Reducing Healthcare Medication Administration Errors Using a Mixed Intervention Strategy: An Overview

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Abstract
Patient safety is the avoidance and decrease in risks and harm in healthcare systems, which is essential when providing care for patients since it appears to be one of the markers of quality care. A medical error is described as an unplanned action or one that fails to produce the desired result. The most frequent type of medical error is medication error, which has been extensively studied in the past. This paper gives an overview of reducing healthcare medication administration errors, reflecting on the guidelines, policies, and laws at the national and international levels, adopting the fishbone cause and effects analysis, intervention plan for reducing medication error (Mixed Intervention Strategy), potential limitation/alteration to the intervention plans and the Plan-Do-Study-Act (PDSA) cycle as a strategy to test the effectiveness of the change implementation.
Keywords: administration errors, healthcare, interventional, medication, patient safety

Introduction

The improvement and minimization of health-related conditions and treatment methods that exist in the twenty-first century have always been a special responsibility of the healthcare system (Getnet & Bifftu, 2017). Due to such advancements, it is now possible to provide patients with great and quality care as a result of the availability of highly experienced health clinicians, and strict health and safety protocols that are supported by laws serving as guidelines for both caregivers and patients. World Health Organization (WHO) defines patient safety as the avoidance and decrease in risks, errors, and harm in healthcare systems. It is also essential when providing care for patients since it appears to be one of the markers of quality care (Getnet and Bifftu, 2017).

A medical error is described as an unplanned action or one that fails to produce the desired result, the employment of an incorrect plan to accomplish an objective, or a divergence from the standard of care that may or may not harm the patient (Makary & Daniel, 2016). The most frequent type of medical error is medication error, which has been extensively studied in the past. The National Health Service (NHS) estimated that medication errors have caused 12,000 fatalities annually and that the larger issue of medication errors may result in an additional £0.75 billion to £1,500,000 in additional healthcare costs (Sutherland et al., 2018). An estimated 237 million medication errors are made in England every year, usually at some point over the course of the treatment (Elliott et al., 2021).

In the healthcare ward, the nurses administer medications for an estimated 40% of their workdays, which is crucial to lowering medication errors (Latimer et al., 2017). However, nurses (caregivers) are known for putting in long shifts to provide care, and studies have revealed that longer shifts are linked to decreased work performance, elevated burnout,

worst nurse-reported care quality, and increased mortality in a healthcare system. This has also endangered patient safety and made it difficult for nurses to implement interventions (Ergun et al., 2017; Griffiths et al., 2018).

The negative effect of medication errors needs to be addressed since they affect the emotional and physical health of both the caregiver and the patient. An unintentional error can have a long-lasting effect on caregivers, causing them to feel ashamed, lose their confidence, depressed, or even come up with suicidal thoughts (Robertson & Long, 2018). This demonstrates that healthcare workers are also affected by the effects of medication errors, in addition to patients' safety (Garcia et al., 2019).

Improving medication errors is pivotal in promoting the wellness of clinicians, resulting in higher quality of treatment and lower costs of preventable medical errors, which is the justification for generating this service improvement report on minimizing medication errors in the healthcare ward (Melnyk et al., 2018). In addition to providing background information on recent research related to drug administration errors, the report will discuss the health and safety laws and regulations required to maintain safe work and care environments, a fishbone root cause will be used to evaluate the primary cause. A design section that outlines the intervention plan is followed by the PDSA cycle-based method, and conclusion.

Background Information

Humans who are sick are dependent on their medications. Therefore, at some point in life, humans must use medication to treat or prevent illness. However, Wondmieneh et al. (2020) pointed out that, if medication is not taken properly, it can occasionally result in major injury, incapacity, and even death. According to Jember et al. (2018), medication errors are the main reason for avoidable patient harm in hospitals around the globe. Medication mistakes in healthcare settings result in health issues (Dagne & Mekonnen, 2021). According to Wondmieneh et al. (2020), medication administration errors (MAEs) are the most often reported types of medical errors, and they have negative effects on patients and healthcare organizations as a whole. Any avoidable incidence that could lead to improper drug use or patient damage is referred to as a medication error (Jember et al., 2018).

Patient safety is seriously threatened by medication administration errors (MAE). The greatest of errors, estimated 42% of which involve omission of doses and 50% of which involve administration at the incorrect time, were found in the global distribution epidemiology of MAE (Fontan et al., 2003). According to the National Patient Safety Agency (NPSA) in the United Kingdom, 50% of all hospitals that administer drugs also experience MAE. This indicates that nurses and other healthcare professionals must take immediate action to address the issue of medication mistakes, which is a widespread issue in the United Kingdom.

