Using Quality Tools to Improve Medication Safety in Al-Herafeen Healthcare Unit in Port Fouad City

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Abstract

Background: Drug safety is among the hottest issues of everyday clinical medicine. A medication error is a preventable incident that can trigger improper use of medication or injury to patients.

Aim of the study: to identify medication error types, apply quality standards in organizing the workplace, establish a risk management plan and achieve timely, effective and efficient medication use in our healthcare unit especially in the pharmacy, reduce the rate of medication errors especially dispensing and transcription errors and establish a process for identifying and tracking medication errors.

Materials and Methods: Sum of improvement quality tools were used such as brainstorming, Pareto chart, control charts, histogram, bar chart, checklist, SWOT analysis, cause-effect diagram, and benchmarking.

Results: After following up the medication errors, it was noticed that the percentage of medication errors reached 35% in June 2020, with dispensing errors reached 60% of errors and pharmacy represented 60% of errors in the healthcare unit. It was noticed that the small size of the pharmacy storage area represented 50% of errors. A risk management plan was done and requirements were budgeted for closing an empty space.

Conclusion: The percentage of medication errors was increased in Al-Herafeen Healthcare Unit especially in the last month. The most common type was dispensing errors and the majority of errors noticed to be in the pharmacy. The factor that most significantly influences safe medication use in the pharmacy is the limited space and storage area, so it's a priority to find a solution for the narrow space.

Keywords: Healthcare unit, Medication safety, Port Fouad, Quality tools

Introduction

Drug safety is among the hottest issues of everyday clinical medicine (**Alshammari, 2016**). A medication error is described as a defect in the course of treatment that results in patient injury or harm. All medications are included in the 'process of treatment' (**Walsh, 2009**). The National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) describes a medication error as: A preventable incident that can trigger improper use of medication or injury to patients while the medication is in possession of the health care provider, patient or user. Such incidents could be connected to professional practice, protocols, care products, and system such as medication prescription, labeling, order communication, nomenclature and packing, dispensing, compounding, administration, distribution, usage and education (**Walsh, 2009**). The harm caused by bad management of medications can cause fatal disease. Medications are often handled by healthcare staff on behalf of those who use their services. Providers have to promote effective and efficient use of medications in care facilities. This involves handling, prescribing, and administration of medications. Inability to do so represents significant risks for vulnerable people, Such as: elderly people, individuals with limited movement, decreased mental ability, neurological disability, those depend on medical support (**Issue 5: Safe management of medicines, Cqc.org.uk, n.d.**). Understanding everything you are fighting against will help you keep it safe. The most common reasons for

prescription medication errors are: communication gap between patients and physicians, bad communication among physicians, ambiguous medical abbreviations, sound alike or look alike medications **(Walsh, 2009)**.

Materials and Methods

The research project team performed this work in Al-Herafeen Healthcare Unit in Port Fouad by collecting data in June 2020 for the period from July 2019 to June 2020. A retrospective direct observational descriptive study was performed in Al-Herafeen Healthcare Unit in Port Fouad City. The Quality tools used are: Statistical control chart (a method of Statistical Process Control, SPC that enables the control of distribution of variation rather than attempting to control each individual variation) **(TQM Tools, Ifm.eng.cam.ac.uk, n.d.),** Brainstorming (a method for generating ideas in a group situation **(Brainstorming, Ifm.eng.cam.ac.uk, n.d.)**, Brain storming team included: The researchers - Pharmacists - Prime pharmacist - Head of Occupational safety and health **-** Head of Quality team in Al-Herafeen Healthcare Unit - Head of Information technology team), SWOT analysis (A strategic planning approach helps an individual or organization recognize strengths, weaknesses, opportunities and threats related to project management or market competition) **(SWOT analysis, En.wikipedia.org, n.d.)**, checklist (Generally used to check that all aspects of a situation have been taken into account before action or decision making) **(TQM Tools, Ifm.eng.cam.ac.uk, n.d.),** Fishbone diagram (a method for analyzing process dispersion. The diagram's purpose is to relate causes and effects) **(TQM Tools, Ifm.eng.cam.ac.uk, n.d.)**, **Bar chart** (provides a visual presentation of categorical data, a grouping of data into discrete groups. These categories are usually qualitative) **(Bar chart, En.wikipedia.org, n.d.)**, Histogram (a graphic summary of variation in a set of data. It can be analyzed to draw conclusions about the dataset, in which the continuous variable is clustered into categories and the value of each cluster is plotted to give a series of bars) **(TQM Tools, Ifm.eng.cam.ac.uk, n.d.),** Pareto chart (Demonstrates that most of the effects are due to relatively few causes. Quantitatively, 80 percent of the issues are caused by 20 percent of causes. Hence the right 20 percent commitment will fix the 80 percent of the problems. It lets us determine where to direct initial effort for best outcomes) **(SLUIJS, 2003)** and Benchmarking (Finding and copying the best practices of other healthcare units steps).

