ASSESSMENT OF MAJOR SOURCES OF MEDICATION ERROR WITH POSSIBLE SOLUTIONS FOR IMPROVING QUALITY WHILE REDUCING ERROR: A QUASI-EXPERIMENTAL STUDY IN A MULTI-SPECIALTY HOSPITAL IN DELHI-NCR

THE THESIS SUBMITTED IN PARTIAL FULFILLMENT
FOR THE COMPLETION OF THE
POST GRADUATE DIPLOMA IN MANAGEMENT

Health and Hospital Management

By

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PG/21/019

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Area of Dissertation: Quality

Attendance: 100%.

Objectives achieved: Yes .

Deliverables:

Strengths: Hardworking, sincere

Suggestions for Improvement:

Suggestions for Institute (course curriculum, industry interaction, placement, alumni):

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Course Specialization (Choose one)	Hospital Management		
Name of Guide/Supervisor	Dr/ Prof.: Dr.Preetha G.S ; Dr. Sumant Swain		
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ACKNOWLEDGMENT

This internship work has been a very scrupulous but enriching time of my life. These four months have given us immense knowledge and an unparalleled understanding of the work, which was earlier restricted to books only. It gives me tremendous bliss to acknowledge the valuable and cooperative guidance and assistance of various individuals without whom I would have been unable to do my work.

At this moment of accomplishment, I would like to express our deep and sincere gratitude to my mentor, Dr. Preetha G.S., Professor & Dean (Research), Dr. Sumant Swain (Assistant Professor), and Mrs. Diksha Gautam (Research Officer) IIHMR DELHI, who provided constant guidance and support during the internship period.

I would like to express my sincere gratitude to Mr. Lalit Sharma (Quality Manager), Dr. Mohd. Jawed (Medical Superintendent) and Mr. Praveen Kumar (Clinical Pharmacologist) for their continuous guidance; despite being busy with their duties, taking time to hear and guide me, and giving helpful advice, this work would not have been possible without their constant support.

I'm also very thankful to the management team of Felix Hospital, and all the nursing and housekeeping staff for their attention towards my work and for helping me, which greatly added to my project. I warmly appreciate the love, strength and constant support of my parents.

Also, I wouldn't have made this far without the grace of God.

Date: 27.06.2023 Dr. Avinash Kumar

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LIST OF ABBREVIATIONS

1. OPD – OUTPATIENT DEPARTMENT
2. IPD – IN-PATIENT DEPARTMENT
3. ICU – INTENSIVE CARE UNIT
4. OT – OPERATION THEATRE
5. HDU – HIGH DEPENDENCY UNIT
6. ENT – EAR, NOSE, AND THROAT
7. NABH – NATIONAL ACCREDITATION BOARD FOR HOSPITALS AND HEALTHCARE
8. NABL – NATIONAL ACCREDITATION BOARD FOR TESTING AND CALIBRATION LABORATORIES
9. CT – COMPUTED TOMOGRAPHY
10. MRI – MAGNETIC RESONANCE IMAGING
11. EQAS – EXTERNAL QUALITY ASSESSMENT
12. ACLS – ADVANCED CARDIAC LIFE SUPPORT
13. BLS – BASIC LIFE SUPPORT
14. NICU – NEONATAL INTENSIVE CARE UNIT
15. WHO – WORLD HEALTH ORGANIZATION
16. ME – MEDICATION ERROR
17. LASA – LOOK A LIKE SOUND A LIKE
18. POCQI – POINT OF CARE QUALITY IMPROVEMNET
19. PDCA – PLAN DO CHECK ACT
20. QI – QUALITY IMPROVEMENT
21. AMS – ASSISTANT MEDICAL SUPERITENDENT

22. RMO – RESIDENT MEDICAL OFFICER

23. TL – TEAM LEADER

FELIX HEALTHCARE

Dr. DK Gupta envisioned a multi-specialty hospital for the people of Noida sector 137, It's a 200 bedded hospital spread on a plot area of 1190 sq. mt. with a total area, covering 70,000 sq. ft.

Started from a single speciality clinic name Felix Astha, then to a 30 bedded nursing home with 30 beds in the year 2011. In the year 2014 foundation of Felix Hospital was established, within one year inception of multi-speciality came into operation with basic facilities of OPD. With the year passing by bed capacity increased to 200 beds with ICU, NICU and modular OT.

In the year 2017, super speciality Cath labs, CCU, Blood bank, Surgical ICU, Dialysis unit, Nephrology, Urology, and Spine surgery OPDs started. Apart from the Hospital, there are 3 polyclinics in Sector 75, sector 135, and Sector 48 of Noida and catering services to international patients as well.

Dr. DK Gupta, the founder, and Managing Director of Felix Hospital, aims to make Felix Hospital a 100% success rate for all of the services they offer, including consultation, diagnostics, pharmacy, indoor treatment, surgeries, and aftercare. They pleased to be a pioneering company in India that focuses on end-to-end healthcare solutions for its patients by achieving every achievement and earning every trust.

Vision, Mission & Core Values

Vision - Felix hospital aims to provide World Class Quality Healthcare Services for all.

Mission –Felix hospital strive to provide responsive, compassionate & patient-centric healthcare with a humanitarian approach. Felix Hospital envisions to be the healthcare provider of choice in this region.

Core Values - The foundation of Felix hospital has been its core values. The robust values define the culture and character of our hospital.

Respect – Value people, be it doctors, staff, patient or attendants	**Accountability –** Believe in taking complete responsibility throughout	**Integrity –** Earn the trust through ethical and responsible conduct
Compassion – Bring humanity to work	**Excellence** – Believe in confident pursuit of highest quality	**Innovation**- Strive to redefine the standards of excellence in everything.

SCOPE OF SERVICES

Key Specialities

- Mother and childcare
- Critical care
- Emergency and trauma Care
- Interventional Cardiology
- Neurosurgery
- Endocrinology
- Gastroenterology
- Spine Surgery
- Neurology
- Nephrology including Dialysis
- Urology
- Dermatology
- Cosmetology
- Plastic and Reconstructive Surgery

Other Specialities

- Cardiology
- ENT
- Eye Care
- Physiotherapy
- Homeopathy

- Laparoscopic Surgery
- Obstetrics and Gynaecology
- Chest Physician
- Nephrology
- Psychiatry and Psychology
- Nutrition and Dietetics
- Plastic Surgery
- Paediatrics
- Neuroscience
- Gastroenterology
- Dermatology
- Dental Care
- Oncology
- Anaesthesiology

Infrastructure Highlights

- 200 bedded.
- NABH And NABL Accredited hospital.
- Fully equipped Radiology lab has GE Multi- Slice CT scan machine,3D, 4D Ultrasound machine, 500 MA X Ray, MRI machine.
- 24*7 Emergency and Trauma Centre.
- In –house Laboratory.
- 10 bedded Dialysis Unit.
- 24*7 Blood Bank.

