exclusion Criteria:

  New as well as Routine patients' entry were recorded. Data was collected of 300 patients without repetition and between the time frame 8 AM to 5 PM.

6.6 DATA ANALYSIS TOOL

- The tool used for analysing data collected was MS-Excel.

7. RESULTS

7.1. AN ANLYSIS OF TAT OF THE 300 SAMPLE SIZE TAKEN

- The sample size was 300. The total TAT of 300 samples showed an average **delay** of 24 minutes i.e. 54 minutes, standard time for an indent from the time it is issued to the time it reaches the station being 30 minutes.
- As the standard turnaround time is supposed to be 30 minutes, the result was evaluated based on those indents which took greater than, less than and equal to 30 minutes from the time of being ordered to the time the medication is delivered.

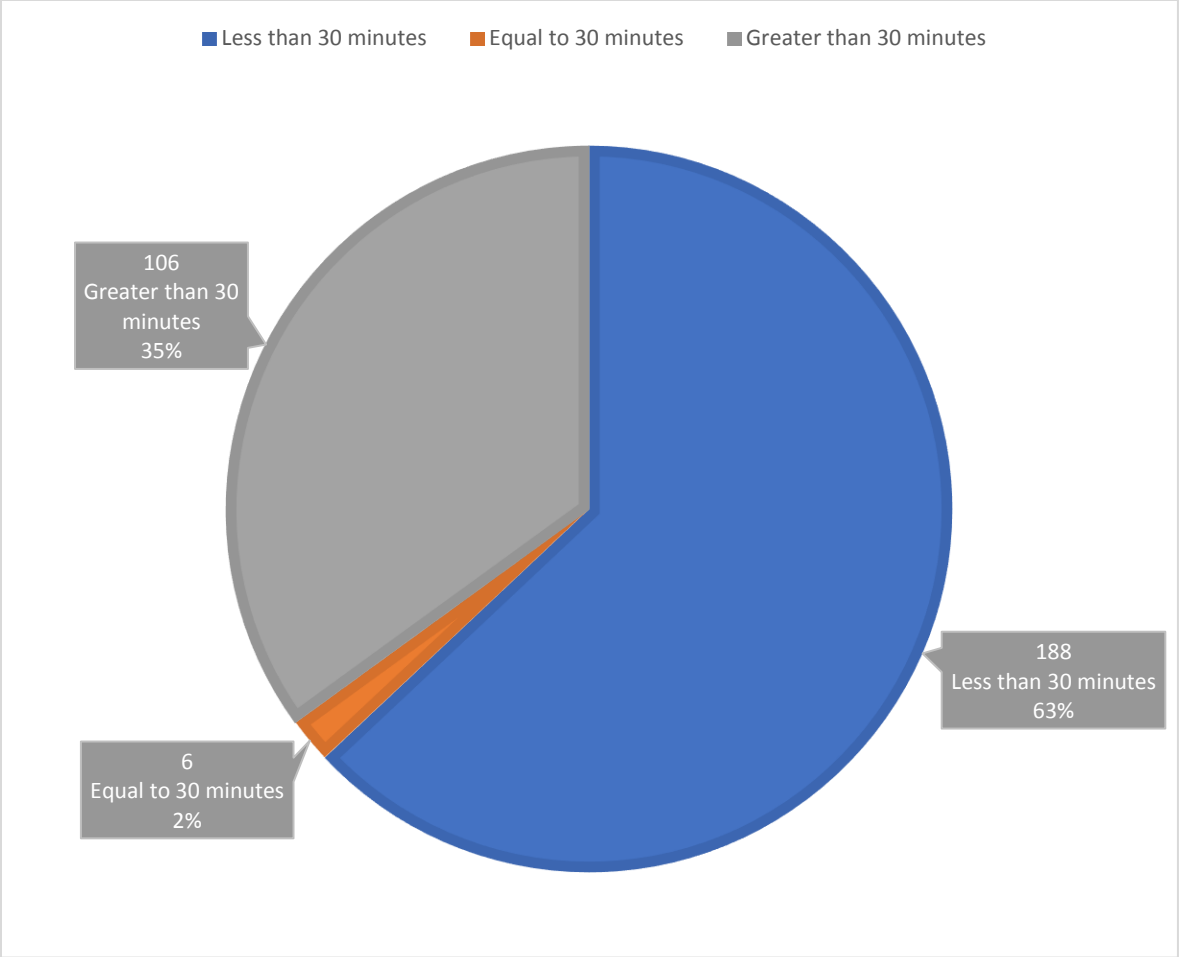


Fig 7.1 Average TAT

- 63% (i.e. 188 indents) were delivered before 30 minutes time, 2%(i.e. 6 indents) took exactly 30 minutes and 35%(i.e. 106 indents) took more than 30 minutes.