For quality monitoring, Risk management plan (Recognizing, measuring and prioritizing risks accompanied by a systematic and efficient use of resources to reduce, monitor and manage the possibility or effect of unfortunate incidents) **(Risk management, En.wikipedia.org, n.d.)**, Strategic planning (Organizational management activities aimed at establishing priorities, reinforcing processes, focusing efforts and resources, making sure that people in the organization and stakeholders work towards common goals, agreeing upon expected outcomes, and evaluating and trying to adjust the organization. Vision-

mission-objectives-SWOT analysis are the strategic plan stages used throughout the research project) **(Strategic Planning, balancedscorecard.org, n.d.)**, Action plan (A document detailing steps needed to be taken to accomplish a particular goal. It helps to clarify the resources needed to achieve the target, sets out a timetable for when particular activities need to be accomplished and defines the required resources.) **(Strategic Planning, balancedscorecard.org, n.d.)**, KPIS (A Key Performance Indicator "KPI" is a measurable value that demonstrates how effectively an organization is achieving objectives) **(KPI Examples and Templates, Klipfolio.com, n.d.)** and Current and expected results are monitored and compared by check lists where all results are tabulated and represented by different types of charts.
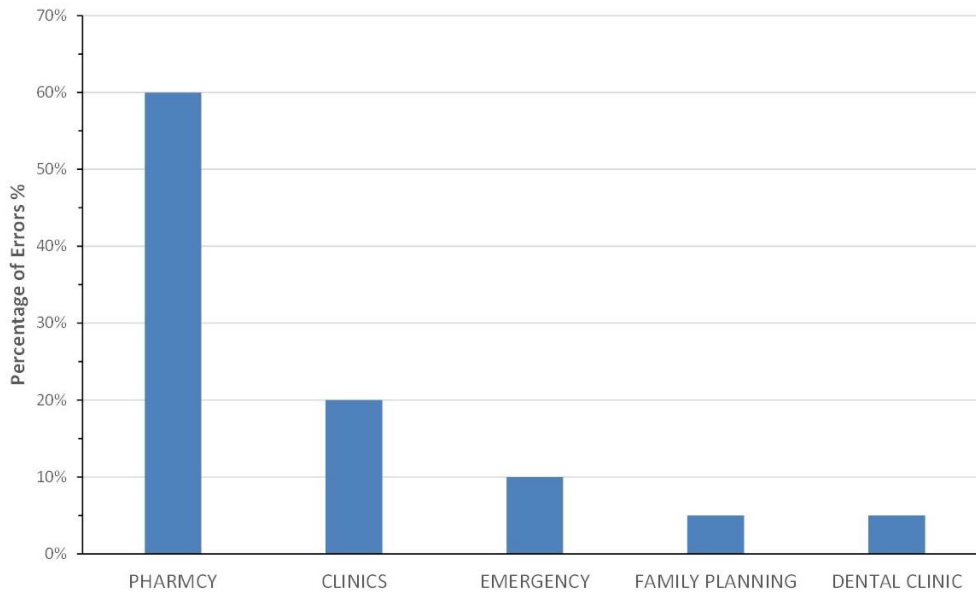
Results

