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Promoting Safety of Medication Administration and Reducing Medication Errors Using Photographic Patient Identification in An Inpatient Psychiatric Setting: A Quality Improvement Initiative

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Abstract

Background: Medication errors pertaining to patient wristband workarounds in a behavioral and mental health inpatient unit can affect patient outcomes, safety and can even be fatal. The proper verification of the five rights of medication administration, patient acuity, diagnosis, and unit staffing can impact the need for patient wristband workarounds to occur. Improving staff and patient education and reducing the need for wristband workarounds through the utilization of patient photographic identification significantly reduces the number of medication errors relating to wristband workarounds during the medication administration process. Additionally, a significant reduction in the time it takes to administer medications can be noted.

Local Problem: Registered Nurses (RNs) spend a significant amount of time administering medications on the unit and due to contributing factors such as patient acuity, diagnosis and shortages in staffing can lead to patients presenting to the medication window without their assigned patient identification wristband. Such occurrences make it difficult for the RN to properly verify the five rights of medication administration. These circumstances result in the RN making the decision to perform a barcode workaround. These workarounds directly correlate to an increased risk in medication errors.

Methods: The Plan-Do-Study-Act (PDSA) model was utilized for implementation of this intervention. Tally sheets were utilized to collect data regarding frequency of patient wristband workarounds during both pre- and post-intervention data collection periods. The macrosystem's "EZ Track" medication error reporting system was utilized to collect data regarding the number

of medication errors that occurred and were reported by the RNs. Data from both pre- and post-intervention periods were compared and analyzed for patterns correlation.

Interventions: Patient photographs were taken for newly admitted patients for a two-week period. RNs marked a tally on the tally sheet each time a barcode workaround occurred.

Results: The number of patient barcode workarounds reduced significantly during the post-intervention period, thus resulting in a 75% reduction of medication errors.

Conclusion: Continued investigation into the effectiveness of the medication administration process and utilization of the intervention is recommended to reduce medication errors on the unit.

Keywords: medication errors, wristband overrides, wristband workarounds, patient photographic identification, inpatient behavioral unit, inpatient mental health unit, medications

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The five rights of medication administration are the right patient, the right time, the right dose, the right drug, and the right route (Hanson, 2022). A failure to verify the five rights of medication administration can lead to a medication error, which could negatively impact the patient's overall health. Upon admission to a facility and unit, a patient is provided with a patient identification wristband which has a barcode that can be scanned for administering medication through the electronic medical record system. Hospitals nationwide struggle with medication errors associated with overriding scanning a patient's identification wristband when administering medications. This could be a result of a patient removing their wristband, a wristband being defective or time constraints because of understaffing (Hanson, 2022). Wristband associated medication errors are particularly common in inpatient behavioral, mental health and psychiatric settings.

Problem Description

Unlike a typical inpatient hospital unit where the medications are administered at the bedside by the patient's assigned nurse, an inpatient behavioral or mental health unit administers medications at a medication window which is in the hallway next to the nurses' station. Only one registered nurse is designated to administer medications to the entire unit for the shift. The location of the medication window causes frequent confusion for patients who often present to the nurses' station instead. Medications are administered daily between the hours of 8am and

10am on day shift and 8pm and 10pm on night shift. Patient medications are not brought to a patient's room unless a specific exception is made on a patient-by-patient basis. There are no mobile workstations which can safely be brought into the patient's room. This is meant to reduce safety concerns for the patients and the staff.

The medication administration process involves patients lining up to have their vitals obtained by a Licensed Nursing Assistant (LNA) and then lining up at the medication window. Patients are expected to bring their patient identification wristband with them, and then verify their name and date of birth with the nurse administering the medications for that shift. Patients are typically admitted to the microsystem with acute psychiatric conditions which means that they do not often wear their patient identification wristbands. When a patient presents to the medication window without their patient identification wristband, the nurse must either ask the patient to find their wristband and return to the window when they have found it or scan a second barcode which is kept in the patient's chart. Without the wristband being attached to the patient's wrist, it may be difficult to confirm the patient's identity and thus lead to an increase in medication errors.

After observing several medication administrations on the unit, it was clear that having to scan the secondary wristband was a workaround frequently utilized, and that the risk of medications errors could potentially be reduced by altering the process. While there is ample data collected regarding medication errors overall, unfortunately, little data has been collected on the unit pertaining to wristband associated medication errors. The goal was to improve the medication administration process on the inpatient behavioral or mental health unit to reduce the rate of medication errors. Data was first collected from the unit by auditing the "EZ Track" data

from the prior 6 months, observing the medication administration process and tracking the number of times a secondary barcode was scanned. The plan to alter the medication administration process was to place signs around the unit reminding patients to bring their wristbands to the medication window, and utilizing photographs of each patient in a binder with their secondary barcode so that the nurse could easily identify the patient's identity before administering the medication should they present without their wristband. Follow-up data audits were conducted in four to six weeks to determine if a reduction in medication errors and "EZ Tracks" occurred.

Available Knowledge

The PICOT model was used to formulate a research question for this literature review. The "P" (population) is patients who are admitted to the inpatient intensive psychiatric care unit, (microsystem) that are adults (ages 18 and older), who take psychiatric medications for a mental health diagnosis. The proposed "I" (intervention) is the use of patient photographs in a binder for facial recognition in addition to asking the patient their name and DOB, next to secondary identification barcodes inside the medication administration room. The "C" (comparison) is overriding scanning patient wristbands. The desired "O" (outcome) is a reduction in medication errors on the inpatient psychiatric intensive care unit by 2% and "T" (time) is over a 60-day period.

The intended purpose of this literature review was to evaluate and analyze the literature, to explore possible interventions to decrease the number of medication errors among adult patients who are admitted to the behavioral and mental health unit and who receive medications.

The goal of the literature review was to determine whether there is sufficient research to indicate if medication errors can be reduced within the chosen patient population via the proposed intervention. A review of the literature identified best practice within an inpatient behavioral or mental health unit.

Search Methods

The EBSCO and Google Scholar search engines as well as Medline, PubMed, Health Source: Nursing/Academic Edition, The Cochrane Database of Systematic Reviews, and UpToDate were utilized to search for literary resources relevant to this PICO(T) question. The Boolean phrases included in the search were "medication errors, reducing medication errors, inpatient psychiatric units, inpatient behavioral health units, patient identification wristbands, wristband overrides, preventing medication errors, causes of medication errors, medication errors in psychiatric units, electronic health records and medication errors and technology and prevention of medication errors." Limits set on search criteria included the year of publication- articles written prior to 2016 were eliminated, as well as articles that did not pertain to the PICO(T) question or included patients from other age demographic groups or settings that were not inpatient hospitals specifically.

Articles that were editorials and irrelevant to the chosen topic or setting were also eliminated. Quality articles were chosen to assess in this literature review based on Melnyk's Level of Evidence scoring and pyramid. Melnyk's Level of Evidence pyramid is used to assist researchers in categorizing and rating studies based on specific criteria, such as the type of research study conducted.

