RESEARCH
O&G Forum 2024; 34-3s: 1755-1763

EFFECTIVE STRATEGIES TO ENHANCE PEDIATRIC MEDICATION SAFETY BY REDUCE NUMBER OF MEDICATION ERRORS AND INCREASE ADHERENCE TO MEDICATION SAFETY PROTOCOLS IN OUTPATIENT PHARMACY AT KFAFH

Dr. Dalal M. AL-Harbi[1], Mr. Basem Mohammad Aljohani[2], Mr. Fahad Mohammed Assiri[3], Mr. Ali Saeed Ali Alzahrani[4], Mr. Abdullah Saleh Alhadhrami[5], Mr. Abdullah Suliman Alharbi[6], Mr. Raein Faiz algaedi[7], Mr. Wael Hasan alzahrani[8]

[1]Pharm D, King Fahad Armed Forces Hospital, Jeddah, dr.dalalmsalharbi@gmail.com
[2]Pharmacy Technician, King Fahad Armed Forces Hospital, Jeddah, Basemmaljohani469@gmail.com
[3]Pharmacy Technician, King Fahad Armed Forces Hospital, Jeddah, Fa7ad331@hotmail.com
[4]Pharmacy Technician, King Fahad Armed Forces Hospital, Jeddah, ASZ0045@hotmail.com
[5]Pharmacy Technician, King Fahad Armed Forces Hospital, Jeddah, A-1113-1@hotmail.com
[6]Pharmacy Technician, King Fahad Armed Forces Hospital, Jeddah, Abd55655@gmail.com
[7]Pharmacy Technician, King Fahad Armed Forces Hospital, Jeddah, dr.r.alharbi@hotmail.com
[8]Pharmacy Technician, King Fahad Armed Forces Hospital, Jeddah, wo0i0o@outlook.sa

Abstract
Background: Medication errors pose significant risks to pediatric patients, leading to adverse drug events, hospitalizations, and even fatalities. The outpatient pharmacy plays a crucial role in ensuring accurate dispensing and administration of medications. However, despite existing safety measures, medication errors continue to occur. This quality improvement project aims to identify areas for improvement and implement strategies to decrease medication errors.
Methods: The PDSA rapid cycle quality improvement method was used for this project, focusing on enhancing medication process safety in pediatric patients in Outpatient Pharmacy. We analyzed identified medication errors to determine underlying causes and implemented several actions.
Interventions
- Standardized Procedures for pediatric medication handling
- Improve communication between healthcare providers, pharmacists, and patients.
- Provide ongoing training programs for pharmacy staff on pediatric medication safety practices and error prevention strategies.
- Create culture that encourages reporting medication errors without fear of retribution.
- Educate patients and their families about their medications, including the importance of adherence.
- Establish a system for monitoring and evaluation of medication safety protocols.

Results
- A significant Decrease the number of medication errors by 87.5% in total medication handling stage.
- Adherence to medication Safety Protocols increased by 90%.
- A significant increase in the number of interventions by the outpatient pharmacy staff by 87.41 %.
- The intervention resulted in a significant reduction in the prescribing error rate to 76.3% postintervention Besides, rates of all types of medication errors declined to different degrees due to the intervention.
- The overall rate of acceptance of the pharmacist's suggestions was 94.3%.
- Significant increase in Percentage of Parents' Education to understanding and drug- related needs by 41.3%

Conclusions: The efficient strategies implemented positively enhanced overall patient safety in this vulnerable population, improving patient outcomes, reducing medication errors, and minimizing adverse effects on health-system costs.
Key words: Pediatrics, Medication Error, Outpatient Pharmacy.

Introduction

Problem Description:

Pediatric patients are more vulnerable to medication errors due to weight-based dosing, age-specific medication formulations, and communication challenges, which contribute to the increased risk of errors in this population. These errors in

pediatric patients are a significant concern, as they can lead to adverse drug events, harm, and even mortality.

The outpatient pharmacy and medication safety in KFAFH has been experiencingan increasing number of medication errors in the years past, which is considered athreat to patient safety because failure to prevent these errors can result in unwanted occurrences that could be harmful.

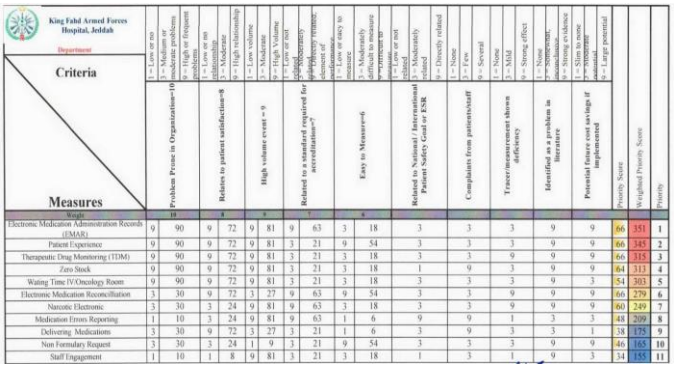
Medication errors can impact patients, parents, and healthcare professionals directly by increasing costs, lengthening hospital stays, and indirectly affecting confidence in healthcare services. Children may also suffer severe mortality and morbidity as a result.

While at the same time imposing a considerable financial burden on health care systems, the medication safety center and outpatient pharmacy at King Fahd Armed Forces Hospital (KFAFH), Jeddah, has considered enhancing medicationsafety in pediatric patients in Outpatient Pharmacy at KFAFH as a top priority; hence, the improvement project is conducted.