7.2. AN ANALYSIS ON TAT DIVIDING THE SAMPLE INTO NEW AND ROUTINE PATIENTS:

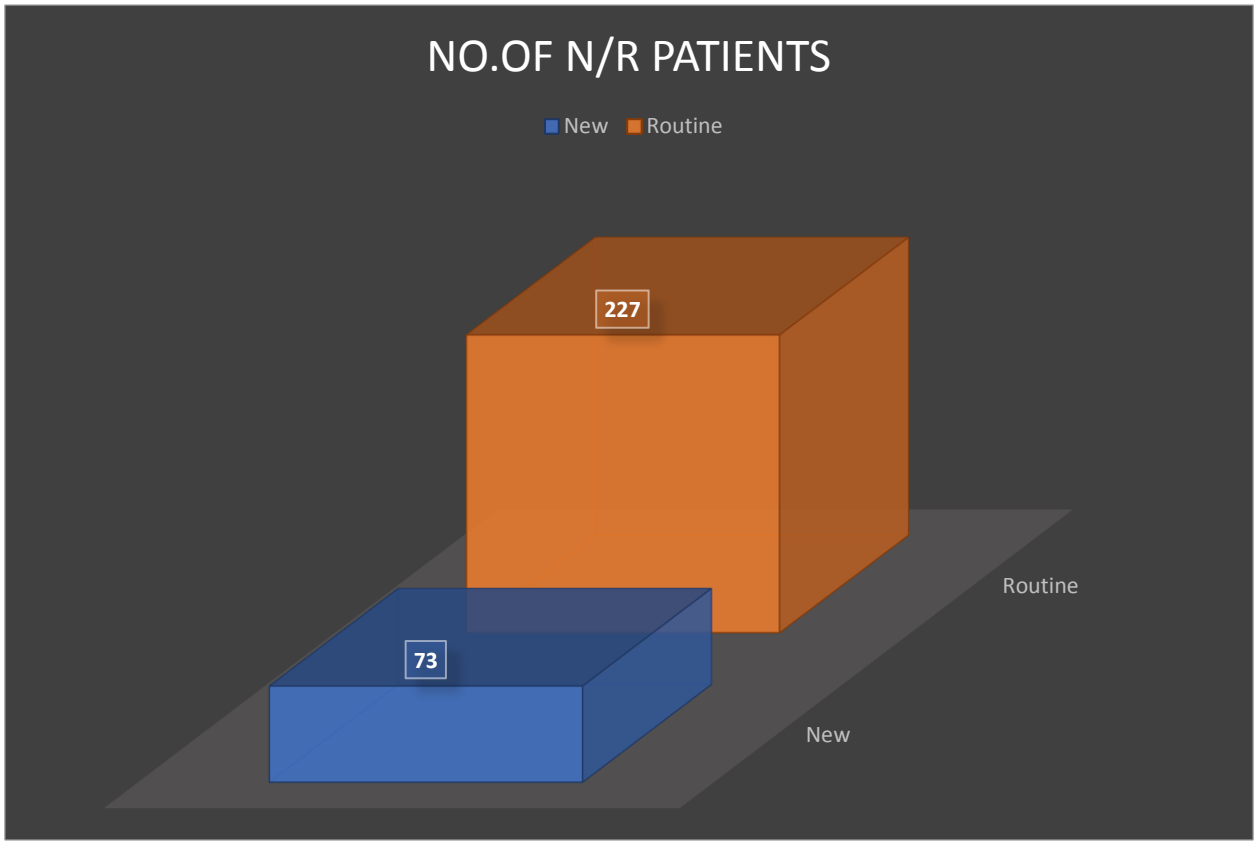


Fig 7.2 Number of N/R patients

- Analysing the results:

  TAT of N/R patients:

	NEW	ROUTINE
TOTAL	**73**	**227**
LESS THAN 30M	**29**	**138**

%	**40**	**61**
EQUAL TO 30M	**0**	**6**
%	**0**	**3**
GREATER THAN 30M	**44**	**83**
%	**60**	**36**

- Average TAT(N)= 31 minutes, Delay being 52 minutes.
- Average TAT(R)= 31 minutes, Delay being 53 minutes.