- In house Ambulance.
- Canteen and Cafeteria.
- Breast feeding room.
- Room Category (General, Economy, Semiprivate, Private, Deluxe, Suite).
- 24*7 ATM.
- Cashless panel.
- Cashless Services.
- Custom Packages.
- Home Care Services.

Hospital Facilities

Rooms: At Felix Hospital there are various room categories as under:

- Suite: Suite at Felix Hospital has room with a separate washroom, Wi-Fi Connectivity, small refrigerator, a TV, a microwave, two lockers for safekeeping and personal belongings, full time nursing staff, a housekeeper.
- Deluxe: Deluxe room at Felix Hospital has an attendant bed, Wi-Fi Connectivity, small refrigerator, a TV, lockers for safekeeping and personal belongings, and full-time nursing staff available.
- Private Room: Single room at Felix Hospital has an attendant bed, Wi-Fi connectivity, small refrigerator, a TV, a locker for personal belongings.
- Semiprivate Room: Multi bedroom at Felix Hospital has chairs and a locker for personal belongings and essentials.
- Cafeteria: Cafeteria of Felix Hospital opens all day and night, with an assorted range of food and beverage options to choose from. It is located at the ground floor

and is open to employees and visitors. Another food corner setup by healthy café is open from 8:00am to 9:00 pm.

- Laundry Services: Provision of Laundry services have been catered for in the hospital.
- ATM.
- Waiting room: Located at the 8th Floor.
- Pharmacy: Felix Hospital has a 24x7 pharmacy located on the ground floor, and one can get medicines anytime one wants.
- Blood bank: NABL accredited 24*7 blood bank, to facilitate any requirement for blood. The blood bank adopts most advanced technology and equipment, to collect and store blood for all blood groups - A, B, AB, O (both positive and negative) as per international standards:
- **Hospital is licensed to provide:**
    - Whole Human Blood.
    - Blood Components.
    - Felix hospital blood bank is EQAS accredited. This external audit agency keeps a check on the hospital procedure, quality and safety for collection and checking of blood.
- Best 24*7 Home care services.
- Sample Collection at Home- Customized preventive health package.
- Vein finding machine for prick accuracy.
- Reports over WhatsApp.
- Single use collection kit for 100% hygiene and safety.

- Home Nursing Services - Post-Operative Care
    - Management of medicines
    - Urinary Catheter Care
    - Assistance in daily activity
- Old Age Care:
    - Assistance in Daily activitie
    - Monitoring overall health and vital signs
    - Intake of medication on time
- Supportive Care:
    - Helping with medical equipment
    - Urinary Catheter Care
    - Assistance in daily activity
    - Injections and Infusions
    - Critical care patients
- Medical Equipment on Rent:
    - Patient Beds
    - Walking Aids
    - Wheelchair, recliners
    - Bathroom, Toilet Aids
    - Respiratory Support

- Physiotherapy Service:

  - Basic Pain Management like Knee pain, back pain, Shoulder pain
  - Regime Management like personal training, Balancing and Strength Training, Pilates, Taping etc
  - Specialized Service for Post-Surgery, Sports Injury etc.

- Ambulance:

  - A fleet of dedicated ambulances available 24*7 for patients carefully equipped to meet any medical emergency such as road accidents, cardiac arrest, or transfer of critical patient, etc.
  - **Facility available in our ambulance includes:**

    Emergency Kit containing all emergency drugs, equipment, and drips.
  - Special Shock Absorbers to avoid jerks while taking the patient to the hospital.
  - Two-way communication system to communicate between hospital and mobile care unit for expert advice and other requirements.
  - Ventilators, to provide oxygen supply to the patient.
  - Telescopic Stretcher
  - Air Condition to provide maximum possible comfort to the patient.
  - Suction Machine
  - Defibrillator
  - ACLS and BLS

- International Patients:

  - Help to schedule your appointment with the best doctors.

- VISA Invitation Letter assistance from Felix Hospital.
- Dedicated Point of contact from inquiry to treatment at the hospital.
- Interpreter services on call and at hospitals.
- Special food and stay arrangements.
- Hassle-free follow-up post-discharge.

- E- clinic:

  - Meet the best doctors from anywhere in the world at your convenience.
  - As technology advances, it has become easier to communicate with anyone worldwide. With communication barriers declining, whether you are in a big city or remote village, accessibility of medical facilities and care has increased. With Felix e-clinic facility, the experts are just a video call away.
  - With Telemedicine, stays in your home's comfort and consult a specialist.
  - Please fill out a simple form, and our executive will do the rest.

- The E-Clinic Facility at Felix

  - Expect a call back within 2 hours of receiving the request form.
  - Our executive will arrange a consultation with the specialist.
  - Sample Collection from your home for required tests (blood/urine etc.)
  - All required medicines will be delivered at your doorstep.
  - Home nursing facility available if required.

ABSTRACT

Introduction

Medication mistakes are a major concern for healthcare systems worldwide since they occur frequently in hospitalized patients. These mistakes can happen during the medication-use process and are defined as any avoidable circumstance that could lead to drug misuse or harm to the patient. Medication errors (ME) can occur while prescribing, dispensing, transcribing, administering, and monitoring drugs. One of the most significant and avoidable medical errors is medication errors. Medication errors can be caused by a variety of things, including a breakdown in communication between the involved doctors, patients, and pharmacists. The POCQI model developed by the WHO/SEARO (World Health Organization- southeast Asia Region Office) analyzes practice performance and give fixes for issues preventing the provision of standard healthcare. POCQI is a four-step, simplified methodology that enables and empowers teams of health workers to use local data to identify quality gaps (problems or issues).

Methodology

The study was conducted in a 200 bedded hospital of Delhi NCR it was quasi-experimental study. All the inpatients were included in the study. During the study period, 750 patient files were audited. And later the data was collected and analyzed using MS Excel.

Results

A total of 750 files were audited during the study initial baseline assessment of medication error comes out to be 12.4% and after planning training sessions through PDSA cycles

from baseline error of 12.4% medication errors gets reduced to 6%. Signature of RMO's on the drug chart, more cross-checking of drugs before administration of medicines these kinds of changes were implemented during the study period.

Conclusion

POCQI model was implemented to reduce the medication error in the hospital using the PDSA cycles. Medication errors gets reduced by 6% from the baseline assessment. The study findings arouse interest in management to take the study for further improvement in the project. As it's been recommended to hospital to implement the EMR and EHR software in hospital so that errors like missing dose, missing frequency and prescription errors gets vanish for good.