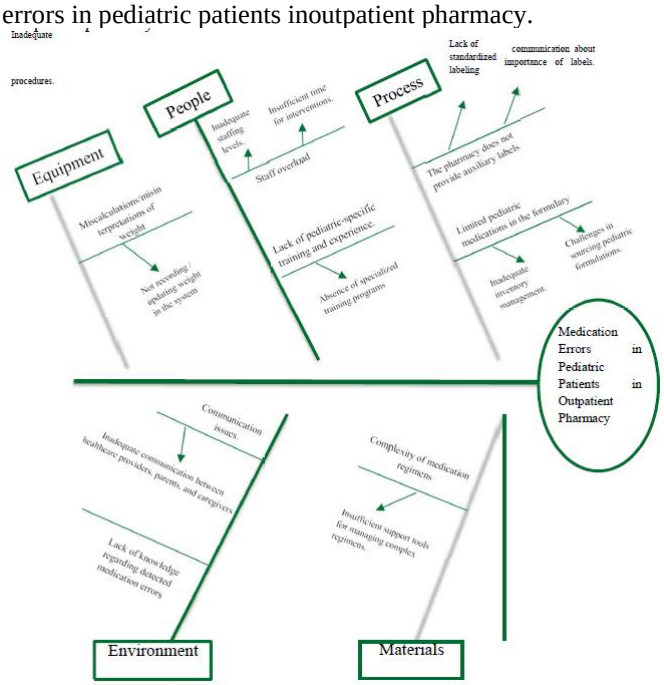
SMART aim for Effective Strategies to Enhance medication process safety inpediatric patients in Outpatient Pharmacy:

Rationale:

Medication errors have always been a problem for the KFAFH and one of the hospital-wide and departmental priorities to measure and monitor; however, in the years past, there has been an increasing number of more significant medication errors in pediatrics, which are challenging and problematic to manage. The outpatient pharmacy and medication safety center are working together to prevent and minimize the impact of medication errors on pediatric patients in the KFAFH service, in addition to improving clinical care, patient safety, efficiency, and the overall patient experience. Since enhancing medication safety is essential to help reduce these risks and enhance patient outcomes, the outpatient pharmacy and medication safety analyzed the causes, and several strategies and actions were implemented to reduce the Risk of Pediatric Medication Errors.



Fishbone diagram illustrating the root causes of medication errors in pediatric patients inoutpatient pharmacy.



Background (Available Knowledge)

Approximately 1.5 million people are harmed by medication errors (MEs), which are among the most frequent medical mistakes. Adverse events for hospitalized patients are primarily caused by medication mistakes (Bates et al.,1999; Bates, Boyle, Vanda Vliet, Schneider, & Leape, 1995) [1,2]. MEs incur significant expenses, ranging from US$ 6 billion to US$ 29 billion annually, inaddition to undermining patients' trust in medical care (WHO, 2014) [3].

MEs cost between $2,000 and $2,500 per patient and extend hospital stays by two days (Bates et al., 1995; Classen, Pestotnik, Evans, Lloyd, & Burke, 1997;Vasin, Zamamin, & Hatam, 2014).[4]

Pharmacists can recognize and prevent medication errors by checking dosing calculations, screening for drug-drug interactions, and counseling caregivers onproper administration and medication-storage safety tips [5]. They can also double-verify the patient, drug, dose, line attachment, pump settings, andinfusion rates in the institutional setting [6].

Pharmacists can optimize medication use by ensuring that patients receive the right medication, at the right dose, at the right time, and for the right duration. They can also identify and resolve medication-related problems, such as adverse drug reactions, drug interactions, and non-adherence [7].

In pediatric patients, pharmacists can formulate and package

medications specifically for children by carefully determining and adjusting dosages. Theycan also provide education about the child's medication to parents/caregivers, especially as part of the medication use process [8].

Pediatric medication safety training programs for healthcare workers offer important ways to lower the risk of medication inaccuracy. The training programshould be included as part of the process for onboarding new staff to reduce the risk of medical errors among the pediatric population. Once staff have completedthis training program, they should be knowledgeable about safely administering and dispensing medication to pediatric patients [9].

It is crucial for healthcare providers to ensure that the appropriate drug and doseare prescribed to children, especially neonates, because of their differences in response to drugs compared with adults. Understanding pediatric pharmacokinetics and stages of development can help providers more accurately prescribe medications for children and minimize dosing errors [5].

Pediatric-specific strategies for reducing medication errors include standardizingand identifying medications effectively, as well as the processes for drug administration. Establishing and maintaining a functional pediatric formulary system with policies for drug evaluation, selection, and therapeutic use can also help reduce medication errors [10].

Pharmacists can actively educate caregivers on how to take medications properly and provide clear instructions on administration and storage. This can help ensure that medications are being administered correctly and safely [8].

Although several studies have demonstrated that specific interventions in the medication orders and processing might reduce the risk of error (Kaushel et al.,2001[11]

The pediatric population is at higher risk of being affected by DRPs, as “Children are not just “little adults” in that they exhibit essential individual variation in organ development, weight, and body surface area, which makes drug therapy more complicated than in adults [12] Prior empirical research has shown that MEs are linked to a number of factors, including medical complications, a lack of therapeutic training, a lack of experience, a lack of knowledge about drugs, work overload, poor communication, interruptions and distractions, a lack of standard protocols and procedures, and a lack of resources[[13], [14], [15], [16], [17]]

Measures:

The outcome measures were selective to evaluate the impact of the implementation of theactive strategies:

- The number of medication error
- The number of pharmacist intervention to prevent medication error

Percentage of Parents’ Education to Understand Drug-Related Needs.

- Patient satisfactions.

