

**Summer Training at
Apollo BSR Hospitals
Bhilai Chhattisgarh**

**Study on Turnaround Time of Medicine Dispensing in IP Pharmacy, to
Identify Medication Errors and to Verify the Quality of Central Store, IP
Pharmacy and OT Store**

**By
Farheen Zeba Siddique**

**Under the guidance of
Dr. Anoop Khanna**

**MBA Hospital and Health Management
2015-2017**



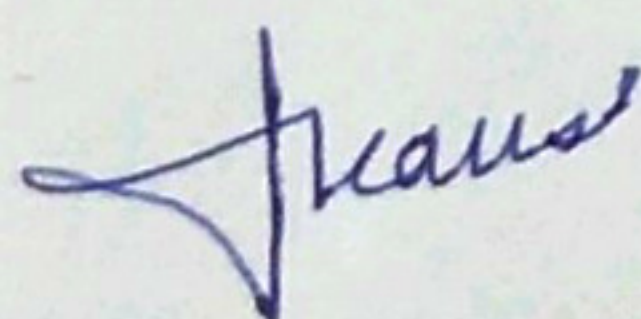
**The IIHMR University, Jaipur
2016**

TO WHOMSOEVER MAY CONCERN

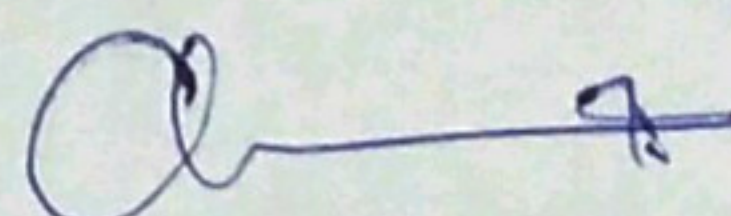
This is to certify that **Dr. Farheen Zeba Siddique** student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone summer training at **Apollo BSR hospital, Bhilai, Chhattisgarh** from April 1st, 2016 to May 31st, 2016.

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

I wish her all success in all future endeavors.



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



Mr. Anoop Khanna
Professor
The IIHMR University, Jaipur



Apollo BSR Hospitals
touching lives BHILAI

ABSRH / INT / ICT

DATE: 01.06.2016

TO WHOM SO EVER IT MAY CONCERN

CERTIFICATE OF INTERNSHIP

This is to certify that **Dr. Farheen Zeba Siddique** student of IIHMR University, Jaipur has done 2 month's internship from **01.04.2016** to **31.05.2016** in our **Quality Department** of Apollo BSR Hospitals, Bhilai.

She was punctual and found to be sincere during her internship.

For Apollo BSR Hospital,
(A Unit of BSR Superspeciality Hospitals Ltd.)

Dr. Komal Pandit
Manager- Quality & Operations



APOLLO BSR HOSPITALS
(A UNIT OF BSR SUPERSPECIALITY HOSPITALS LTD.)

ACKNOWLEDGEMENT

I extend my sincere gratitude to **Mr. Sanjay Shrivastav**, Chief Administrative Officer for giving me the opportunity to do this study and undergoing process of learning at APOLLO BSR BHILAI. I thank them for all the trust and faith they posed in me and I only hope that I have been able to live up to their expectations. Their guidance and support was helpful in enhancing my work.

I extend my sincere gratitude towards, **Dr. Komal Pandit**, Manager- Quality and Operations, who has been my mentor for the summer internship program and has been instrumental in helping me shape this study in a desirable way.

I would also like to extend my thanks to **Miss Pooja Prasad** (IP Pharmacy In charge), **Miss Pragati Baghel** (Clinical Pharmacist), **Mr. Bhupendra Singh** (OT Store In charge) and **Mr. Rishi Deshmukh** (Central Store In charge).

Last but not the least I would like to thank the entire staff of **Apollo BSR Hospital, Bhilai** for their support and guidance.

I would like to express my sincere thanks to **Dr. S.D. Gupta**, Director IIHMR, **Col. Dr. Ashok Kaushik**, Dean IIHMR, **Mr. Anoop Khanna (mentor)**, and all my faculty members for the proper guidance and cooperation extended by them. I am also grateful to my parents, my family and friends for giving me moral support.

However, I accept the sole responsibility for any possible error of omission and would be extremely grateful to the readers of this project report if they bring such mistakes to my notice.

Date – 31st May, 2016

Dr. Farheen Zeba Siddique

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PREFACE

Summer internship is an integral part of the PGDHM curriculum. As a part of the course; students of first year are required to undergo summer placement at any reputed organization to get in depth exposure of various departments in the organization and better understanding of the health care delivery system and its functions.

The major objectives of the summer training program as follows:

- 1) To understand and learn day by day operational management of a Hospital/Health Care Organization and its service centers.
- 2) To study identified issues/ problems associated with some specific area/ program.
- 3) To acquire more knowledge on roles and responsibilities of key players and stakeholders in the hospital.
- 4) To understand various functions in hospital by interactions with key stakeholders, policy makers, academicians and researchers.
- 5) To work on the project/task assigned by the summer training organization.

During the training period I had an **Overview of various departments of the hospital**. I also carried out a study titled **“A study on turnaround time of medicine dispensing in IP pharmacy, to identify medication errors and to verify the quality of central store, IP pharmacy and OT store.”**

ABOUT THE ORGANIZATION

Apollo BSR is a multi-specialty hospital with a motto to provide quality healthcare at affordable cost. It has a fully quipped Centre if international standard for cardiac intervention and surgeries.

VISION:

*“To be the most **preferred** healthcare service provider in the region, to **selflessly** contribute to humanity by continuously **challenging** the existing standards of care.”*

MISSION:

*Apollo BSR Hospitals always **provide comprehensive and modern healthcare solutions**. People experience a wide range of **high quality technology and a humane approach** in the hospitals.*

THE JOURNEY:

The Group started with diagnostic Centre in the year 1993 at Bhilai. Over a period of time all modern diagnostic facilities like 1.5 T MRI, 64 Slice Cardiac CT , Multi-slice Spiral CT scan, 4-D Real Time Color Doppler, Ultra-Modern Pathology, Endoscopy, Bronchoscopy, Mammography, Echocardiography Sonography, Digital X-ray etc. have been installed at our various Centre's. Thereafter similar Centre have been setup at other locations such as Nagpur, Raipur, Korba and Rajnandgaon.

In the Year 2000 the Group ventured into establishing ultra-modern Superspecialty Cancer Hospital in Bhilai- BSR Cancer Hospital which is the only comprehensive cancer management Centre in Chhattisgarh.

After seventeen years into being called a pioneer and leader in Diagnostics in Central India and eight years in Comprehensive Cancer Management, BSR Healthcare is now a well-known name in healthcare sector.

BSR realized the need for a Multispecialty Superspecialty Tertiary care hospital in Central India and prompted by the desire to extend high quality Medicare beyond the confines of the rich class, BSR Healthcare, has set up Super specialty Hospital at Bhilai. Apollo BSR Hospitals, Bhilai became operational from September 2007.

Our Commitment to the Community.

“Caring for community.”

Those simple words describe the past, present and future of Apollo BSR Hospitals, Bhilai. Our roots run deep in the community, starting with the 1st Hi-tech diagnostic Centre in 1993. After fifteen years of being pioneer in diagnostics in entire Central India, BSR healthcare started comprehensive cancer management hospital - BSR Cancer Hospital & Research Institute at Bhilai in June 2001.

Apollo BSR Hospitals is a 150 Bedded Super Specialty Hospital providing secondary & tertiary level healthcare at affordable cost in association with Apollo Hospitals, Chennai. The inpatient beds are classified into Deluxe Suite, Private Room, Double Bed Wards, Shared Ward and dedicated Cancer Wards.

The hospital enjoys the reputation of being the first and only hospital to have a digital flat panel Cath lab and 4 modular OTs with laminar air flow and HEPA filters for coronary Bypass surgeries, Coronary Angioplasty and other special surgeries. They are having 42 bedded ICU including cardiac, surgical, medical, neonatal and pediatric ICU.

Apollo BSR at Bhilai is an attempt to integrate the best and most qualified medical professionals and doctors by providing them the best infrastructure, latest technologies in Biomedical engineering and health care services along with the dedicated team of nurses, technicians, staff and health care services so that the patients in Chhattisgarh as well as neighboring states could be benefited. Already they have got a good response from the patients in this region and they are regularly getting the patients not only from Chhattisgarh but also from the neighboring states. They are recognized and empaneled by Govt. of Chhattisgarh, CSEB, NSPCL, FCL, BSNL, CISF, NMDC, SECL and various insurance companies/TPA's. They have also started more departments like Infertility clinic, cosmetology, joint replacement surgery, high end ophthalmology etc.

VARIOUS DEPARTMENTS IN THE HOSPITAL CARE-

1. CLINICAL SERVICES:

- ❖ 24-hour Accident & Emergency Services (Trauma Unit).
- ❖ Anesthesia
- ❖ Cardiology
- ❖ Cardiothoracic Surgery
- ❖ Dental
- ❖ Dermatology and Venerology
- ❖ Endocrinology and Diabetology
- ❖ ENT
- ❖ Gastroenterology
- ❖ General & Laparoscopic Surgery
- ❖ Health Check-ups
- ❖ Infertility Clinic- (IVF, IUI)
- ❖ Internal Medicine
- ❖ Medical Oncology
- ❖ Nephrology
- ❖ Neurology
- ❖ Neurosurgery
- ❖ Obs. &Gynecology
- ❖ Ophthalmology
- ❖ Orthopedics
- ❖ Pediatrics/Neonatology
- ❖ Pain Management
- ❖ Plastic Surgery/Cosmetic Surgery
- ❖ Psychiatry & Psychotherapy
- ❖ Respiratory Medicine
- ❖ Surgical Oncology
- ❖ Urology

2. CRITICAL CARE UNITS:

- ❖ Medical Intensive Care Unit
- ❖ Cardiac Intensive Care Unit
- ❖ Surgical Intensive Care Unit
- ❖ Neonatal Intensive Care Unit
- ❖ Intensive Cardiac Care Unit

3. DIAGNOSTIC SERVICE:

- ❖ Laboratory
- ❖ Radiology (MRI Service Delivery at BSR Diagnostic Centre)
- ❖ Radiotherapy department (Service Delivery at BSR Cancer Hospital)
- ❖ Nuclear Medicine Department (Service delivery at BSR Cancer Hospital)

4. THERAPEUTIC SERVICE:

- ❖ Clinical consultation services
- ❖ Clinical inpatient services
- ❖ Operation theatres
- ❖ Labor room
- ❖ Digital Cath Lab
- ❖ Dialysis Unit
- ❖ Bronchoscopy
- ❖ Endoscopy
- ❖ ECG, Echo, TMT, EEG, EMG, PSG, Spirometry

5. AMBULATORY CARE AREA:

- ❖ Outpatient services
- ❖ Emergency services
- ❖ Pharmacy services (IP – 24 Hours, OT Pharmacy, OP Pharmacy)
- ❖ Physiotherapy

6. AUXILLARY SERVICES:

- ❖ Dietary services
- ❖ Central Sterile and Supplies Department
- ❖ Laundry
- ❖ Stores (general, medical) and Sub stores
- ❖ Mortuary
- ❖ MGPS (Cylinders and piped medical gases)
- ❖ Engineering services
- ❖ Housekeeping
- ❖ Security
- ❖ Medical Record Department
- ❖ Hospital Management Information System
- ❖ Administrative Office
- ❖ Ambulance and Non ambulances

SPECIFIC PROJECT:

A STUDY ON TURNAROUND TIME OF MEDICINE DISPENSING IN IP PHARMACY, TO IDENTIFY MEDICATION ERRORS AND TO VERIFY THE QUALITY OF CENTRAL STORE, IP PHARMACY AND OT STORE.

OBJECTIVES:

- To assess the turnaround time in IP pharmacy.
- To assess efficient working of IP pharmacy, central store and OT store.
- To assess the material flow and management from central stores to OT stores and IP pharmacy.
- To identify the various types of Medication errors occurring in various wards.
- To assess proper arrangement and recording of narcotics.
- To assess the training needs if any for the staff.