Chart (1): Statistical Control Chart showing the percentages of Medication errors in Al-HERAFEEN Healthcare Unit in the last year.
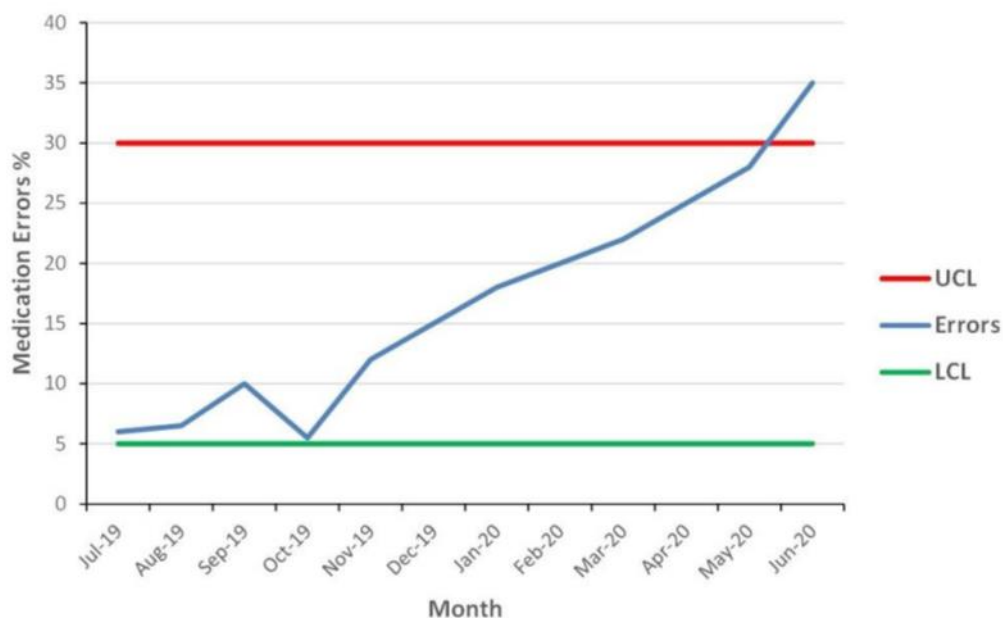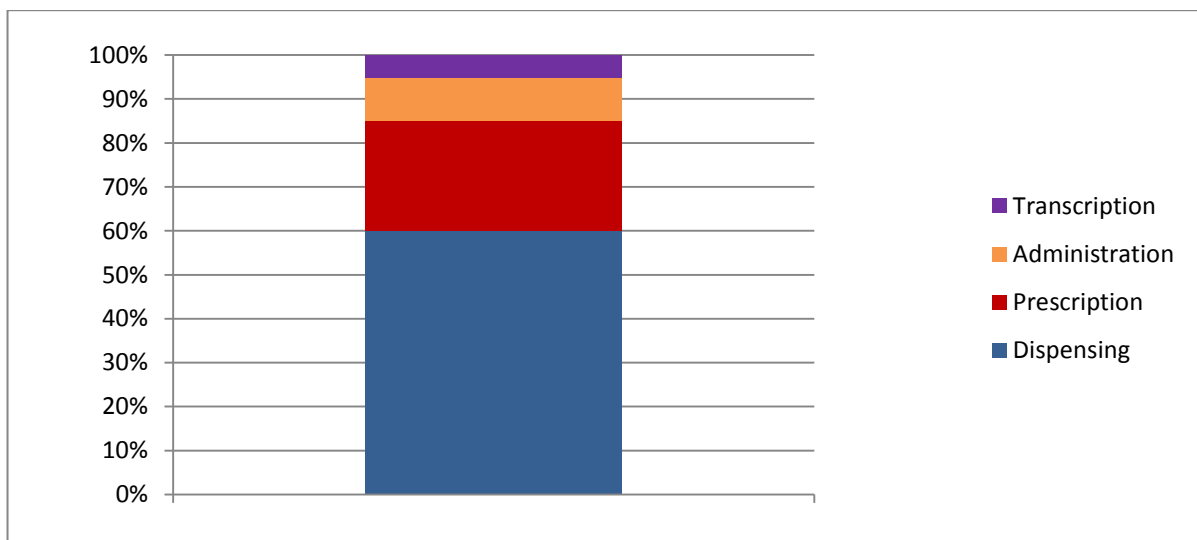