Results:

- Delays in both the cases i.e. new as well as routine patients came 52 and 53 minutes respectively.
- For Routine patient's, there were 36% cases of delay.
- For New patient's, there were 60% cases of delay.
- On-time deliveries were 64% in case of Routine patient's indent requests, and 40% in case of New patient's requests.

7.3. ANALYSIS OF INDIVIDUAL STEPS IN PROCESS FLOW INVOLVED IN TAT:

- Individual delay in time is depicted in the following figure with respective steps involved:

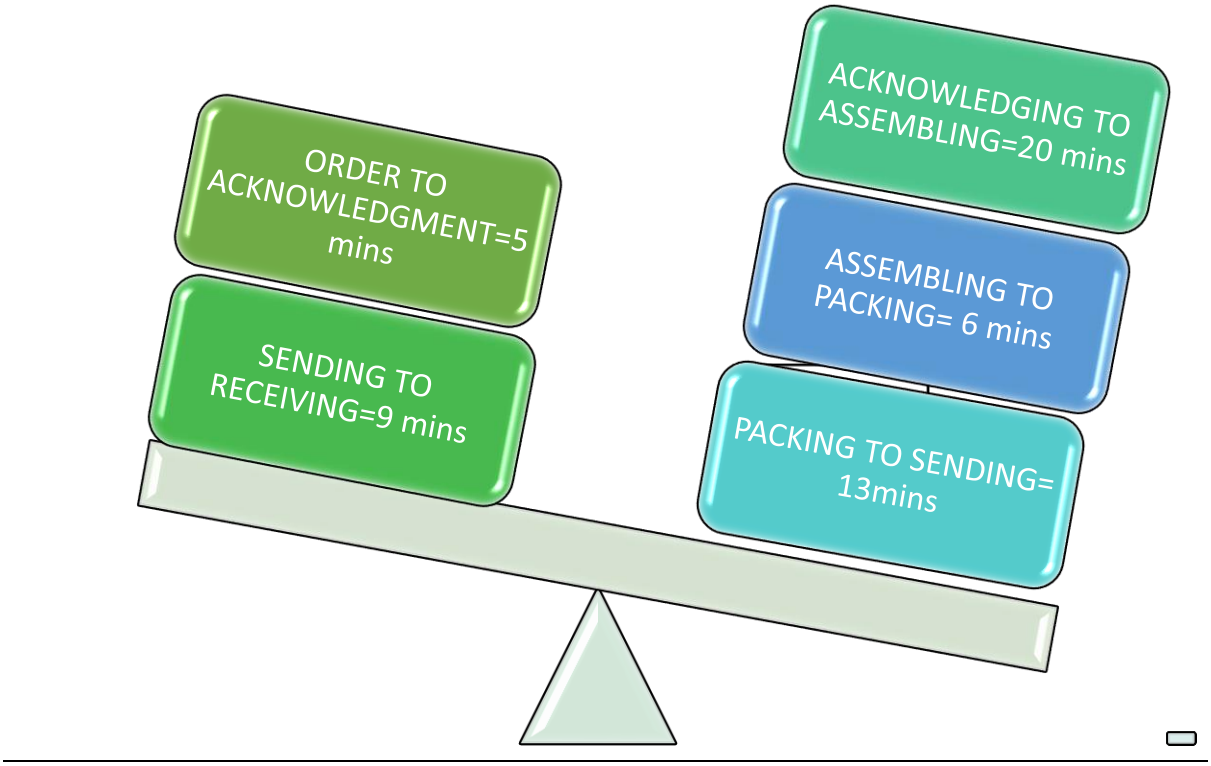


FIG 7.3. Delay in individual steps in TAT

7.4. MEDICATION ERROR ANALYSIS:

For the analysis, we take into consideration:

- The total number of errors in individual categories
- The NCCMERP Index as per the errors filed.