Process Measures: Adherence to Medication Safety Protocols:

- Percentage of implemented Double Checking
- Percentage of compliance with Standard Labeling Compounding medications.
- Percentage of dispensing Ready-to-Use" Medications Compounding"
- Percentage of use of appropriate measuring devices (oral syringes).
- Pediatrician acceptance rate of the pharmacist's suggestions
- Number of staff compliance monthly medication safety course

Data collections Tools:

- Process Measure (Adherence to Safety Protocols): Regular audits and observations would be conducted to assess staff adherence to safety protocols. This involves a checklist of safety measures observed during actual medication dispensing and workflow. Audits might occur weekly to ensure consistent monitoring.
- Outcome Measure (Reduction in Medication Errors)
- Baseline data were taken from the data previously reported to the CQI department.
- Data was collected via an Excel sheet (Intervention, Medication Error).
- Data is analyzed and followed up daily and reported to the CQI department.

Analysis

Descriptive statistics were carried out; categorical variables were summarized bynumber and percent; Data was displayed inline graphs to examine variationoccurring at the aggregate level.

All statistical analysis was performed by using software Microsoft Excel.

Ethical Considerations:

This project was initiated by Pharmacy Department and approved by CQI &PSNo consent from the patient is required for this project.

Design Interventions:

on January 01, 2023, Active strategies were implemented by medication safety pharmacist and outpatient pharmacy staff within the Hospital to Enhance medication process safety in pediatric patients in Outpatient Pharmacy at KFAFH.

We are doing:

1. Standardized Procedures for pediatric medication handling. This ensures consistency and reduces the risk of errors caused by confusion or miscommunication.
2. Improve communication channels between healthcare providers, pharmacists, and patients. Encourage open dialogue, clarify medication instructions, and ensure that all parties are well-informed about the prescribed medications.
3. Provide ongoing training programs for pharmacy staff on medication safety practices, and error prevention strategies. This ensures that staff members are equipped with the necessary knowledge and skills to minimize errors.
4. Create a culture that encourages reporting of medication errors and near-misses without fear of retribution. Establish a confidential reporting system to capture incidents and near-misses, allowing for analysis and identification of trends or recurring issues.
5. Educate patients and their families about their medications, including proper administration techniques, potential side effects, and the importance of adherence. Encourage them to ask questions and actively participate in their healthcare.
6. Establish a system for ongoing monitoring and evaluation of medication safety protocols. Regularly review

data on medication errors, near-misses, and patient outcomes to identify areas for improvement and implement necessary changes.

Engagement Approach: Regular team meetings were conducted to brainstorm, discuss, and develop intervention strategies. Additionally, external experts in Pediatrician consultant were consulted to ensure the interventions were evidence-based.

Anticipated Problems:

Anticipated challenges included initial staff resistance to change, and the need for additional time and resources for training programs. Moreover, maintaining consistency in adherence to updated safety protocols posed a challenge, as it required continual reinforcement and staff accountability.

Sustainability Plan:

The sustainability of the interventions was a core consideration. This involved:

- **Continuous Training and Education:** Developing a structured, ongoing trainingprogram to onboard new staff and update existing staff with regular refresher courses on pediatric medication safety.
- **Periodic Reviews and Improvement:** Establishing a culture of continual quality improvement with regular reviews and updates of safety protocols to adapt to newchallenges or emerging best practices.

7. By incorporating these measures into the operational fabric of the outpatient pharmacy, the interventions were designed to create a sustainable improvement in medication safety for pediatric patients.

Strategy Specific Aims

Primary Aims

- To reduce the number of medication errors related to pediatricprescriptions of less than 60 reports/month by the end of 2023.
- To increase Adherence to medication Safety Protocols by 80% frombaseline by the end of 2023

Secondary Aim:

- To improve outpatient pharmacy staff intervention and enhance Communication and Education for patients, families, and healthcareprofessionals by 70 % from baseline by the end of 2023.

Methods (context):

The project was carried out in King Fahd Armed Forces Hospital, Jeddah. The Plan Do StudyAct rapid cycles Quality improvement method was used for this project. The PDSA activitiesfocus on Enhance medication process safety in pediatric patients in Outpatient Pharmacy atKFAFH. We have analyzed of identified medication errors to determine underlying causes,and several actions were put into place. The project was conducted from January 01, 2023, with ongoing monitoring measures monthly, followed by interventions and action plans accordingly. (Figure 1)

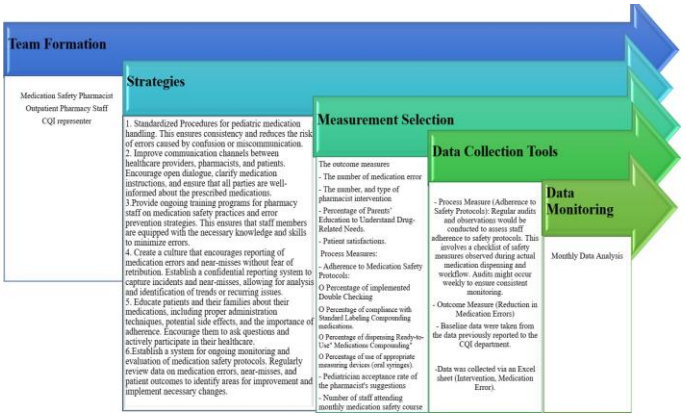


Figure1

PDSA Cycle 1: Standardized Procedures for Pediatric Medication Handling

Aim: To develop standardized procedures for medication dispensing, labeling, andadministration to reduce errors caused by confusion or miscommunication.

Change Hypothesis and Strategy for Change: Create detailed protocols and checklists for dispensing, labeling, and administering medications. Implement the new procedures and checklists for a trial period.