The percentage of medication errors was increased in Al-Herafeen Healthcare Unit, especially in the last month and reached 35%, based on the percentages got from the Quality team.

It was found that the most common causes of medication errors include: insufficient doctors, failure to store the drug properly and in an orderly manner in a sufficient space, lack of a policy of distinguishing look alike drugs and sound like drugs, lack of a policy for dealing with high alert medications and highly concentrated drugs, inability to distribute the temperatures required to store the drug in a suitable way, existence of a number of nursing expatriates from our governorate, which makes it difficult for them to attend and benefit from all internal training, low budget and high independents.

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Chart (2): Bar Chart showing medications errors in different settings in Al-Herafeen healthcare unit, revealing that the percentage of errors found in the pharmacy reached 60% of the medication errors in the whole unit

Histogram (1) : Histogram showing the most common types of medication errors in Al-Herafeen Healthcare Unit, revealing that Dispensing errors reached 60%, followed by Prescription errors, then Administration errors, and the least common is Transcription errors.
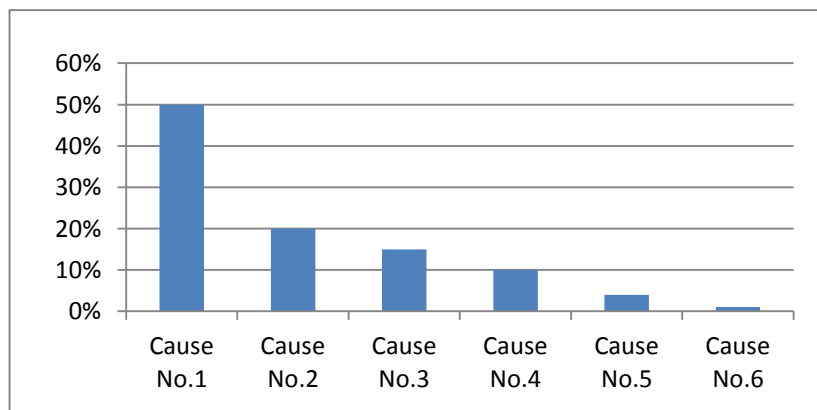
Chart (3): Pareto Chart showing the percentages of accumulation, frequency and severity of medication errors in all healthcare settings in Al-HERAFEEN Healthcare Unit
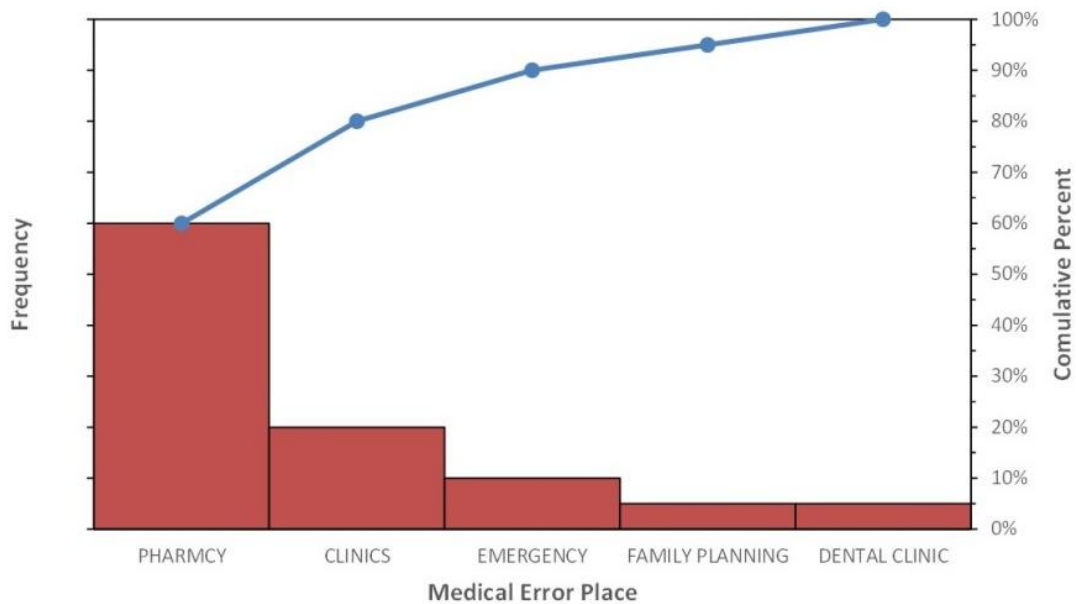