Chapter 1

INTRODUCTION

1. Introduction

Medication mistakes are a major concern for healthcare systems worldwide since they occur frequently in hospitalized patients. These mistakes can happen during the medication-use process and are defined as any avoidable circumstance that could lead to drug misuse or harm to the patient. Medication errors (ME) can occur while prescribing, dispensing, transcribing, administering, and monitoring drugs. One of the most significant and avoidable medical errors is ME.(1)(2). Even though errors in prescribing and dispensing can be caught as a medicine order moves toward patient administration, measures to lessen errors during administration are particularly important because it is the last step before a patient receives a drug. To reduce MAEs, numerous tactics have been created and put into use in clinical settings.(3) Errors in prescription medications put newborn at high risk for substantial morbidity and mortality. Even though people are generally aware of these concerns, mistakes do occur(4)**.** Due to intricate dosage calculations versus quickly changing body surface area, weight, and organ immaturity, particularly the liver and kidney, neonates are even more sensitive(5). According to the WHO, medical mistakes affect one in ten patients globally and can result in death, permanent or temporary injury, financial loss, and mental trauma to both the patient and, in some situations, the caregiver.(6)

Writing a prescription involves more than merely inputting text onto a piece of paper. Writing a prescription should be done with care and in a methodical manner. It's possible for a prescription to be unreadable, lacking, or unreasonable. The use of electronic medication systems (EMS), also known as computerized provider order entry systems (CPOES), has significantly lowered the rates of both procedural medication errors (such as illegible or incomplete medication orders) and clinical prescribing errors (such as the

prescription of the incorrect drug). While nurses use these systems to prepare and administer medications, little research has examined whether lower MAE rates are related to the electronic drug administration records that are part of these systems. The main issues are medications that are difficult to read or write since this causes a lot of prescription errors(7). More than 98,000 people die from it each year, making it the eighth most common cause of death in the US(8). According to the National Patient Safety Agency, there were 50% medication administration errors and 16% prescribing errors across all care settings in the United Kingdom. Medication errors also occurred in the dispensing and 18% and prescribing stages of the medication treatment process(9). Poor medicine prescribing leads to numerous medication errors, which are caused by untrained medical staff personnel. Medication errors can be caused by a variety of things, including a breakdown in communication between the involved doctors, patients, pharmacists, and other paramedical staff; improper medication storage, labelling, and packaging; confusion over "look-alike sound-alike" (LASA) drugs; a lack of knowledge about current pharmacological trends, protocols, dosing, references, and medication formularies; and a general lack of staff awareness of new drugs and narcotics.(10)

A 1999 report by the Institute of Medicine, up to 98 000 people each year succumb in hospitals due to medical mistakes. Of more than 30,000 medical records discovered in a random sample of the Harvard Medical Project, as high as 19% (n=1133) of adverse events were caused by ME(4)**.** According to research conducted in North India, a ME accounted for 5.4% of all prescriptions written by new-born intensive care unit (NICU) doctors and appeared on every 19th prescription(5)**.** WHO named medication safety as the following major worldwide patient safety risk in 2017, highlighting ongoing worries about the high

occurrence of pharmaceutical mistakes and their effects on health outcomes and costs. Prescription error rates have attracted a lot of interest.(11)

The Point-Of-Care Quality Improvement (POCQI) model 12 has been developed by the WHO/SEARO (World Health Organization- South East Asia Region Office) in collaboration with other organizations to analyze practice performance and give fixes for issues preventing the provision of standard healthcare.(12) POCQI is a four-step, simplified methodology that enables and empowers teams of health workers to use local data to identify quality gaps (problems or issues), conduct root-cause analysis in their own setting, then choose and implement a solution to solve the problem. The concepts are tested using local data and PDSA cycles(13). Use of POCQI model is well known in assessing quality gaps in hospital and health settings. In a study by Mondal et al. in 2022, it was observed that median medication error in newborn unit reduced from alarming 63% to 48% in first PDCA cycle and gradually reduced to 14% in PDSA 4 cycle. This study may finally succeed in its wise goal of reducing prescription errors by utilizing the QI model, which is currently developing as a solution to numerous issues relating to maternal and child health.(12)

Chapter 2

AIM AND OBJECTIVES

2: Aim and Objectives

Aim

The current study aims to assess factors contributing to medication errors and finding ways of reduction in medication error in a multi-specialty hospital.

Objectives of the study

- To evaluate reduction in medication error in a multi-specialty hospital
- To assess major sources of medication error in a multi-specialty hospital
- To train healthcare officials using POCQI model to improve quality and reducing the medication erroring in the hospital.

Chapter 3

METHODOLOGY

3. Methodology

Locale: Felix Hospital, a multi-specialty hospital in Noida

Study design: Quasi experimental study (Figure 1)

Study duration: 4 months

Sampling: Convenience sampling, of the inpatient that were admitted in the hospital during the study duration and the patients who received at least one type of drug during hospital stay, the study includes all the inpatients wards, ICU, HDU and critical areas where drugs were being administered to the patient.

Sample size: 250 files to be audited for medication error in each phase

Inclusion exclusion criteria: The drug monitoring sheets of those patients who admitted, expired, discharged, admitted for day care, went LAMA were included in the study. Prescription errors and adverse drug reaction were being excluded from the study due to less manpower to audit the patients' prescriptions and reasons behind the adverse drug reaction.

Study flow: The study was conducted in three phases for a duration of 4 months – the first phase was the baseline phase conducted for a month, then 10 days of intervention phase where trainings were provided, then second phase started after the intervention for 1 month, after that second intervention phase started that went for 10 days and after that the final third phase data was collected.

A quality circle team was formed to reduce the rate of medication errors according to POCQI model that comprises of 7 members includes 1 members of quality department, Nursing superintendent, Assistant nursing superintendent, Deputy nursing superintendent,

Clinical Pharmacologist, Medical superintendent, Assistant Medical superintendent. As per discussion with the team they decided to have weekly meetings with analysis of collected data. In the meeting quality personnel and the clinical pharmacologist submit their data and accordingly the intervention phase of training is planned to include the nursing staff and duty doctors so that they have better understanding of errors that were being reported and ways to reduce the errors for the future. Training was planned in such a way that maximum number of participations from the nursing team and duty doctors can be made, consultants were not able to attend the meetings dur to workload in that case if any medication error from consultants were made it's been reported to the medical superintendent. And in case some nursing staff was unable to attend the trainings then their team leader assigned the task to share the learnings of the training with the staff, similarly in case of duty doctors AMS taken the responsibility of training the duty doctors that were not able to attend the trainings.

