Implementation of WHO Patient Safety Solution in a Tertiary Care Hospital

By

Jagrati Gour

Dissertation submitted in partial fulfillment of the requirements of the degree

MBA Hospital and Health Management

Academic year, 2018-2020

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PARAS JK HOSPITAL
Partners In Health

PJKH/HR-Misc./2020/00003

Date-18th May'2020

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Dr Jagrati Gour** has successfully completed her internship in **Quality Department** under the guidance of Dr Mani Bhatnagar (Deputy Medical Superintendent) at **Paras JK Hospital, Udaipur** with effect from **07th February 2020 to 18th May 2020.**

We certify that her conduct at assigned work was good and as per the organization requirement.

We wish her all the best in her future endeavors.

For Paras JK Hospital

Alok Sharma

Senior Manager- Human Resources

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ABSTRACT

Title- Implementation of WHO International Patient Safety Solutions at Paras JK Hospital.

Author: Dr. Jagrati Gour

1. Objective:

   - To identify the gaps in implementation of WHO International patient safety solutions
   - To compare the WHO International patient safety solutions with the organization's current process
   - To devise training interventions of International patient safety solutions to all stakeholders

2. Methodology:

   A descriptive cross-sectional study was performed by conducting a survey on hospital staff consisting of doctors, nurses, and pharmacists to assess the level of understanding on WHO 1st , 2nd and 5th patient safety solutions pre and post training. The study was conducted on two groups of 75 respondents each over a duration of 3 months.

3. Key Results:

   In the first assessment conducted for 1st and 5th WHO patient safety solution, training program resulted in a steep increase in passing percentage from 8% to 95% pre & post-training respectively. In the assessment conducted for 2nd patient safety solution, respondents who crossed the passing benchmark increase from 32% to 93% pre & post-training respectively.

4. Conclusion:

   Patient safety has recently been recognized as a core value of patient care by WHO in 2005. After reviewing all the WHO nine International Patient safety solutions in Paras JK Hospital the most significant problematic areas for patient safety were found to be Patient Identification , Look alike sound medication and control of concentrated electrolytes on which gaps were identified and required interventions in the form of training were given to the staff concerned. The significant improvement in the post-training assessment scores show that unintentional harm or errors can be diminished by giving continuous and regular pieces of training. Besides, Nurses were found to be least aware about IPSS and need to assess and trained at regular intervals.

Keywords- Patient Safety, Look alike Sound alike drugs, Patient Identification, Concentrated electrolytes, IPSS

Acknowledgment

I am exceptionally thankful to all professionals at Paras JK Hospital for sharing their knowledge and precious time. I owe a great debt to Dr. Mani Bhatnagar (Deputy Medical Superintendent) and Dr. Amrit Kaur (Quality Manager) for guiding me in this project. It has been my privilege to work under their guidance in the hospital.

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Lastly, I would like to thank the Faculty of IIHMR University, Jaipur for providing facilities for my study.

About the organization

Paras Healthcare was established in 2006, with the mission of providing specialized tertiary medical care services at affordable prices to underserved communities across the country. The private healthcare provider stands apart from others in its vision of making healthcare for all a reality for ordinary people in rural and remote regions. Every single individual working in Paras hospital from doctors to nurses and the management are united in the endeavour to deliver top quality healthcare to all. Paras Healthcare is a leader in establishing specialized hospitals in places that lack access to healthcare, specifically super specialty tertiary care. Each of its initiatives is based on three tenets-Affordability, Accessibility and Quality.

Mission

Our mission is to provide the best quality medical service with utmost responsibility and compassion. Our management ensures that every patient gets the best possible treatment whether preventive or diagnostic.

Vision

Paras Hospitals aspires to be the preferred healthcare partner for the community. We will initiate all our endeavours based on the three tenets of healthcare- Affordability, Accessibility, and Quality.

Scope of Services

1. Cardiology
2. Neurosurgery
3. Orthopaedics
4. Neurology
5. Urology
6. Gynaecology and obstetrics
7. Gastroenterology
8. General and laparoscopic surgery
9. Nephrology

IMPLEMENTATION OF WHO INERNATIONAL PATIENT SAFETY SOLUTIONS AT PARAS JK HOSPITAL

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LIST OF ABBREVIATIONS

ALOS	Average Length of Stay
FDA	Food and Drug authority
GDA	General Duty Assistant
HDU	High Dependency Unit
HR	Human Resource
ICU	Intensive Care Unit
IPD	Indoor Patient Department
IPSS	International Patient Safety Solution
ISMP	The institute of safe medication practices
JCI	Joint Commission International
KCL	Potassium Chloride
LASA	Look Alike Sound Alike
MRD	Medical Record Department
NABH	National Accreditation Board For Hospital And Healthcare Providers
NABL	National Accreditation Board For Testing And Calibration Laboratories
NICU	Neonatal Intensive Care Unit
OPD	Outdoor Patient Department
OT	Operation Theatre
SBAR	Situation, Background, Assessment, Recommendation
SICU	Surgical Intensive Care Unit
SOP	Standard Operating Procedures
WHO	World Health Organization

CHAPTER 1
INTRODUCTION

The squeezing need to diminish extending poor wellbeing estimates influencing thousands worldwide has frightened World Health Assembly to laid down components to build understanding security. Because of such prerequisite, nine life-sparing patient security arrangements were planned by the World Health Organization(WHO) that would be important to bring down decrease healthcare related damage. There is a shortage of examination analysing consciousness of such nine patient wellbeing arrangements.

Regardless of commonplace upgrades in healthcare conveyance in emergent nations, late reports suggests that the advancement can be discouraged by current troublesome Safety estimates elementary for good professional practices in providing medicinal services.

Because of the mode, the World Health Assembly in 2004 proposed to set-up instruments to increment which was titled as "lifesaving Patient Safety solution". The World Health Organization (WHO) planned nine life-sparing Patient Safety Solutions Aide memoirs so as to actualize activities that address dangers related with specific patient safety issues and abatement healthcare related damage, influencing a large number of patients around the world.

Aide memoirs that is 9 life-saving Patient Safety solutions which aims to address life threatening adverse events or risks related to Hospital acquired infection, failure of equipment, improper catheterization, unsafe use of injection devices, inappropriate cooperative behaviour, poor communication among healthcare providers during patient hand-overs, error in correct Patient Identification and transfer of patient, performance of correct procedure at wrong body site, adverse event due to concentrated electrolyte solutions.

Patient identification is considered as a foremost initial part of the care process in health institutions, as well as an essential safety resource and, if correctly performed and used, it assists in the prevention of errors and potential harm to patients. Failures in patient identification have been recognized as the root cause of many complications.

Look-alike and sound-alike drugs (LASA) have similarities in their phonetics, and orthographic which can cause medication errors and ultimately may lead to produce adverse effects in the patients.

While the significance and consequence of the indicated patient safety measures have been globally appreciated but still there is deficiency on how these patientsafetysolutions are considered by existing health practitioners. consequently it ought to be of prime importance to increase the level of knowledge, and awareness regarding WHO nine life-saving Patient Safety Solutions among health care professionals/work

CHAPTER-2
LITERATURE REVIEW

In 2005, the World Health Organization (WHO) propelled the World Alliance for Patient Safety and perceived six activity regions. One of these activity regions are the improvement of Solutions for Patient Safety. Today, the answers for improving patient wellbeing offer an increasingly helpful methodology—one in which achievement (more secure consideration) is dictated by how well healthcare providers cooperate as a group, how adequately they communicate with one another and with patients, and how cautiously the consideration conveyance procedures and supporting frameworks of care are planned.

Patient safety solution- *Any system design or intervention that has demonstrated the ability to prevent or mitigate patient harm stemming from the processes of health care. (WHO,2007)*

WHO 9 Patient Safety solutions are:

1. Look-Alike, Sound-Alike Medication Names
2. Patient Identification
3. Communication During Patient Handovers
4. Performance of Correct Procedure at Correct body site
5. Control of Concentrated Electrolyte Solutions
6. Assuring Medication Accuracy at Transition in Care
7. Avoiding Catheter and Tubing Misconnections
8. Single Use of Injection Devices
9. Improved Hand Hygiene to Prevent Health Care-Associated Infection

I. Look-Alike, Sound-Alike- The presence of confusing medicine names is one of the prime well-known reasons for prescription blunder or called prescription error. Many medication names resemble the other the same or sound the same with other medication names. Adding to this disarray are unintelligible penmanship, inadequate information on medicate names, recently accessible products, comparable packaging or naming, comparative clinical use, comparable qualities, frequency of medicine to be taken, and dosage of the drugs.