Critical Appraisal of the Evidence

Replinger et al. (2020) conducted a mixed-methods, qualitative study regarding the available patient identification techniques and approaches utilized within the hospital setting worldwide as well as challenges associated with improper patient identification. The primary focus of this study was to identify the available patient identification techniques within the healthcare setting, as well as the unintended negative outcomes to patient care because of a lack of use of patient identifiers within the inpatient setting. The results of the study found that one of the biggest implications of failing to properly identify a patient is patient safety. Coincidentally, the most notable suggestion for minimizing poor patient safety outcomes was an increase in biometric and electronic patient identifiers such as patient photographs linked to patient profiles in the EMR.

Van Der Veen et al. (2018) conducted a controlled study on 1,230 inpatient patients who received medications. The hospital in this study administered medications using an electronic medication dispensing system which included scanning patient identification barcode wristbands. They examined 5,793 medication administrations and determined which workarounds for administering medications ultimately contributed to medication errors. Outcomes indicated that approximately 36% of medication errors that occurred were due to a patient barcode wristband not being scanned at all, 28% were due to wrong medication being scanned, 11% were due to electronic alerts regarding medications being ignored and the remaining 25% were due to other miscellaneous patient circumstances which resulted in utilizing workarounds in the electronic medication dispensing system.

While this study was not conducted specifically on inpatient behavioral or psychiatric patients, the results do reinforce the PICO(T) topic as the results indicate that workarounds within the medication administration process lead to a high number of medication errors in inpatient healthcare settings. The small number of patients and medication administrations examined and setting of this study (only one hospital) as it pertains to the PICO(T) topic could be considered a limitation. It would be recommended that the sample size and number of medication administrations be increased for better validity and reliability. The results yielded are indicative of the need for further research on possible interventions to prevent and reduce the occurrences of medication errors.

Strudwick et al. (2017) conducted a qualitative research study on a variety of inpatient psychiatric patients ranging in age from pediatric, to adolescent, adult, and geriatric. The intended purpose of this small study was to determine the patient perception of importance of patient identification barcode wristbands for purposes such as medication administration and patient safety. The research was conducted via patient surveys administered by peer support workers on 52 patients within the inpatient psychiatric setting.

Results indicated that most patients associated their patient identification wristband with negative connotations such as having to take medications, the stigma associated with carrying a mental health diagnosis, poor perceived relationships with healthcare providers. Patients also voiced concern over their identification wristbands drawing further attention to diagnosis and medications or treatments being received, which drove a desire to remove them. Further research was recommended by Strudwick et al. (2020) for patient education which would reinforce the importance of patient identification wristbands with patients upon admission.

Unfortunately, the sample size was very small for this study and therefore, the data collected may not be reliable. Additionally, no concrete recommendations were made by the researchers for improvement. These results indicate a need for interventions within the psychiatric and behavioral patient population and ties well to the evidence suggesting that the risk of medication errors is higher within these units.

Salmasian et al. (2020), conducted a quasi-experimental study with a historical cohort design in an urban, academic Emergency Department in Boston, Massachusetts. The unit has 59 acute care and observation beds and an annual volume of approximately 60,000 patient visits. The patient population was of mixed diagnosis and demographics. The focus of the study was to determine if photographic patient identification impacted rate of near-misses or actual medication errors within the unit.

The research was conducted using the RAR (wrong patient retract and reorder) model, which is a validated measure endorsed by the National Quality Forum. The RAR examines the number of times a medication is ordered by a provider for a patient, then retracted and reordered either for a different patient (the correct patient) or discontinued before it reaches the patient, and a patient-related medication error occurs. The researchers hypothesized that many of these near misses occurred because of patient diagnosis and acuity, distraction on the part of the provider due to the unit setting and prescribing multiple medications to multiple patients at the same time. To test their hypothesis, patient identification photographs were placed in the patients' chart within the Electronic Health Record (EMR). A total of 2,558,746 medication orders were reviewed and of those orders, 596, 346 (23.3%) had patient identification photographs displayed to the healthcare providers in the EMR. These orders were for 71, 851 unique patients between

the ages of 49.2 and 19.1 years, and 42, 677 were female. The defined study groups were patients with photographs and patients without photographs. Variables within the study were patient age, urgency of the treatment being prescribed, shift during which the order was placed and the number of workspaces available at the time the medications were being prescribed.

Results of the study indicate that the medications ordered for patients with photographic identification within the EMR were significantly less likely to trigger the RAR and reached the patient safely and more quickly than those prescribed to patients without photographic identification. An overall reduction of 35% in medication errors overall were noted for patients who had photographs displayed in their EMR.

Obvious limitations within this research exist such as lack of randomization-meaning the providers could not be blinded to the study groups because either a patient photograph was present within the EMR, or it was not. Another limitation is the EMR system utilized at this facility- other EMR systems may not allow for patient photographs and therefore, data may not be replicable in other settings. Overall, the results of this study accentuate the positive impact that photographic identification within the EMR and within the medication administration process can have on the patient population as a whole to reduce medication errors and decrease the potential for patient harm. While significant limitations within the study exist, the results do support the PICO(T) topic.

Another qualitative study was conducted by Keers et al. (2018) using interview methods for data collection on a group of 20 healthcare providers (Registered Nurses and Student Nurses) on an inpatient mental health unit. During the interview, 26 medication errors (including 5 near

misses) were described which included 16 skill-based slips and 5 which were error violating circumstances which included wrong medication, wrong patient, wrong dose, or incorrect route of administration.

The sample size of this study is a significant limitation for accurate data collection. However, it is relevant to the PICO(T) question as it does provide insight into the occurrence of medication errors, the causes behind them and the fact that staff do recognize that they happen. Additional background research conducted by Keers et al. (2018), indicates that medication administration errors may be the most common type of patient care related error reported in a mental or behavioral healthcare unit. This information drives the need for additional data collection on possible safe and effective interventions to prevent and reduce the occurrence of such.

Manias and Kusljic (2020) conducted a systematic review of 34 articles. Twelve intervention types were identified that were effective in reducing medication errors. Chart review was the most common method for this study for data collection. Statistical analysis was then used to identify the most successful interventions for reducing medication errors in adult inpatient medical settings. The most successful interventions identified were medication reconciliation via the pharmacy or pharmacist, electronic medication reconciliation, prescriber education and the use of electronic medication records, including patient identifiers. The authors did not identify any interventions which were found to reduce medication dispensing error rates.

The number of articles reviewed in this study was rather limited. Had the number of articles reviewed for this research been larger, additional intervention types may have been

identified. The data collected from this review is helpful in identifying the need for both technological and human interventions to prevent medication errors and thus, is relevant to the PICO(T) topic.

Gumapac (2021) conducted a controlled trial which analyzed the number of medication errors which occurred pre and post implementation of barcode scanning during medication administration within an inpatient hospital setting. Pre-barcode scanning data was collected from the years 2003-2006 and the post-barcode scanning data was collected from the years 2015-2019. It was found that prior to the implementation of barcode scanning for medication administration, there were 219 medication errors (not including near misses) and that post implementation of barcode scanning the number of medication errors (not including near misses) reduced to 100.