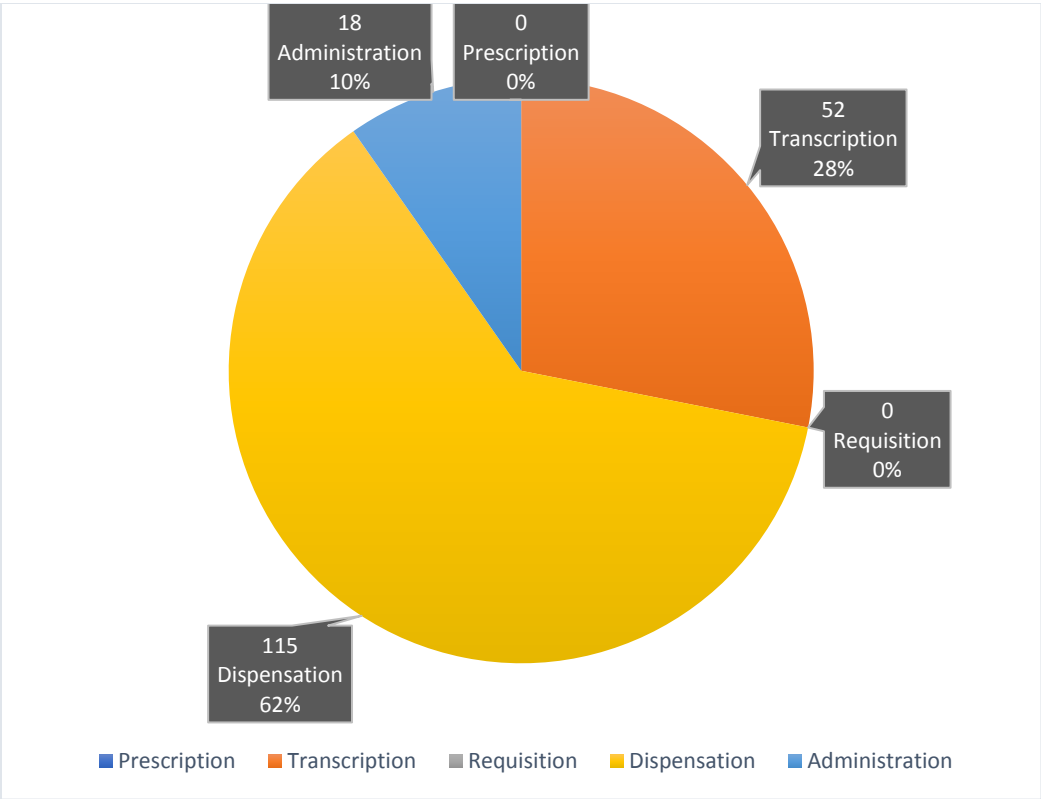
- The NCCMERP Index:

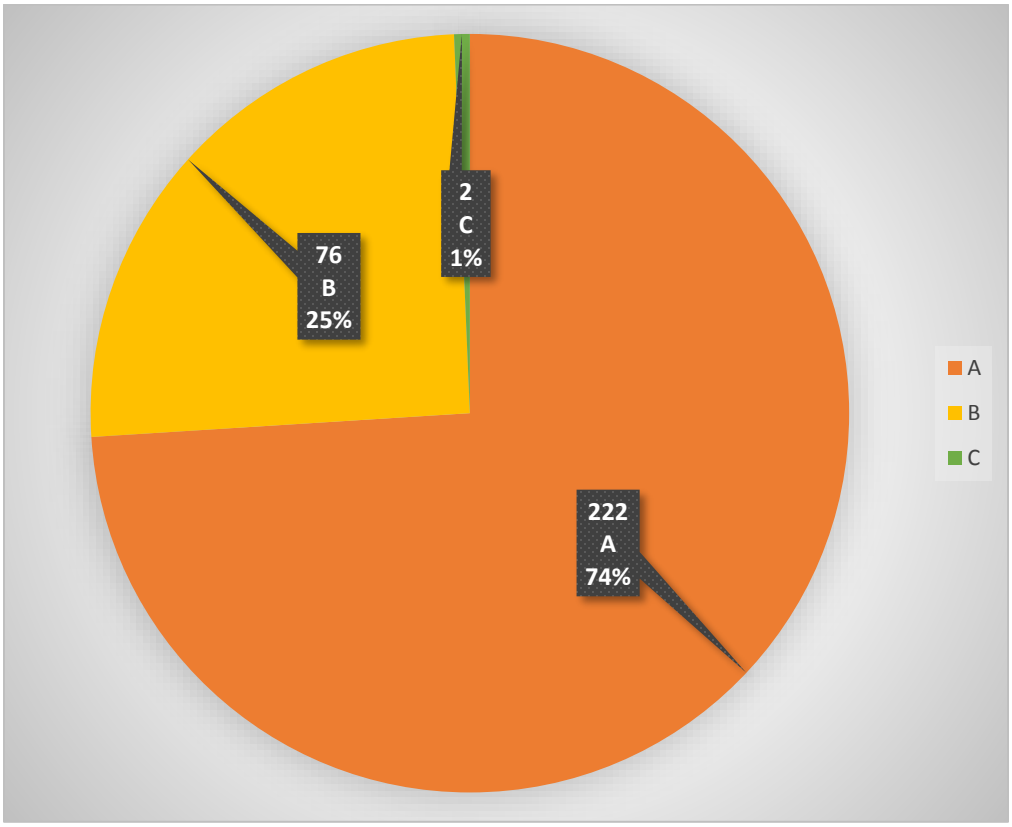
Category	Description
A	No error, capacity to cause error
B	Error that did not reach the patient
C	Error that reached the patient but unlikely to cause harm
D	Error that reached the patient and could have necessitated monitoring
E	Error that could have caused temporary harm
F	Error that could have caused temporary harm requiring initial or prolonged hospitalization
G	Error that could have resulted in permanent harm
H	Error that could have necessitated intervention to sustain life
I	Error that could have resulted in death