The areas covered for this project are-

1. Central Store
2. IP Pharmacy
3. OT store
4. Medical ICU
5. Surgical ICU
6. Neonatal ICU
7. General wards (Male General ward, Female General Ward and Onco Ward)
8. Gynecology General wards

INTRODUCTION

Medication turnaround time can be defined as the time between when a medication order is composed, either written or electronically recorded, and the time medication is delivered to the nursing unit. The major expectation from the pharmacy department in the hospital is to make right drug available at the right time. The delays in delivering of drugs and medical consumables interrupt in the smooth functioning of pharmacy.

Reducing the medication time can improve efficiency, patient safety and quality of care.

Turnaround time (TAT) is the total time taken between the submission of a process/task for execution and the return of the complete output to the customer/user. TAT is one of the metrics used to evaluate operating system scheduling algorithms.

Medication error is defined as is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer. There are four types of errors –

- i. Prescription errors
- ii. Transcription errors
- iii. Administration errors
- iv. Dispensing errors

Medication errors that lead to iatrogenic injuries are a well-known worldwide phenomenon and are common, costly and clinically important. Medication errors are a common occurrence and continue to be a problem in the health care industry. Medication errors may be nobody's baby, but when it happens, it could well turn out to be everyone's worry and the reasons given for medication errors range from silly to the downright serious.⁴

Common causes of medication errors include incorrect diagnosis, prescribing errors, drug-drug related reactions, dose miscalculations, incorrect drug administration and lack of patient education. Other factors that can contribute are job-related stress, improper training or education and sound-alike lookalike packaging of medications.

REVIEW OF LITERATURE-

One hospital found a 23percent reduction in medication turnaround time after CPOE implementation in their acute rehabilitation unit ($p=.008$)². In a study comparing two hospitals, researchers found that first doses of antibiotics were administered 56 percent faster using CPOE with clinical decision support (CDS) compared to paper based methods ($p<.001$)³.

Research in specialty settings shows similar results. In a surgical intensive care unit setting (SICU) that implemented CPOE, researchers found a significant 64percent reduction in turnaround time from order to delivery.⁴

Another study found however, that when breaking down the process into two phases,

- Time from order composition to pharmacy order verification and
- from pharmacy verification to medication administration, only the time in the first phase decreased significantly, a reduction of 61 percent.²

A study conducted by MSDS Medical College, Fatehgarh showed that overall incidence of medication errors was found to be 28.3%. Out of total 86 medication errors detected in the study, majority of errors (67.4%) were due to nurses, 22.1% were due to pharmacists and remaining 10.5% were due to physicians. Out of total 86 medication errors observed in this study, 31.4% were 'Errors in medication ordering and transcription', 24.4% were 'Errors in medication dispensing', whereas 44.2% were observed as 'Nursing errors in medication administration'.

The activities performed in the central store include:

- GRN generation and verification of the products supplied by the vendors.
- Physical verification of the goods including expiry date, breakage, batch number etc.
- Supplying of the material to IP pharmacy, OT store and floor store after reception of indent from the respective departments.
- Sending out bills to authorities and to the respected departments.
- Proper arrangement of drugs and instruments in the store and disposal of near expiry and expiry medications.
- Coordinating with the vendors for speedy supply of materials.
- Sending the requirement of medication and instruments to another branch of Apollo hospital.
- Proper recording and arrangement of narcotic drugs.
- Performing stock count and separating near expiry and expiry medications for proper disposal of drugs.

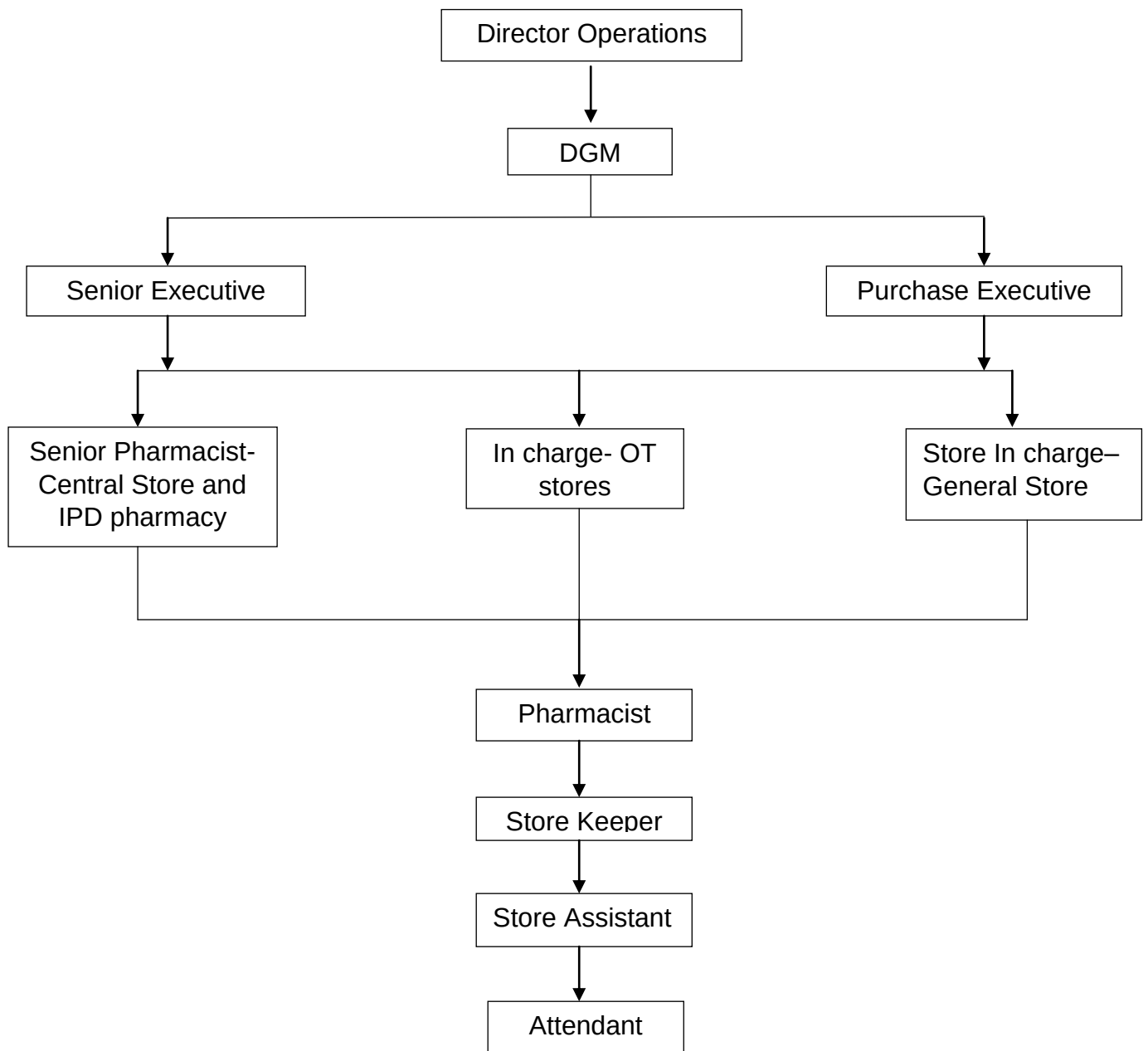
The activities performed in IP pharmacy include:

- Sending out indent to central store for required material.
- Receiving indents from various nursing stations.
- Physical cross check of retrieved item against the indent.
- Entry of material in HIS after physical verification in limited time possible
- Coordinating with the central store for retrieval of material.
- Dispensing correct medicine in correct time to the respected nursing stations.
- Performing stock count and separating near expiry and expiry medications for proper disposal of drugs.

The activities performed in OT store include-

- Sending out indents to central store for required materials.
- Receiving material requirement of OT through OT sheets.
- Proper arrangement of medications, implants and narcotics according to the standards.
- Forwarding of the OT sheets to the billing department for acknowledgement.
- Performing stock count and separating near expiry and expiry medications for proper disposal of drugs.

ORGANOGRAM



DATA COLLECTION & METHODOLOGY-

The procedure followed is enumerated below:

- i. A study of duties of each individual was conducted to understand the roles and responsibilities of the staff working in IP pharmacy, central store and OT store.
- ii. All the staff in each department was interviewed in detail to know about the storage of drugs, disposal of drugs, etc. carried out by them; in addition observation of the staff while working in the department was also done.
- iii. Structured checklists were prepared by referring to the NABH guidelines textbook and reference from the internet was taken for the respective departments, which is given in the annexure.
- iv. A general questionnaire was also prepared for observation regarding turnaround time of medication, narcotics recording, LASA arrangement, HAM arrangement, separating near expiry and expiry medications, and to observe the medication errors in the respective departments.

METHODOLOGY-

Study type- Cross-sectional study

Study Area- Central Store, IP pharmacy, OT store, Wards (general ward 1, general ward 2, general ward 3, and semi-private, private), ICUs (Medical, Surgical, Cardiac, and Neonatal)

Sampling method –Non probability convenient sampling method.

Study participants – Staff of the respective departments.

Sample size – 500 indents from IP pharmacy, 154 patient files and 16 staff involved in IP pharmacy, central store and OT store.

Study Technique – Interview, checklist, observation of pharmacy indents and patient files.

Study Tool - Structured questionnaire, checklist, Pharmacy indents, GRN from central store, Inpatient files from respective departments.

Data Collection Plan – This study observed 500 indents from IP pharmacy, 154 patient files and 16 staff. For collections of data interviews and observation of the staffs of all the departments and concerned areas was carried out after taking authorization from concerned authorities of these departments.

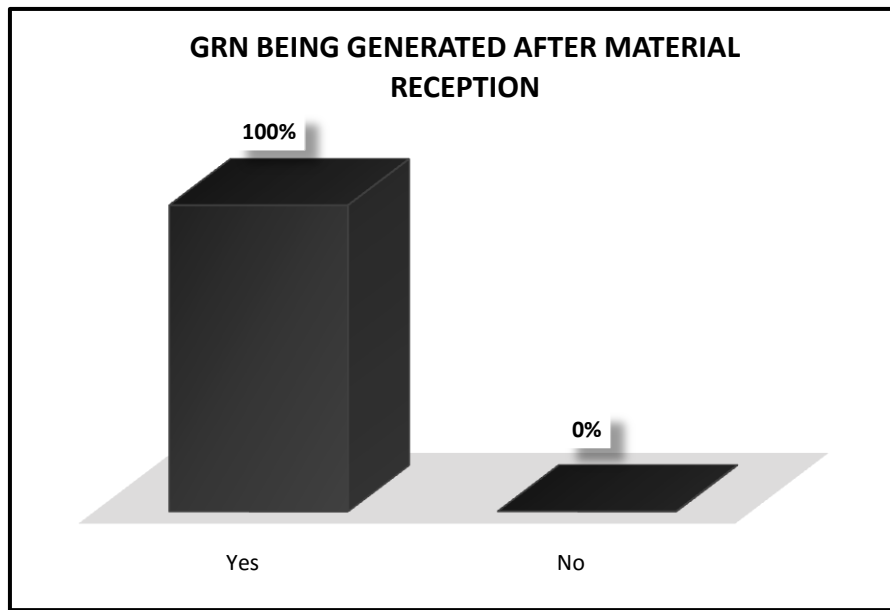
Data analysis – Done with the aid of MS-excel sheets. The data was entered in sheets department wise and then analyzed with the help of graphs.

Ethical considerations- Purpose of the study was clearly explained. The respondents were assured of the data confidentiality.