Statistical analysis: Data was collected and analyzed in MS Excel 2019 for the different phases of the study.

Ethical Considerations: Ethical approval for the study was taken from the Institutional Ethics Committee of Indian Institute of Health Management Research, Delhi. Permission was taken from Felix Hospital, Noida.

FIG. 1: Research design of the study:

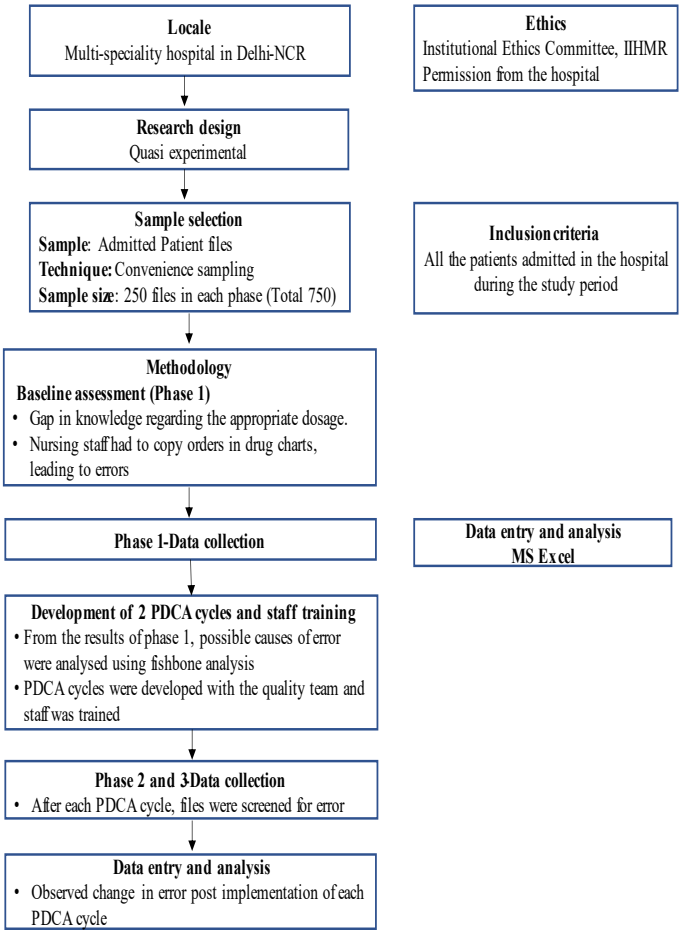


Table 1: Working definitions in the study:

Type of errors	Working definitions
Wrong dose	Above or under the prescribed dose, with an unexplained departure of more than 10% from the norm
Wrong time	For emergency medicine, more than 30 minutes
Wrong rate	Drugs may be administered more or less quickly than prescribed. Unspecified injection rate. 24-hour fluid volume greater than 10% of the required amount, or hourly rate greater than 50% of the ordered rate
Wrong preparation	Incompatible medication combinations and incorrect dilutions with the recommended dosage
Wrong route	Alternative to the route recommended
Omission	Not administering or leaving out the appropriate dose or medicine type
Wrong transcription	Incorrect prescription copy for administration in the medical records. A difference in the drug's name, formulation, method, dose, or dosing schedule, or medicines that weren't ordered
Others	Incorrect patients, the inappropriate place, unapproved drugs, etc.

Chapter 4

RESULTS

4. Results

The present study was done to assess major sources of medication error in a hospital and to evaluate how these errors can be reduced. The study was conducted in Felix Hospital, a multi-speciality 200-bedded hospital in Noida, Uttar Pradesh. A training programme was developed based on the results of POCQI and PDCA cycles were implemented for improvement in the same. Effectiveness of the training was also evaluated after two PDCA cycles.

The results of this study are discussed under the following heads:

- Baseline assessment
- Fishbone Analysis
- Development of the PDCA cycles
- Effectiveness of training programme in reduction of medication error

Baseline assessment

Baseline assessment was conducted over a span of one month. We randomly selected files (n=250) of admitted patients for assessment of different types of medication errors. Treating doctors and nursing staff who were involved in management were unaware of the study. We found error in 12.4% of the selected files (n=31) as shown in Figure 1. Of all files with medication error, transcription error was found in the maximum number of files (n=10) followed by missing dose error (n=9) and wrong dose error (n=7).

With the help of the fishbone analysis, cause and effect analysis was done (Figure 2). Few reasons for medication error could be gap in knowledge regarding the appropriate dosage of

medicine, nursing staff had to copy orders in drug charts leading to errors while transcribing, lack of experienced doctors and nursing staff, lack of accountability as multiple files were observed without countersign of RMOs, no system for cross-checking drug chart with the advised drug etc.

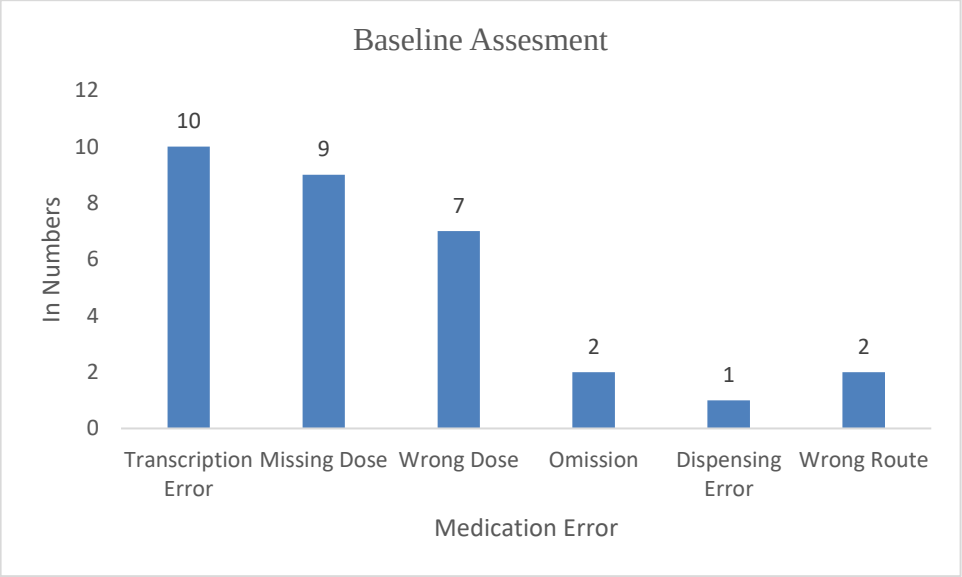


FIG. 2: Baseline assessment of medication error

These observation points on causes formed the basis for development of training programmes to reduce error while prescribing medication. PDCA plan was formed focussing on the following:

- Regular training of doctors and nurses
- Signature and counter signature of health personnel
- Creating positive environment for both nurses and Resident Medical Officers
- Fresher staff to be kept under observation of the team leader for at least a week.