II. Patient Identification- There are several errors occurring in the healthcare sector because of failure to correctly identify patients such as medication errors, diagnostic errors, wrong

individual wrong site procedure, hand-over of infants to other families. Despite the mix of innovation or approach utilized for precisely distinguishing patients, cautious getting ready for the procedures of care will guarantee appropriate patient recognizable proof preceding any clinical procedure and give more safer care with altogether less blunders.

III. Communication during patient handover- During a complete period of sickness or flow of care, a patient can possibly be treated by diverse healthcare professionals and experts in many settings, which incorporates emergency situation care, specific outpatient care, high dependency care, rehabilitation etc. In this period of care, patient moves in different areas from diagnosis, wards to treatment areas n number of times and may encounter three movements of staff every day—during this phase, every second patient is at risk . The hand-over communication among departments and between and among care groups probably eliminates all the basic details/specifics, or information might be misjudged. This failure of appropriate communication can cause genuine breakdowns in the congruity of care, improper treatment, and expected damage to the patient.

IV. Performance of correct procedure at correct body site- These wrong site procedures mainly occur due to lack of communication and lack of unavailable, or correct information within the staff. Detailed analysis says that these errors can be prevented by provision of standardized pre-operative procedure and integration of technology.

V. Control of concentrated electrolyte solutions Concentrated electrolytes falls under the category of high alert medication by the organizations, electrolytes which can cause potential harm to the patients are potassium chloride, sodium chloride, magnesium sulphate if used inappropriately. Ideally concentrated electrolytes should be stored in pharmacy under lock and key with coloured or florescent warning sticker that states must be diluted, and must be removed from patient care areas to reduce unnecessary patient harm.

VI. Assuring medication accuracy at transition in care-. Medication reconciliation is a process designed to avert medication errors at the patient transition points. Medication error are the most common error that happens in healthcare organizations as medicines are being procured, prescribed, stored, administered and evaluated but apparently most frequently occurring medication error are prescribing error and administration errors.

VII. Avoiding catheter tubing misconnection- Tubing catheters syringes are a crucial part of any medical management for the administration of drugs, liquids to sufferer. The design of these apparatus is to such an extent that itis conceivable to inadvertently interface an inappropriate syringes tubing and afterward convey drug, liquids through a unintended and in this way off-base course. This is a direct result of various devices utilized for various courses of organization having the option to associate with one another. The best arrangement lies with presenting design includes that forestall misconnections and make the client make the right move.

VIII. Single use of injection devices- One of the greatest worldwide concern is the spread of the human immunodeficiency infection (HIV), the hepatitis B infection (HBV), hepatitis C infection (HCV) due to the reuse of infusion devices. WHO proposes that in creating and transitional nations in 2000, there use of infusion devices represented an expected 22millionnew instances of HBV infection(approx33% of the aggregate), 2 million instances of HCV disease (approx40% of the aggregate), and about a quarter-million instances of HIV contamination (approx5% of the aggregate) for the entire world (WHO,2007). These contaminations procured in 2000 alone are required to prompt an expected 9,000,000 years of life lost, and disability, somewhere in the range of 2000 and 2030. What's more, every one of the individuals who infuse medicates and may sooner or later offer needles, syringes, or other gear are in danger of bloodborne diseases.

IX. Improved hand hygiene to improve hospital-acquired infections- Itis evaluated that at any one time, >1.4million individuals overall are experiencing diseases procured in hospitals known as hospital acquired infection. Noteworthy proof that hand antisepsis decreases the rate of HAI. Hand hygiene assures patient safety, which ought to happen in an ideal and successful way during the time of patientcare. Notwithstanding, all around there is unsuitably low consistence with hand hygiene practices.. Best cohesion to hand hygiene rules and approaches have been appeared to diminish the proliferation of Hospital-acquired infection.

- Irene Lizano-Díez et al (2020) Conducted a study to discover most techniques of decreasing medication name disarray have been just centred around the procedures of prescribing and administering, regularly observing neighbourhood rules for copy and sound-the same medications. An illustrative late model about this subject is given: the stimulant Brintellix® (vortioxetine) (Takeda Pharmaceuticals USA, Inc.) and the antiplatelet medicine BriliNTA®

(ticagrelor) (AstraZeneca LP). So as to distinguish which techniques are applied to forestall these possible medication error in various nations around the world, we did a writing audit in PubMed of ME identified with LASA meds applying the MeSH expressions("drug labelling", "medication errors", "terminology as topic", "pattern recognition, visual", "phonetics", "recognition (psychology)")) and free terms, arriving at an aggregate of 276 outcomes. Building and continuing a culture of patient safety ought to be considered as a worldwide top-down methodology which included all the components in the framework The point of reference built up by the FDA in counteraction systems to distinguish and dodge LASA errors.

- Ahmed Al-Mandhari (2016) conducted a study on Awareness and implementation of nine World Health Organization's patient safety solutions among three groups of healthcare workers in Oman. Globally healthcare workers (nurses, physicians, and allied health professionals) in hospitals and primary healthcare were the study population of this study. simple, systematic random sampling technique was used to select the candidates for the study from each representative institution. The Sample size was 763 .The overall response rate was 95 % among which female nurses responded maximally with the work experience of more than 4 years. Overall, 85 % of the participant's self-estimated awareness of the nine life-saving patient safety solutions. Awareness index of nurses was maximum followed by physicians and then followed by other allied healthcare professionals with minimal awareness regarding nine life-saving patient safety solutions. The primary healthcare centre staff showed higher awareness compared to hospital staff.

- Teeraporn Chanakit et al (2013) Conducted a cross-sectional study which was intended to consider resemblance of look-alike, and sound-alike(LASA) medicines in medical clinics in Thailand. The questionnaire were created and sent to 1,380 hospitals all through Thailand. The response rate was 11.16% or 154 medical clinics. An aggregate of 5,327 sets of medications were recognized as LASA drugs including 3,695 tablets/cases, 944 infusions, 307 fluid measurement structures 367 outer medications and 14 sets of chemotherapeutic operators. This LASA report could be coordinated into an appropriate program utilized in emergency clinics so as to recognize and avert drug error later on.

- Helena Aparecida De Rezende (2019) conducted a review on how to find Interventions to reduce patient identification errors in the hospital setting. The target population of this review are adults and children irrespective of their age, gender, race, or ethnicity who have a history of hospital admission because of any disease or clinical condition. The Following are the

interventions used to reduce errors in patient identification. at least, two patient identifiers are used to verify patient's identity; integration of technological resources and tools; training program of frontline staff regarding correct identification band; and also educating the patient and family members.

- Sachin Raval et al (2018) directed a To Study Trend of Concentrated Electrolyte Utilization and Management in Tertiary Care Hospitals for Improvement in Treatment Efficacy. The point of this investigation was to look at the pattern of the dispatch time for high risk prescription prior and then afterward. Actualizing new procedures of observing concentrated electrolytes indent. The information of high risk medicine dispatch time from Dec 2017 to Feb 2018 and from March 2018 to May 2018 were gathered. The level of time for dispatching the concentrated electrolyte indent was investigated again for deferred administering. The level of time for dispatching the high focused electrolyte indent was diminished significantly in the wake of creating and actualizing of the preventive system of the medicine dispatch process. Separate stockpiling for concentrated electrolyte, Separate sticker for STAT Indents, Separate arrangement in programming/software for earnest/STAT Indents.

A. Rationale

Patient safety and improved quality of care have become priority issues in the healthcare system. The occurrence of adverse events due to unsafe care is likely one of the 10 leading causes of death and disability in the world. Globally, as many as 4 in 10 patients are harmed in primary and outpatient health care. Up to 80% of harm is preventable. Patient safety is a discipline that emphasizes safety in health care through the prevention, reduction, reporting, and analysis of medical error that often leads to adverse effects. This year The National Accreditation Board for Hospitals and Healthcare Providers (NABH) launched its fifth edition of accreditation standards for hospitals and WHO nine Patient Safety is a requirement of NABH 5th edition and as Hospital was going for NABH accreditation it becomes a necessity for hospital to implement these Patient safety solutions.

B. Research Question:

1. What are gaps in the implementation of WHO International Patient Safety solution in the hospital?
2. What measures are taken to close the gaps identified?
3. How effective is the training programmes in enhancing the knowledge of staff?