DATA ANALYSIS, COMPILATION AND INTERPRETATION

The department wise analysis of the data is as follows:

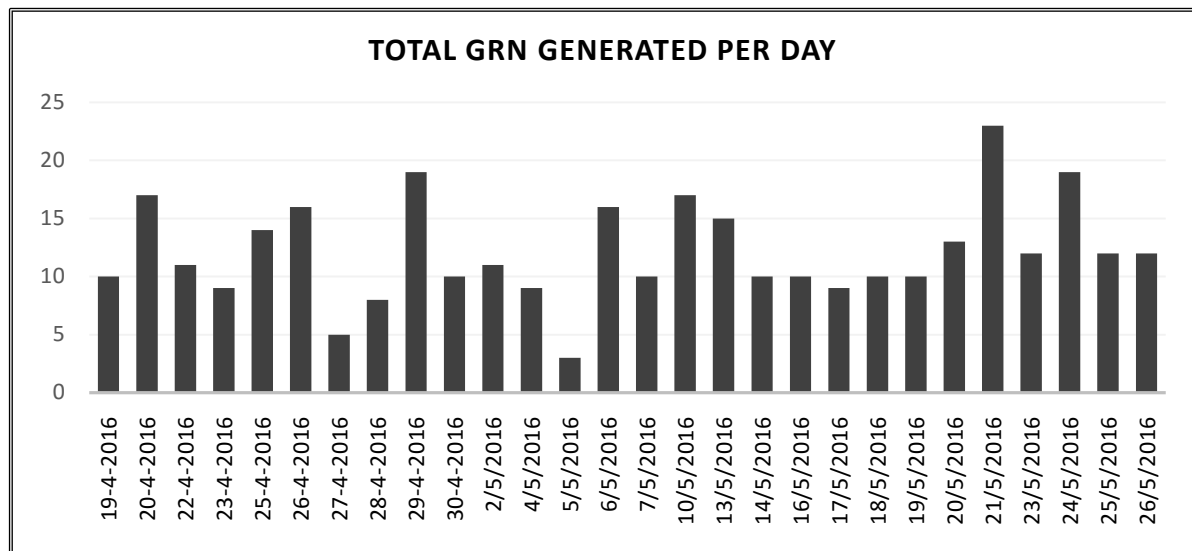
1. GRN being generated after material reception in Central Store:



Graph - 1

- 100% generation of GRN after material reception in central store. There is no theft or misplacement any sort of the goods being received.

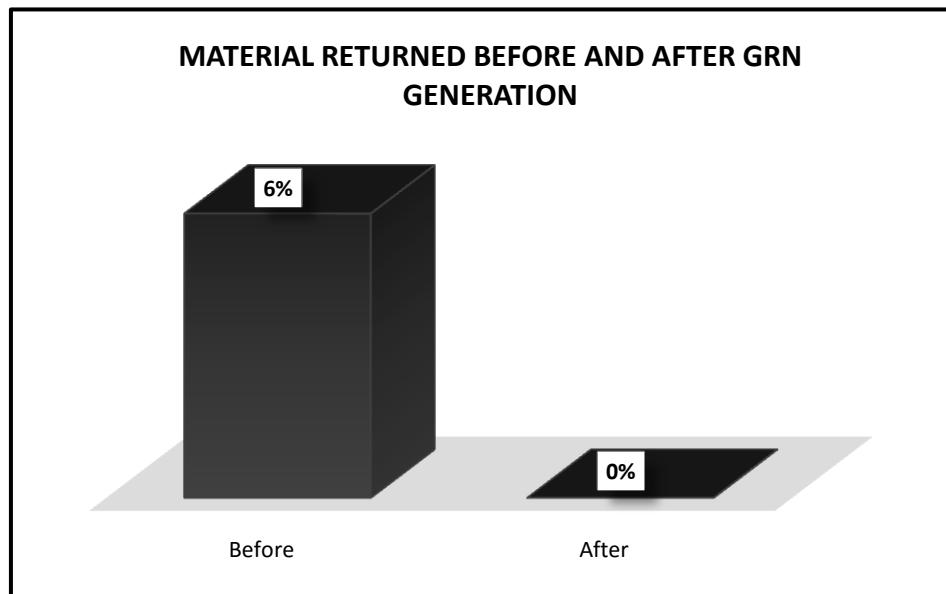
2. Total number of GRN's being generated per day:



Graph – 2

- The standard average number of GRN being generated is 18.
- The average number of GRN being generated is 12 in a 28 days study, which is less than the standard average number of GRN, which indicates that the inventory management needs to be more efficient.
- Total number of GRN being generated is 340.

3. Goods being returned before and after GRN generation.



Graph – 3

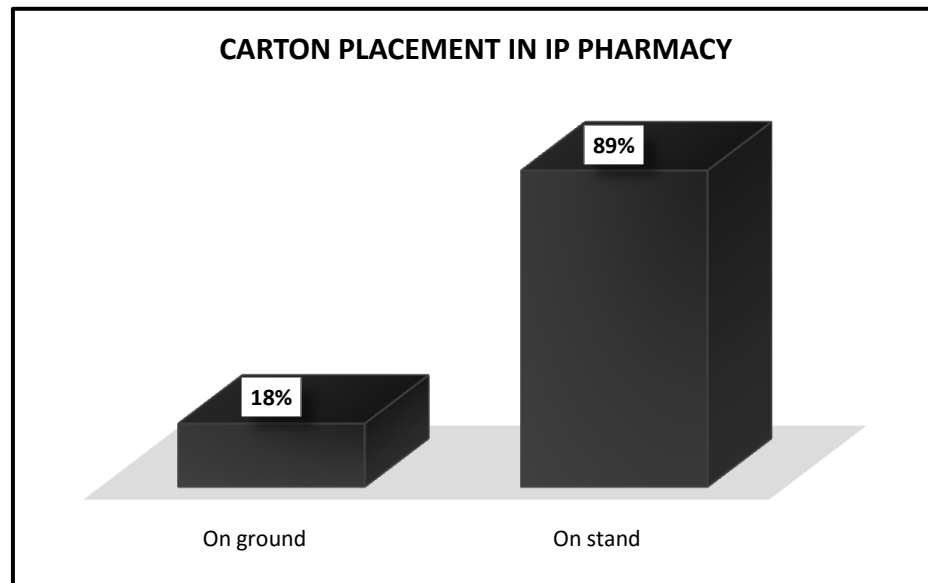
- 6% of the goods have been returned before the GRN generation.
- The entry in register of the material return isn't done at the time of material returning, it is being entered within 1-2 days which may cause an issue in the quantity of the goods being ordered.

4. Physical verification of goods after goods reception:

- 100% verification of goods is done after the reception of goods in central store which included verification of:
 - i. Name of goods – 100%
 - ii. Quantity of goods – 100%
 - iii. Expiry date of goods – 100%
 - iv. Batch no. of goods – 100%
 - v. Breakage of the goods – 100%

After verification of the goods, entry is done immediately in the respected register.

5. Carton placement in respected department:



Graph – 4

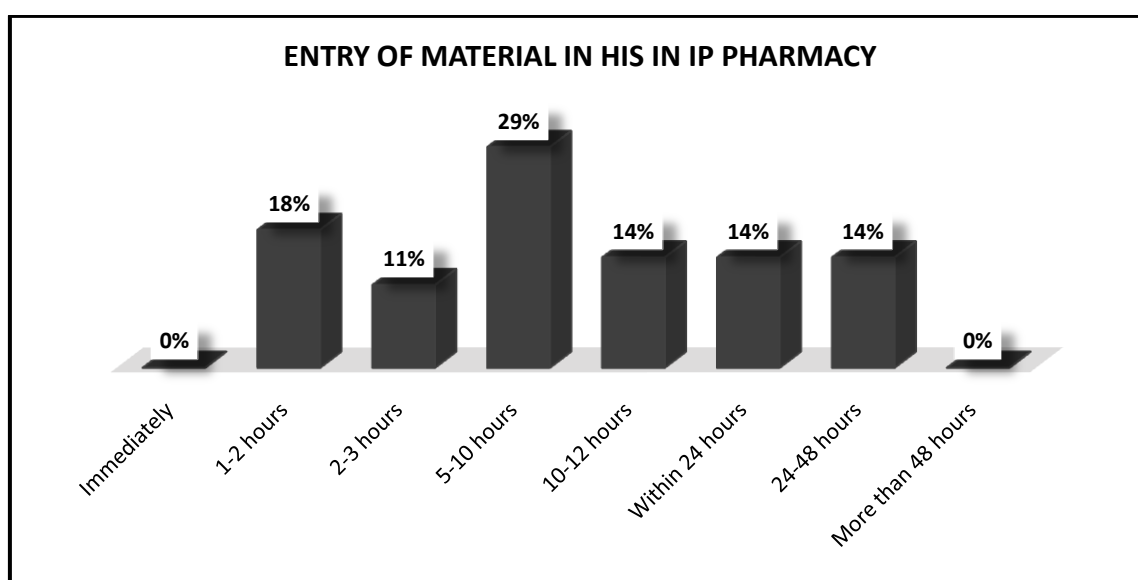
- According to the standards the carton placement should be within the central store and kept over a stand to avoid any kind of damage.
- **Central store-**
 - 100% carton placement is on ground.
 - Many of the cartons have been placed outside the central store in the corridors because of shortage of space which results in damaging of the material.
 - The material inside the cartons may get damaged because of the mopping Of the floor since the cartons have been placed directly on the ground.
- **IP Pharmacy-**
 - 18% carton placement is on ground and 89% carton placement is on stand.

6. Material being checked after material reception in OT store and IP Pharmacy:

- 100% checking of materials have been done in OT store and IP pharmacy. The criteria for checking the material is:

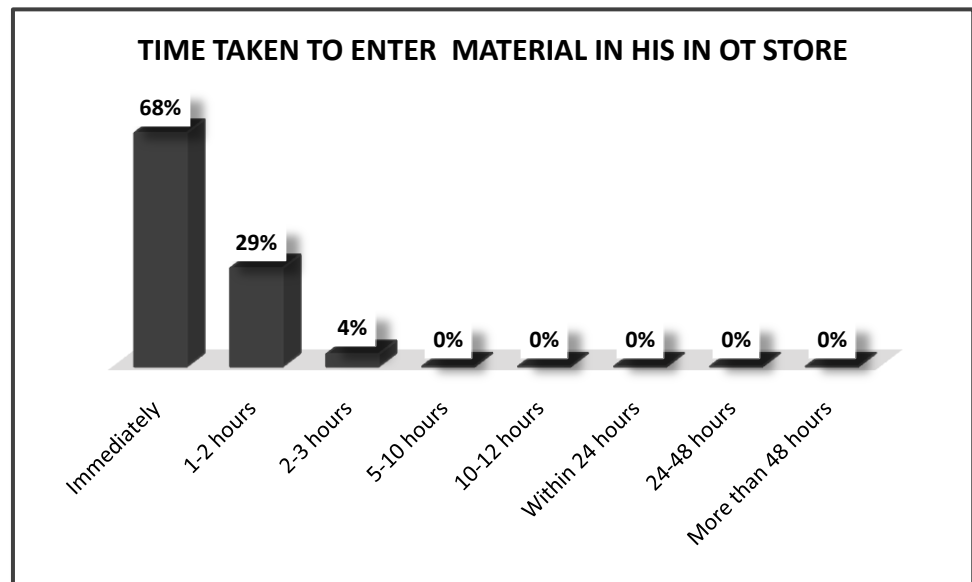
- Name of material – 100%
- Quantity of material – 100%
- Expiry of material – 100%
- Batch no of material – 100%
- Breakage of material – 100%

7. Time taken for material entry in to HIS:



Graph - 5

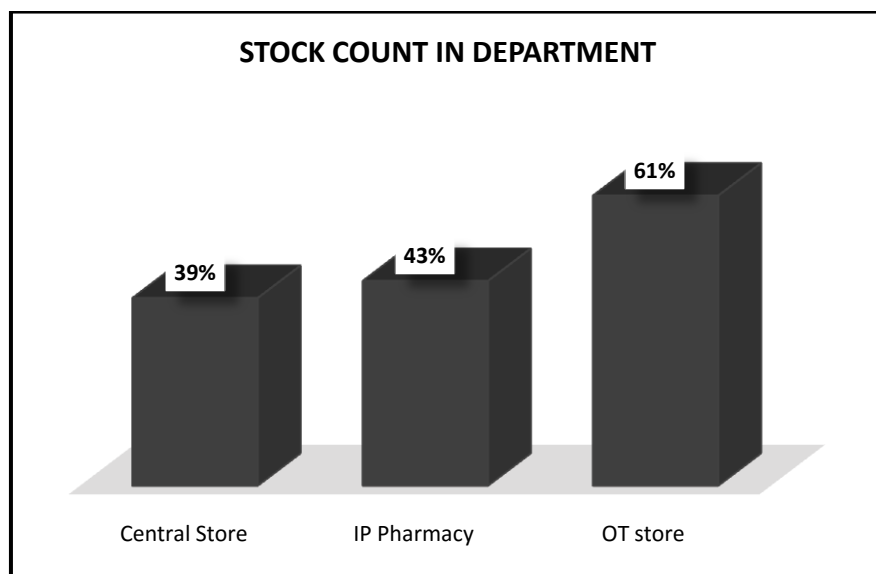
- The entry of materials received should be done immediately after its reception, if not done immediately it may cause an issue in the quantity of the goods and may even result in the misplacement if the materials.
- The material being entered into the HIS is 0% immediately after the reception of material in the department.
- 18% within 1-2 hours.
- 11% within 2-3 hours.
- 29% within 5-10 hours.
- 14% within 10-12 hours.
- 14% within 24 hours.
- 14% within 24-48 hours
- 0% more than 48 hours.