It was found that the most cumulative and frequent medication errors with highest severity take place in the pharmacy which was 60%. So, it is a priority to start with solving the medication problems in the pharmacy.

Regarding the pharmacy, it was found that six types of medication error causes, which are: difficulty of dealing and storage for high alert medication, difficulty of distinguishing between look like drugs and between sound like drugs, difficulty of dispensing medicines, unsuitable temperature and humidity in the pharmacy, failure of drug labelling, inadequate distance between ceiling and drugs. And the largest percentage of medication errors is in Pharmacy occurred when medication errors reached 50%, that was difficulty of dealing and storage for high alert medication.

Chart (4) : Bar Chart showing Percentages of causes of medication errors in pharmacy of Al-HERAFEEN Healthcare Unit

Chart (5): Pareto Chart showing the accumulation, frequency and severity of causes of medication errors in pharmacy of Al-HERAFEEN Healthcare Unit, revealing that the most cumulative and frequent medication errors with highest severity is Cause No.1: Difficulty of dealing and storage for high alert medication 50%
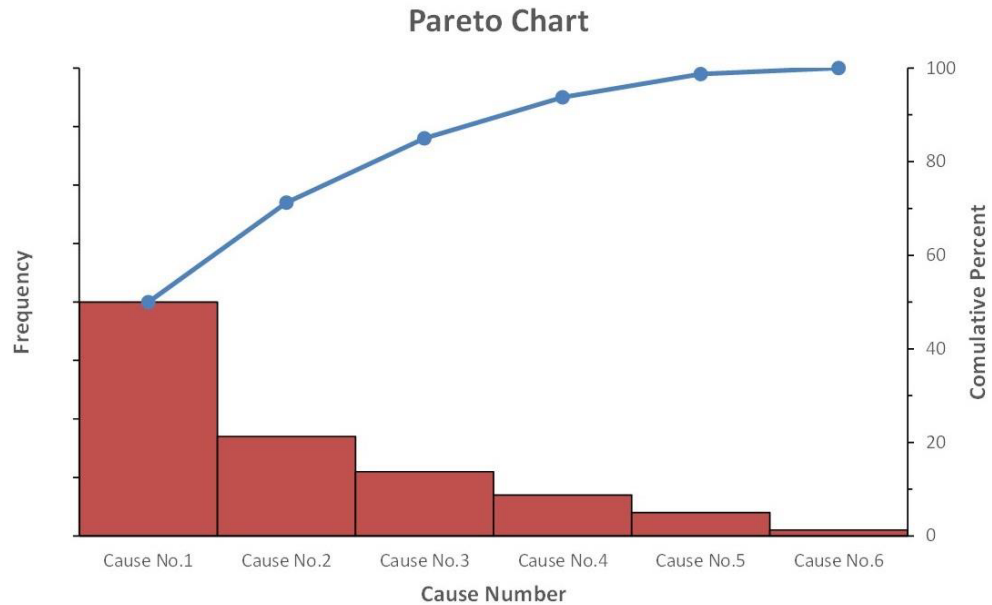
It is a priority to start with solving the storage problem in the pharmacy and a risk management and strategic plan are made to improve medication safety in the pharmacy. Project study team expects that medication errors in pharmacy, after 6 months, will reduce by 50% from 35% to 17.5% after implementing the risk plan for improvement of medication use safety.