C. Hypothesis

Testing the Hypothesis that the training program was effective in improving the Knowledge of participants on LASA & concentrated electrolytes

H0: μd = μ0: Training program has not changed the understanding of participants on LASA & concentrated electrolytes

H1: μd > μ0: Training program has improved the understanding of participants on LASA & concentrated electrolytes

Testing the Hypothesis that the training program was effective in improving the Knowledge of participants on Patient Identification

H0: μd = μ0: Training program has not changed the understanding of participants on Patient identification

H1: μd > μ0: Training program has improved the understanding of participants on Patient identification

Level of Significance: (α=0.05)

D. Aim - To identify the gaps and devise required intervention for implementation of patient safety solutions recommended by WHO to reduce errors of patient safety from the perspective of health care providers.

E. Objective

General objective- To identify the gaps in the implementation of WHO international patient safety solutions in 200 bedded tertiary care hospital, devise and implement necessary pieces of the training intervention.

Specific objectives:

1. To identify gaps in the implementation of WHO international patient safety solutions
2. To compare WHO International patient safety solutions with the organization's current process flow.
3. To devise training interventions of International patient safety solutions to all stakeholders.
4. To monitor the change Post-training intervention.

CHAPTER -3

RESEARCHMETHODOLOGY

3.1 **Study Design**- This was a descriptive cross-sectional study based on retrospective record review and prospective observation based on daily activities in paras JK hospital.

3.2 **Study location**- The study was conducted in a corporate Paras JK hospital, Udaipur. It is a 200 bedded multi-speciality hospital with all basic facilities.

3.3 **Sample population**- The target population of the study includes the nursing staff of Inpatient department, pharmacists of IPD and OPD pharmacy and clinicians who were available at the time of data collection.

3.4 **Study time period**-The study duration was 3 months from 7th February to 18th may 2020.

3.5 **Sample Size and sample technique**

3.5.1 Sampling technique- For this study purposive sampling was considered.

3.5.2 Sample size-The total sample size of the study was 75. For WHO 2nd patient safety solution Patient identification the respondents were only the nursing staff for that also sample size was 75. For WHO 1st and 5th patient safety solution the respondents were divided into 3 groups that are nursing staff, pharmacists, and clinicians.

Nursing staff-45

Pharmacist-15

Clinicians-15

3.6 **Data collection**

Primary data-

- Primary data was collected from the sample group taken for the study using the checklist and questionnaire based on WHO International patient safety solutions.
- Observations
- Discussions with hospital staff.

Secondary data- It was collected from the hospital records, SOP's, manuals of the hospital.

Secondary data was also collected from reviewing the literature articles, journals, and websites available on the internet.

3.7 **Sample Selection**

Inclusion criteria – All Nursing staff who were present at the time of the study, all pharmacists of IPD and OPD pharmacy, and all consultants.

Exclusion criteria – nursing staff who were not available at the time of the study . Junior residents and visiting consultants were also excluded from the study.

3.8 **Study tools**- A set of well-defined Structured questionnaire with both open ended and close ended questions were developed for pre-training and post-training.

3.9 **Data Analysis-** The raw data is was entered and analysed using Microsoft Office Excel 2013 and also IBM SPSS statistics version 22 using paired t test.

- For this study out of WHO 9 patient safety solutions, 3 patient safety solutions were selected as listed below
  1. LASA medication
  2. Patient identification
  3. Control of Concentrated electrolytes

  For Implementation of the above mentioned 3 Patient Safety solutions in Paras JK Hospital, 90 days of training period was divided into 3 categories of events
  - Data collection for Pre-training knowledge assessment
  - Training Intervention days
  - Data collection for Post-training efficacy calculations

  Pre training Knowledge assessment was carried out for 3 IPSS to identify gaps in the compliance of knowledge whereas post training assessment was done after every training program to check the efficacy of the same.

A total of 4 Questionnaires was prepared for 3 IPSS implementation,

1. Patient Identification Pre training assessment
2. Patient Identification Post training assessment
3. LASA and control of concentrated electrolytes Pre training assessment
4. LASA and control of concentrated electrolytes Post training assessment

Table 3.1- list of questionnaire prepared showing the maximum marks and passing marks

S.no	Study	Maximum marks	Passing marks
1.	Patient Identification Pre-training	10	7
2.	Patient Identification Post-training	10	7
3.	LASA and control of concentrated electrolytes Pre training	10	7
4.	LASA and control of concentrated electrolytes Post-training	10	7

Steps for developing a training program for IPSS training

1) Depending upon the objectives, it was decided which mode learning is suitable for reaching the objectives (e g. Questionnaire-both close and open ended questions, training programs)
2) Training Programme was constructed to teach above mentioned 3 IPSS.
3) Training programs also include Hospital SOP's for enhancing the knowledge of the respondents
4) Knowledge assessment test was conducted after every training programme.
5) Evaluation of test results to check the efficacy of trainings

CHAPTER -4

RESULTS & ANALYSIS

As per the objective of the study the results were divided into 3 sections firstly what were the gaps identified, secondly what are changes made in the process flow to close the gap, lastly what were the effect of pieces of training on the staff of the hospital for all the patient solutions mentioned in this study.

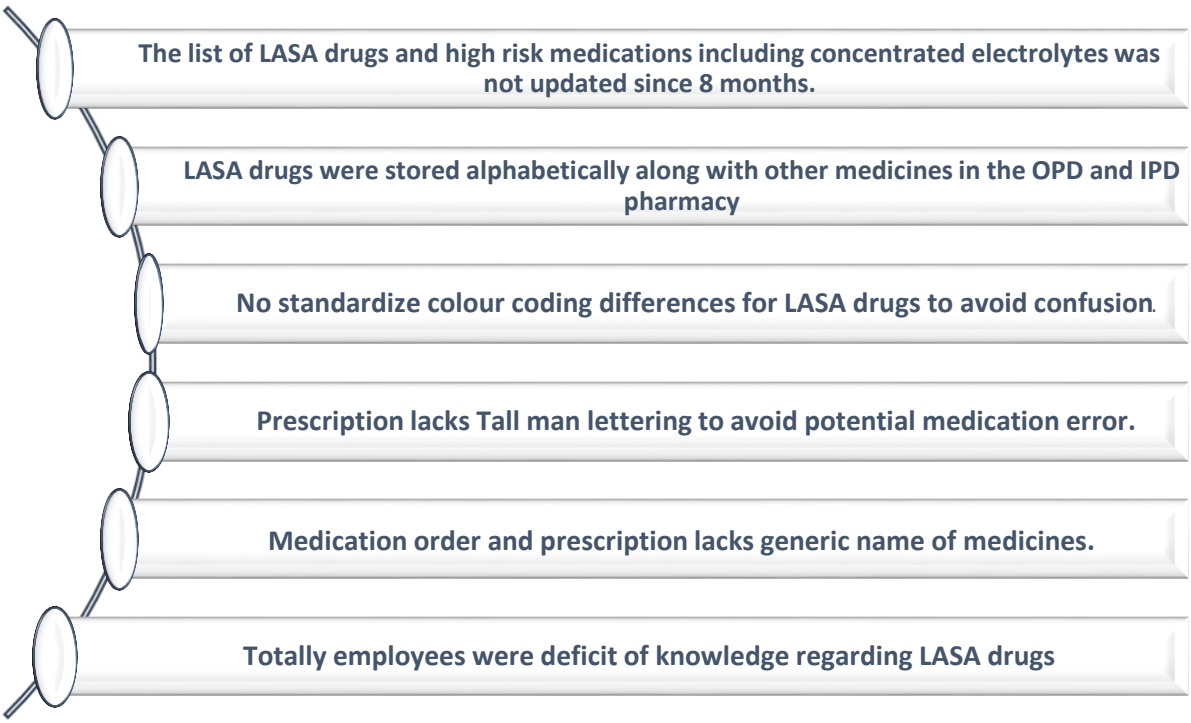
Gaps identified and how policies are revised according to each chapter of WHO 9 IIPS.

The purpose of the study is to reduce these gaps by probably doing trainings programmes and revise the standard operating procedures and regular monitoring and evaluation of the same.

I. LASA and Control of concentrated electrolytes

1. Gaps

These gaps are identified from direct observations, monthly quality report, SOP's and checklist of the hospital. Good amount of time was invested in observing the pharmacy and patient care areas of the hospital to identify the root cause of the gaps.