Graph – 6

- The material entry being done in OT store is 68% immediately after the reception of material in the department.
- 29% within 1-2 hours.
- 4% within 2-3 hours.

8. Daily stock count done in respected departments:



Graph - 7

- Stock count should be done on a daily basis to ensure the proper maintenance of stock.
- 39% times the daily stock count has been done in central store.
- 43% times the daily stock count has been done in IP pharmacy.
- 61% times the daily stock count has been done in OT store.

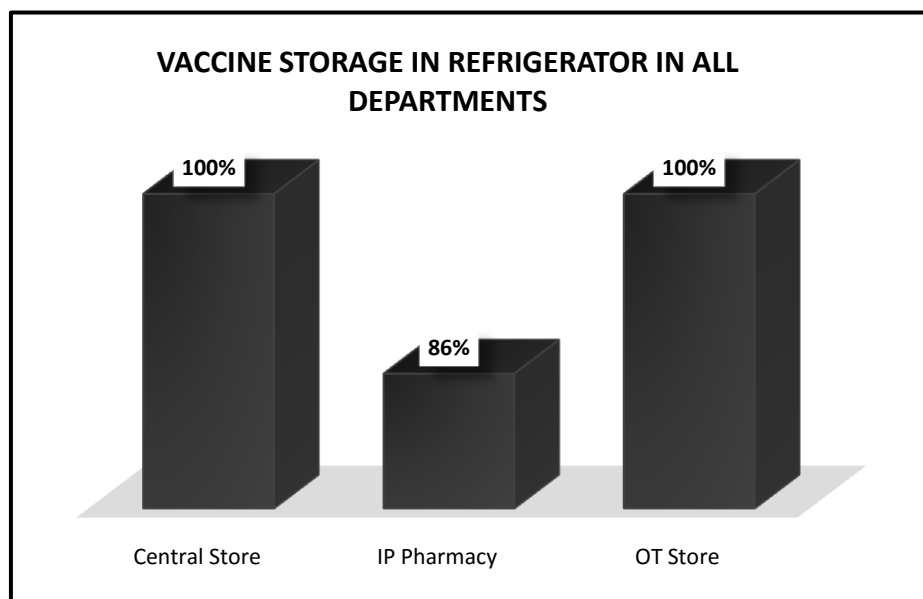
9. Storage condition of medication and instruments in respected departments:

- The storage area should be very clean and organized for fast moving of the medicines.
- The medications and instruments are stored in a dirty and non-cluttered condition in central store.
- The medications and instruments are stored in a clean and non-cluttered condition on OT store.
- The medications and instruments are stored in a clean and non-cluttered condition on IP pharmacy.

10. Temperature maintenance of refrigerator in respected departments:

- Regular maintenance of temperature of refrigerator done in central store, IP pharmacy and OT store.

11. Vaccine storage in refrigerator:



Graph – 8

- Storage of vaccines being done in refrigerator in central store.
- Some of the vaccines required to be stored in refrigerator aren't stored in refrigerator in IP pharmacy.
- Storage of vaccines in refrigerator being done in OT store.

12. LASA storage in respected departments:

- According to the standards the LASA drugs should be kept in different shelves in order to avoid any kind of confusion between the drugs.
- 100% of the times the LASA storage was in same shelf in central store in a 28 days study.

- 100% of the times the storage of LASA drugs was in the same shelf in IP Pharmacy in a 28 days study.
- 100% of the times the storage of LASA drugs was in the same shelf in OT store.

13. LASA and High Alert Medications kept in color coded boxes:

- According to standards the LASA and high alert medications should be kept in color coded boxes. Look a-like drugs should be kept in blue colored boxes and sound a-like drugs in pink colored boxes and HAM in red colored boxes.
- LASA and high alert medications are not kept in color coded boxes in IP Pharmacy and central store.
- LASA and high alert medications are kept in color coded boxes in OT store.

14. Drug labels are marked with :

- According to the drug labels should be marked with the following labels:
 - i. Name of medicine
 - ii. Expiry date of medicine
 - iii. Dose of medicine
 - iv. Frequency of administration
 - v. Strength of medicine
- The drug labels are only marked with name of medicine and dose of medicine only in all of the respected departments.

15. Narcotic drugs being kept separately and locked:

- According to the standards the narcotic drugs have to be kept in a separate cupboard and locked and the key of that cupboard should be with the in charge of the department.
- The narcotic drugs are being store in a separate cupboard and locked properly and the key of the cupboard is with the store in charge.

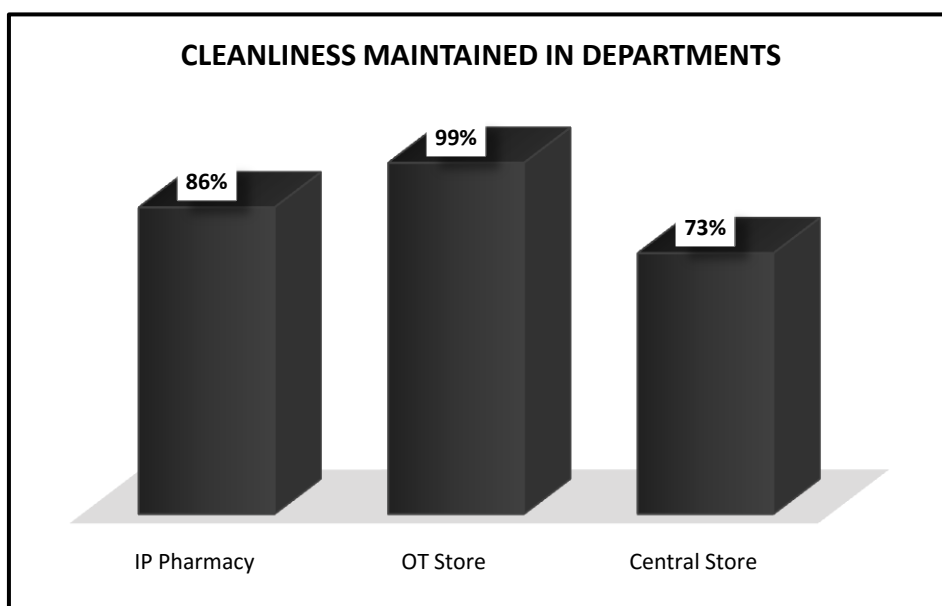
16.Implant ordering record maintained:

- The implant ordering and usage record has been maintained in both central store and OT store.

17. Narcotic drugs register being maintained in respected departments:

- The narcotics drug register is being updated regularly with respect to all the departments.

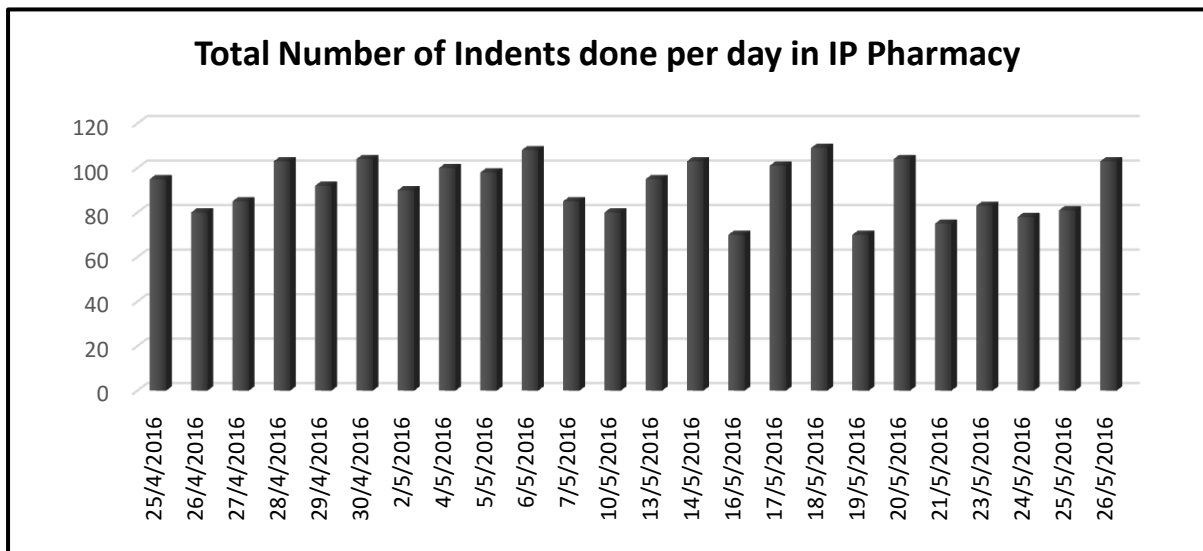
18. Maintenance of dusting and cleaning in all departments-



Graph – 9

- According to standards dusting and cleaning have to be done on a daily basis.
- 86% of the times dusting and cleaning was done in IP Pharmacy in a 28 days study.
- 99% of the times dusting and cleaning was done in OT store in a 28 days study.
- 73% of the times dusting and cleaning was done in central store in a 28 days study.

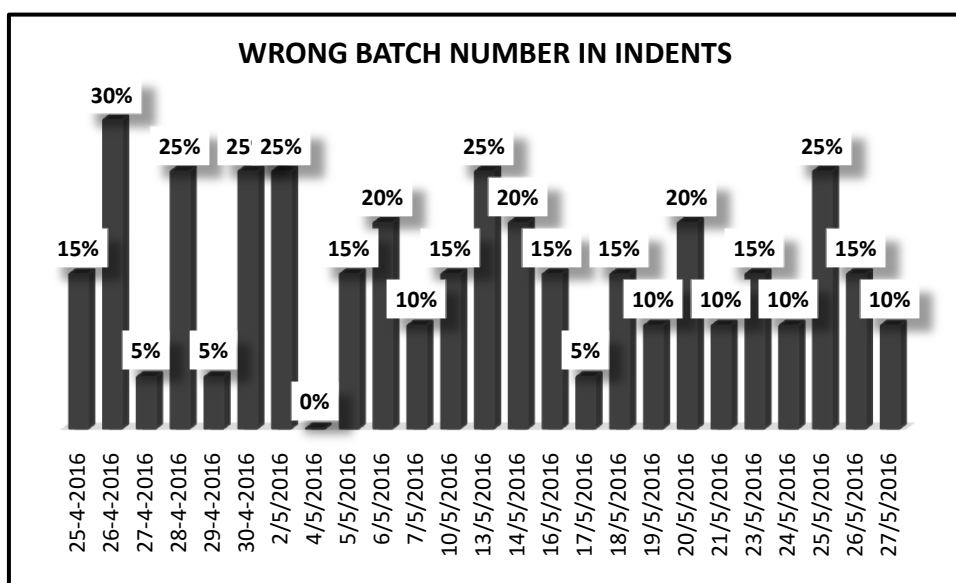
19. Total number of indents done per day in IP:



Graph – 10

- Average number of indents done within the 28 days period is 91.