Implementation: standardized procedures and checklists based on best practices. Conducted training sessions with the staff on the new protocols and introduced them foruse.

Data Collected: Recorded instances of adherence to the new procedures and the number oferrors after implementation.

Key Learnings: The standardized procedures significantly reduced errors due to miscommunication, but some staff found the new process to be more manageable initially.

Predictions vs. Outcomes:

The need for standardized procedures aligned with the outcomes, reducing miscommunication-related errors. The initial resistance from some staff was greater thananticipated.

PDSA Cycle 2: Improving Communication Channels

Aim: To enhance communication among healthcare providers, pharmacists, and patients toensure a better understanding of prescribed medications.

Change Hypothesis and Strategy for Change: Implement a communication protocol to ensure clear dialogue and understanding between all parties. This includes information-sharing sessions and easy-access resources.

Implementation: Introduced regular information-sharing sessions for healthcare providers,pharmacists, and patients. We implemented easily accessible resources explaining medication instructions.

Data Collected:

Feedback surveys on the clarity of information shared after implementation.

Key Learnings**:**

Improved communication led to a better understanding of medication instructions and minimized confusion among all parties. Some patients required additional follow-ups toensure complete understanding.

Predictions vs. Outcomes:

The need for improved communication channels aligned with the outcomes facilitates better understanding. The need for additional follow-ups for some patients was more pronounced than anticipated.

PDSA Cycles 3-7: Further Improvement and Ongoing Monitoring

For the subsequent cycles (3-7), similar PDSA methodologies were applied to refine ongoing training programs, foster a culture of reporting errors, continually educate patients and families, conduct routine audits, and establish a monitoring and evaluation system.

Each cycle involved implementing strategies, collecting data, learning from the outcomes, and adjusting the interventions accordingly.

Study of the Intervention(s)

Assessment of the intervention and their outcome was monitored asfollow:

- Data collection and analysis on monthly basis.
- Once-Weekly meeting for the team to study the data.
- The selected intervention was implemented systematically tomonitor its impact individually.

After 3 months, we noticed an improvement of Adherence to Safety Protocols, reduce therate of medication errors related to pediatric prescriptions, and increased number of outpatient pharmacy staff intervention. (Figure 2 ,3,4,5,6 ,7,8,9,).