Gumapac (2021) notes that the setting for this research was a rural hospital, which provided limited data due to smaller patient population. However, the significance of the results which indicate a positive impact from consistent barcode scanning for patient medication administration fully supports the PICO(T) topic and the possibility for reduction in medication errors within an inpatient setting.

Xie et al. (2019) conducted a qualitative description study which aimed to evaluate the perception of inpatient behavioral and mental health nurses regarding the utilization of barcode and electronic medical record (EMR) technology within the unit. The study also aimed to discover barriers to usage of such and the common themes behind the lack of use in nursing practice. Ten nurses with an average nursing experience between 14.2 and 10.9 years were interviewed. All ten nurses reported that approximately 40% of their shift on the

behavioral/mental health inpatient unit was spent dispensing medications to patients. Through the interviews five themes were identified regarding the usage of electronic medical records and patient identification barcodes. The theme which was most identified was lack of time to properly identify patients through the electronic medical record and their barcode. Additional themes identified were patient and staff safety on the unit due to patient diagnosis and acuity, staff accountability regarding utilizing the EMR, lack of education on proper utilization of the EMR, and clinical workflow.

One nurse identified technology itself as the biggest barrier regarding utilizing a hand-held barcode scanner to scan a patient's barcode stating, "most of the time it does not work, so I have to work around the scanner to medicate my patient in a timely manner" (Xie et al., 2019). Similarly, another participant noted that the barcode scanners often to not work and therefore they must be unplugged and plugged back in to scan a patient wristband, which can cause delays in medicating patients during emergency situations posing risk to patient and staff safety (Xie et al., 2019). Consequentially, it was noted during the interview transcript reviews that the barcode scanning process was overridden entirely due to time constraints due to patient acuity, safety, and situation. Furthermore, the participants indicated that they are often faced with the decision to by-pass the barcode scanning process or enhance patient safety by providing medications efficiently. Xie et al. (2019) addresses this concern in their recommendations for improvement as it is a safety risk to patients via either decision.

Suggested strategies for improving these concerns were in-service educational opportunities for Registered Nurses (RNs) regarding best practice for utilizing the EMR and patient barcodes to dispense medications. The in-service should include education on the "five

rights" of medication administration as well as proper patient identification practices. Xie et al. (2019) suggests strengthening patient education practices by orienting them to the unit and unit expectations surrounding medication administration. The education should include ensuring their patient identification wristband is intact and present with them as they approach the RN for medications so that the RN may scan and confirm their identity. Xie et al. (2019) also suggests that workarounds be discouraged and documented upon occurrence to support the need for further education and devising plans and strategies to reduce medication errors.

Limitations to this research were small sample size, limited setting, and research design. However, the outcomes and results of the study support the PICO(T) topic, emphasize the need for improvement within the proposed patient population and offer suggestions for implementing interventions to address the problem.

Mulac et al. (2021), conducted a study on the types of workarounds that occur within the medication administration process in an inpatient (hospital) setting and why the workarounds occur. They utilized a triangulated, mixed methods design comprised of structured observations (quantitative data) and structured observations of nurses, nurses' comments, and field notes (qualitative data) to complete the study. They observed 44 nurses dispensing 844 medications to 213 patients. During the data collection process, it was found that policy deviations in the medication administration process occurred at multiple levels. The most noted deviations occurred at the task and organization level, environmentally and with the individual nurses. Task and environmental deviations from standard policy occurred with 140 patients (66%) during medication dispensing and with 152 patients (71%) during administration of the medication.

Organizationally, it was found that 29% of medications were not scanned or scanning was overridden and that 20% of patient wristbands were not scanned or scanning was overridden.

The outcome of this study was a recommendation that adaptations be made within the medication administration protocol to improve the workflow of medication administration and improve patient safety and outcomes (Mulac et al., 2019). A heavy emphasis on proper utilization of technology and safe medication administration should be provided to all staff. This study was not conducted on a psychiatric or behavioral health unit, however data collected is relevant and useful in identifying the need for improvement within the medication administration protocols.

Hodkinson et al. (2020)'s meta-analysis and systematic review of observational studies to compare the commonness of preventable harm during the medication administration process. For this research, the data extraction and critical analysis was conducted by two independent reviewers. The random-effects-meta-analysis strategy was utilized followed by univariable and multivariable meta-regression. The overall publication bias was evaluated to ensure quality literature was reviewed. 7,780 articles were reviewed along with 81 studies which included 285,687 patient records. The results of the review indicated that the rate of preventable harm was 3% (with a 99% confidence interval) and the overall medication error related harm was 9% (with a 95% confidence interval). The researchers also found that the medications which posed the greatest risk for patient harm were drugs affecting the central nervous system (CNS), such as those given within the microsystem and cardiac drugs. Strengths of this research are the sample size, the specific care to evaluate the literature for publication bias and the research design (Hodkinson et al., 2020).

It was also discovered that the risk of medication errors was higher among vulnerable populations, in intensive care settings, emergency settings and geriatric settings where patients are administered numerous medications to treat comorbidities. Hodkinson, et al. (2019), also identified the need for further research on the severity of implications in both the primary care and psychiatric settings where nearly 80% of all healthcare is delivered. These conclusions coincide with the proposed PICO(T) topic, patient population and setting discussed in this literature review and further prove the need to identify safe and effective interventions to reduce the potential harm caused by medication related errors within the setting.

Ayani et al. (2016), conducted a cohort study on 448 patients in an inpatient psychiatric setting in Japan over the course of one year and 22,733 patient hospitalization days (number of days each patient spent admitted to the psychiatric unit in total). Four psychiatrists and two physicians reviewed all charts pertaining to medication incidents and classified them as medication errors or adverse drug events (ADEs) and then evaluated them for severity. After review, it was determined that there were 995 ADEs, 398 medication errors (incidence 42.0 and 17.5 per 1,000 patient days). Among the ADEs it was found that 1.4%, 28% and 71% were rated life threatening, serious, or significant respectively. Antipsychotic drugs were deemed the common denominator among all errors and were associated with more than half of all ADEs within the patient population. Researchers determined through this study that the use of antipsychotic medications and patient diagnosis greatly contributes to the increased rate of ADEs on an inpatient psychiatric unit (Ayani et al., 2017). This research study fully supports the proposed PICO(T) and is invaluable in defining the need for research and subsequent

intervention to reduce the number of medication errors within the inpatient mental or behavioral health setting.

Finally, the systematic review conducted by Alshehri et al. (2017) evaluated the nature and frequency of medication errors and adverse drug events (ADEs) in mental health hospitals. 20 studies were evaluated, and the rate of medication errors ranged from 10.6 to 17.5 per 1,000 patient days (n=2), and the rate of ADEs ranged from 10.0 to 42.0 per 1,000 patient days (n=2). Coincidentally, the rate of preventable ADEs was found to range from 13.0% to 17.3%. The drug category most associated with medication errors and ADEs was found to be antipsychotics or psychotropic medications, which are commonly prescribed by providers within the inpatient mental health setting (Alshehri et al., 2017). A small sample size is a limitation for this systematic review, though the data attained through research fully supports the PICO(T) and will prove useful in further research on the proposed topic.