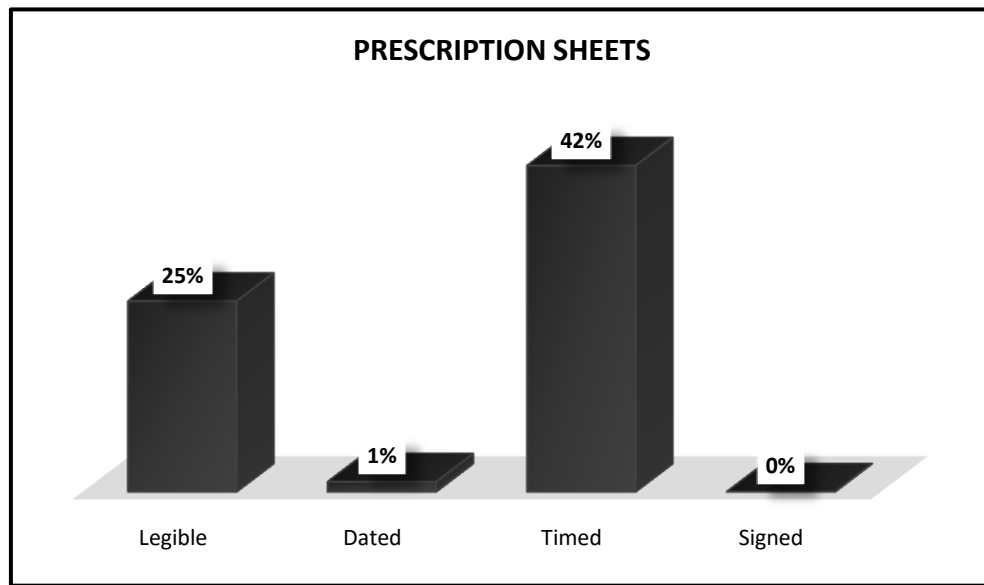
20.Number of indents having wrong batch number-



Graph – 11

- The average of 15% indents had wrong batch number of medications.

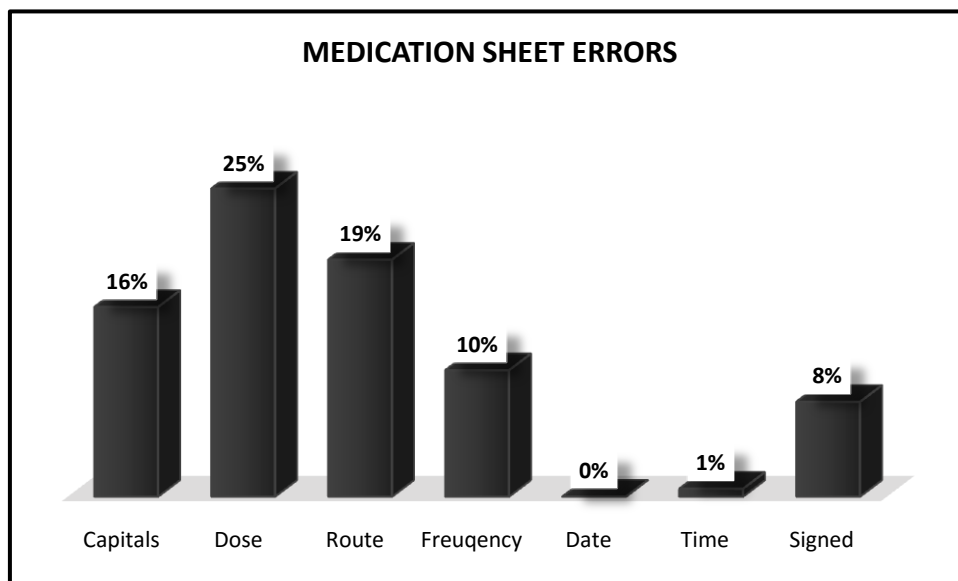
21. Prescription Errors:



Graph – 12

- The standard prescription sheet should be legible enough so that it doesn't create any kind of confusion to the nursing staff, should have date and time mentioned and properly signed by the doctors.
- On observing 154 patient files following errors were found:
 - i. 25% prescription sheets were not legible
 - ii. 1% did not have date mentioned in them.
 - iii. 42% did not have time mentioned in them.
 - iv. All of the prescription sheets were signed by the doctors.

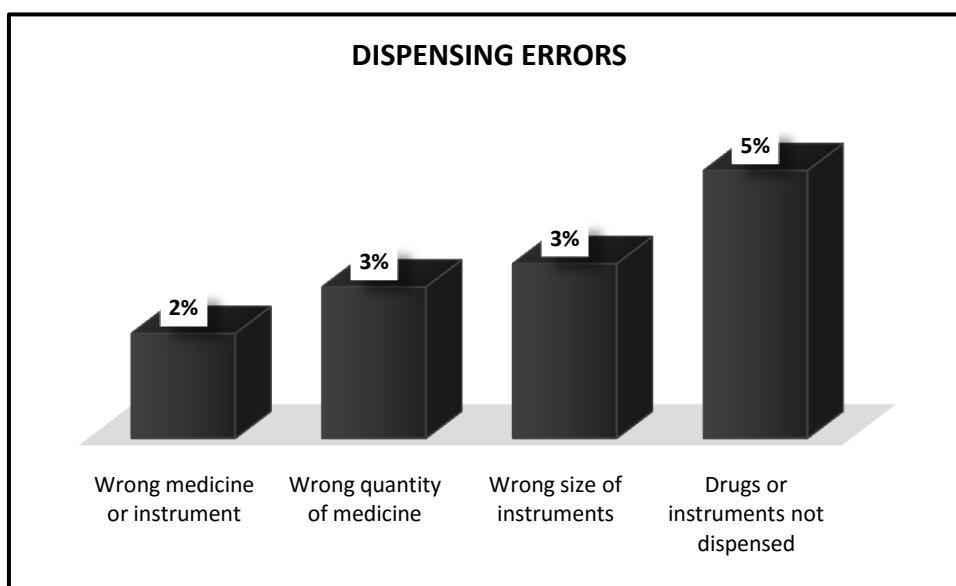
22. Transcription errors:



Graph - 13

- The standard medication sheets should have name of the medicines mentioned in capitals only, dose of the medicine, route of the medicine, frequency of administration, date, time and sign or initial of the nursing staff providing the medicine.
- On observation of 154 patient files following errors were found in medication sheets of patient in various departments:
 - i. 16% of the medication sheets did not contain medicine names in capitals.
 - ii. 25% of the medication sheets did not contain dose of the medicine.
 - iii. 19% did not contain route of medicine.
 - iv. 10% did not contain frequency of administration of the medicine.
 - v. Date was mentioned in all of the medication sheets.
 - vi. 1% did not contain the time at which the medicine has been administered.
 - vii. 8% of the medication sheets was not signed by the nursing staff after administering the medicine to the patient.

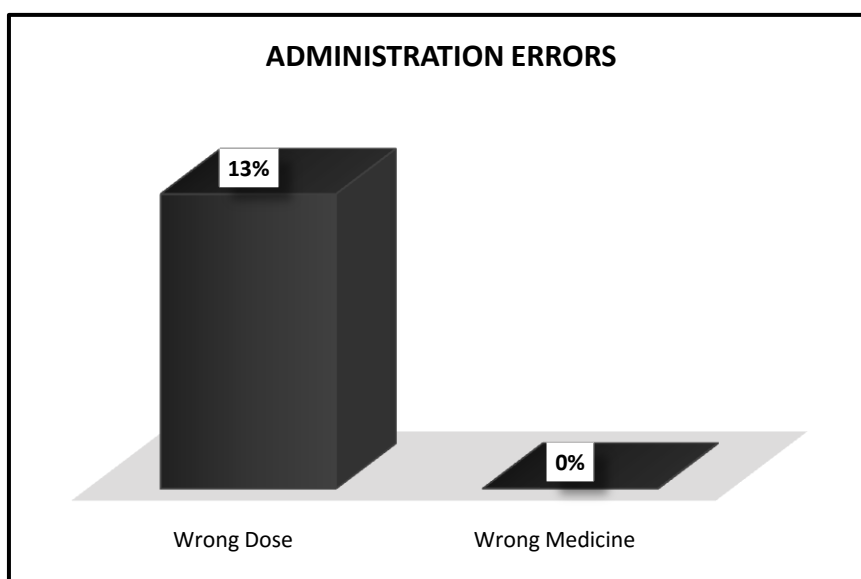
23. Dispensing Errors:



Graph – 14

- On observation of 500 indents it was seen that:
 - i. 2% wrong medicine or instrument was dispensed from IP Pharmacy.
 - ii. 3% Wrong quantity of the medicine has been dispensed.
 - iii. 3% of wrong sizes of the instruments have been dispensed.
 - iv. 5% of the drugs and instruments were not dispensed from IP Pharmacy.

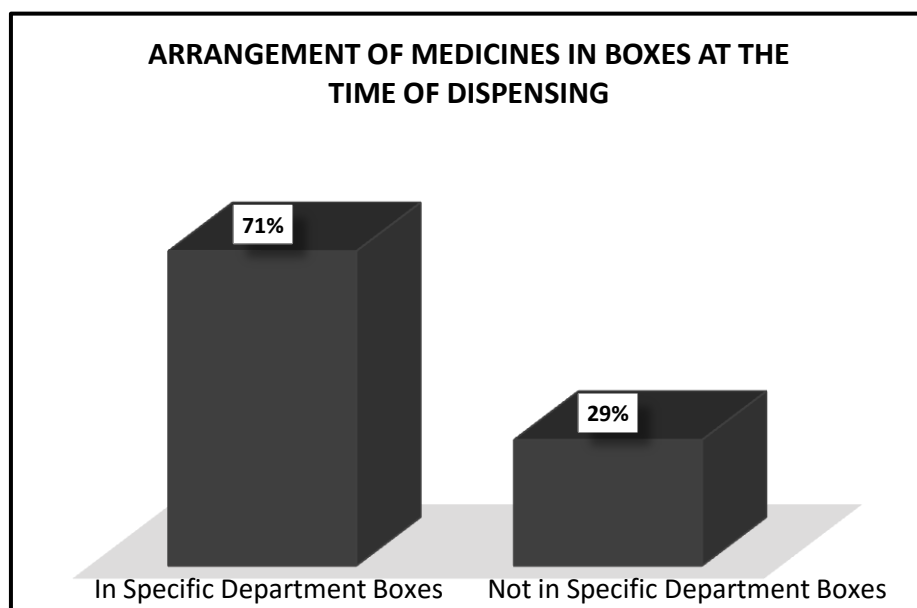
24. Administrative Errors:



Graph – 15

- On observation it was found that 13% of the administrative error resulted was of wrong dose administered to the patient.
- Total number of cases reported were 2.
 - i. Case 1 MR no – 10167764
 - ii. Case 2 MR no - 10162011
- Some of the reasons which resulted in administrative errors was:
 - i. Illegible handwriting.
 - ii. Negligence of the nursing staff as they are in a hurry to administer the medicines because of delay in reception of the medicines from IP pharmacy.