Figure 2

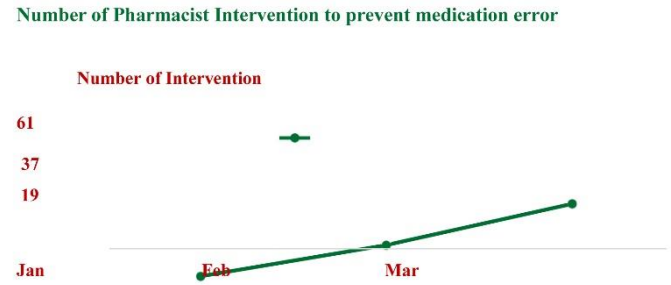


Figure 3

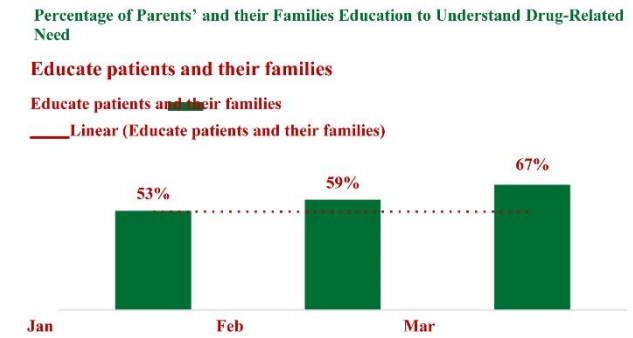


Figure 4

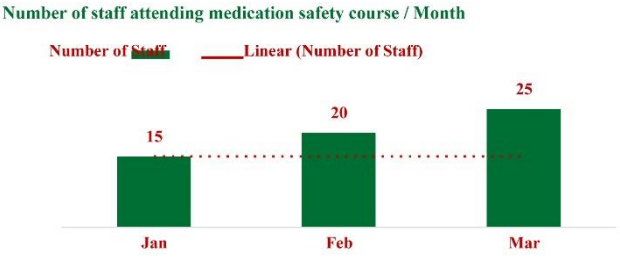


Figure 5

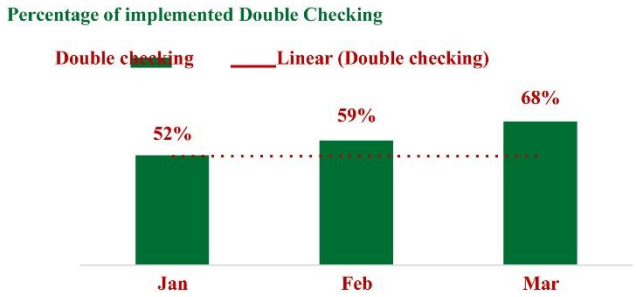


Figure 6

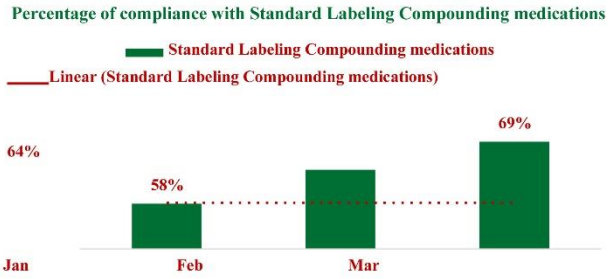


Figure 7

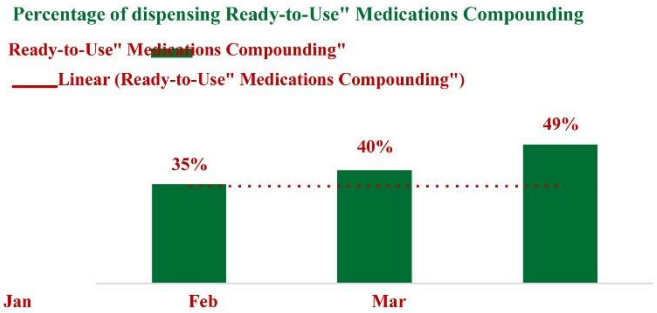


Figure 8

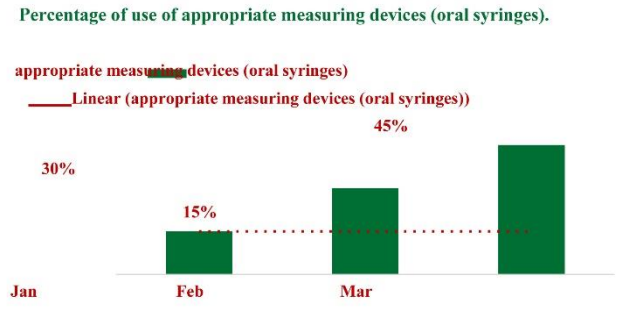


Figure 9

Results:

- A significant Decrease the number of medication errors by 87.5% in total medication handling stage
- The solutions suggested during this improvement project succeeded in decreasing the number of medication errors by less than 60 reports /month in the total medication

handling stage as shown in Figure 11

- The pharmacist prevented 1088 MEs from occurring within 943 patients. About 2.7 MEs per prescription were prevented.
- Most patients involved in preventing MEs were in the age group of 1 month -14 years.
- Medication-related errors (563 (51.7%)) and Patient-related errors (257 (23.6%)) were the most prevented errors.
- Medication incorrect dose (277) was the most prevented subtype of error, followed by medication dosing frequency (234) and Patient's body weight (215).
- Most of the errors prevented were near misses (99.9%), followed by errors that reached the Patient but did not cause any harm (0.08%).
- Figures 10 show the different possible causes of the detected MEs. The highest percentage of causes of MEs where pharmacy does not provide auxiliary labels with the dispensed compounding medications (13.59%) and Lack of independent check system (12.66%)
- A significant increase in the number of interventions by the outpatient pharmacy staff by 87.41 %.
- The intervention resulted in a significant reduction in the prescribing error rate to 76.3% post intervention. Besides, rates of all types of medication errors declined to different degrees due to the intervention.
- Most interventions were provided as prescribing stage (769 (76.3%)).
- A total of 1008 interventions for 768 pediatric patients were recorded. There were 769 prescribing errors, 277 of which were dosing errors.
- The overall rate of acceptance of the pharmacist's suggestions reaches more than 94.3%.
- Weight-based dose checking in a pediatric outpatient pharmacy proactively prevents potential adverse events among the pediatric population.
- Adherence to medication Safety Protocols increased by 90%.

Figures 10 show the different possible causes of the detected MEs.

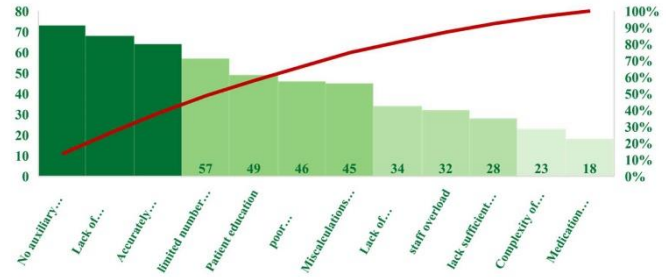


Figure 10

The solutions suggested during this improvement project succeeded in decreasing the number of medication errors by less than 60 reports / month in the total medication handling stage as shown in Figure 11

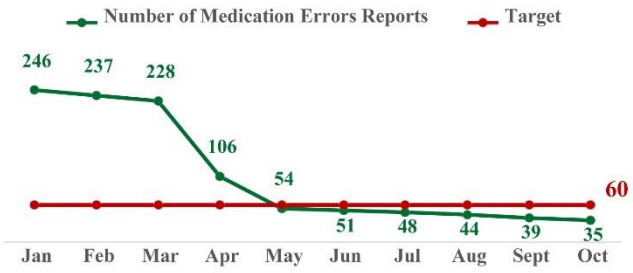


Figure 11

Figure 12 shows the different types of errors related to medications prescribing detected at the beginning of the study.