Considering these points, Fishbone analysis was done:

From the baseline collected data it was seen that multiple types of errors were found during auditing the patients' files. Fishbone analysis used as quality improvement tool helped to analyze the cause effect relationship for the occurrence of medication errors where multiple errors were noted during the study that later further categorized accordingly. In case of any medication error a incident form was being filled by the quality personnel and clinical pharmacologist, if the errors was from the nursing end then Nursing superintendent was being informed, in case of RMO's assistant medical superintendent was informed and in case of consultants Medical superintendent later all the collected incident forms were submitted in quality department for further analysis.

As mentioned earlier, a baseline survey was conducted over a period 4 months with a total 750 files were being audited during the study and data was later reviewed by the quality team. The nurses and duty doctors (RMO's) were not aware about the audits initially, once baseline assessment as conducted and data was collected then later bring in their knowledge about the errors. As per the analyzed data training sessions were planned after analyzing the baseline conducted, training session runs for nearly six days as per PDCA and training session was planned in such a way that maximum numbers of nurses and duty doctors got involved and this training was given by the member of quality team and clinical pharmacologist respectively on various topics, initially first phase of training session given more emphasis on pharmacological properties, dosages, mode of administration of drugs and nursing staff who was not able to attend the training session in that case Team leaders were assigned the responsibility to train the respective nursing staff for the same and similar in case of RMO's, assistant medical superintendent had taken the responsibility to train the staff who unable to attend the session. During the session audio visuals aids, incident forms were used for the reference where the errors were the maximum.

After the first training session again data was collected and analyzed after the analysis of second phase of data again training session was planned as per PDCA cycle that run for nearly 10 days, during this second PDSA cycle emphasis were given on Full signatures of healthcare staff on drug charts and fresher staff will administer drug under the observation of TL, Drug Charts should have the signatures of the nursing staff and nursing in charge, countersign by the RMOs and TL will evaluate the fresher staff progress in this initial hurdle was to motivate the nursing staff and RMOs but later stage it was quite visible Medication error percentage decrease to some extent.

After the second training session decrease in medication errors was quite evident from the baseline assessment, with regular training sessions and implementation new techniques in hospital medication errors can be reduced that eventually helped the hospital and patients to have minimal medication errors.

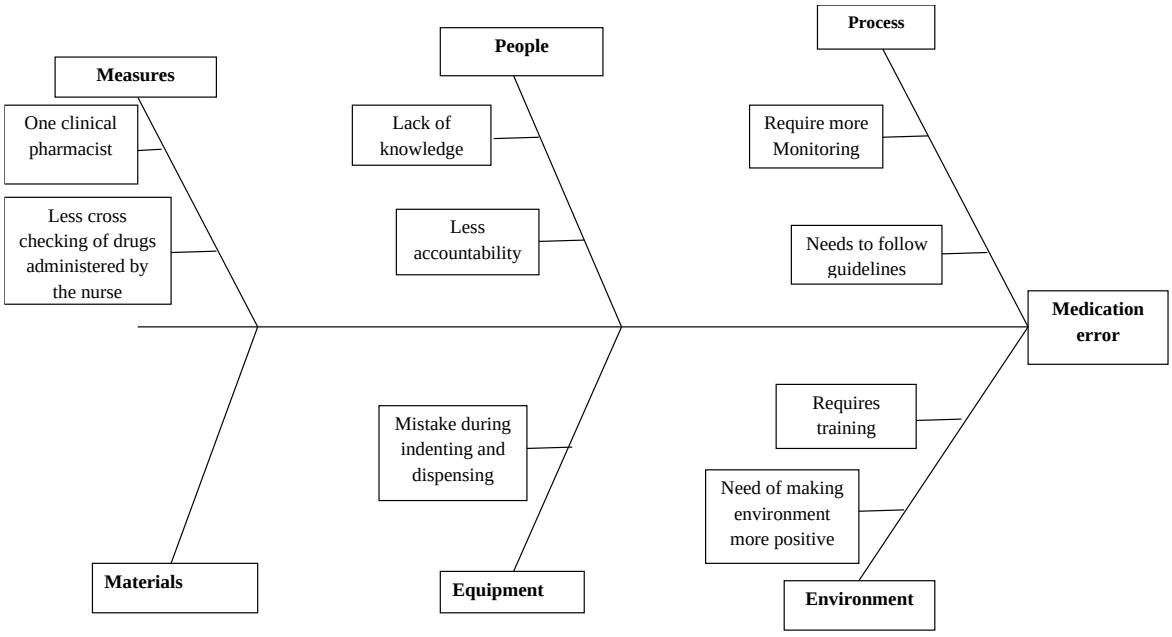


FIG. 3 Fishbone Diagram (Cause & Effect)

After Fishbone analysis was done, development of PDCA cycle for training

The Point of Care Quality Improvement (**POCQI**) model was adopted to improve the quality of care and for development of the training module. The training programme was developed on the plan-do-check-act (PDCA) cycle based on POCQI model. A quality improvement team of seven members was formed as per POCQI module. The team included 1 member from the quality department, Nursing Superintendent (NS), Assistant Nursing Superintendent (ANS), Deputy Nursing Superintendent (DNS), clinical pharmacist, Medical Superintendent (MS), Assistant Medical Superintendent (AMS).

Training participants: On duty doctors and nursing staff

Number of planned cycles: 2

PDCA cycle 1:

Plan: The plan was to train the on-duty doctors and nursing staff on management of medications, e.g., pharmacological properties, dosages, mode of administration etc.

Do: Training calendar was made with nursing staff and RMO so that effective training and active participation is ensured.

Check: A marked decrease in the occurrence of medication errors.

Act: Regular training and monitoring by the quality team of the process cycle.