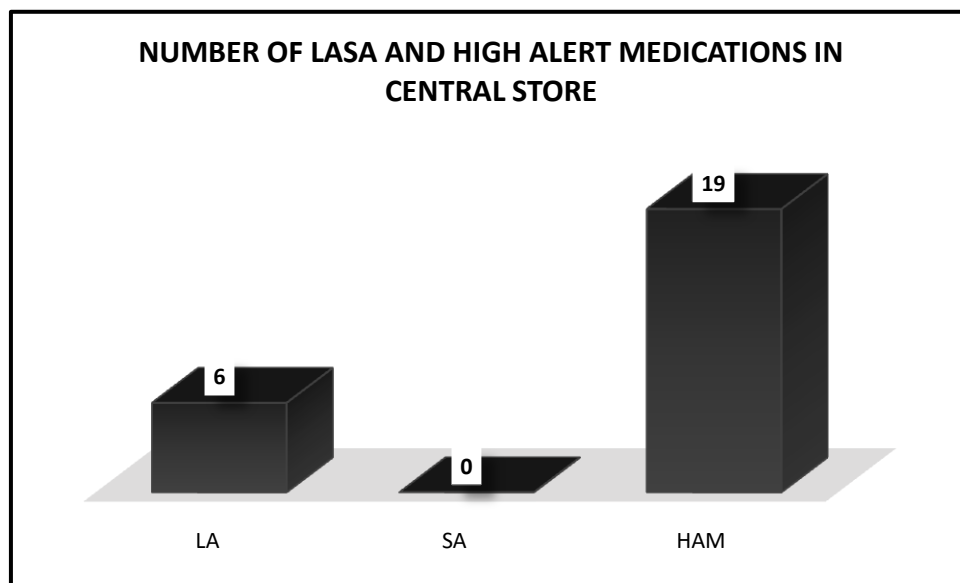
25. Arrangement of medicines done in specific department boxes in IP Pharmacy:



Graph - 16

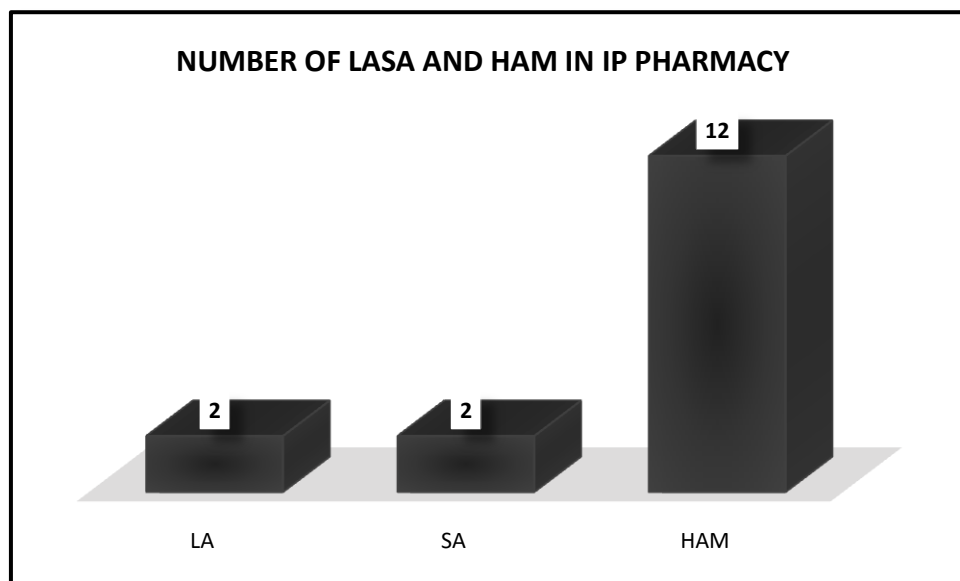
- According to the standards the medications should be arranged in the assigned department boxes.
- 71% of the times the arrangement of medicines was done in the specific boxes in an organized manner in a 28 days study.
- 29% of the times the arrangement of medicines was not done in the specific boxes in an unorganized and cluttered manner which leads to mixing up of the medicines of one department to another.

26.Number of LASA and High Alert Medications in Central Store, IP Pharmacy and OT store:



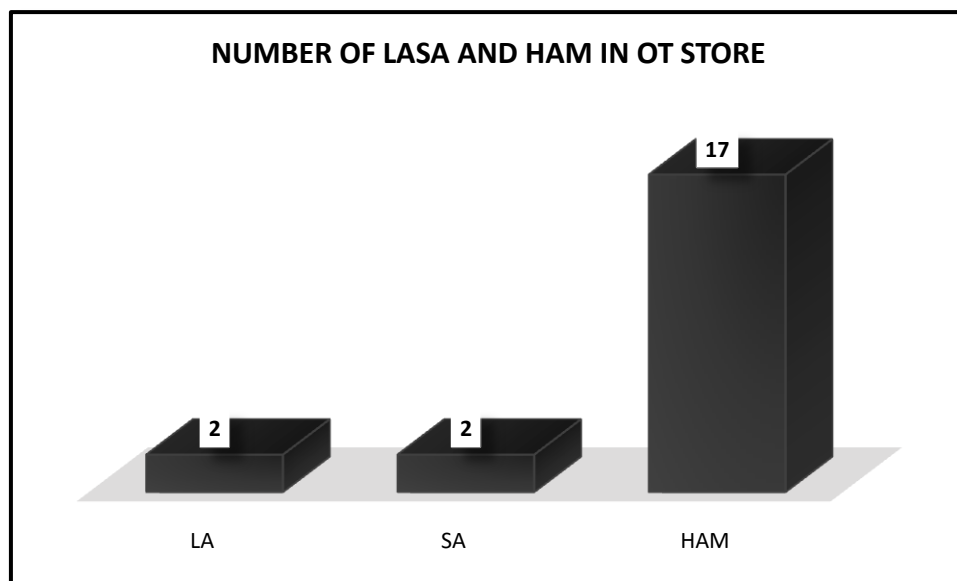
Graph – 17

- The standard number of LASA drugs and HAM according to the list provided should be:
 - i. Look a-like drugs – 44
 - ii. Sound a-like drugs – 30
 - iii. High Alert Medication – 22
- Total number of look a-like medication in central store is 6.
- Total number of high alert medication in central store is 19.



Graph – 18

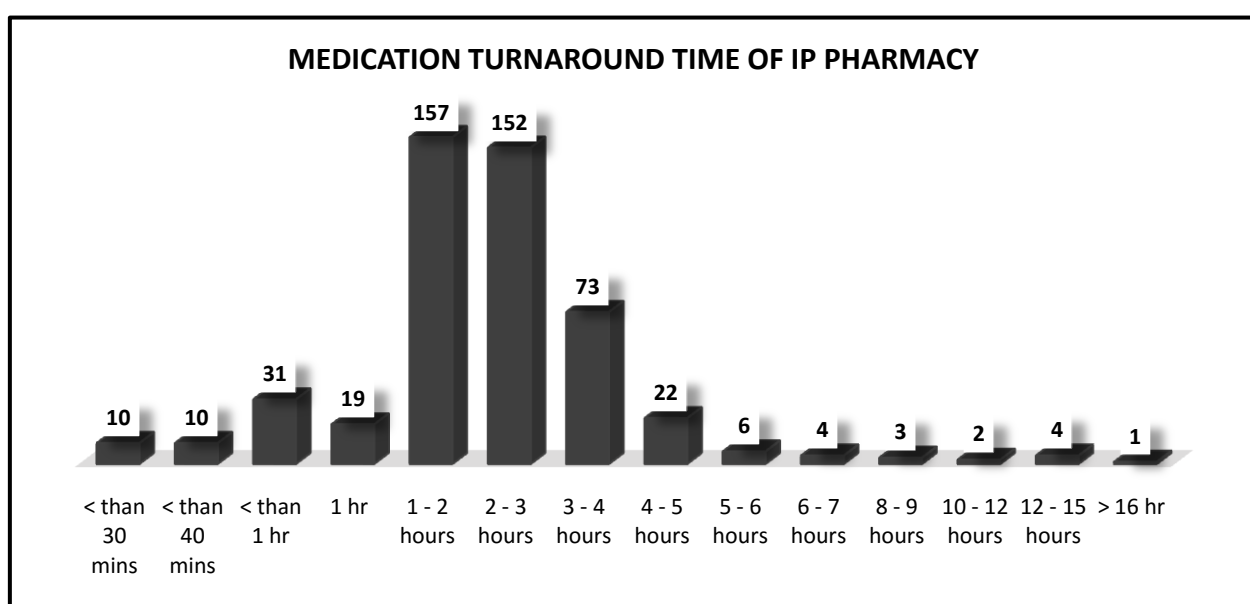
- Total number of LASA drugs in IP pharmacy is 4.
- Total numbers of HAM in IP pharmacy are 12.



Graph - 19

- Total number of LASA drugs in OT store are 4.
- Total number of HAM are 17.

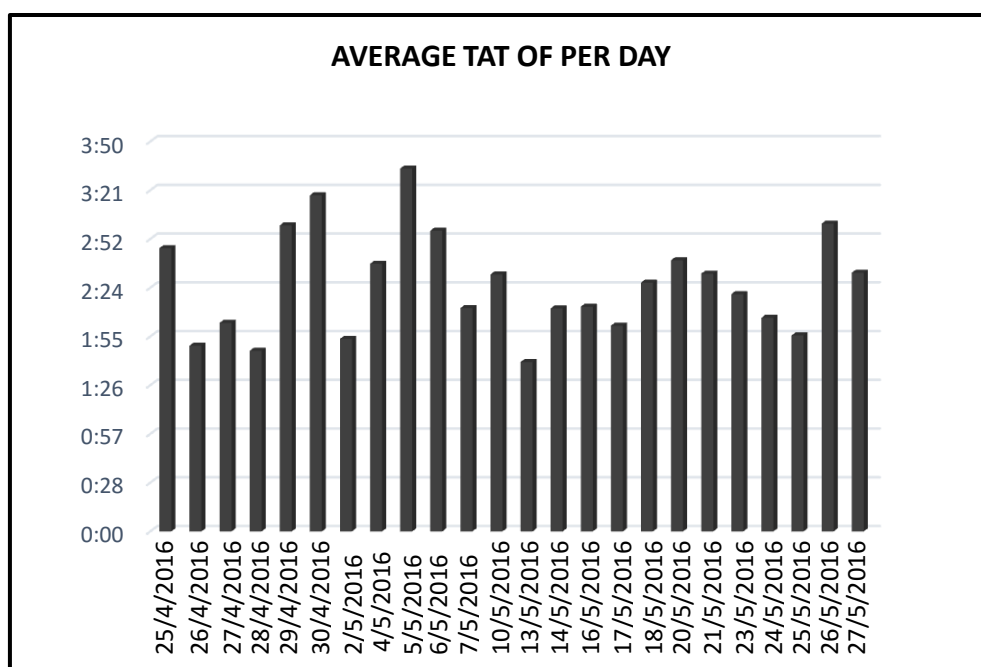
27. Medication TAT in IP pharmacy:



Graph – 20

- According to standards the ideal medication dispensing time is 30 minutes.
- On observation of 500 indents it was observed that:
 - i. 10 medications were dispensed in less than 30 minutes.
 - ii. 10 medications were dispensed in less than 40 minutes.
 - iii. 31 medications were dispensed in less than 1 hour.
 - iv. 19 medications were dispensed within 1 hour.
 - v. 157 medications were dispensed within 1-2 hours.
 - vi. 152 medications were dispensed within 2-3 hours.
 - vii. 73 medications were dispensed within 3-4 hours.
 - viii. 22 medications were dispensed within 4-5 hours.
 - ix. 6 medications were dispensed within 5-6 hours.
 - x. 4 medications were dispensed within 6-7 hours.
 - xi. 3 medications were dispensed within 8-9 hours.
 - xii. 2 medications were dispensed within 10-12 hours.
 - xiii. 4 medications were dispensed within 12-15 hours.
 - xiv. 1 medication was dispensed in more than 16 hour.