2. Standard Operating Procedures

Ideally in the first step SOP's were revised against WHO 9 IIPS later trainings were provided to the staff for the same. Changes done in the policies are listed below in table

Table 4.1- showing list of WHO suggested actions and changes made in SOP of the hospital

S.no	WHO Suggested Actions	Revised SOP
1.	Annually reviewing the LASA medications	The LASA list should be updated in every 6 months
2.	Colour differences to reduce confusion	Colour coding done Pink colour- look alike drugs Blue colour- sound alike drugs Orange colour- concentrated electrolytes
3.	Storing in separate location in non-alphabetical order in racks	LASA drugs and high risk drugs should be stored in non-alphabetical order under single lock and key cupboard with colour coding
4.	Minimize the use of verbal orders or telephonic orders to reduce medication error	Verbal or telephonic orders should only be accepted in case of life threating situations by read back policy.
5.	Prescription should include capital letters and also the generic name of the drug to avoid medication error	Prescription should include capital letters and also the generic name of the drug to avoid medication error which is being audited by prescription audit.

To reduce the medication error hospital was capturing the NABH quality indicator which is compliance rate to medication prescription in capitals. This indicator addresses how many doctors are writing the prescription in the capitals to reduce the dispensing error from the pharmacy. This record is captured from the prescription audit which is done monthly.

Doctors are trained to follow the quality indicator to reduce the medication error and ensuring the patient safety by using capital letters, tall man, by mentioning the dose, frequency, generic name, purpose of prescribing the drugs in the prescription.

Figure 4.1. shows the compliance rate to medication prescription in capitals from the month of January 2020 to May 2020.The graph shows varied percentage in terms of compliance but there is prominent increase of 16% in compliance from January to May i.e. 61% to 77% but still there is room for improvement to reduce potential medication error.

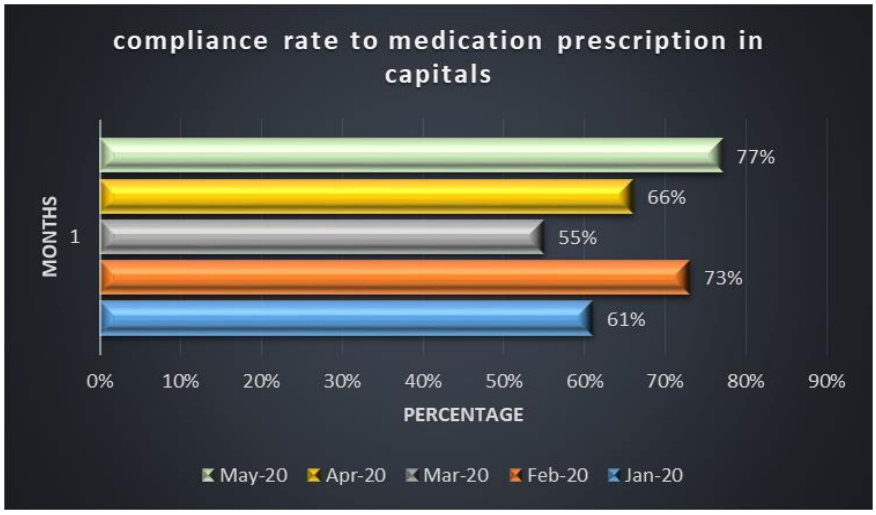


Figure-4.1 showing compliance rate to medication prescription in capitals

Compliance rate to Medication Prescription in capitals
Total no. of prescriptions in capital letters ---------- **x 100** **Total no. of prescriptions**

Table 4.2 and 4.3 shows the list of few drug pairs which are look-alike and sound-alike respectively of the Paras JK Hospital. Colour coding is given to LASA drugs to prevent errors. This colour coding was implemented in pharmacy and patient care areas for storage purpose. Colour coded labelled stickers were pasted on the racks/shelves/drug bins of the cupboard in the pharmacy and patient care areas along with their generic name in the bracket to avoid confusion.

Table 4.2- List of Look-alike drug pairs of Paras JK Hospital

LOOKS A LIKE DRUGS				
S.NO	**MEDICINE 1**	**MOLECULE**	**MEDICINE**	**MOLECULE**
1	TAB ALPrax	Alprazolam	TAB DOMstal	Domperidone
2	TAB ATIvan	Lorazepam	TAB PACItane	Trihexyphenidyl
3	TAB BACtrim	Trimethoprim + Sulfamethoxazole	TAB FLExon	Ibuprofen+ Paracetamol
4	TAB Avil	Pheniramine	TAB Lasix	Furosemide

Table 4.3- List of sound-alike drug pairs of Paras JK Hospital

SOUND A LIKE DRUGS				
S.NO	**MEDICINE 1**	**MOLECULE**	**MEDICINE 2**	**MOLECULE**
1	TAB BriliNTA	Ticagrelor	TAB TrajeNTA	Linagliptin
2	TAB FOLvite	Folic Acid	TAB OSSivite	Calcium Carbonate+ Vitamin D3
3	TAB SibeLIUM	Flunarizine	TAB LibrIUM	Chlordiazepoxide
4	TAB ESOGress	Esamprazole	TAB ESCIGress	Escitalopram Oxalate

Table 4.4- showing examples of look-alike sound-alike drug pairs in different countries

Table 1 – Examples of confused drug name pairs in selected countries
Brand name is shown in italics—Nonproprietary name is shown in bold

Country	***Brand name*** **(Nonproprietary name)**	***Brand name*** **(Nonproprietary name)**
Australia	*Avanza* **(mirtazapine)**	*Avandia* **(rosiglitazone)**
	Losec **(omeprazole)**	*Lasix* **(frusemide)**
Brazil	*Losec* **(omeprazol)**	*Lasix* **(furosemida)**
	Quelicin **(succinilcolina)**	*Keflin* **(cefalotina)**
Canada	*Celebrex* **(celecoxib)**	*Cerebyx* **(fosphenytoin)**
	Losec **(omeprazole)**	*Lasix* **(furosemide)**
France	**fluoxétine**	*Fluvoxamine*
	Reminyl **(galantamine hydrobromide)**	*Amarel* **(glimepiride)**
Ireland	*Losec* **(omeprazole)**	*Lasix* **(furosemide)**
	morphine	**hydromorphone**
Italy	*Diamox* **(acetazolamide)**	*Zimox* **(amoxicillina triidrato)**
	Flomax **(morniflumato)**	*Volmax* **(salbutamolo solfato)**
Japan	*Almarl* **(arotinolol)**	*Amaryl* **(glimepiride)**
	Taxotere **(docetaxel)**	*Taxol* **(paclitaxel)**
Spain	*Dianben* **(metformin)**	*Diovan* **(valsartan)**
	Ecazide **(captopril/hydrochlorothiazide)**	*Eskazine* **(trifluoperazine)**
Sweden	*Avastin* **(bvacizumab)**	*Avaxim* **(hepatitis A vaccine)**
	Lantus **(insulin glargine)**	*Lanvis* **(toguanine)**

Source: WHO (2007), aide Memoire, PS-solution 1, Pg.2

3. Training

After identifying the gaps and changes made in SOP's, pieces of training were given to staff. To test the efficacy of training candidates were asked to undergo Pre-test for which training is going to be provided to know of level of knowledge before training, after completion of training programme participants are again asked to give Post-test.

It was compulsory for each participants to attend at least one training session of each topic.

Following are the results of Pre-training and Post training

3.1 Pre-training

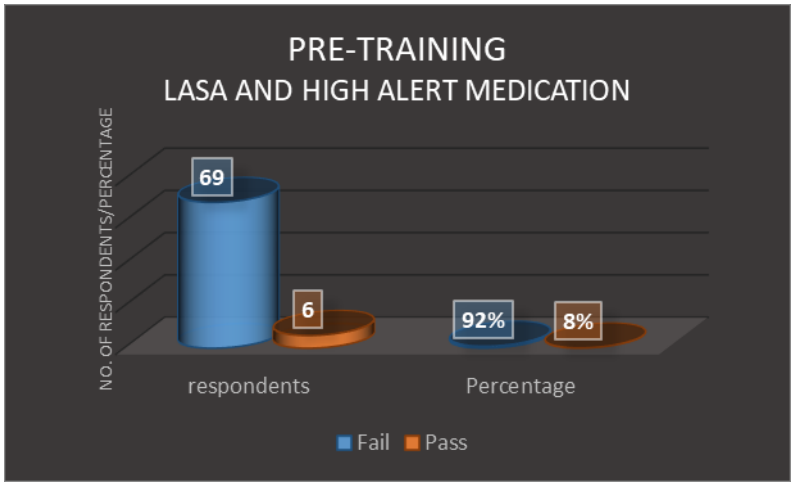


Figure 4.2 showing pretraining results of LASA and High alert medications

Pre-training Survey Results: Figure 4.2 shows out of 75 respondent who participated in survey on LASA & High alert medication, only 8% scored 70% or more. 92% of the participates scored less than 70%. This implies that the majority of the hospital staff lack basic knowledge on LASA, and high risk/alert medications.