Table 7.4.1 NCCMERP Index

Results:

- In terms of **number of errors** in individual categories:
- In terms of NCCMERP Indices


18
Administration
10%
0
Prescription
0%
52
Transcription
28%
0
Requisition
0%
115
Dispensation
62%
Prescription
Transcription
Requisition
Dispensation
Administration


2
C
1%
76
B
25%
222
A
74%
A
B
C

- Transcription:

Capital (illegible writing)	24
Start Date	3
Dose	6
Route	1
Time	5
Signature	13

Table 7.4.4 Number of transcription errors

- Dispensation:

Drug Combinations	2
Wrong Medicine	1
Indent destination code	0
Drug dispensed within the defined time frame	106

Table 7.4.5 Number of dispensation errors

- Administration:

Signature	15

Proper documentation	3

Table 7.4.6 Number of administration errors

8. CONCLUSION

· The turnaround time calculated was greater than 30 minutes for 35% of the cases , the delay being of 24 minutes.

· The medication error was maximum in the case of dispensation error which included the tat greater than 30 minutes, i.e. in 106 cases.

· Minimum errors were in prescription and requisition; administration errors accounted for 28% which included the signature at time of medications and proper file maintenance.

· Recommendations were suggested to decrease the turnaround time and medication errors.

9. GAPS & RECOMMENDATIONS:

8.1 Turnaround time Gaps & Recommendations:

(1) The indent ordered is printed and then the pharmacist goes on to assemble them.

The reasons for delay in the above-mentioned steps include:

A. There are 3-4 pharmacists available at any moment. Out of which:

1-2 are busy at the desk in several works including attending calls, filling up details of inventory and stock, accepting returns of previous indents &

2-3 are engaged in works of assembling as well as adding new stock in respective places and other chores required to be attended to.

B. There is no specific work assigned to staff, because of which there is chaos at times and some delay in indent assembling. At-a-time 7-8 prints are laid down and then the assembling starts. Hence delay in further consecutive steps.

This staffing pattern could be on the wall so that each one is aware of their duties each day.

- One staff could be assigned the work of attending calls and managing returns with other desk jobs.
- Two staffs could be there to assemble the medicines as soon as they are printed.
- One would be responsible to print the indents ordered as well as assist in handling the desk and assembling medicines.

<table>
<tr><th>DESK</th><th>FLOOR</th></tr>
<tr><td rowspan="2">1-</td><td>1-</td></tr>
<tr><td>2-</td></tr>
<tr><td colspan="2">2-</td></tr>
</table>

Table 8.1 Suggested table on work distribution

(2) Many a times within an hour there are 4-5 indents of a single patient, each having one item requested. Because of which there is increase in indents load that is to be sent to the same destination every 10 mins.

The nursing staff should be directed **to avoid ordering single indents** every time which in turn leads to an increase in the number of entries thus increasing TAT.

(3) The senior most pharmacist should be responsible to look into the workload divided among the staff and monitor continuous flow.