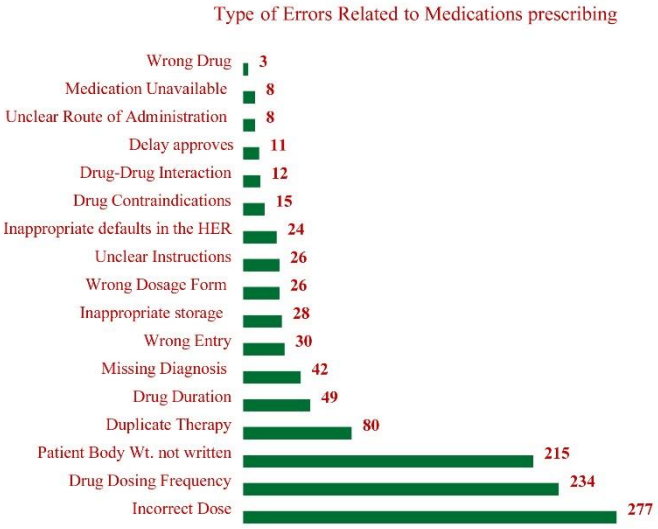


Figure 12

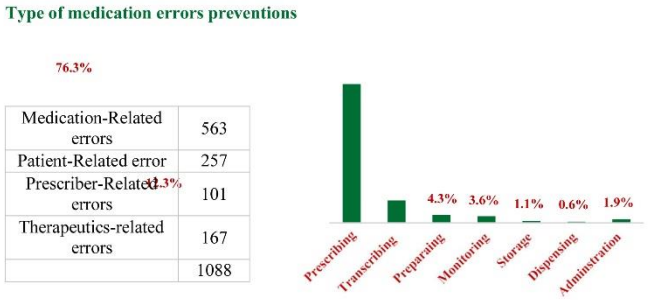


Figure 13

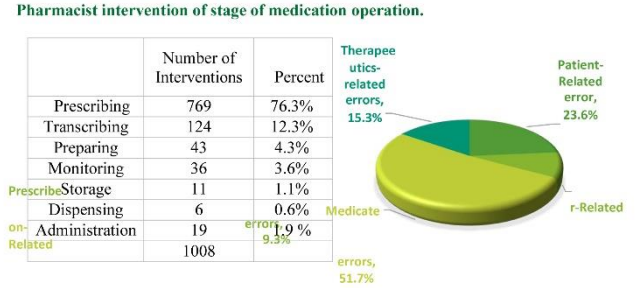


Figure 14

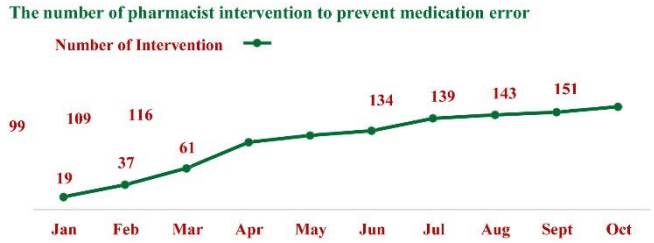


Figure 15

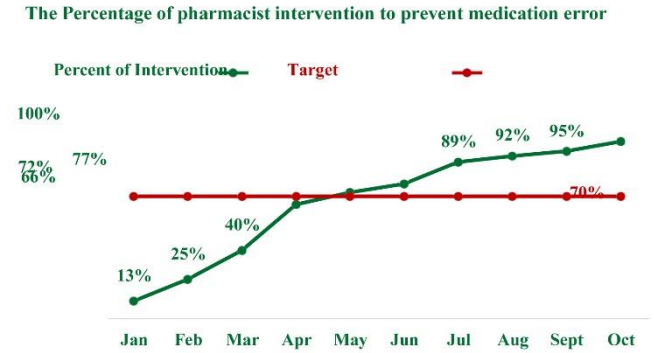


Figure 16

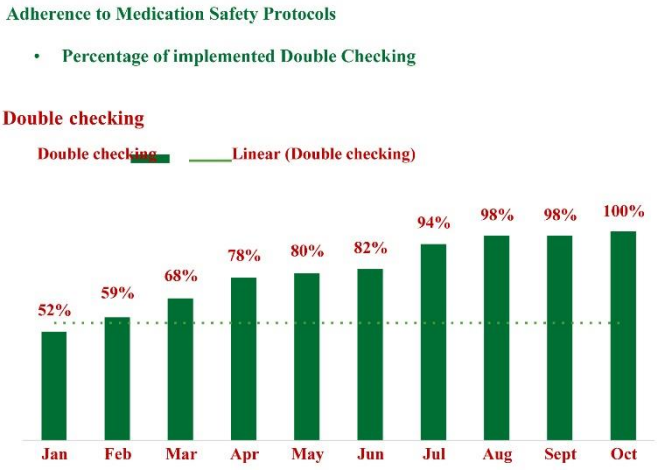


Figure 17

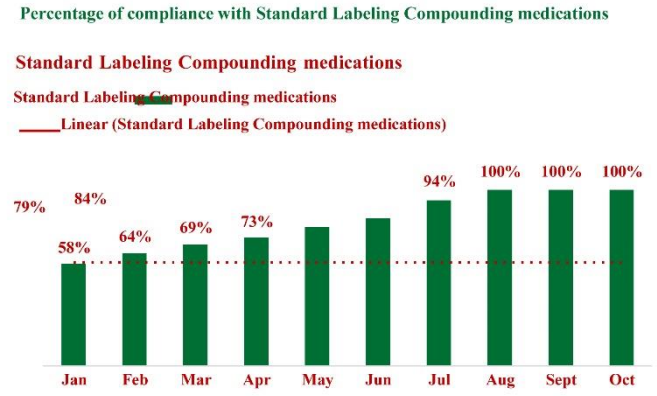


Figure 18

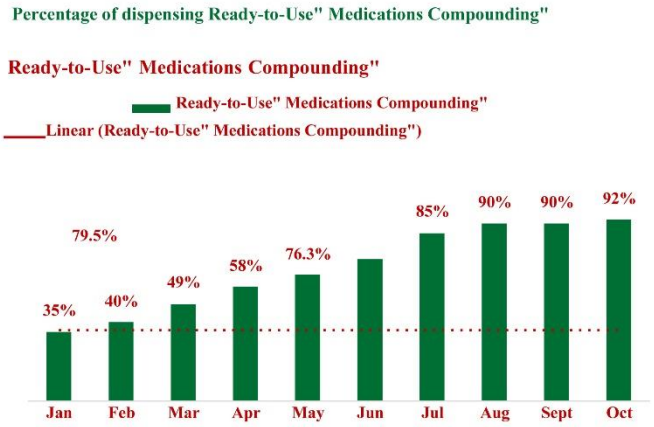


Figure 19

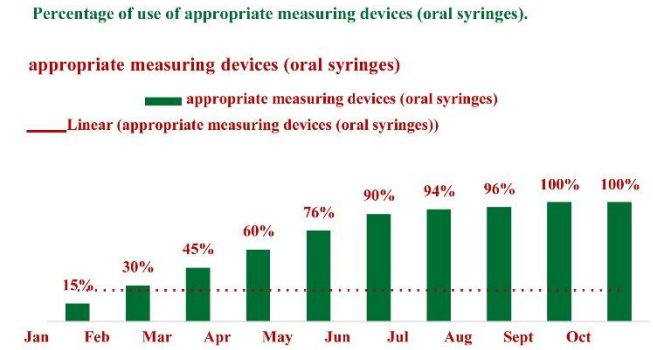


Figure 20

Figure 21

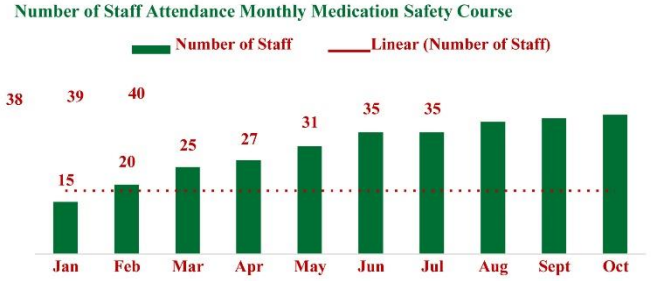


Figure 22

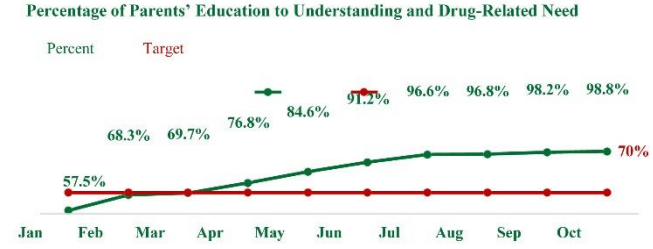


Figure 23

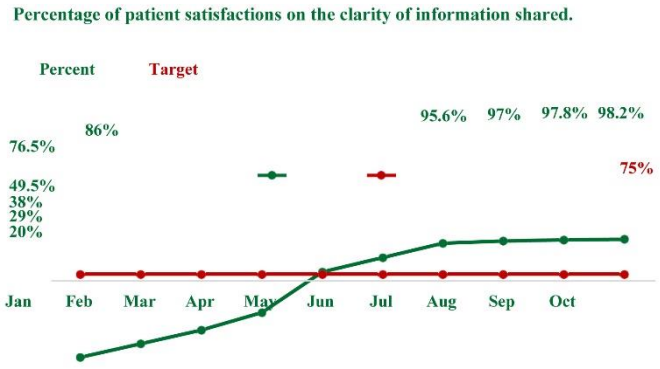


Figure 24

Summary and Interpretation:

The medication safety project in the pediatric outpatient pharmacy revealed numerous valuable insights, strengths, and limitations that influenced its implementation and outcomes.

Lessons Learned: (Impact of the project)

1. Importance of Collaboration: Collaborating with diverse teams (pharmacists, healthcare providers, and medication safety pharmacists) was vital for a comprehensive approach.
2. Continuous Training Impact: Ongoing staff training significantly improved their preparedness to handle pediatric medications safely.
3. Communication is Key: Enhanced communication channels improved understanding between healthcare providers, pharmacists, and patients, impacting medication safety positively.
4. Culture of Reporting: Establishing a culture of reporting errors without fear of retribution encouraged incident reporting and enhanced safety culture.
5. Data-Driven Decisions: Continuous monitoring and evaluation using collected data were fundamental for identifying areas of improvement.

Project Strengths:

- **Holistic Approach:** Addressed multiple aspects of medication safety.