In LASA and high risk/alert medication questionnaire 3 categories of respondents were considered that are nursing staff, physicians, and pharmacists.

Figure 4.3 Shows the results of each category separately.

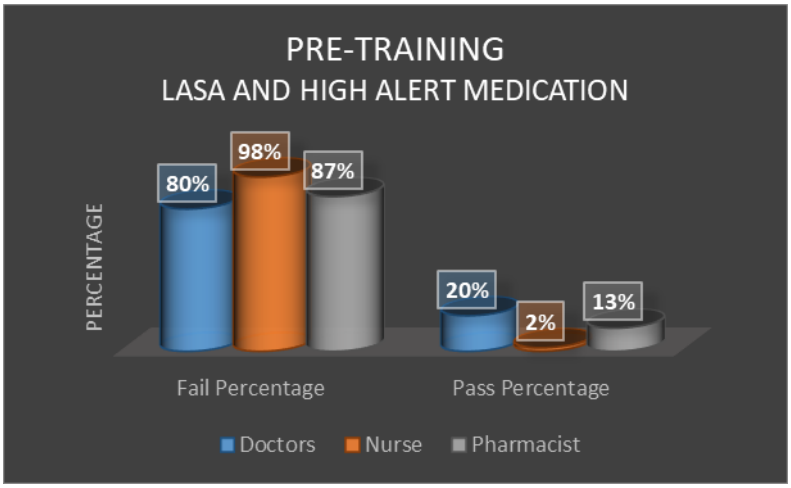


Figure 4.3 showing pre-training percentage of LASA and High alert medications group wise

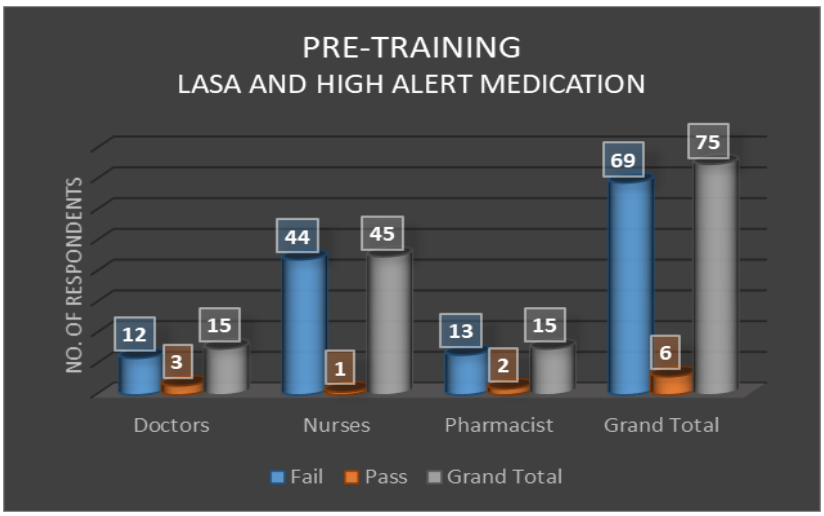


Figure 4.4- showing pre-training results(in numbers)of LASA &High alert medications group wise

Deciphering Pre-implementation Survey Results on the Basis of employee Type: Doctors were found to be the most aware about the concept of LASA & High alert drug. 20% of the doctors who were surveyed scored above passing levels followed by 13% of Pharmacist. While only 2% of the nurses could make through the passing criteria .

3.2 *Post-training*

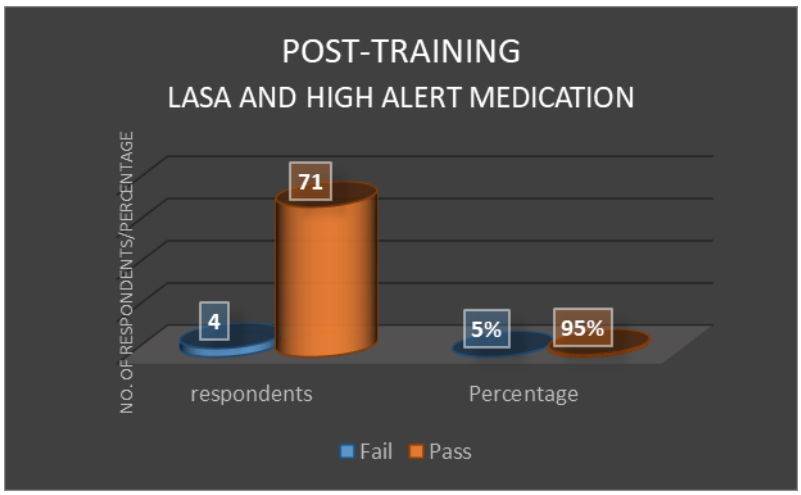


Figure 4.5 showing Post training results of LASA and High alert medications

Post-implementation Survey Results: A significant improvement was seen in the understanding of participants about the concept of LASA & High Alert Medication. 95% of the participants scored 70% or more while 5% of the respondent still lacks the conceptual understanding and could not clear the passing criteria. Figure 4.6 shows results according to different respondents.

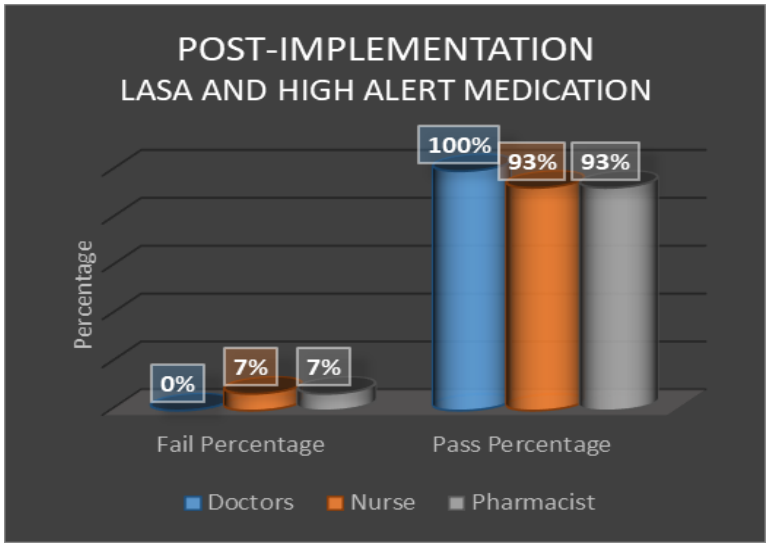


Figure 4.6- showing post-training percentage of LASA and High alert medications group wise

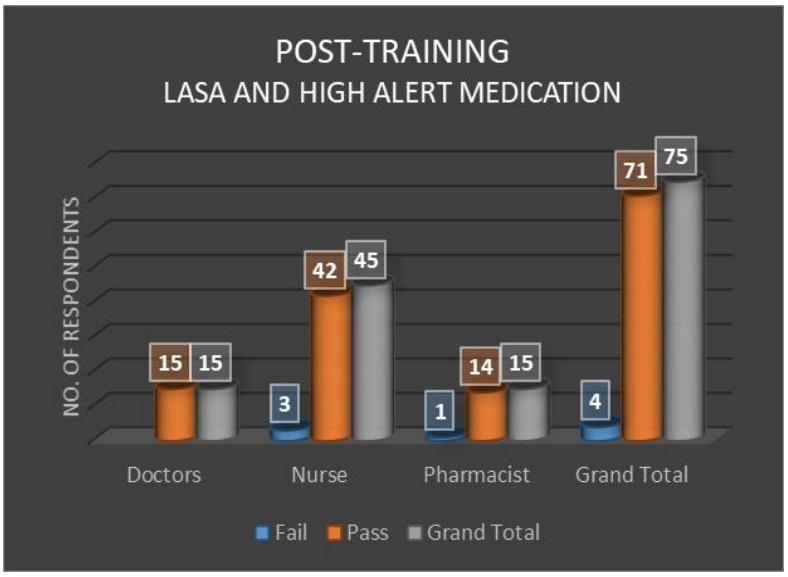


Figure 4.7- showing pre-training results (in numbers) of LASA &High alert medications group wise

Pre-implementation Results Basis Employee Type: All the doctors made to the passing benchmark while Pharmacist success percentage reached 93%. Besides, Nurses showed notable advances taking passing percentage from 2% (Pre-Implementation) to 93% (Post-Implementation).