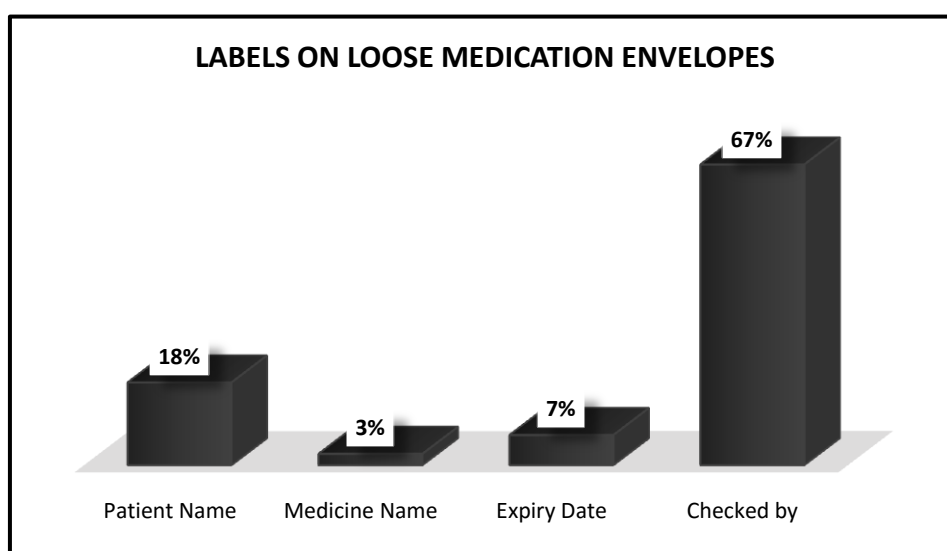
28.Average Medication TAT per day:



Graph - 21

- The total average medication TAT of 28 days was 2 hours and 24 minutes and the ideal medication dispensing time is 30 minutes. The delay in medicine was caused due to following reasons:
 - i. Negligence of employees.
 - ii. Staff shortage on some days.
 - iii. Out of stock medicines.
 - iv. Software issues.

29. Label on Loose medication envelope:



Graph – 22

- According to standards the envelope in which the loose medications are dispensed should contain :
 - i. Patient name
 - ii. Medicine name
 - iii. Expiry date
 - iv. Checked by (sign of the person dispensing medicine)
- On observation of 120 loose medications being dispensed from IP pharmacy it was found that:
 - v. 18% of the medications did not had patient name written on it.
 - vi. 3% of the medications did not had medicine name written on it.
 - vii. 7% of the medications did not had expiry date of the drugs written on it.
 - viii. 67% of the medications were not signed after being checked before dispensing.

- The reason for not mentioning the patient name on the envelopes was that the staff feels that it is not necessary to write the patient name and the nurses can identify the patients medicine without his/her name written on it by checking the indent.
- Sign of the staff was not done because of negligence.

30. Number of indents having wrong MRP:

Date	Percentage of indents having wrong MRP.
25/4/2016	5%
26/4/2016	5%
27/4/2016	0%
28/4/2016	0%
29/4/2016	0%
30/4/2016	5%
2/5/2016	0%
4/5/2016	0%
5/5/2016	0%
6/5/2016	0%
7/5/2016	0%
10/5/2016	0%
13/5/2016	0%
14/5/2016	0%
16/5/2016	0%
17/5/2016	0%
18/5/2016	0%
19/5/2016	0%
20/5/2016	0%
21/5/2016	0%
23/5/2016	0%
24/5/2016	0%
25/5/2016	0%
26/5/2016	0%
27/5/2016	0%

Table – 1

- Out of 20 indents observed per day 3 indents showed wrong MRP.

- The first indent showed a difference of 100 rupees which was not corrected and charged to patient. The medicine with wrong MRP was Mucotroy.
- The second indent showed a difference of 13 rupees. The medicines with wrong MRP were:
 - i. Vitak Injection
 - ii. Normal saline
- The third indent showed a difference of 60 rupees which was not charged to patient. The medicine with wrong MRP was :
 - i. Moxibblue drop 0.50%

FINDINGS FROM THE INTERVIEW OF STAFF OF RESPECTED DEPARTMENTS

1. Stock count being performed on a daily basis:

- According to standards the stock needs to be counted on a daily basis.
- Out of 16 staff interviewed for daily stock count 2 staff did not perform daily stock count.

2. Dusting and cleaning being done:

- According to standards dusting and cleaning have to be done on a daily basis.
- Out of 16 staff interviewed 12 staff informed of daily dusting and cleaning and 4 informed of weekly dusting and cleaning.

3. LASA drugs stored in color coded boxes:

- According to standards the LASA drugs and high alert medications are suggested to be kept in color coded boxes:
 - i. Look a-like drugs – Blue color boxes
 - ii. Sound a-like drugs – Pink color boxes
 - iii. High alert medications – Red color boxes
- 14 staff informed of storing LASA in color coded boxes and 2 informed of not storing LASA in color coded boxes.

4. Number of sound a-like drugs available:

- The standard quantity of sound a-like drugs according to the list provided are:
 - i. Sound a-like drugs – 30
- Out of 16 staff interviewed 7 had the knowledge of less than 10 sound a-like drugs availability.
- 7 staff had the knowledge of 10 to 15 sound a-like drugs availability.
- 1 staff informed of 20 to 30 sound a-like drugs availability.
- 1 staff informed of more than 30 sound a-like drugs availability.

5. Number of look a-like drugs available:

- The standard number of look a-like drugs according to the list provided are:
 - i. Look a-like drugs – 44
- 10 staff informed of less than 10 look a-like drugs availability.
- 6 informed of 10 to 15 look a-like drugs availability.

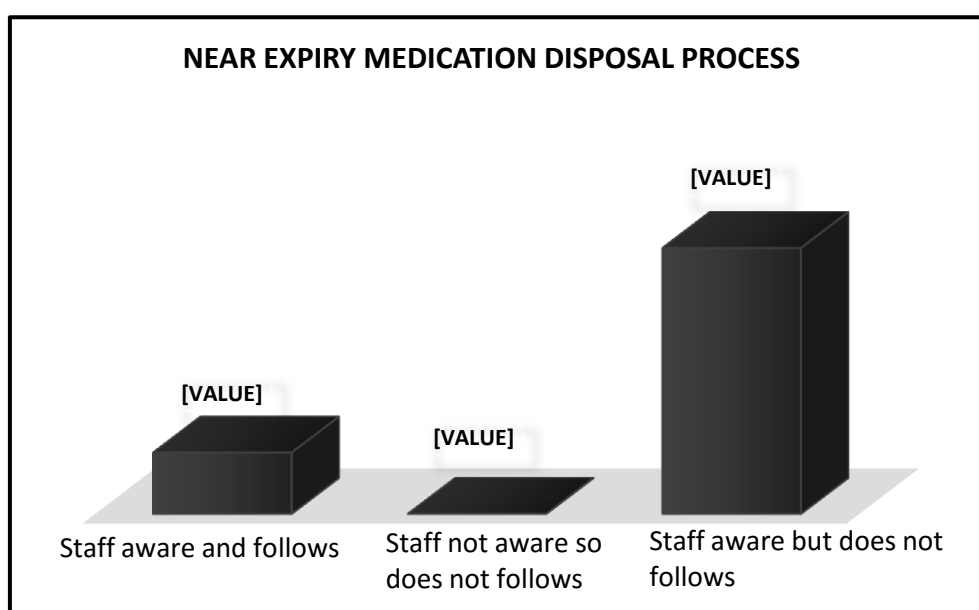
6. Emergency medications being kept separately:

- All of the staff had the knowledge of emergency medications being kept separately.

7. Pest control being done:

- According to the standards the pest control has to be performed on a daily basis.
- Out of 16 staff interviewed 12 had the knowledge of pest control being performed on a daily basis and 2 had the knowledge of pest control being performed on a monthly basis.

8. Staff aware about the near expiry medication process:



Graph - 23

- According to the standards three months near expiry date medicines are disposed of. All of the expiry and near expiry medication are segregated from all of the departments and sent to central store where the medications name, expiry date, MRP and batch number are verified and then transferred to the distributor who then sends the segregated medicines to the supplier of the medicine and returned.
- 81% of the staff is aware about the near expiry medication disposal process and is not following the process in a proper manner.
- 19% of the staff is aware and follows the proper near expiry medication disposal process.

9. A record being maintained for the disposal of drugs:

- A record of the disposal of drugs should be maintained in each department in order to reduce any kind of issue in misplacement of the drugs and to record the quantity of medicine.
- Out of 16 staff interviewed 10 staff had the knowledge of record being maintained for disposal of drugs and 6 staff has no knowledge of the record being maintained for disposal of drugs.

10. Staff aware about the spillage cleaning process:

- In case of spillage **code brown** needs to be announced and the spillage has to be cleaned up by the house keeping staff only.
- 100% of the staff are aware about the spillage cleaning process but does not follow the process.
- After any kind of spillage, it is not being cleaned for the day. It is being cleaned by the housekeeping staff who does the daily dusting and cleaning.

11. Training being provided for spillage cleaning process:

- Out of 16 staff interviewed 7 staff has knowledge about the training being provided and 9 staff has no knowledge regarding the training being provided.

12. Number of times the training is being provided:

- 6 staff had the knowledge of training being provided on a monthly basis and 3 staff had the knowledge of training being provided on a weekly basis.

13. Drugs storage technique in all departments:

- The drugs are stored according to the **brand name** in the stores.
- Out of 16 staff interviewed 13 staff had the knowledge of drugs storage according to brand name and 3 staff had the knowledge of drugs being stored according to generic name.

14. Reasons for high risk of error occurrence according to the staff of respected departments:

- 8 staff informed that the reason for high risk of error occurrence is verbal orders.
- 2 staff informed that the reason is confusion in LASA drugs.
- 3 staff informed that the reason is similar abbreviations.
- 3 staff has no knowledge of reason for high risk of error occurrence.

15. Expiry drugs being checked:

- According to the standards the expiry and near expiry medications need to be checked on a monthly basis.
- Out of 16 staff interviewed 13 had the knowledge of checking expiry medicines on a monthly basis.
- 2 staff had the knowledge of checking expiry medicines on a weekly basis.
- 1 staff had the knowledge of checking expiry medicines on a daily basis.

16. Implant ordering and usage record being maintained:

- Out of the 11 staff interviewed 10 had the knowledge of maintain implant record and 1 staff had no knowledge of maintain implants record.

17. Training being provided for HIS:

- Out of 16 staff interviewed 9 staff had the knowledge of training being provided for HIS and 7 staff had no knowledge of training being provided for HIS.

18. Staff awareness about code red:

- **Code Red** is announced in the hospital in case of any fire, smoke, and odor of something. For which the staff needs to identify the type of fire and in which floor it has effected and then take actions accordingly.
- All of the staff are aware about code red and follows the process.

19. The evacuation process in case of fire:

- In case of fire, the staff needs to identify the type of fire and in which floor it has affected and then take actions accordingly, but from safety point of view one staff needs to stay and lock the door to avoid any kind of theft and misplacement of drugs.
- Out of 16 staff interviewed 9 staff had the knowledge of all staff evacuating at the time of fire.
- 5 staff informed that one staff stays back to lock the door.
- 1 staff has no knowledge of evacuation process in case of fire.

20. In case of fire the protocol that should be followed:

- According to the standards in case of fire the door of the store needs to be locked.
- Out of 16 staff interviewed 1 staff informed of locking the door of store in case of fire.
- 5 staff informed of leaving the door open.
- 10 staff informed of closing the door but not locking it.

21. Staff awareness about code blue:

- **Code blue** is announced in the case on some **medical emergency** like collapse of a patient, patient requiring CPR and other life threatening situations. After the announcement of code blue all the medical staff needs to assemble in the area being announced and start the procedure.
- All of the staff are aware of the code blue and follow the process.

22. Mock drills being arranged for code blue and code red:

- For better practice of how to handle the situation of code blue and code red mock drills need to be performed for the staff.
- Out of 16 staff 13 staff had no knowledge of any mock drills for code red and code blue.
- 1 staff informed of mock drills being performed on a weekly basis.
- 2 staff informed of mock drills being performed in a monthly basis.

23. The drug labels according to NABH standards:

- According to the NABH standards the following should be marked on the drug labels:
 - i. Name of drug
 - ii. Strength of drug
 - iii. Frequency of administration
 - iv. Expiry date
 - v. Dose of drug
- All of the staff had knowledge of the drug labels. But the boxes containing drugs are not being marked with all of the labels suggested they are only labeled with name and dose of the drug.

24. PPE provided to staff:

- The PPE to be provided to the staff is lab coats.
- Out of 16 staff interviewed 8 staff informed that they are provided with the PPE and 8 staff informed that they are not provided with PPE.

25. PPE being used by the staff:

- Out of 16 staff interviewed 8 staff informed of using the PPE and 8 staff informed of not using PPE.