Evidence Synthesis

Strudwick, et al. (2017)'s study was primarily aimed at identifying the barriers from a patient perspective which contributed to medication errors or ADEs. Researchers found that patients within the mental or behavioral health inpatient setting play a significant role in the occurrences of medication errors. Patients within the study were found to associate their patient identification wristbands with negative connotations to their diagnosis, the stigma surrounding a mental health diagnosis, lack of understanding of their prescribed medications as their pertain to their diagnosis and a lack of patient-provider trust. These findings are particularly pertinent to the PICO(T) patient population, setting and problem. It could be assumed that patients who carry

a psychiatric or mental health diagnosis are more likely to remove their patient wristbands to avoid unwanted emotions or negative perceptions related to diagnosis or treatment, thus impairing the medication administration workflow, and increasing the risk of errors or ADEs.

Further supporting the conclusions of Strudwick et al. (2017)'s research, the studies conducted by Alshehri et al. (2017) and Ayani et al. (2017) yielded outcomes which found that patients taking antipsychotic or psychotropic medications were more likely to experience negative impacts of a medication error. These results support the PICO(T) and the need for further interventions to prevent such errors from occurring. Nearly 2% of patients admitted to an inpatient behavioral or mental health unit will be prescribed an antipsychotic drug (Dennis et al., 2020) thus putting this specific population at an increased risk for negative impact should a medication error or ADE occur.

While not all the literature represented studies conducted specifically within the proposed PICO(T) patient setting (mental and behavioral health inpatient), the conclusions drawn from the research were consistent across the board. Medication errors occur across all inpatient settings in healthcare and often occur in patients with comorbidities being treated by providers who prescribe numerous medications to numerous patients throughout a shift. Salmasian et al. (2020)'s research highlighted this point as it was conducted in a busy emergency department setting in an urban area. While the setting was not behavioral or mental health, the patient population frequently presented with mental health diagnosis and acuity which mimics the fast pace and acuity often seen within a behavioral or mental health inpatient setting. Similarities in patient acuity and the fast-paced, emergent environment allow for the conclusion to be drawn

that outcomes would likely mirror those of this study should they be conducted on a mental or behavioral health unit.

Common themes identified via all the presented literature in this review were medication errors and adverse drug events stemming from high patient census, staffing shortages or time constraints for staff, patient acuity, lack of education on proper usage of technology and best practice as well as frequent utilization of workarounds on scanning patient wristband and barcodes. As noted in the research conducted by Salmasian et al, (2020), Keers et al. (2018), Gumapac (2021), Mulac et al. (2021), Van der Veen et al. (2018) and Xie et al. (2019), patient diagnosis plays major role in the healthcare provider and Registered Nurses' ability to safely dispense medication through utilization of the Electronic Health Record (EMR) and with usage of technology such as patient wristbands.

All researchers also concluded that nearly all medication errors and adverse drug events (ADEs) were preventable with suggestions for improvement being increase in staff and prescriber education, proper training on usage of technology and the EMR, patient education on importance of patient identification wristbands and preventing workarounds by implementing methods for nonpunitive accountability should a workaround occur.

Additional suggestions within the literature were made for reducing the number of medication errors such as patient biometric scanning such as palmar vein scans. The intervention which coincides with this PICO(T) was adding patient photographs to the EMR upon admission to avoid having to utilize workaround to administer medications. Unfortunately, the addition of patient photographs to the EMR to prevent medication errors and ADEs is scarcely represented

in the literature, however the lack of supporting research only signifies the need for further research to be conducted and thus, strengthens the proposed PICO(T).

Implications for Practice and Recommendations

Much research has been conducted regarding the cause and effect of medication errors and ADEs in healthcare settings across the board. However, little in-depth research has been done regarding specific interventions to reduce medication errors and ADEs and the effectiveness of such. The gaps signify a need for further exploration of the proposed intervention via research. Based on the outcomes of the studies within the literature reviewed however, the conclusion can be made that an intervention such as placing patient photographs in an EMR or secondary barcode book to prevent or reduce workarounds could significantly reduce the risk of patient harm.

Patients on a mental or behavioral health inpatient unit often carry multiple diagnoses and take multiple medications. Their diagnosis may require medications to be frequently administered or in an emergency circumstance to maintain staff and patient safety. Patients who carry psychiatric diagnosis are typically prescribed antipsychotic or psychotropic medications. The combination of acuity and treatment plan can increase the potential for them to remove their patient wristbands. Should they present to the medication window to receive their prescribed medications without their wristband, the Registered Nurse (RN) will be faced with the decision to work around the practices and procedures to safely administer the medication. Without proper patient identification, the RN will not be able to perform effectively the “five rights” of medication administration. This puts both the patient and the RN at risk of a medication error

occurring and potential for patient harm. Patient photographs attached to a secondary barcode within the medication room will allow the RN to positively identify the patient in three ways: patient photograph, barcode and verifying their name and date of birth. This will alleviate the need to override the barcode scanning process, reduce patient harm and the time it takes to administer medications during a shift.

It is impossible to control all aspects of an inpatient behavioral or mental health unit due to diverse patient population, levels of acuity, wide range of diagnosis and staffing constraints. However, by providing adequate patient and staff education regarding proper patient identification, diagnosis, and treatment, ensuring staff fully understand how to utilize the technology, and focusing on patient and staff safety, along with implementing the proposed intervention, the risk of harm to patients and staff can be reduced.

Because very limited research exists regarding the use of photographic patient identification to reduce medication errors in inpatient behavioral and mental health units, but the evidence regarding potential cause for harm to patients has been well documented, there is a need for further data collection.

Rationale

According to Zhou et al. (2018), a medication error is defined as a preventable event which may cause patient harm due to inappropriate medication use while the medication is under the control of the healthcare professional, patient, or consumer. Medication errors are one of the most significant threats to patient safety in inpatient hospital settings because medication errors can occur at any stage- from the time the medication is prescribed to the patient to the time the

patient takes the medication (Zhou et al., 2018). Medication errors are the leading cause of adverse drug events (ADEs) which can lead to patient harm, extended and unnecessary hospitalizations, time away from work, and the utilization of additional resources. Medication errors and ADEs can have serious consequences such as poor patient satisfaction and outcomes, negative impact on existing conditions and even patient death. Medication errors and ADEs are responsible for 1 in 131 and 1 in 854 inpatient deaths (Zhou et al., 2018). Each year in the United States alone 7,000 to 9,000 people die because of medication errors (Tariq et al., 2023). Medication errors and ADEs also pose the risk of financial strain on the patient and the healthcare system as they often lead to unnecessary utilization of additional resources which can include staff, medications, and hospitalizations. Given the high frequency of medication errors leading to patient harm, it is imperative that prevention and reduction of occurrences be a priority in healthcare across the board. Research by Xie et al. (2019) found that 19% of Registered Nurses (RNs) providing direct care in hospitals reported that medication errors directly involving patients had occurred either "occasionally" or "frequently" in the previous year.