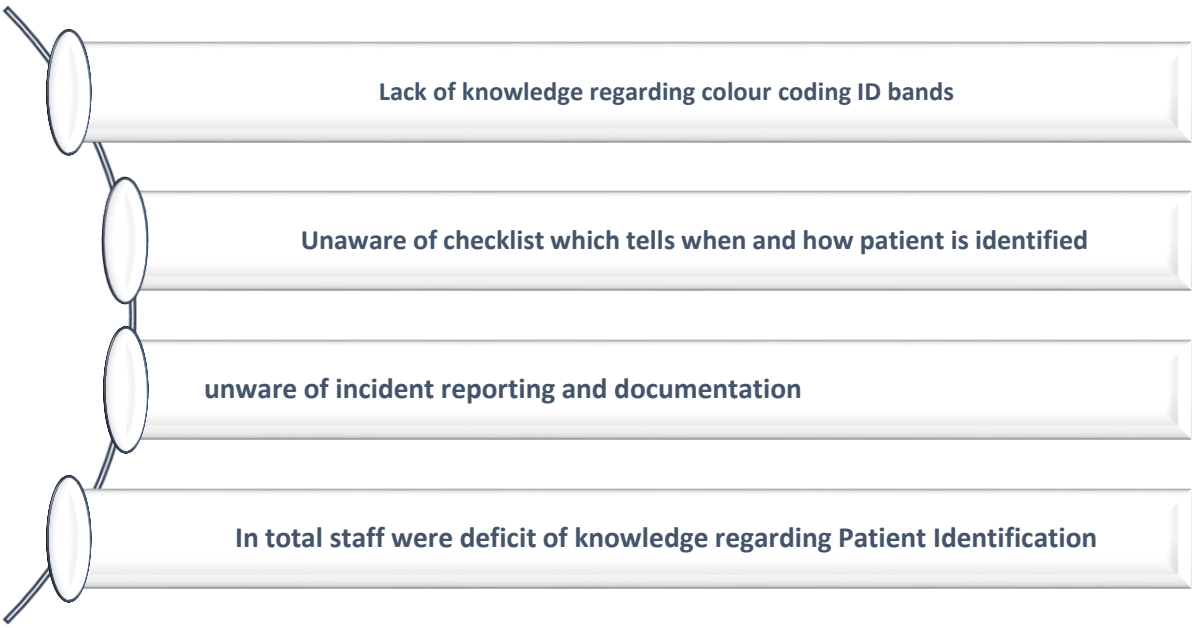
II. Patient Identification

Patient Identification is recognized as most crucial part in entire patient care process in all health care organizations, if patient is identified correctly before every procedure it may reduce all potential and serious harm to the patients. Root cause of many errors in the hospital is wrong Patient Identification.

For correct patient identification at least 2 Patient identifiers are used. Colour ID bands are used for different patient (e.g.-white ID band for adult patients, red ID band for allergic patients)

Figure 4.8- showing colour ID bands

1. **Gaps:**



2. Standard operating procedure

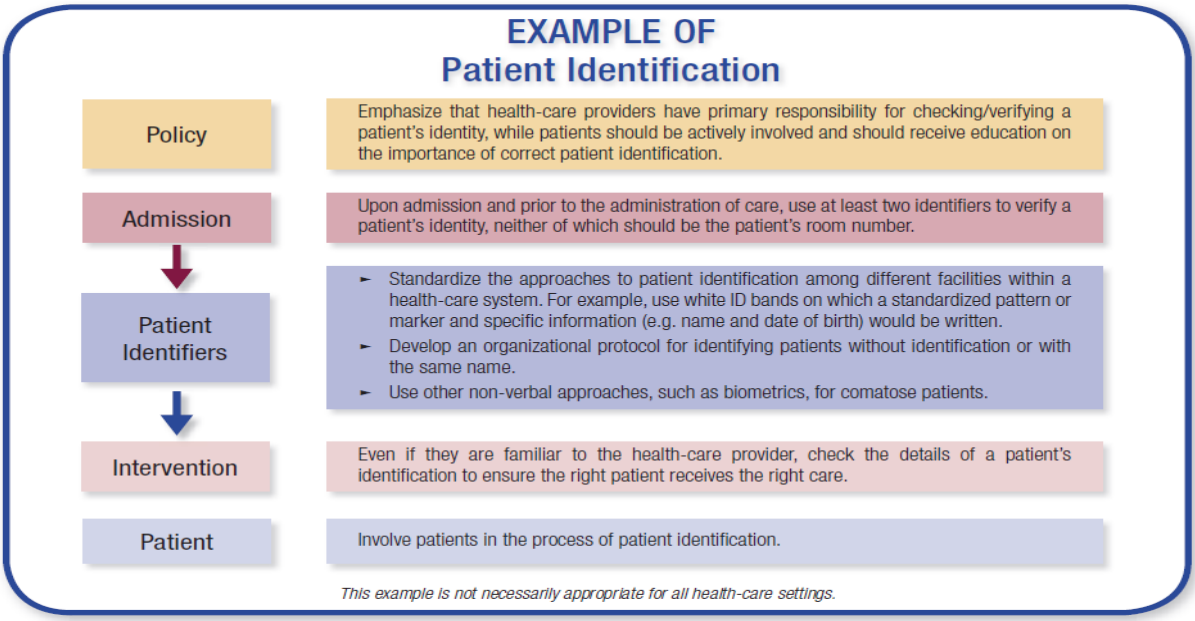


Figure- 4.9 showing example of Patient identification policy
Source: WHO (2007), aide Memoire, PS-solution 2, Pg.5

Figure 4.10 shows the incidence of patient Identification error which gradually increased from 92% to 98% from month of January 2020 to May 2020 that shows there is improvement in staff understandings and knowledge' on the other hand we can also assume that incident reporting has also improved.

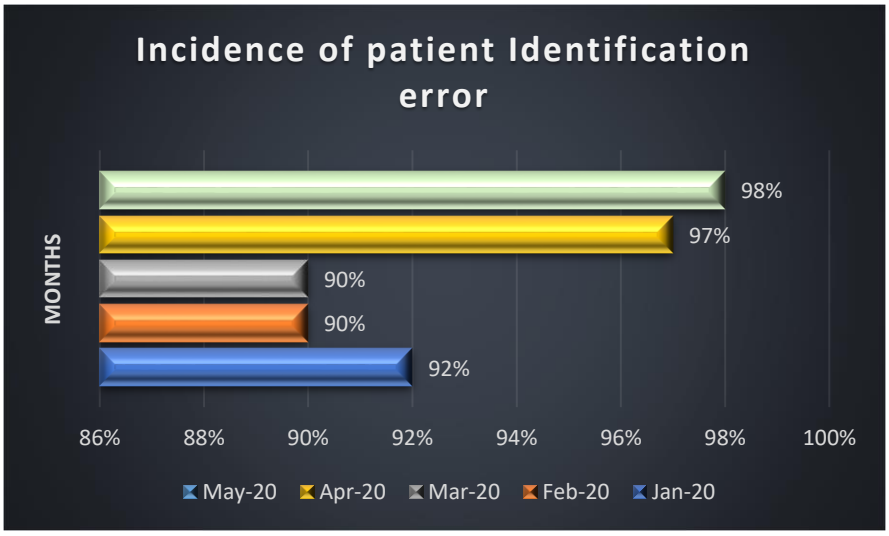


Figure- 4.10 showing incidence of patient identification error

Incidence of patient identification error
Total no. of patient identification errors ---------- **x 100** **Total no. of patients**

3. **Training**

Trainings were given to nursing staff of the hospital. One test is taken before the training and another test was taken just after the training to check the efficacy of trainings.

3.1 *Pre-training*

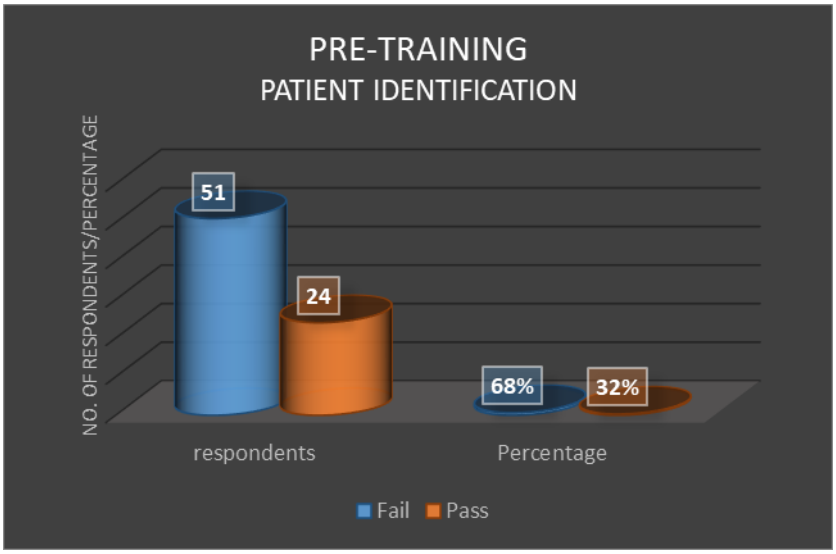


Figure- 4.11 showing Pre training results of patient identification

Pre-training Results: For Pre-test 75 respondents were selected and out of 75 respondents, only 24 nursing staff passed the test and rest 51 were below the passing criteria. In terms of percentage 32% nurses scored 70% or more marks in the test conducted before training. While 68% of the participant scored below passing levels which indicates that there is need to train the nursing staff on Patient identification.