Prescription dispensing takes up a significant amount of a nurse's time (Dumo, 2012). The nurses also serve as the final safety check in the series of actions involved in providing medication. Additionally, they are the last to ensure patients' safety (Tsegaye et al., 2020). When doing their duties, nurses face numerous challenges that could result in prescription mistakes. High workload, inadequate training in the effective management of medications, and the absence of a stress-free workplace for reporting errors are a few of the conditions that allow nurses to commit prescription errors (Wondmieneh et al., 2020). According to Mahajan (2021), nurses notably experience mental anguish, a lack of self-confidence, and disciplinary actions when medication delivery errors cause patient injury. While medication errors cannot completely be eliminated, Nguyen et al. (2018) emphasized that efforts can be made to reduce them. A recent study by Alqenae et al. (2020) shows that 20% of patients report

pharmacological adverse effects after being discharged, which would increase costs because it could be necessary to admit the patient, exemplifying the significance of medication errors in reducing hospital readmissions.

Guidelines, Policies, and Law at the National and International Level
According to the National Institute for Health and Care Excellence (NICE, 2018), organizations are advised to make sure that solid and open procedures are used to detect, modify, prioritise, and learn from occurrences involving medications and patient safety. The National Reporting and Learning System and other national patient safety reporting systems should be followed as these measures are implemented. Secondly, using a variety of techniques by organizations to spot incidents involving patient safety and medications, including direct observation of medication administration, patient surveys, and health record reviews. Organizations should implement policies and review regularly the systems to account for reporting and learning.

Health providers are advised to urge their staff to report drug errors according to the Care Quality Commission (CQC, 2022). However, reporting medication errors is only subject to a few regulatory regulations (Rogers et al., 2017). The CQC does not need to be notified of a prescription error unless the cause or effect meets the requirements of a death or injury, abuse, or an incident connected to/investigated by the police. As a result, since they are not formally documented, such therapeutic errors can happen again. According to CQC (2022), medication errors occur when human factors have an impact on human systems. According to them, some aspects to take into account include weariness, staffing levels, and environmental circumstances; as a result, recognizing and preventing errors is vital in improving patient outcomes by developing methods intended to prevent the occurrence of similar instances.

A computerized method was also adopted by the NHS (2019) to assist patients in learning about their safety. Some patients still feel uncomfortable utilizing it, showing that the NHS is cognizant of the possible role that patients may play in reducing medication-related incidents.

Measurement
The investigation of the potential causes of medication error and their impacts on patients and quality of care are analysed using the fishbone cause and effects (Figure1).
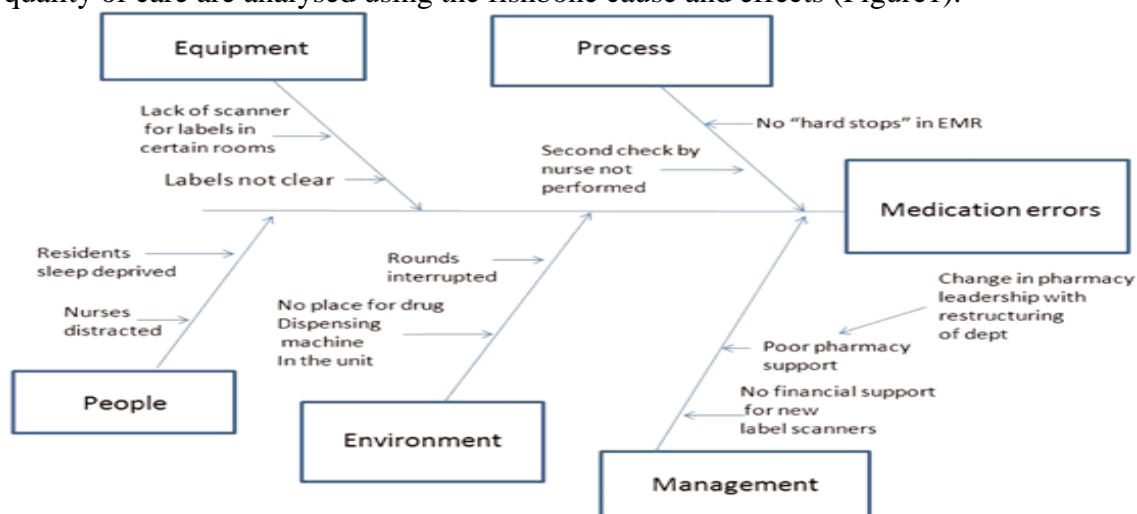