26. The ideal medicine dispensing time

- The ideal dispensing time of medications is 30 minutes.
- Out of 6 staff interviewed 5 staff had the knowledge of ideal dispensing time as 20 minutes and 1 staff had the knowledge of ideal dispensing time as 25 minutes.

27. FEFO and FIFO technique known to staff:

- The product with the deadline for the next intake will be the first to be served or removed from stock is **FEFO**. The medicines with the near expiry need to be consumed first.
- **FIFO** is the consumption of products which came in first.
- Out of 16 staff 9 staff had the knowledge of FEFO and FIFO technique and 7 staff had no knowledge of FEFO and FIFO technique.

GENERAL FINDINGS DEPARTMENT WISE

1. Central store-

- Near expiry and expiry medications are not being dispensed in the given time.
- A syringe with expiry date Dec-2015 was found.
- Many medications are kept in different alphabet shelf.
- Injections out of their boxes.
- Instruments not in their correct size boxes.
- Syringes not in their correct size boxes.
- Some syringes kept outside the boxes.
- Chemo drugs kept in HAM marked shelf.
- Medication not dispensed from central store since the staff didn't recognize the composition of the medicine.

2. IP Pharmacy-

- 2 Dextrose Injections with expiry date Dec-2015 was found in IP Pharmacy.
- Many medications are kept in different alphabet shelf.

CONCLUSION AND RECOMMENDATIONS

1. For storing sound a-like drugs if color coding is not possible a part of the medicine name can be written in uppercase letters to help distinguish sound a-like medications from one another to avoid medication errors. Example – ep**SOLIN** Injection and epi**DOSIN** Injection.
2. For both LASA drugs they should be stored separately to avoid confusion.
3. There should be CCTV camera at the back side of the department in both IP Pharmacy and central store.
4. Arrangement of cannulas should be according to color and size of cannula to avoid dispensing error in IP pharmacy and central store.
5. Cartons to be placed over a stand in central store to avoid damage to the cartons containing fragile material.
6. Regular store checking should be done in order to take out the near expiry and expiry medications which are not being removed and regular checking of the storage of medicines should be done.
7. Training for HIS should be taken for staff since some of the staff are not able to use the HIS.
8. List of medicines entered in to HIS needs to be updated. The list of medicines on refrigerator needs to be updated.
9. After the collection of drugs, it is kept in the rack for long time, though it is ready to be dispatched. Major reasons for the above problem were:
 - i. Lack of Manpower,
 - ii. Attendants who are supposed to deliver medicines to the respective wards are busy in dispensing the drugs, or are on leave.
 - iii. Once the attendants go out for dispensing the medicines they take a lot of time to return to the pharmacy for dispensing the next batch of medicines.
10. The staff waits to receive the phone call from respective department to deliver out the medication which are ready, the attendants should deliver the medications as soon as they are ready to dispense.
11. In case of urgent indents it should be shown in the HIS at the time of reception of indent so that the urgent indents should be dispatched in less time.
12. Regular training for the employees involved in indenting and drugs dispensing.
13. Employees are advised to use PPE regularly.
14. Drug labels to be marked according to NABH standards which will also help in segregating near expiry and expiry medication.
15. Training for nursing staff (general wards, ICU's) to be more careful in writing the medicines in medication sheets and administering the drugs to patient.
16. Training of employees in central store and IP pharmacy regarding pharmacology should be undertaken since some of the employees are not aware for the composition of drugs which results in delay of medicine dispensing.
17. LASA drugs and HAM should be stored in their respected shelves.

REFERENCES

1. A preliminary study on profile and pattern of medication errors from a tertiary care teaching hospital - http://iaimjournal.com/wp-content/uploads/2015/07/iaim_2015_0207_15.pdf 94:95
2. Evaluation of Medication Turnaround Time - <https://dalspace.library.dal.ca/xmlui/bitstream/handle/10222/14908/Alsharif-InternshipReport.pdf?sequence=2&isAllowed=y>
3. Guide handling LASA - <http://www.pharmacy.gov.my/v2/sites/default/files/document-upload/guide-handling-lasa.pdf>
4. Medication errors a case study - <http://www.indiaenvironmentportal.org.in/files/file/Medication%20Errors.pdf>
5. Medication Errors: A preventable Problem - <http://medind.nic.in/iaa/t12/i6/iaat12i6p17.pdf>
6. Medication Turnaround Time in inpatient setting article by AHRQ - <https://healthit.ahrq.gov/sites/default/files/docs/page/medication-turnaround-time-quick-reference-guide.pdf>
7. Medication turnaround time in hospital pharmacy department – www.ijrdpl.com
8. NABH standards and guidelines.

ANNEXURE

List of activities carried out in the hospital:

Date	Departments
1/4/2016 – 12/4/2016	Observation of various departments of hospital and their working.
13/4/2016 – 15/4/2016	Observation of work flow process of respected departments involved in project.
16/4/2016 – 18/4/2016	Preparation of questionnaires and checklist for respected departments.
19/4/2016 – 27/5/2016	Interview and observation of the staff for medication turnaround time and medication errors. Observation of indents and patient files.
28/5/2016- 31/5/2016	Data analysis and interpretation and preparation of report.

ACRONYMS AND ABBREVIATIONS:

OT	Operation Theatre
ICU	Intensive Care Unit
SICU	Surgical Intensive Care Unit
MICU	Medical Intensive Care Unit
NICU	Neonatal Intensive Care Unit
CCU	Cardiac Care Unit
PPE	Personal Protective Equipment's
LASA	Look a-like Sound a-like
HAM	High Alert Medications
IP Pharmacy	In patient Pharmacy
TAT	Turnaround Time
GRN	Goods Receipt Number
HIS	Hospital Information System
FEFO	First Expired First Out
FIFO	First In First Out
MRP	Maximum Retail Price

QUESTIONNAIRE AND CHECKLIST USED:

S.no.	<u>CHECKLIST</u>	
1.	GRN being generated after material reception in Central Store	i. Yes ii. No
2.	Total number of GRN's being generated per day	
3.	Goods being returned before and after GRN generation	i. Before ii. After
4.	Physical verification of goods being done after reception in central store	i. Name ii. Quantity iii. Expiry iv. Batch no v. Breakage
5.	Carton placement in central store, IP pharmacy and OT store	i. On ground ii. On stand
6.	Material being checked after reception in OT store and IP pharmacy	i. Name ii. Quantity iii. Expiry iv. Batch no v. Breakage
7.	Time taken for material entry into HIS in IP pharmacy and OT store	i. Immediately ii. 1-2 hours iii. 2-3 hours iv. 5-10 hours v. 10-12 hours vi. Within 24 hours vii. 24-48 hours viii. More than 48 hours
8.	Daily stock count being performed in central store, IP pharmacy and OT store	i. Yes ii. no
9.	Storage condition of medications and instruments in central store, IP pharmacy and OT store	i. clean ii. dirty iii. non cluttered iv. cluttered
10.	Temperature maintenance of refrigerator in all departments	i. yes ii. NO

11.	Vaccine storage in refrigerator in all departments	i. Yes ii. No
12.	LASA storage in all departments	i. Same shelf ii. Different shelf
13.	LASA and HAM stored in color coded boxes	i. Yes ii. No
14.	Drug labels are being marked with	i. Name of drug ii. Expiry date of drug iii. Dose of drug iv. Frequency of administration v. Strength of drug
15.	Narcotic drugs are kept separately and locked	i. Yes ii. No
16.	Implant ordering and usage record being maintained in central store and OT store	i. Yes ii. No
17.	Narcotic drugs register being maintained	i. Yes ii. No
18.	Maintenance of dusting and cleaning	i. Very dirty – 5 ii. Dirty – 6 iii. Less clean – 7 iv. Moderate clean – 8 v. Clean – 9 vi. Very clean – 10
19.	Total number of indents being done per day in IP pharmacy	
20.	Number of indents having wrong batch number of medicines and instruments	
21.	Observation of prescription sheets for errors	i. Legible ii. Date iii. Time iv. Sign

22.	Observation of medication sheets for errors	i. Drug name in Capitals ii. Dose iii. Route iv. Frequency v. Date vi. Time vii. Initial of nursing staff
23.	Observation of dispensing error in IP pharmacy	i. Wring medicine or instrument dispensed ii. Wrong quantity of medicine dispensed iii. Wrong size of instrument dispensed iv. Medicines or instruments not dispensed
24.	Observation of administrative errors in various wards	i. Wrong dose administered ii. Wrong medicine administered
25.	Arrangement of medication in specific department boxes at the time of dispensing	i. In specific department boxes ii. Not in specific department boxes
26.	Number of LASA and HAM in central store, IP pharmacy and OT store	
27.	Medication TAT in IP pharmacy	
28.	Average TAT per day	
29.	Number of indents having wrong MRP	

S.No.	<u>QUESTIONNAIRE</u>	
Q1.	Do you perform daily stock count?	i. Yes ii. No iii. Not known
Q2.	How often is dusting and cleaning done?	i. Daily ii. Weekly iii. Monthly iv. Never
Q3.	Are LASA stored in color coded boxes?	i. Yes ii. No iii. Not known
Q4.	How many sound a-like drugs are available?	i. Less than 10 ii. 10 to 15 iii. 15 to 20 iv. 20 to 30 v. More than 30
Q5.	How many look a-like drugs are available?	i. Less than 10 ii. 10 to 15 iii. 15 to 20 iv. 20 to 30 v. More than 30
Q6.	Are emergency medications kept separately?	i. Yes ii. No
Q7.	How often pest control is done?	i. Daily ii. Weekly iii. Monthly iv. Yearly v. Never vi. Not known
Q8.	Is staff aware about the near expiry medication disposal process?	i. Staff is aware and follows ii. Staff not aware so does not follows iii. Staff aware but does not follows
Q9.	Is there a record maintained for disposal of drugs?	i. Yes ii. No iii. Not known

Q10.	Does the staff know about the spillage cleaning process?	i. Staff aware and follows ii. Staff not aware so does not follows iii. Staff aware but does not follows
Q11.	Is there training provided for spillage cleaning process?	i. Yes ii. No iii. Not known
Q12.	Is yes, then how often the training is provided?	i. Weekly ii. Monthly iii. Yearly iv. Never v. Not known
Q13.	How are drugs arranged in the store?	i. Generic Name ii. Brand Name iii. Not known iv. FEFO v. FIFO
Q14.	According to staff what are the reasons for high risk of error occurrence?	i. Verbal orders ii. Confusion in LASA iii. Similar abbreviation iv. Less HIS training v. Not known
Q15.	How often expiry drugs are checked?	i. Weekly ii. Monthly iii. Daily iv. Never v. Not known
Q16.	Do you maintain implant ordering record?	i. Yes ii. No iii. Not known
Q17.	Is training provided for HIS?	i. Yes ii. No iii. Not known
Q18.	Is staff aware about the code red?	i. Staff aware and follows ii. Staff not aware so does not follows iii. Staff aware but

		does not follows
Q19.	What is the evacuation procedure in case of fire?	i. All staff evacuate ii. One staff stays to lock the door iii. Two staff stays iv. One or two staff evacuate and rest stays v. Not known
Q20.	In case of fire what is the protocol?	i. Lock the door of store ii. Leave the door open iii. Close the door but do not lock it iv. Do not know
Q21.	Is the staff aware about the code blue?	i. Staff aware and follows ii. Staff not aware so does not follows iii. Staff aware but does not follows
Q22.	How often mock drills are arranged for code blue and code red?	i. Weekly ii. Monthly iii. Yearly iv. Never v. Not known
Q23.	What all should be mentioned on the drug labels according to the NABH standards?	i. Name of medicine ii. Strength of medicine iii. Frequency of administration iv. Expiry date of medicine v. Dose of medicine vi. All of the above vii. None of the above viii. Not known
Q24.	Is the staff provided with PPE?	i. Yes ii. no

Q25.	Does the staff use PPE?	i. Yes ii. No
Q26.	What is the ideal medication dispensing time?	i. 20 minutes ii. 25 minutes iii. 30 minutes iv. 45 minutes v. 1 hour vi. More than 1 hour vii. Not known
Q27.	Does the staff know about FIFO and FEFO technique?	i. Yes ii. no