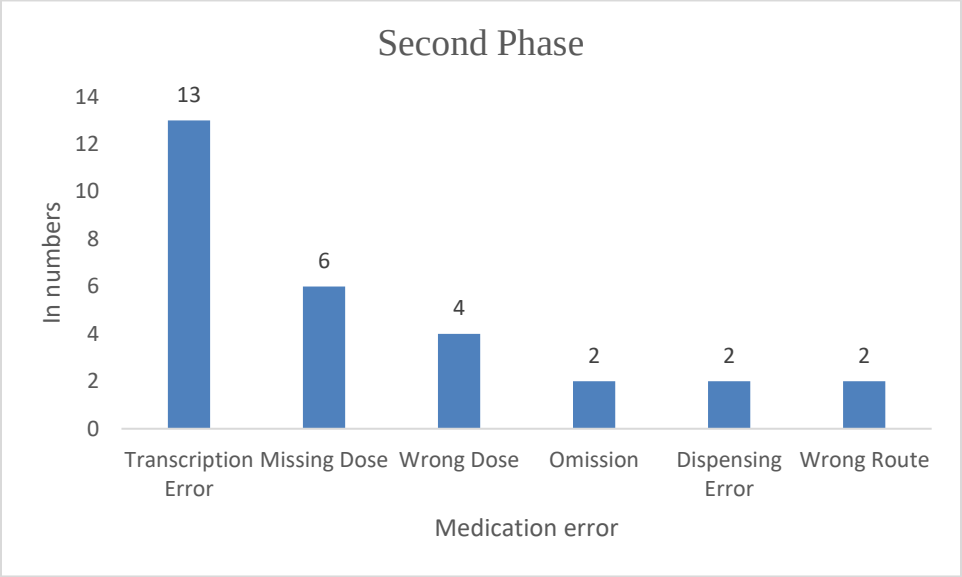


FIG. 4: Second assessment of medication error

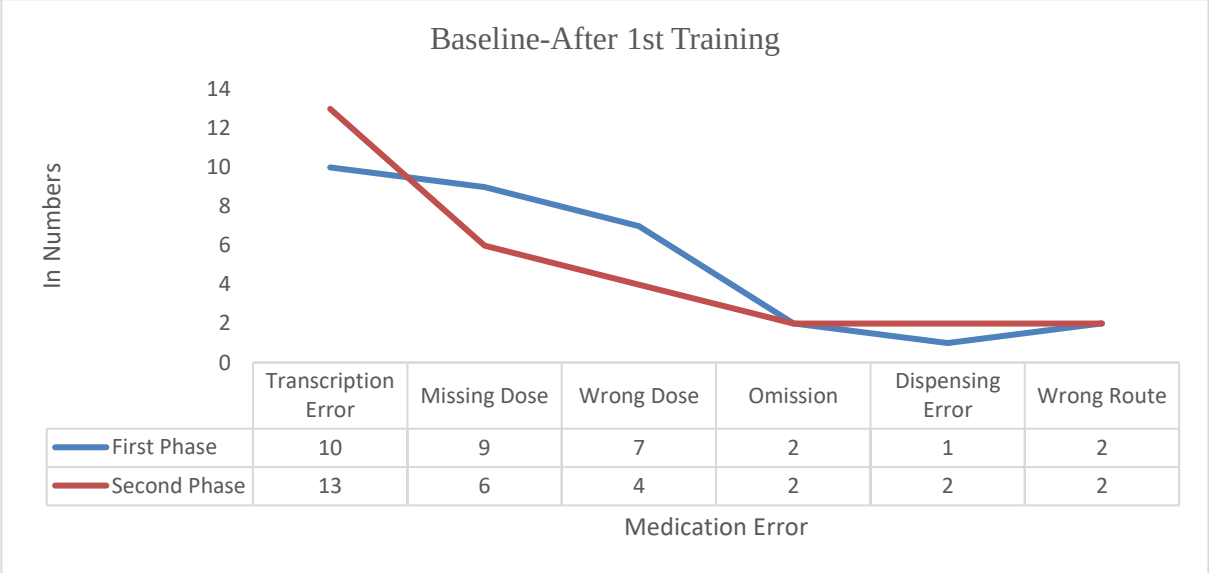


FIG. 5: Change in medication error after 1st PDCA cycle from baseline

PDCA cycle 2:

Plan: Full signatures of healthcare staff on drug charts. And fresher staff will administer drug under the observation of team leader (TL)

Do: Drug charts should have the signatures of the nursing staff and nursing in-charge. Countersignatures by the RMOs. TL will evaluate the fresher staff's progress.

Check: The initial hurdle to motivate the nursing staff and RMOs. Medication error percentage decrease to some extent

Act: Proposal for full signature and cross checking of drug charts regularly. Fresher staff to be frequently evaluated by the TL.