(4) Indents are of 2 types (based on the carrying capacity of the containers)

- Those to be sent by shoot.
- Those that must be delivered in-hand at the respective stations.

In case of normal deliveries, the medications are packed into the container and sent through pneumatics as soon as they are assembled. In hand deliveries are packed and kept at the pharmacy. After every 45-50 minutes one of the attendee collects all the packages (~8-9), loads them on a trolley and goes on to deliver them at their respective stations. For urgent deliveries, the pharmacist requests the respective wing's nurse who had ordered the indent to send their attendee to collect the package.

- Unavailability of containers at the pharmacy
- There should be a message at each receiving station – "The containers are to be sent back to pharmacy as soon as they are emptied."

(5) to resolve the problem, of late deliveries of heavy indents, either:

- There could be fixed division of work between the two attendees present i.e. One would be responsible for delivering in-hand packages every half-an-hour and doing other works at the pharmacy in the rest of the time available & the second one would be sending medications though shoots and helping in the work flow (in rotation every alternate day/hour).

8.2 Medication Error- Gaps & Recommendations

In my result findings as the major portion of the error accounted in administration was due to the signature error which the nursing staff failed to administer in the medical records of the patient file, I had suggested for the introduction of BCMA. Bar Code Medication Administration is a_state-of-art technology introduced recently and adopted in healthcare organisations and hospitals to reduce the medication errors in their respective organisations. Improving their processes, zeroing in on errors that could cause harm, and pursuing to build a safe culture for both the customers as well as the employees. Written Communication Error, i.e. the drug that is administered but not signed accounted for vast majority of the sample size taken and analyzing the results. To bridge this gap of signature absence and thus to eliminate the problems that arise further, the following recommendation is suggested:

(1) Introducing BCMA (Bar Code Medication Administration):

Using the_state-of-the-art technology to improve patient safety. Just as the technology is used in a number of industries including retail sector as well as in number of hospitals nowadays, required bar codes would contain a unique identifying information about drugs. When used with bar code scanners and computerized patient information systems, bar code technology can prevent many medication errors, including administering the wrong drug or dose, or administering a drug to a patient with a known allergy.

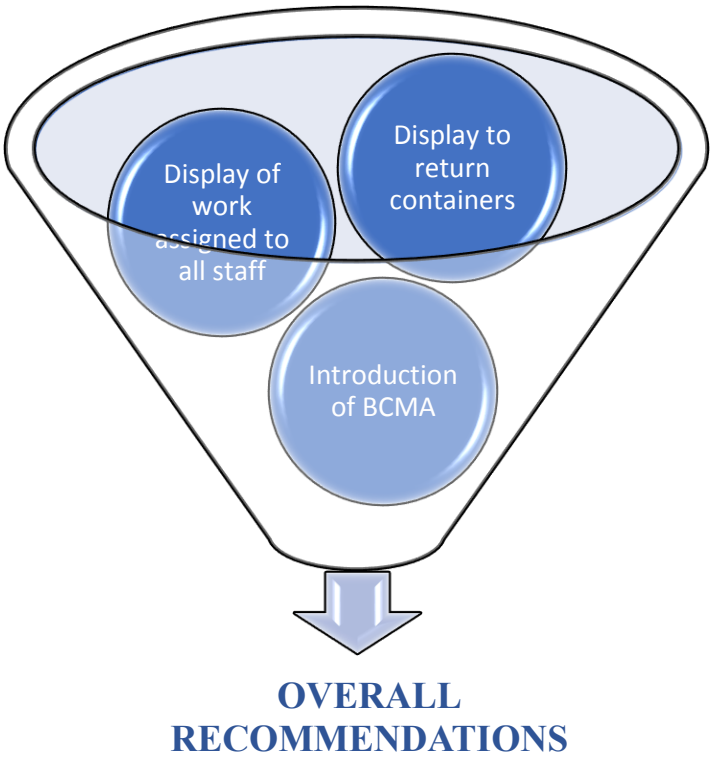


Fig 8.1 Overall Recommendations

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- Medication Errors: Causes, Prevention and Reduction

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- Imperial Journal of Interdisciplinary Research (IJIR) Vol-2, Issue-10, 2016 ISSN: 2454-1362, http://www.onlinejournal.in (4)
- Reduction in medication errors in hospitals due to adoption of computerized provider order entry systems-https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3628057/ (5)