Discussion

The research project team performed this work in the Al-Herafeen Healthcare Unit in Port Fouad using a retrospective descriptive observational by collecting data in June 2020 for the period from July 2019 to June 2020. After following up the medication errors in the clinics, emergency, dental clinic, pharmacy and family planning clinic in Al-Herafeen Healthcare Unit by the quality control team and it was found that: the percentage of medication errors was increased in Al-Herafeen Healthcare Unit, especially in the last month, based on the percentages got from the Quality team. Sum of improvement quality tools were used such as: brain storming, pareto chart, control charts, histogram, bar chart, check list, SWOT analysis, cause effect diagram and benchmarking. It was found that there are many causes for that increase including: insufficient doctors, expatriate nurses, Medicine overstock in the pharmacy and store, Budget constraints, Long working hours and workload, poor communication, our medical center is located in the Herafeen area of Port Fouad, and it is an area far from the city center without any public transportation,...etc. Through the statistical chart, SWOT analysis and Fishbone diagram and based on KPIs from the Quality team, it was found that the

largest percentage of medical errors in our healthcare unit occurred in June 2020 when medication errors reached 35 %. Then, KPIs (key performance indicator) were used from the quality control team to draw a Pareto chart for these medication errors in different places of the healthcare unit. It was found that the most cumulative and frequent medication errors with highest severity was dispensing errors which take place in the pharmacy with percentage of 60%. The prescription errors come in the second order and the clinic is the second area in the incidence of medication errors, the least error is in transcription. So, it was a priority to start with solving the medication problems in the pharmacy. Through the Fishbone diagram and based on KPIs from the Quality team, it was found that there are six types of medication error causes in the pharmacy, which are: narrow space, Bad distribution of medicine, Poor electricity, Unsuitable temperature and humidity, Failure of drug labelling,...etc. KPIs (key performance indicator) were used from the quality control team to draw a Pareto chart for these risks. It was found that the most cumulative and frequent medication errors with highest severity is difficulty of dealing and storage for high alert medication 50%. So, it was a priority to start with solving the storage problem in the pharmacy. Then a brainstorming session was held to put forward different ideas to solve the problem of not having enough space to store the drug in accordance with quality standards and to preserve the safety of the drug. The best proposed solutions were agreed upon, that was to take advantage of an unexploited space inside our PHC center and do its processing and preparing it with equipment and devices that prepare them to be a drug store with specifications that preserve the safety of the drug and quality standards can be applied inside it. A strategic plan was made, and the tools, devices, and requirements were budgeted for closing this empty space inside the PHC Center and listing all the necessary needs which is represented in the following: (Shelves - refrigerator - air conditioning - room thermometer - refrigerator thermometer - cutters to close the empty space). And now there is a new drug store with the specifications required to protect the drug and maintain its safety.

A Prospective study was conducted in a unit of General Medicine and Pediatric Ward at Civil Hospital, Ahmedabad from October 2012 to January 2014. The study was approved by Institutional Ethics Committee. The majority of errors 65% fall in prescription errors followed by dispensing errors 31% and the least errors were found in dispensing errors 4% **which is against our study** which revealed that the majority of errors fall in dispensing errors 60%, followed by prescription errors 25%, then administration errors 10% and the least error is in transcription 5%. **(Patel, 2016)**