- **Incremental Improvements:** Applied iterative changes via PDSA cycles, leading to progressive enhancements.
- **Staff Engagement:** Staff involvement and training were crucial for successful implementation.

Challenges Faced:

- **Resistance to Change:** Initial reluctance among staff to adapt to new procedures.
- **Time-Intensive Processes:** Some interventions, like double-check procedures, affected workflow efficiency.
- **Patient Education:** Ensuring patients and families fully comprehend medication instructions required additional follow-up efforts.

What I'd Do Differently:

- **More Emphasis on Change Management:** Addressing staff concerns and providing more transitional support during implementation.
- **Increased Patient Education Engagement:** Focused efforts on developing more comprehensive patient education strategies with follow-up mechanisms.
- **Deeper Analysis of Error Trends:** More detailed analysis of the patterns in reported errors to tailor interventions better.

Limitations and Adjustments:

- **Turnaround of Patients:** Rapid turnover of patients affected the depth of engagement and follow-up for patient education efforts.
- **Generalizability:** The project's specific environment might limit generalizability to different pharmacy settings.

Confounding, and Adjustments:

- **Confounding:** External factors like sudden procedure changes might have impacted results.
- **Adjustments:** Continuous adjustments were made based on feedback and ongoing data analysis to counter any inherent biases.

Data and Precision:

- **More Data Points:** Ongoing data collection was beneficial, but a more extended observation period would have yielded more comprehensive insights.
- **Efforts to Minimize Limitations:** Continuous adjustments were made based on feedback and ongoing data analysis to counter any inherent biases and limitations.