Fig. 1: Diagram showing the potential root causes of medication errors

Source: https://pocketdentistry.com/root-cause-analysis

Figure 1, shows the potential contributing factors to medication errors in the nursing ward. This revealed a few of the causes of the high number of medication accidents. The critical underlying causes of an undesirable event are found through the use of root cause analysis (RCA). There are numerous reasons why medication errors happen, including high staff burnout, job satisfaction, staffing, miscommunication, environmental factors etc. (Bolandianbafghi et al., 2017; Garcia et al., 2019).

Medication Error Due to Environmental Factors
Medication preparation and administration are interrupted by environmental conditions, which results in an error. As part of a nurse's shift, interruptions and distractions occur frequently on the ward. According to recent studies, these disruptions during medicine administration on the ward result in a considerable number of medication errors (Mortaro et al., 2019). The study's conclusions suggested that staff members need adequate training on the hazards associated with interruptions during the delivery of medication due to a high risk of disruptions. Over 100 interruptions were recorded during the 56 medication episodes that Johnson et al. (2017), observed on the ward, accounting for 99% of all medication events. The study demonstrated that interruptions are a significant contributor to medication errors by confirming their frequency.

According to Laustsen and Brahe (2018), interruptions during planning and administration cause problems with working memory and attention. To prevent medication errors, the intervention or solutions must create an environment that is nurses-friendly before medication preparation and administration. There should also be an improved focus while getting ready for administration, factors that cause disruptions such as phone calls and talks with co-workers should be avoided.

Design
The environmental cause of medicinal errors will be focused on in this report since most of the medication errors take place during the administration stage. The great majority of studies in the literature have discovered that combining interventions can significantly lower medication mistakes. Alemu et al. (2017) point out that distraction during the administration of medications is strongly linked to MAEs. When providing drugs, nurses who were distracted were five times more likely to administer the wrong medication than those who weren't. To reduce the occurrence of drug administration errors, it is crucial to adopt procedures that aid in the accurate identification of medications and make the atmosphere in which nurses deliver medications distraction-free.Work interruptions during the administration of medications, according to Schroers (2018), are a primary factor in over 43% of medication mistakes. According to Schroers (2018), nurses encounter interruptions at a rate of 5.5 to 14 per hour, which results in significant levels of inefficiency. As a result, these nurses will not be able to give medication within the authorized 60-minute window.

Additionally, Manias et al. (2020) discovered that combining approaches helped to lower medication mistakes (Sarfati et al., 2018). Simulations reduce medication errors by enhancing staff attitudes, knowledge, and abilities. Because blame culture also contributes to stress and trauma among nurses, the current therapies will also include training for blame culture and responsibility as well as a simulation to evaluate medical abilities (Okpala, 2018). However, there is still no data to support the solutions that many researchers have tried to design to cut down interruptions to reduce medication errors (Ramadaniati et al., 2018). The following will highlight the intervention that has to be put in place to lower medication errors.

Intervention plan for reducing medication error

The targeted intervention plan will use a mixed intervention strategy. The allocation of medication nurses to a separate booth/room will be the first phase in the intervention strategy. It is crucial to employ medication administration booths in hospitals to reduce interruptions from personal interactions and phone calls during drug delivery. The nurses will dispense medications in a separate medication room. The nurses will be obliged to put their phones away when in these booths so they can focus fully on preparing and giving patients their medications. Other nurses will need to be a part of the team since they must comprehend the function of the medication booth to avoid entering it or interfering with the nurse who is inside. To determine whether this is successful in reducing the number of medication errors reported relative to the medication errors initially recorded, an audit will be performed weekly according to Foy et al. (2020) who reported that quality improvement frequently uses audits and feedback.