Medication errors occur in all healthcare settings, however, in an inpatient behavioral and mental health unit, the likelihood of a medication error occurring is higher due to vulnerable patient populations, patient diagnosis, patient age, types of medication being administered, and length and frequency of hospitalization (Keers et al., 2018). Psychiatric patients often are involved with outside providers for care, which can lead to miscommunication among healthcare professionals regarding treatment and medications. A general lack of trust between patients, hospital providers and outside providers also has potential for contributing to a higher number of medications errors on inpatient behavioral and psychiatric units (Tariq et al., 2023).

QI Model

The Plan-Do-Study-Act framework model was utilized to measure effectiveness of the specific aim. To determine the number of overrides that occurred, tally sheets were placed in the medication administration room for 14 days with a goal of 80% utilization by staff (Coury et al., 2017). The RN marked a tally on a tracking sheet in the medication room each time a wristband override occurred. The current medication administration process would then be altered by adding patients' photographs to a secondary identification barcode in a binder in the medication room. If a patient presented to the medication window without a wristband, the binder wristband was scanned, and identity was confirmed via the photograph. The same tally sheets were utilized, and this process continued for an additional 21 days. Data from the tally sheets as well as data collected via the medication error tracking system was utilized to determine effectiveness of the intervention.

Specific Aims

Medication error data suggests that an uptrend in medication errors exists. Limited data regarding medication errors specifically associated with wristband overrides has been collected. Bar Code Medication Administration (BCMA) technology was designed to support medication administration safety. However, failure to use the technology in medication administration has been reported and observed. It has been observed that an average of 5-8 wristband overrides occur in a week, which can include overrides for emergent or acute patient care needs. Medication administration errors pertaining to identification wristbands are largely represented in the literature with the biggest focus being on the five rights of medication administration and

ensuring that RNs are properly utilizing medication and equipment protocols (Barakat & Franklin, 2020). The specific aim of this project was to implement a procedural change to the medication administration process and scanning patient identification wristbands.

The Plan-Do-Study-Act framework model was utilized to measure effectiveness of the specific aim. During the "plan" phase, a literature review was conducted, and an intervention was selected. In the "do" phase baseline data was gathered. In the "study" phase the data was analyzed and in the "act" phase the intervention was implemented. To determine the number of overrides that occurred, tally sheets were placed in the medication administration room for 14 days with a goal of 80% utilization by staff (Coury et al., 2017). The second specific aim for this intervention was to increase the number of meds administered with BCMA technology. For example, if there were an average of 8 workarounds performed per week this will equal 16 workaround occurrences in 14 days. Therefore, the goal was to decrease the number of workaround occurrences to 10 in a 14-day period. The RN marked a tally on a tracking sheet in the medication room each time a wristband override occurred.

Methods

Context

After completing a 5P assessment of the clinical microsystem, a quality improvement proposal was created. The 5P assessment is a tool commonly used to examine the five specific qualities within the microsystem such as its patients, professionals, processes, patterns, and purpose. Insights gained from the 5P assessment were used to gain a deeper understanding of

how the clinical microsystem tracks data, implements proposed changes, tracks outcomes, and maintains safety while providing a high level of patient care (Abrahamson et al., 2020).

Purpose

The purpose of the macrosystem and microsystem offers a foundation for understanding the motivation for new policies and procedures being implemented. The microsystem is a 16-bed inpatient behavioral and mental health (psychiatric) intensive care unit within the hospital macrosystem. The purpose of the microsystem is to serve a patient population with a range of mental health and behavioral health conditions who reside in the local area. The specific aim of the microsystem- "trusted care when you need it the most" is painted on the wall in the hallway of the unit and is also printed in the patient handbook. This statement aligns with the overall purpose of the organization which is "INSPIRE wellness, HEAL our patients and SERVE with compassion in every interaction" (Elliot Hospital, 2023, p 10). The microsystem utilizes a team-based approach to assist patients in finding stabilization of symptoms through utilization of supportive groups, pharmacological and non-pharmacological interventions, a deeper understanding of diagnosis and symptoms, and peer-to-peer interactions. The microsystem integrates evidence-based practice via staff and patient satisfaction surveys and staff meetings to track outcomes of improvement changes being implemented, outcomes, and support staff in maintaining a high quality of patient care.

Population

Having a thorough understanding of the patient population that the clinical microsystem serves allows the opportunity to identify areas that can be improved to achieve high-level staff

and patient outcomes. The minimum age to meet admission criteria for inpatient admission is 18 years. Typically, patients range in age from 18-65 years old. Patients considered for admission are actively in a crisis, have attempted suicide or extreme acts of self-harm, or are experiencing an exacerbation of symptoms related to their psychiatric diagnosis. If the patient did not have a mental or behavioral health diagnosis prior to presenting to the Emergency Department, a prescriber will meet with them to ensure that they meet the diagnostic criteria for admission. The top five diagnoses of patients being treated as an impatient admission are: depression, unspecified psychosis, unspecific mood disorder, unspecific schizophrenia, and unspecified bipolar disorder. Patients considered for admission to the microsystem will also be medically cleared by the prescriber. The weekly average patient census is 11.62.

Patients can be voluntarily admitted for inpatient behavioral or mental health care, ordered to attend treatment by a judge or a petition can be filed by a provider or family member (involuntary emergency admission). The legal status of their admission will determine the length of the patient's admission. Therefore, the average length of all admissions is 7.5 days.

Professionals

Identifying staff within the microsystem helps to understand workflows, how the staff interact with one another, staffing concerns, shift rotations and satisfaction within the workplace. The inpatient behavioral or mental health unit has a dedicated Nurse Manager, a Clinical Nurse Leader (CNL), two Psychiatric Mental Health Nurse Practitioners (PMHNP), two social workers, two occupational therapists, Registered Nurses (RNs), and Mental Health Techs (MHT). They also have dedicated support staff which includes a unit secretary and safety camera monitors.

The Nurse Manager, CNLs, PMHNPs and social workers all have their own offices within the unit, making them easily accessible to staff.

Processes

Within the clinical microsystem there are multiple key processes. A clear understanding of typical unit workflows, procedures and processes within the microsystem offers insight into ways that staff communicate, complete tasks, provide high-level patient care, interact within the interdisciplinary team, and assists to identify areas for improvement. Ineffective workflows and failing to follow unit procedures can lead to poor communication between staff, poor communication with patients, increased stress levels of staff, as well as increased risk of errors and the potential for patient harm.