Reflecting on the project, while it achieved notable improvements in medication safety, there were challenges in staff adaptation, and patient education. For future endeavors, a more extended observation period, increased transitional support, and more targeted patient education strategies would be fundamental to refine the project's efficacy and overcome its limitations.

Conclusion:

The project largely achieved its aims, showcasing improvements in medication safety through reduced errors, enhanced communication, and a culture of reporting.

The project demonstrated potential cost savings by reducing medication errors, potential adverse events, and subsequent interventions to rectify errors. While specific monetary savings were not explicitly calculated, the reduction in error-related expenses highlighted potential cost-effectiveness.

Regarding sustainability, the project laid a solid foundation for continued improvements. Continuous data collection, ongoing staff training, and an established culture of reporting errors contribute to sustainability. Efforts to ensure continuity involve ingraining these practices into standard operating procedures and integrating them into the pharmacy's culture.

The project's success could serve as a model for similar pharmacy settings. To spread this project, a detailed blueprint and best practice guidelines need to be established, along with clear documentation on the efficacy of the interventions. A plan for wider dissemination, such as creating toolkits or guidelines, would facilitate replication in other settings.

The next steps involve further refining the interventions based on ongoing feedback, expanding the project's reach, and potentially conducting further studies to delve deeper into specific aspects, such as the long-term impact of these interventions and cost- effectiveness in a larger setting. This could involve collaborating with other institutions for a multi-site study to gauge the intervention's effectiveness in varied settings.

Acknowledgements:

"I extend my sincere appreciation to [Dr. Adeeb Khawaji, Director of Pediatric Department, [Outpatient pharmacy Staff],

[Dr. Shaimaa Alsulami, Pediatric Clinical Pharmacist], and the team from the Continuous Quality Improvement (CQI) department for their invaluable support and guidance throughout this project. Their expertise and dedication have been instrumental in shaping the direction and success of this work. I am grateful for their insights, assistance, and commitment to improving medication safety in our pediatric outpatient pharmacy. Their contributions have been crucial in implementing and refining the interventions aimed at enhancing patient care and safety.

References

[1] Bates D. W, Boyle D, Vander V. M, Schneider J, Leape L. Relationship between medication errors and adverse drug events. J Gen Intern Med. 1995;10:199–205. http://dx.doi.org/10.1007/BF02600255 .

[2] Bates D. W, Boyle D, Vander V. M, Schneider J, Leape L. Relationship between medication errors and adverse drug events. J Gen Intern Med. 1995;10:199–205.

[3] WHO. Reporting and learning systems for medication errors: The role of pharmacovigilance centers. 2014. Retrieved from http://apps.who.int/medicinedocs/documents/s21625en/s21625en.pdf.

[4] Vazin A, Zamamin Z, Hatam N. Frequency of medication errors in an emergency department of a large teaching hospital in Southern Iran. Drug Healthc Patient Saf. 2014; 6:179–186.

[5] Amy Wu, PharmD. Minimizing Medication Errors in Pediatric Patients. US Pharm. 2018; 44(4):20-23 Available from: https://www.uspharmacist.com/article/minimizing-medication-errors-in-pediatric- patients

[6] The Pharmacist's Role in Medication Safety | PSNet, September 7, 2019. Available

[7] from: https://psnet.ahrq.gov/primer/pharmacists-role-medication-safety

[8] Pharmacists' Impact on Patient Safety, AMERICAN PHARMACISTS' ASSOCIATION. Available from: https://www.pharmacist.com/Portals/0/PDFS/Practice/PharmacistsImpactonPatientSafety_Web.pdf?ver=dYeAzwlN3-PG9eSkMMsV-A%3D%3D

[9] Audrey R Kennedy, Lindsay R Massey et al. Pediatric medication safety considerations for pharmacists in an adult hospital setting. American Journal of Health-System Pharmacy, Volume 76, Issue 19, 1 October 2019, Pages 1481–1491

[10] Morizio K, Edwards CJ, Jarrell DH. Pediatric medication safety. November 1, 2018. Reliasmedia.com website. Available at: https://www.reliasmedia.com/articles/143437- pediatric-medication-safety. Accessed December 28, 2020.

[11] Preventing pediatric medication errors. Sentinel Event Alert A complimentary publication of Issue 39 The Joint Commission Revised April 14, 2021

[12] Joachim A. Koeck, Nicola J. Young, et al. Interventions to Reduce Medication Dispensing, Administration, and Monitoring Errors in Pediatric Professional Healthcare Settings: A Systematic Review. Frontiers in Pediatrics. 2021; 9: 633064. Published online 2021 May 26. Doi: 10.3389/fped.2021.633064

[13] Bekele, F.; Bereda, G.; Tamirat, L.; Geleta, B.A.; Jabessa, D. Childrens are not just "little adults". The rate of medication related problems and its predictors among patients admitted to pediatric ward of southwestern Ethiopian hospital: A prospective observational study. Ann. Med. Surg. 2021, 70, 102827.

[14] S.P. Slight, et al. The causes of prescribing errors in English general practices: a qualitative study. Br. J. Gen. Pract., 63 (615) (2013), pp. e713-e720

[15] R.T. Rothwell. Reducing Medication Errors in the Acute Care In-Patient Setting: An Integrative Review (2016)

[16] V.K. Kimeu. Factors Influencing Medication Administration Practice Among Nurses at Kenyatta National Hospital General Critical Care Init (2015)

[17] A.A. Avery, et al. Investigating the Prevalence and Causes of Prescribing Errors in General Practice: The Practice Study (2012). A Report for GMC.

[18] S. Mercer, et al. Multimorbidity: Technical Series on Safer Primary Care (2016)