3.2 *Post-training*

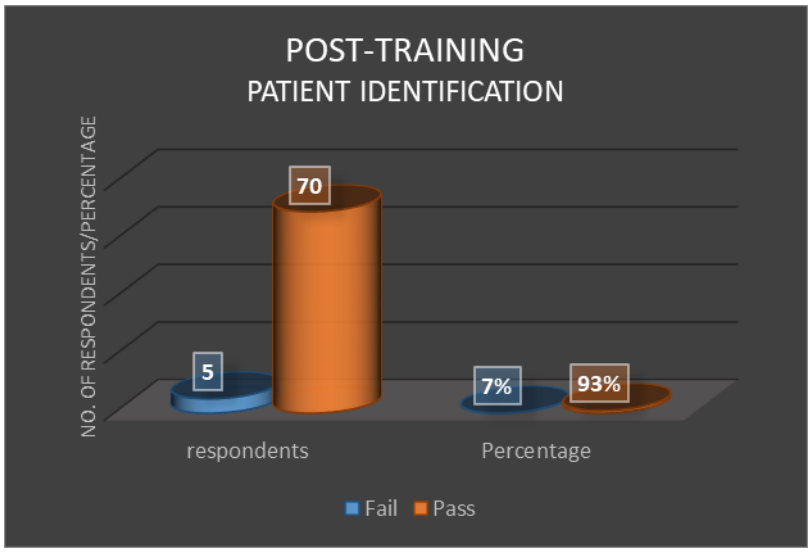


Figure- 4.12 showing Post training results of patient identification

Post-training Results: Post training results showed a straight jump of 61% taking passing percentage from 32% to 93%..Only 7% of the participants couldn't make it to passing pool. In other words out of 75 respondents 70 passed the test and remaining 5 still in the category of fail Success of training program is evident from percentage rise in successful candidates

Paired Sample T-Test

The paired sample *t*-test, sometimes called the dependent sample *t*-test, is a statistical procedure used to determine whether the mean difference between two sets of observations is zero. In a paired sample *t*-test, each subject or entity is measured twice, resulting in *pairs* of observations.

Like many statistical procedures, the paired sample *t*-test has two competing hypotheses, the null hypothesis and the alternative hypothesis..

Like many statistical procedures, there are 2 competing hypothesis for paired t test first null hypothesis and second alternate hypothesis. The null hypothesis presumes that the true mean difference between the paired samples is zero. Contrary, the alternative hypothesis presumes that the true mean difference between the paired samples is not equal to zero

In this study paired t test with right tail was performed as the samples before and after training was exactly same and to proof that there is positive effect of training on the staff .

Figure 4.13 below shows the mean average of LASA and concentrated electrolytes scores before training and after training respectively. There is significant increase from 4 to 8.48 in the mean average score post training.

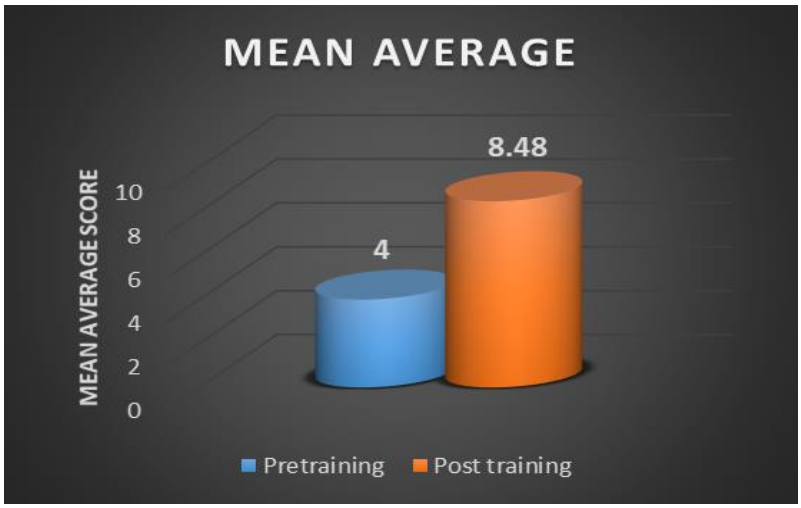


Figure 4.13- showing mean average of pre-training and post-training scores of LASA and concentrated electrolytes

Table 4.5 - Paired t test for LASA drugs and concentrated electrolytes training

Paired Sample Test								
	Paired Differences					t	df	Sig. (1-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Post-test – pre-test	4.000	1.551	0.179	3.643	4.357	22.336	74	0.000075

1. <u>Ho Hypothesis</u>

Since p-value<α i.e. 0.000075<0.05, therefore we reject null hypothesis (H_0).

If said differently, the difference between the mean average of the post training & pre-training scores is big enough to be statistically significant.

2.P-value

P-value (0.000075) is significantly lower. Hence chance of type1 error (rejecting a correct H_0) is very small.

3. The statistics

The test statistic says "t" is equals to 22.336, which is not in the 95% critical value accepted range [-1.9925: 1.9925]

Conclusion: Paired t test is used to see the effect of training whether training have positive effect or negative effect on the staff, there is significant increase in the score of post-test(mean- 8.48) and pre-test (mean- 4) .Since p-value<α we have corroborative evidence to reject the null hypothesis and have evidence to support the claim that the training program has significantly improved the understanding of participants on LASA and concentrated electrolytes

Figure 4.14 below shows the mean average of Patient Identification scores before training and after training respectively. There is significant increase from 6 to 9 in the mean average score post training

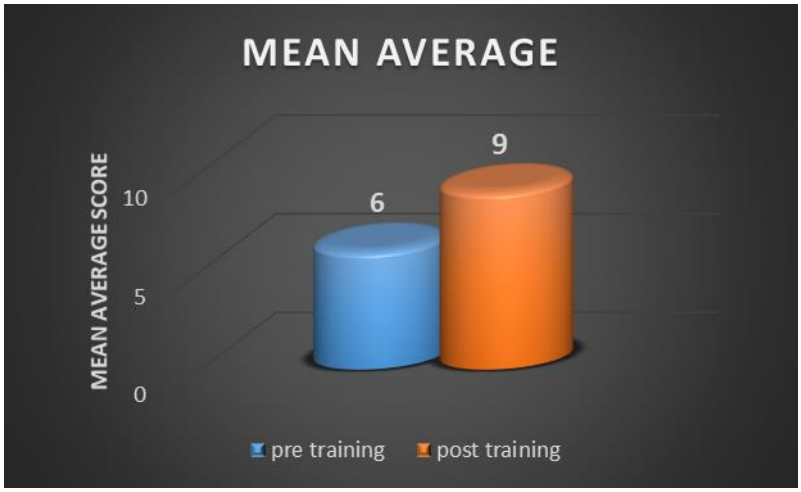


Figure 4.14- showing mean average of pre-training and post-training scores of Patient Identification

Table 4.6 – Paired t test results for patient Identification training

Paired Sample Test								
	Paired Differences					t	df	Sig. (1-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Post-test – pre-test	2.427	2.001	0.231	1.966	2.887	10.502	74	0.007976

1. <u>H0 hypothesis</u>
Since p-value<α i.e. 0.007976 <0.05, therefore we reject null hypothesis (H_0).
If said differently, the difference between the mean average of the post training & pre-training scores is big enough to be statistically significant.

<u>2. P-value</u>
P-value (0.007976) is significantly lower. Hence chance of type1 error (rejecting a correct H_0) is very small.

<u>3. The statistics</u>
The test statistic says t is equals to 10.502, which is not in the 95% critical value accepted range [-1.9925: 1.9925]

<u>Conclusion:</u> Since p-value<α we have evidence to reject the null hypothesis and have evidence to support the claim that training program has significantly improved the understanding of participants on WHO 2nd Patient safety solution which is patient Identification.