Starting with the admission process and how patients enter the unit: the microsystem does not accept direct admissions. Patients must go to the Hospital's Emergency Department for evaluation first. Before arriving at the unit, patients must be medically cleared. A head-to-toe physical assessment and mental health interview will be performed by the assigned RN upon admission. The PMHNP and social worker will meet with the patient within 24 hours of admission to reconcile medications as well as obtain relevant information regarding previous admissions or support services being utilized.

At the beginning of each shift, each nurse meets with the staff nurses of the oncoming shift to give a report to their in the conference room. Patient report is not conducted at the bedside. Upon being discharged from the microsystem, patients will have appointments made

with outpatient treatment facilities for medication follow-up and a safety plan which includes steps to follow to maintain safety after leaving the hospital.

Medication is administered at a medication window during each shift by a designated nurse (this RN may or may not be the patient's assigned nurse). Medications are administered daily between the hours of 8am and 10am on day shift and 8pm and 10pm on night shift. It is not unit procedure to bring patient medications to patient's room unless a specific exception is made on a patient-by-patient basis. There are no mobile workstations which can safely be brought into the patient's room. This is meant to reduce safety concerns for the patients and the staff. The patients present to the medication window, where their patient wristband is scanned, and the scheduled medications are administered. As needed (PRN) medications are provided to patients throughout the shift following the same process. PRN medications are often administered by the patient's assigned RN. Team rounding is performed every other day, and on the other days, the patient meets one on one with the PMHNP. All available members of the team and the patient are present for team rounding. The treatment plan is reviewed and revised to document the patient's progress and plan for discharge. The safety of patients and staff are key metrics that are tracked within the unit. There are cameras in each patient room and the milieu that are monitored by a designated staff around the clock for patient safety. In-person safety checks are also performed and kept in a logbook. This is kept with the patient chart after the patient is discharged.

Patterns

A key pattern within the microsystem that differs from weekdays to weekends is visiting hours. Weekday visiting hours are 7:30 - 8:30 pm. During the weekend visiting hours are 2:00 -

4:00 pm. The unit is busier during visiting hours, as each visitor must be checked for contraband before entering the unit. An increase in people present in the unit means a higher demand for staff for visual safety checks and supervision. There are also metrics tracked for nursing documentation and medication compliance within the unit.

Cost/Benefit Analysis

This quality improvement project was created utilizing information from the 5P assessment and involved implementing staff and patient education, and a new procedure for medication administration. This improved the medication administration process and reduced the risk for potential medication errors. Before implementing this quality improvement project, all costs associated with the project including environmental, material, and staffing resources were outlined. The overall cost of this project was minimal, except for purchasing the camera and film. The patient identification wristband and chart sticker printing supplies were already purchased by the hospital in bulk. Therefore, monetary costs did not play a monumental role in the cost/benefit analysis.

Environmental Factors

Ensuring that staff have the proper patient identification to safely administer medications in a timely manner is of paramount importance within the microsystem. Certain circumstances present a need for patients to receive medications urgently due to acuity or diagnosis. Each nurse is assigned a caseload of 3-5 patients, with a maximum census of 15. The unit is frequently at maximum capacity meaning, administering medication efficiently and safely can be a lengthy process if patients appear at the medication administration window without their wristbands. The

RN must make the decision to perform a workaround by overriding the barcode scanning process to administer medication. Data collected from the microsystem indicates that an average of 5-8 wristband workarounds occurred over a 7-day period, which included overrides for emergent or acute patient care needs.

In addition to financial impacts, a patient can experience psychological, emotional, and physical effects after a medication error occurs. Medication errors can lead to mistrust between healthcare professionals and the patient and decrease patient satisfaction (Tariq et al., 2023). The cost of an inpatient psychiatric stay is already among the costliest type of inpatient admissions within the macrosystem due to the number of medications typically administered, the number of staff involved in care and the intensive treatment received. Patients will meet with the care team daily to discuss their treatment. According to the macrosystem (2023), the average cost of an inpatient behavioral or mental health stay is approximately $1,600 a day, making the average 7.5 stay cost a total of approximately $12,000. Medication errors are shown to increase the length of stay an average of 2.2-4.6 days, which translates to an additional $3,520-$7,360 (Chen et al., 2017). Implementing a change in medication administration, and thus reducing the risk for medication errors which could lead to a lengthier patient stay, would simultaneously reduce costs.

Human/Staffing Factors

Registered Nurses (RNs) are the staff that administer medication, the cost of their salaries must be considered. However, because a medication error could lengthen the duration of the patient admission and require care from the entire care team, all salaries should be taken into

consideration for this quality improvement project. The average annual salary of a Psychiatric Mental Health Nurse Practitioner (PMHNP) in New Hampshire is $125,480 or $60.33 hourly. The average salary of a Nurse Manager and CNL in New Hampshire is $95,384 annually, or $45.86 hourly. The average annual salary of a resource nurse is $70,331 or $33.81 hourly. The average annual salary for psychiatric registered nurses in New Hampshire is $68,180, or $32.87 hourly (Nursing Journal, 2023). The average annual salary for a Mental Health Technician (MHT) or Licensed Nursing Assistant (LNA) in New Hampshire is $32,880 or $15.81 hourly. Additionally, the average salary of a Social Worker is $71,305 annually or $34.28 hourly. Lastly, the average annual salary of an Occupational Therapist in New Hampshire is $97,257 annually, with an hourly rate of $46.75 (Nursing Journal, 2023). According to the Mesoystem Careers website, a camera/safety monitor makes an average of $13 per hour. The quality improvement intervention required approximately one hour of staff education via a staff meeting, therefore the hourly salaries for all the staff able to attend the educational meeting were factored into the overall cost of this project.

Material Costs

In addition to staff education, this quality improvement project utilized materials specific to this intervention. The associated costs are as follows:

Table 1.

Material Costs

Material	**Reason Needed**	**Cost**
KODAK Printomatic Digital Instant Print Camera	To obtain patient photographs	$49.99

KODAK Printomatic Digital Instant Print Camera printer paper refill	To obtain patient photographs	$24.99 (for 50 pack)
Patient Identification wristband refills	To print patient wristband for binder	$162.50 (for 250 bands) *Label printer already owned by hospital/unit
1 inch 3-ring binder	To hold patient photographs and wristbands	$4.29
Clear plastic sheets	To place patient photographs and wristbands in	$14.29 (for 200)
Patient labels/chart stickers	To place on clear plastic sheet to ensure correct patient information (compatible with EMR)	$64.55 (for 5,000 stickers) *Printer for stickers already owned by hospital/unit)
Tally sheets x8	For nurses to mark tally each time barcode/wristband override book is used	$8.00 for both
1 ream of printer paper	To print tally sheets/unit signs	$13.98
Lamination cost	To laminate unit signs	$1.89 (x6 sheets)
TOTAL COST (approximate)		**$360**

Interventions

Pre-intervention data was obtained via the tally sheet method prior to implementing this quality improvement intervention. The RNs marked a tally on the tally sheet every time they performed a wristband workaround sheet.