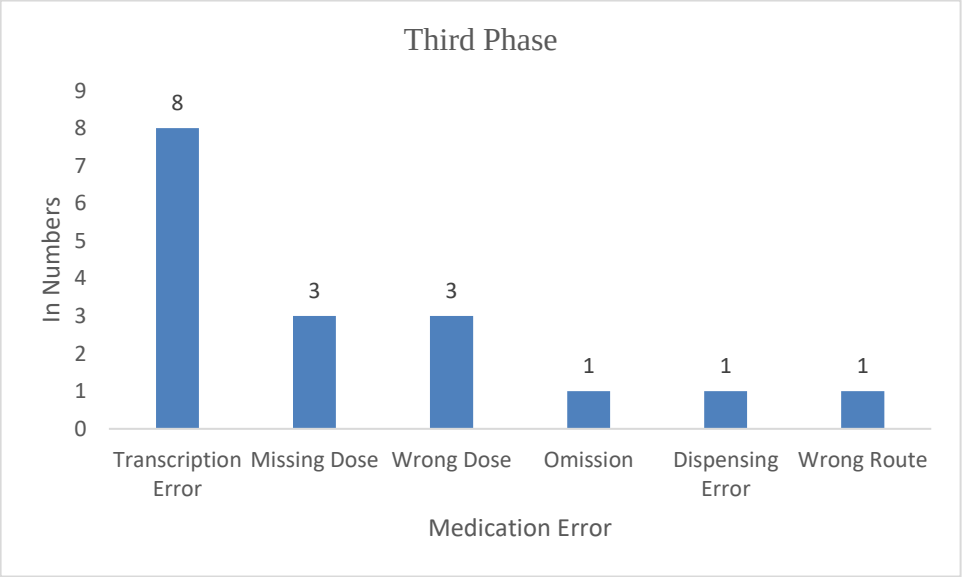


FIG. 6: Third assessment of medication error

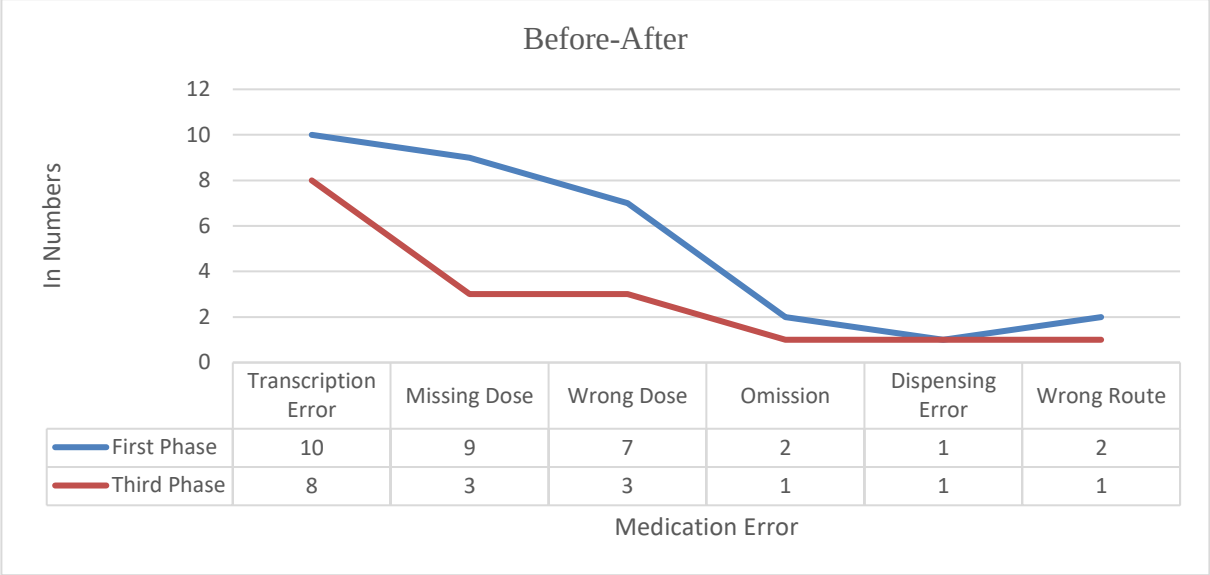


FIG. 7: Change in medication error from baseline to 2nd PDCA cycle

Based on the PDCA protocol, staff was given training with the aim to reduce medication error.

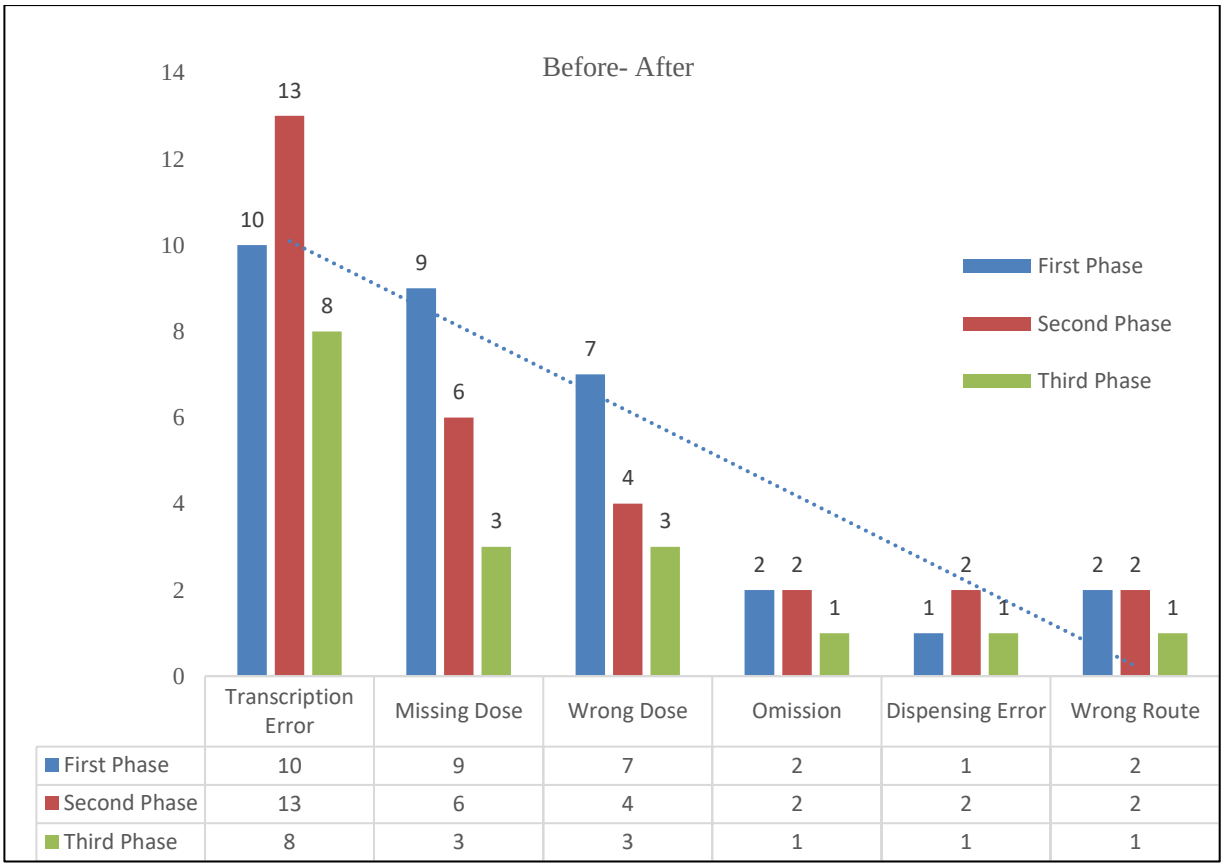
Effectiveness of training sessions

After conducting training based on each PDCA protocol, evaluation of files was done to check the effectiveness of intervention. Training was done in three batches each for both PDCA protocols. Both times, files (n=250) were evaluated to assess effectiveness of the training session.

Error was found to decline after using the POCQI model from baseline (12.4%) to after 1st PDCA cycle (11.6%) which focused on training the staff (Figure 3). The medication error reduced to 6.8% after the second PDCA cycle which emphasized cross-checking of medications by nursing staff and RMOs and evaluating fresher staff performance (Figure

4). Total error reduced from finding error in 31/250 files at baseline to 17/250 files at the end (after 3 months), post intervention.

Transcription error and missing dose error were more frequently observed than all other errors. No improvement was found in dispensing errors.



	Transcription Error	Missing Dose	Wrong Dose	Omission	Dispensing Error	Wrong Route
First Phase	10	9	7	2	1	2
Second Phase	13	6	4	2	2	2
Third Phase	8	3	3	1	1	1

FIG. 8: Overall change in medication error from baseline to third phase

Chapter 5

DISCUSSION

5. Discussion

Medication error can occur in any phase of hospital stay and medicine prescription. These errors in medication prescription can lead to morbidity and mortality in any age group. In our present study, we observed 12.4% medication error at baseline, i.e. 31 of 250 files had error which is a significantly high number which cannot be ignored.