Based on a 10-year study, 2013 Pharmacist Liability: A Ten-Year Analysis, by the Healthcare Providers Service Organization and CNA, a pharmacy underwriter, pharmacy dispensing errors are common. Injury claims from dispensing errors revealed that 75.3% of injuries resulted from patients receiving the wrong medication or the wrong dosage from the pharmacy **which comes with our study results** which revealed that the majority of errors fall in dispensing errors 60%. Study results showed that independently

owned pharmacies and franchises had the highest rate of dispensing errors at 46.3%. Large, regional chain pharmacies accounted for 34.6% of errors and hospital inpatient pharmacies accounted for 4.3% percent of errors. **(How Common are Pharmacy Dispensing Errors? Hg.org, n.d.)**

Medication errors are among the most common errors in the healthcare settings and they have significant implications on patient safety. These errors occur at all stages in medication use: ordering, prescription, dispensing, and administration. So it is advisable to find effective solutions by error detection through an active management and effective reporting and monitoring system discloses medication errors and encourages safe practices. **(Elden, 2016)**

Conclusion

From the results of our research in Al-Herafeen Healthcare Unit, it is concluded that, the percentage of medication errors was increased in Al-Herafeen Healthcare Unit especially in the last month, there are many causes of increased rate of medication errors including insufficient doctors, expatriate nurses, Medicine overstock in the pharmacy and store, Budget constraints, Long working hours and workload, poor communication, our medical center is located in the Herafeen area of Port Fouad, and it is an area far from the city center without any public transportation,...etc. The most common type of medication errors in Al-Herafeen Healthcare Unit is dispensing errors, the prescription errors come in the second place, in which ambiguous abbreviations, symbols, units or bad hand-writing are the common causes and the least error is in transcription. The majority of errors noticed to be in the pharmacy, so it's advisable to start with solving medication problems in the pharmacy, the clinic is the second area in the incidence of medication errors, the dispensing errors occur by pharmacists and the remaining were prescription errors by physicians during the selection of drug dose and frequency, and administration and transcription errors by nurses, there are many causes of medication errors in the pharmacy including narrow space, Bad distribution of medicine, Poor electricity, Unsuitable temperature and humidity, Failure of drug labelling,...etc. The factor that most significantly influence the medication-use process and safe medication in the pharmacy is the limited space and storage area, so it's a priority to find a solution for the narrow space, so this research aimed to identify medication errors, hazards , their types, how to implement the quality tools for prevention of medication errors, especially in the pharmacy, establish a process for identifying and tracking medication errors and increase awareness of medication errors through education and the research team planned to take advantage of an unexploited space inside our PHC center and do its processing and Preparing it with equipment and devices that prepare them to be a drug store with specifications that preserve the safety of the drug and quality standards can be applied inside it.

Recommendations:

Based on the result and conclusion of this research and after studying and using different quality tools, it is recommend appropriate staffing numbers and training of staff in all disciplines should be in place, working hours and workload should be reduced, staff training such as orientation programs, periodical training, condition-based training, exploiting an empty space inside the primary health care center, closing it and equipping it with all the requirements and special devices to establish and equip a special drug store, increasing the number of shelves and stands designated for placing medicines in the pharmacy and pharmacy store, increasing the number of refrigerators for storing some medicines and different types of insulin inside the pharmacy and pharmacy store, storing lookalike drugs away from each other in the medication storage area, medication bottles should be properly organized with labels facing forward, routinely check all medications on the shelves and discard any expired medications, lock up or sequester drugs with high potential of causing errors, setting a specific date to spend the chronic monthly treatment, using reliable system to enter information about the patient, such as age, allergies, concomitant medications, contraindications and therapeutic duplications and ensuring complete entry of data of the patient, system should be in place for reporting adverse events, incidents and near misses with regular audits carried out to identify error prone areas or processes that require modification, all treatment should be clinically verified by a clinical pharmacist prior to dispensing, the pharmacist should have access to the patient information relevant to the treatment, preparing a list of error-prone abbreviations, symbols and dose designations, and deliver it to the medical staff to be familiar with this type of information and counseling patients about instructions on how to take the medications and appropriate route of administration and allowing patients to ask questions whenever they need.

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