The quality improvement project entailed modifying the medication administration process via the following interventions. First, a staff meeting was held, which lasted no longer than one hour and included all members of the care team. During the meeting, staff were

educated on the new medication administration procedures and allowed time for questions and explanation of the reason for the change and data collection process. Members of the team involved in implementing this project included the project lead, staff RNs, MHTs/LNAs, Resource Nurses, CNLs, Nurse Manager and the patients. Then, laminated signs were placed in the dayroom, group room, by the nurses' station and outside the medication administration window. These signs reminded patients to bring their wristbands to the medication window for medication administration (Check sheet, 2023).

Next, beginning with all new admissions, patients had their photograph taken in the conference room, using the Kodak camera and the white pulldown projector screen (already present in conference room) as a background. Patients were oriented to the unit, shown the laminated charts, and provided with an explanation for their photograph being taken. The patient had the right to refuse their photograph being taken, however, given the unit is already under 24-hour video surveillance, consent was expected. In the event of a patient refusing to participate and have their photograph taken, a tally mark was made on the tally sheet in the medication room. Patient chart stickers and patient identification wristbands were printed. The photographs and wristbands were placed in a clear plastic sleeve in a 3-ring binder in the medication room. A patient chart sticker was placed on the clear plastic sleeve to ensure the right wristband is with the right patient, and the right photograph. These wristbands and photographs were placed in the medication administration room (which is always locked) next to the same tally sheet which was utilized to collect pre-intervention data. When a patient presented to the medication window without a wristband, the RN utilized the barcode and photograph for two-step patient identification and made a tally on the tally sheet.

Study of the Interventions

Tally sheets were collected every Sunday at the end of first shift (7:30pm) and replaced with a new tally sheet for the next week. Data was analyzed for patterns at the end of each week. The data collected via the organization's software was analyzed and assessed at the end of the post-intervention collection period. The two sets of data were compared with attention to patterns and gaps in data. It is important to mention that the patient's photograph and wristband barcode were removed from the binder and placed in the secure bin for document shredding located at the nurses' station upon discharge from the unit.

Measures

The tally sheets utilized to collect pre-intervention data were compared to the data collected after the intervention was implemented. This was used to measure whether the implementation of patient photographs and wristband barcodes in the medication administration room helped to reduce the number of medication errors on the unit. To measure the number of medication errors overall, the hospital currently utilizes the data collection and statistical software called BlueSight to analyze all safety errors, including medication errors. Medication errors are initially tracked by staff on a critical safety event document called an "EZ-Track" form, which is turned into the resource nurse and then the unit's CNL. The CNL then enters the information into the BlueSight software. "EZ Track" forms are utilized hospital wide and there are specific forms designated for patient or staff injury, needle sticks, patient falls, utilization of restraints, and medication administration errors. Information collected on an electronic "EZ-Track" form includes the date and time of the error, the staff involved, the nature of the error,

whether the error negatively impacted the patient or staff and corrective action taken (if any). When an “EZ Track” form is filed, the unit’s CNL is notified and immediately begins looking into the incident. The numerical data is translated via the BlueSight software, while the personnel related data is reviewed.

An important factor that contributed to the overall effectiveness of this quality improvement project was the buy-in from the RNs administering medications to utilize the tally sheets to collect data regarding the occurrences of workarounds being used. If they were not properly or consistently utilizing the data collection tool, then the data the project lead analyzed may not be accurate. By providing adequate education to staff and the care team regarding the goal for outcome of this quality improvement project, and allowing ample time for clarification, it is believed that adequate buy-in was achieved.

Secondly, if the patients did not allow the staff to photograph them upon admission, then the data required to track outcomes for this project was not accurate and thus, the effectiveness of the intervention was not able to be determined. If a patient refused to have their photograph taken, a tally was marked on the tally sheet in the medication room. By effectively communicating to the patients the reason for the photograph and properly obtaining consent to photograph them, the risk of this occurring was reduced.

Operational Definitions

A *medication error* is defined as a preventable event which may cause patient harm due to inappropriate medication use while the medication is under the control of the healthcare professional, patient, or consumer. (Zhou et al., 2019)

A *workaround* is defined as the temporary solution or practice for handling exceptions to normal practice or workflow (Van der Veen et al., 2018).

A *workflow is* defined as the set of tasks grouped chronologically into processes, and assigned to individuals or resources needed to complete the tasks that are necessary to complete a given goal (Cain et al., 2018).

Medication administration is defined as the act of administering an individual a medication via a prescribed route (Kim et al., 2023). Common administration routes are oral, topical, intravenous, and injection.

A *tally sheet* is defined as a simple way to collect data about the frequency of occurrence of events (Clinical Excellence Commission, 2023).

A *tally* is a vertical line marked on a data collection sheet to indicate the occurrence of an event (Clinical Excellence Commission, 2023).

Analysis

BlueSight Software uses statistical analysis via a program called Control Check which provides the monthly data. The continuous data provided from the Control Check software includes the average (mean) number of medication errors from the previous weeks and month as well as comparisons to prior weeks, months and even years. This information is then reviewed by the leadership team monthly. The project lead planned to attend the meetings to compare the data collected via the tally sheets with the data collected by the BlueSight Software and Control

Check program. The goal of this quality improvement intervention was to yield a reduction in medication errors overall within the inpatient behavioral and mental health setting.

This intervention had high reliability due to the versatility of the steps needed to implement it and therefore, could be duplicated on this unit or in another psychiatric or behavioral health inpatient unit. However, due to human error, and the fact that data was partially collected via a tally sheet, the validity of this intervention may be low. The RN assigned to administer medications may have been distracted or inadvertently forgotten to mark the tally sheet next to the photograph and barcode book, which could have resulted in inaccurate data.

The weekly data (nominal data) collected via the tally sheets in the medication administration room was converted to a column histogram noting frequency and percentage for visual reference, and then compared to the data collected via the hospital software. Since the BlueSight software calculates an r value, the inferential data was obtainable. This comparison assisted the project lead to determine if a decrease in rate of occurrences of wristband barcode workarounds correlates to a decrease in occurrences in medication errors overall. Time was a variable in this intervention. Given the short duration of the data collection process, it may have been difficult to obtain sufficient data to support the success of implementing this intervention.

Ethical Considerations

This proposal was reviewed by the UNH Department of Nursing Quality Review Committee to support IRB exempt status for QI projects. The ethical considerations for this quality improvement proposal included patient photographs being taken and safe administration of the medications to patients. Due to a patient's diagnosis, level of emotional, physical, or

mental stress, along with acuity, a patient may not have been able to effectively understand why they were being photographed. The macrosystem utilized a consent to photograph form. This form was utilized to obtain consent from the patient to agree to their photograph being taken. Therefore, patients were provided with a verbal explanation regarding the use of their photograph, the reason, and the way they were disposed of upon discharge from the unit. Patients signed the form and it was kept in their chart. Refusal for photographs to be taken was accepted under any circumstance and for any reason, and the consent for use of their photograph could have been revoked by the patient at any time.