Transcription error was found to be the maximum compared to other errors as also seen in a study by Meneza et al. in 2018 (15). Reason for high transcription error could be illegibility of the prescriptions, staff incompetence, heavy work load and repetitive desk jobs. Including transcription error; missing dose and wrong dose error contributed to ~ 84% of all errors. Omission, dispensing and wrong route errors were very less compared to the rest.

Fishbone analysis have done during the study to understand the cause and effect of medication errors in hospital, and through analysis we could reach the root cause analysis of the errors and then effects were categorized accordingly to get better hold of the errors

After two PDCA cycles, there has been a reduction of approximately 50% error within 3 months. Similar results have been found in the study by Mondal et al. 2022 on neonates where baseline error was 72% and it was reduced to 14% after four PDCA cycles.(12)

Reduction in error after training sessions reflects that with timely intervention, proper training and continuous evaluation, medication error can be decreased. The errors are preventable and result in increased patient morbidity and mortality as well as increased healthcare costs and unnecessary hospitalization; thus attention is required to be given to reduce the prevalence of medication error. The present study showed that error can be reduced if proper training and awareness is created regarding medication error.

Chapter 6

CONCLUSIONS

6. Conclusion

This quality improvement model proves that study could ultimately achieve its goal of reducing the medication errors by 6%. The few changes that we had made in training the staff and duty doctors through two PDSA cycles were sustainable and could be possible with time it will reduces the error even more and there will be scope of improving the cycle with time. The study findings arouse interest in management to take the study for further improvement in the project. As its been recommended to hospital to implement the EMR and EHR software in hospital so that errors like missing dose, missing frequency and prescription errors gets vanish for good.

Chapter 7

LIMITATIONS

7. Limitations

This project successfully implemented POCQI model to reduce the medication in multi-specialty hospital. The project helps in implementing new ideas to reduce the errors. Limitation of the study that prescription errors and adverse drug reaction were no included in the study due to less time and manpower, including prescription errors and adverse drug reactions could have given the study a whole new perspective in terms of planning the PDSA cycles and planning the training for the team. Auditing more patient files could be possible if the hospital had one more clinical pharmacologist. Trainings were planned in such a way that it also included the consultants but due their busy schedule they were not able to attend any meeting apart from this there was not enough time for the post evaluation and medication errors could have been become less if the study duration time could be more.

Chapter 8

RECOMMENDATIONS

8. Recommendations

During the period of these 4 months its been observed that involvement of quality manager was negligible, involvement can lead to better implementation of training plans and to get a better understandings for the staff to implement these trainings sessions post completeness of the study so that a streamline process is formed and cycle gets better with time and keeping the medication error in a certain limit so that patient safety gets improved.

Impact of medication errors should be further analyzed by the clinical pharmacologist and the quality department to get a better understanding hoe medication error can impact the patients, a in-depth report needs to be made after analysis showing the parameters on which the patient might suffer.

RMO's should double check the medication chart of the patient considering all the medicines that prescribed to patient was being administered on time, dosages, routes were correctly mentioned in the drug chart, and apart from the workload of RMO's needs to be reduced to certain extent as due to workload they were unable to cross check the medication chart before signing it.

As Prescription errors were not included in the study the main reason behind excluding the prescription errors because due to lack of manpower as of now only 1 clinical pharmacologist was there, it will be challenging task for one person to cover the inpatient files and prescriptions at the same time so more manpower can be hired so that audits can be done more rigorously.

The use of electronic medication systems (EMS), also known as computerized provider order entry systems (CPOES), has significantly lowered the rates of both procedural

medication errors (such as illegible or incomplete medication orders) and clinical prescribing errors (such as the prescription of the incorrect drug).

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ANNEXURE

Annexure

Hospital survey on medication error

Instructions

This survey asks for your opinions about patient safety issues like medication error, and event reporting in your hospital and will take about 10 to 15 minutes to complete.

If you do not wish to answer a question, or if a question does not apply to you, you may leave your answer blank.

An "**event**" is defined as any type of error, mistake, incident, accident , or deviation, regardless of whether or not it results in patient harm.

"**Patient safety**" is defined as the avoidance and prevention of patient injuries or adverse events resulting from the process of health care delivery.

Administration Errors

1. Whether all drugs are administered at the correct time?
2. Whether all drugs are administered properly?

SECTION A

Please indicate your agreement or disagreement with the following statements (12)–

	Never	Rarely	Some-times	Most of the time	Always
1. Management support for Patient safety-	⬇	⬇	⬇	⬇	⬇
• Hospital provide work climate that promote pt- safety.					
• Actions of hospital shows that pt- safety is top priority.					
• Hospital seems interested in patient safety only after adverse event happens.					
2. Feedback & communication about Error- Communication Openness					

- Staff will freely speak up if they see something that may negatively affect pt care.
- Staff feel free to ques that the decision or actions of those with more authority.
- Staff are afraid to ask questions when something does not seem right.

3. Feedback and communication about Error

- We are given feedback about changes put into place based on event reports.
- We are informed about errors that happen in the unit.
- In this unit, we discuss ways to prevent errors from happening again.

4. Frequency of Events Reported

- When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?
- When a mistake is made , but has no potential to harm the patient , how often is this reported?
- When a mistake is made that could harm the patient, but does not, how often is this reported?

5. Nonpunitive Response to Error

- Staff feels like their mistakes are held against them.
- When an event is reported, is feels like the person is being written up , not the problem.
- Staff worry that mistakes they make are kept in their personnel file.

Section B

Please indicate your agreement or disagreement with the factors affecting medication errors.

Factors	**Strongly Agree**	**Neither**	**Disagree Strongly**

agree

disagree

1.Knowledge- information- understanding of the subject.

2.Experience- work related knowledge over the years.

3.Fatigue- psychological aspect of not having enough energy to do the job.

4.Physical health.

5.Workload- relationship between one's mental processing ability with amount of work required of the individual.

6.Procedure- Who, what to do, when and under what criteria.

7.Physical environment- hospital environment, nursing Station condition, etc.

8.Transparency of responsibility- specificity of each person's task for that person is clear.

9.Safety culture- set of what is being pursued in the organization for safe healthcare.

10.Training- Systematically develop the knowledge, skill and Attitude needed to perform a specific task.

11.Communication between staff- process of transferring Information and understanding from one person to another.

12.Supervising staff- Planning, organizing, directing and controlling work and employee activities.

13.Error management culture-An approach that does not attempt to fix the errors completely but attempt to deal with and communicate the errors and their consequences after the error has occurred.

Avinash Kumar DIssertatoipm

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