The second phase will be a simulation of four scenarios, each lasting 15 minutes, in which medication is administered to a manikin acting as a patient. Simulated sounds will act as interruptions, and the nurses will need to use their initiative to demonstrate how they would handle the interruptions in the real world. A facilitator in a managerial position will lead the simulation session. The data from the simulation session will be audited to see whether there have been any changes in how nurses handle disruptions when providing medication. To determine whether the medication is being provided properly, the facilitator will examine and record data. A debriefing session will be held following each of the four scenarios to get feedback on what might be improved. Every two weeks, a simulation will be conducted to help nurses hone the abilities needed to give medication when there are disruptions. To determine whether the current intervention is successful, it will persist for five months. The personnel will test their newly acquired skills on the ward for a month after the five months to evaluate if they have improved (Hewitt et al., 2015).

Potential limitation/alteration to the intervention plans

The lack of staff and employees becoming burned out in their regular work are two major problems that could occur. Due to the fortnightly audits that will be done when using the separate medication area, certain staff members may be more cautious when administering medication, resulting in biased outcomes. Nurses may be less watchful when dispensing the medication because a manikin rather than a real patient will be utilized in the simulation. However, because they are aware that the data will be collected, they may ensure that they are extra watchful. also causing bias in the results' output. Additionally, using simulations can be highly expensive, and financing for the intervention might not be available (Lamé and Dixon-Woods, 2018). Although there are limitations to employing simulations, the cost of prescription errors is higher (Mansouri et al., 2019), and this may outweigh them.

Strategy

The Plan-Do-Study-Act (PDSA) cycle will be used to test the effectiveness of the change implementation. This involves implementing quality improvement in healthcare settings in four stages (Coury et al., 2017). Thus, the report's main aim is on the requirement to explain how the PDSA cycles are employed to help improve the implementation of the planned intervention to reduce medication error.

Plan:

During the planning stage, a proposal will be presented to senior staff to gain approval for the implementation of the intervention. The existing data on medication errors from the acute

ward will be collected and evaluated to determine what the current data metrics regarding medication errors are.

Do:
The nurse assigned to medicine administration will call the patients into a medication booth during the first stage of the intervention. To reduce interruptions, a safety initiative of protected time will be offered. To bring the simulated situations together, the second stage of the intervention will involve finding a simulation framework (Traoré et al., 2018). A senior staff member with extensive knowledge of mental health units will then create each simulation. To practice, a program will be created specifically for medication errors and interruption simulated noises as part of the plan's implementation. Before and after intervention information may reveal a risk of bias at this stage because the staff is aware of the objectives of the interventions and audits (Dall'Oglio et al., 2017).

Study:
Both qualitative and quantitative analyses of the data will be performed. First, qualitative data emphasizes comprehending participants' actual experiences (Bazeley, 2013). The effectiveness of the distinct medicine booth and simulations will be assessed through pre-and post-testing. The effectiveness of the dedicated medication booth for the medication nurses will be evaluated every week.

Analysis will be done using a final summative evaluation of the project (Kiernan, 2018). To ascertain if the treatments have decreased medication errors, the results will be analysed using pre- and post-intervention data. Since the quality improvement project's pilot study will span six months, the data will be evaluated by an audit at the halfway point of the third month. This will be done to see if the simulation sessions and using a separate medication booth on the ward have improved in any way. The nurses will discontinue the simulations in the fifth month, and after the sixth month, data from the ward will be audited to determine whether the simulations helped reduce medication errors.

Act:
The team anticipates that after implementing these interventions, the number of medication errors will drop by at least 20%. If the intervention is successful, more medication administration booths will be implemented throughout the wards; however, if it is unsuccessful, management will be invited to a debriefing meeting to identify what is not working and what needs to be improved. The management member in charge of the simulation sessions will also provide feedback. However, if the intervention proves to be effective, all of the wards will receive it. To demonstrate the use of a separate medication booth and simulation as an evidence-based strategy for decreasing medication errors across wards, it will be presented to the higher management.

Conclusion
In conclusion, despite being avoidable, medication errors are nevertheless common. Even though they prepare and administer medications, healthcare practitioner plays a critical role in lowering medication mistakes. When administering medications, their job is interrupted and distracted, which leads to medication errors. Medication mistakes, patient safety, and patient care can all be improved with the assistance of the present quality improvement initiative. The improvement strategy intends to lessen medication errors brought on the ward by interruptions. The mixed intervention includes the use of separate medication booths and simulation to minimize and enhance skills and knowledge of dealing with interruptions in

delivering medication. healthcare practitioner will also experience an improvement in their physical and emotional well-being, which will cause them to make less avoidable prescription errors. The need for further medications to correct mistakes will be avoided, which will result in a decrease in additional medical expenses and financial savings.

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