CHAPTER -5
CONCLUSION

Globally, the delivery of health care is questioned by a wide range of patient safety problems. The traditional medical oath— "First do no harm"—is rarely violated intentionally by physicians, nurses, or other practitioners. Patient safety has recently been recognized as core value of patient care by WHO in 2005.

The study aims to identify the gaps and devise required interventions for implementation WHO patient safety solutions.

After reviewing all the WHO nine International Patient safety solutions in Paras JK Hospital the most significant problematic areas for patient safety were found to be Patient Identification ,Look alike sound medication and control of concentrated electrolytes on which gaps were identified and required interventions in the form of training was given to the concerned staff.
The significant improvement in the post training assessment scores shows that unintentional harm or errors can be diminished by giving continuous and regular trainings of staff for example patient should be identified before every single procedure, Use of tall man and generic name in the prescription can reduce the dispensing error, trainings on how to use concentrated electrolytes and lastly how to store High risk medications.

By applying paired t test, it is being proved that there is improvement in the knowledge of staff by training interventions. Therefore, hospital should continue doing the trainings to enhance the understanding of staff.

CHAPTER -6

DISCUSSION AND RECOMMENDATIONS

For proper patient safety solution and reduce the potential errors in the hospital given below are some suggestions

- For the respondents who could not clear the post assessment test should be given additional trainings
- Any change from WHO regarding Patient safety should be updated by the quality department in the hospital.
- Formulation of patient safety guidelines in department manuals detailed SOP's for the same so that so that it can evaluated, and changes can be made according to the requirement by the authorized person.
- Where available technologies should be implemented to streamline the information access regarding patient safety.
- Consider Integration of automated system (e.g.: biometric for patient identification)
- Induction Programme should be introduced on Patient Safety.
- Proper documentation in case of any incident.
- Maintenance of training records on regular basis

CHAPTER -7

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APPENDICES

Questionnaire

Patient Identification

Pre-training questionnaire

Patient Identification

Overwriting not allowed

* Required

1. Name of the respondents *

2. Age *

3. Gender *

Female

Male

Prefer not to say

Other:

4. work Experience (in years, months) *

5. How many patient identifiers are used in Inpatients wards *

6. Which of the following patient identifiers are used in inpatients wards *

1. Patient UHID
2. Date of birth
3. Any photo ID
4. All of the above

7. Which are the 2 patients identifiers used ? *

8. If two patients having same name and surname ,how will the patient is identified? *

1. Date of birth
2. Blood group
3. UHID
4. Bed number

9. Arrange the following in order of fixing the ID bands *(Tick in the boxes in correct sequence)

S.no	left upper limb	right lower limb	right upper limb	left lower limb
1	☐	☐	☐	☐
2	☐	☐	☐	☐
3	☐	☐	☐	☐
4	☐	☐	☐	☐

10. What is the full form of UHID ? *

11. Which colour ID band is used for vulnerable patients? *
    1. Pink
    2. Blue
    3. Black
    4. Violet

12. Is patient UHID transferable? *
    1. Yes
    2. No
    3. Maybe

13. Staff should verify the patient id before *
    1. Drug administration
    2. Blood sampling
    3. Blood transfusion
    4. X-ray or imaging procedure
    5. All of the above

14. Patient identification should be ensured before drug administration? *
    1. Yes
    2. No
    3. May be

15. Patient UHID no. is *
    1. Patient's location in hospital
    2. Patient's DOB
    3. UHID that hospital assigns
    4. None of the above

Post training questionnaire

Patient Identification
overwriting not allowed
*Required

Name of the respondent *

Age *

Gender *
Female
Male
Prefer not to say
Other:

Work experience (in years/months) *

1. What is the correct full form of UHID? *
1. Unique hospital Identification Data
2. Unique Hospital Identification
3. Unique Hospital Identification number
4. Unique Hospital ID

2. which colour ID band is used for twin baby girl? *
1. Blue
2. Violet
3. White
4. Pink

3. If patient is having amputated right upper limb, where is the ID band fixed? *
1. Right upper limb
2. Left upper limb
3. Right lower limb
4. Left lower limb

4. Which colour ID band is used for allergic patients? *
1. White
2. Red
4. Blue
5. Violet

5. How many patient identifiers are used in Inpatients wards *

1. 1
2. 2
3. 3
4. 4

6. If mother delivers twin babies one baby girl and one baby boy which color ID band mother will wear? *
1. White
2. Pink
3. Blue
4. All

7. Is patient DOB written on patient Identification band? *
1. Yes
2. No
3. Maybe

8. If ID band is illegible, missing or contains incorrect information then who is the responsible person to put new ID Bands
1. Doctors
2. Nursing staff
3. Floor manager
4. Front office staff

9. Which colour ID band is used for adult inpatients? *
1.White
2.Violet
3. Pink
4. Blue

10. Photo ID is considered as patient identification source in IP wards. *
1. True
2. False

LASA medications and concentrated electrolytes

Pre-Training questionnaire

High Alert Medications

*Required

Name of the respondent *

Age *

Gender *

a) Female
b) Male
c) Prefer not to say
d) Other:

1. The LASA medication error is reduced by *

a) Improved handwriting and printing
b) Use of electronic prescription
c) Using Tall man
d) All of the above

2. Prescription should include *

a) Brand name
b) Non-proprietary name
c) Both
d) none of the above

3. Which technique is used to reduce the confusion associated with the use of LASA names on labels, storage bins and shelves, computer screens? *

a) Boldface
b) Colour difference
c) Both a and b
d) Tall man

4. Look-alike and sound-alike medication errors only occur with medications of similar spelling or sounding names *

a) True
b) False

Fill in the blank for question number 5

5. The storage racks in pharmacy store/ward for look-alike should have clear_____ coloured and sound alike drugs should have clear_____ coloured warning sticker labelling. *

a) Blue and pink
b) Pink and blue
c) Orange and green
d) Green and orange

6. After identifying a look alike sound alike medication error, what would be the proper course of action?
a) Inform the in-charge nurse
b) Call the pharmacy
c) Inform the physician
d) All of the above

7. Ideally who should prepare the electrolyte solution? *
a) Nursing staff
b) Physician
c) Nursing in-charge
d) Pharmacist

8. Concentrated electrolyte must be labelled with which colour warning stickers *
a) Orange
b) Pink
c) Florescent
d) Yellow

9. Before disposing the left-out amount of Narcotic injection it should be diluted in how much times quantity of water? *
a) 250-500
b) 500-1000
c) 1000-2000
d) Not to be diluted

10. Is Promethazine a high alert medication? *
a) Yes
b) No
c) Maybe

Post Training Questionnaire

High Alert medication
Over writing not allowed
*Required

Name of the respondent *

Age *

Gender *
Female
Male
Prefer not to say
Other:

Work Experience (in months/years) *

1. Which colour alert sticker is used to indicate High alert medications *
1. Green
2. Yellow
3. Orange
4. Red

2. High Alert Medication includes *
1. LASA drugs
2. Narcotics
3. Concentrated Electrolytes
4. All of the above

3. Medication error due to LASA drugs occur because of *
1. Similarities in their nomenclature (generic/brand name)
2. Their looks (packaging)
3. Both of the above
4. None of the above

4. LASA medications are stored alphabetically, along with other medications. *
1. True
2. False

5. Which of these electrolytes whose inadvertent erroneous use can cause significant harm to the patient *
1. Potassium chloride (equal to or greater than 2mEq/ml,)
2. Sodium chloride (greater than 0.9% concentration)
3. Magnesium sulphate (Equal to or greater than 50% concentration)
4. All of the above

6. Which of the given below drugs are not to be stored in refrigerator *
1. Insulin
2. Heparin
3. Vasopressin
4. Artacil

7. The storage racks in pharmacy store/ward for look-alike should have clear_____ _colour and sound alike drugs should have clear_____ colour warning sticker labelling. *

1. Pink and blue
2. Green and orange
3. Blue and pink
4. Orange and green

8. Which out of these given below are sound alike medications *
1. Crocin ------- Crocin DS
2. Tab Avil ------ Tab Lasix
3. Tropine 1ml ------ Pyrolate 1ml
4. Orflox 200mg Tab ------- NORflox 400mg Tab

9. Is insulin a High Alert medication? *
1. Yes
2. No
3. May be

10. Which out of these given below are Look-alike medications
1. Ciplox cream ------ Ciplox D cream
2 Medzol inj. ------ Medzol eye drop
3 Atorva 10mg ------ ETova Tablet 400mg
4 XylocARD inj. 50ml ------ xylocAINE 2% 30ml