Because the photograph and barcode, plus visualization of the patient achieved two-step patient identification, the RN could safely administer the medication to the patient should they have been unable to identify themselves with their patient wristband. However, this did not mean that RNs were not asking patients for their full name and date of birth each time a medication was administered as well as checking the dose, route, and time for each medication.

Results

Initial Steps of the Intervention

Before the intervention was implemented, the project lead met with the Clinical Nurse Leader (CNL), Nurse Manager and Resource Nurse to ensure that there was adequate explanation of the intervention and pre-intervention data collection process. These meetings also discussed ensuring staff buy-in and methods for handling patient refusal to participate in the intervention, securing proper consent information, and formulating a proper documentation note to utilize during the implementation phase. The documentation note stated that the intervention

was explained to the patient by the Registered Nurse (RN) upon admission and that the patient either consented to participate and have their photograph taken or that the patient did not consent to having their photograph taken. It was during this time that this student was informed that the consent form would no longer be necessary, as the organization preferred that the consent be documented by the admitting RN within the electronic health record (EMR) under the admission assessment. Consent from the patient to participate in this intervention included the patient's consent to have their photograph taken and utilized to administer medication to them. This information was obtained via electronic communication between this student, the CNL, Resource Nurse and academic faculty to ensure that proper steps were taken to remain within the organization's policy as well as to document that the intervention did not require additional review by the facility internal and the university Institutional Review Board (IRB).

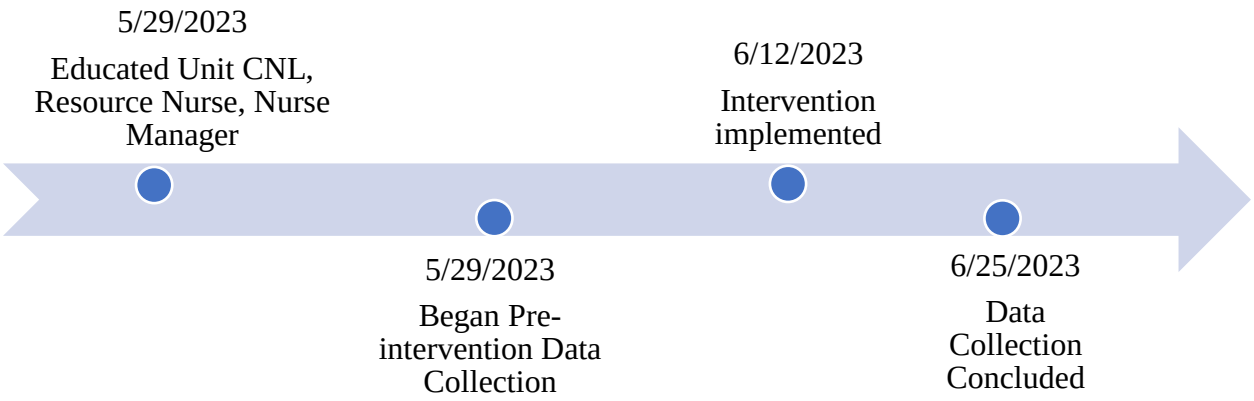
The pre-intervention data collection process was then explained to the staff on the unit at the beginning of shift hand-off meetings for both day and night shift. Pre-intervention data was collected over a two-week period via tally sheets which were kept in the locked medication administration room. These tally sheets briefly explained the nature of the data collection (if a float pool or per diem RN were to work the unit) and separated data by shift and by day of the week. This student collected each week's data on Monday morning at the beginning of the shift.

Modifications were made to the data collection process, including the elimination of the use of the Software. BlueSight is a software program utilized by the hospital to obtain personnel specific data and offer opportunities for management to provide feedback on performance to individual staff, not as data collection software as previously indicated. After communication and review with the unit CNL, a key stakeholder, it was determined that the BlueSight Software was

better utilized for punitive action on a staff by staff (individual) basis after incidents and errors of all types are reported via “EZ Track” forms. “EZ Track” forms are electronic documents which are completed by RNs every time a medication error or safety related incident occurs on the unit. The “EZ Track” forms are transmitted to the unit CNL who reviews the circumstances surrounding the incident and provides feedback to the staff involved. Therefore, the data collected could not be sorted by medication errors alone and would not be helpful in determining the success of the intervention. Due to the additional knowledge of the software, utilization of data yielded by BlueSight was eliminated. Another modification from the original proposal was the duration for each data collection period due to time constraints within the curriculum. Lastly, the medication reminder signs were not placed around the unit as there were already signs made by the organization which labeled the medication room and expectations surrounding medication administration. Handouts regarding such were presented to patients in the “welcome” folders at admission. The project lead did not attend leadership huddle to discuss outcomes and data due to the meetings being scheduled outside of the course curriculum timeframes. No loss was observed due to these changes, nor does it appear that change in outcome occurred.

Diagram 1.

Project Timeline



Process Measures and Outcomes

Pre- and post-data collection was measured via staff report, using tally sheets which were kept in the medication administration room. Each time the RN performed a wristband workaround to dispense medication to a patient, they marked a tally under the appropriate day and shift.

Pre- and post-data collection was also measured via the microsystems "EZ Track" reports which are filed each time a medication error occurs. This data generates the week following the report and was utilized to compare to the data collected via the tally sheets to determine if wristband workarounds impacted the number of medication errors reported.

It was found that pre-intervention, the RNs on the unit performed a total of 19 wristband workarounds with12 (63%) occurring during dayshift and 7 (37%) occurring during night shift. Post-intervention the number of wristband workarounds decreased to a total of 14, with 9 (64%) occurring during the dayshift and 5 (36%) occurring during the nightshift (Table 1). Both the frequency of the tallies and the frequency of the medication errors were defined by grouping into day shift and night shift (7am-7pm and 7pm-7am) for data analysis and pattern recognition

purposes. During the post-intervention phase, a total of 6 patients refused to participate in having their photograph taken on admission to the unit.

Table 2.

Tally Sheet Data

Tally Sheet Data	**Pre-intervention (N=19)n(%)**	**Post-intervention (N=14)n(%)**
Frequency of Tallies		
Day Shift	12 (63)	9 (64)
Night Shift	7 (37)	5 (36)
Frequency of Medication Errors	**Pre-intervention (N=4)n(%)**	**Post-intervention (N=1)n(%)**
Day shift	1 (25)	0 (0)
Night Shift	3 (75)	1 (100)
Total Number of Patient Refusals to Participate		6

"EZ Track" data provides the date, time, staff involved, nature of the error, negative impacts, and corrective action. For this analysis and pattern recognition, date was defined as day of the week, time was broken down between day shift and night shift (7am-7pm and 7pm-7am). Lastly, the staff involved was also broken down by day shift and night shift and years of experience (0-3 and 4-10 years). The nature of the error was defined by wrong patient, wrong dose, wrong time, wrong medication or 'other'. A category for wristband workarounds does not exist on the current reporting system. A total of 4 pre-intervention "EZ Track" forms were completed which pertained to errors regarding the wrong patient (N=2), the wrong time (N=1), and other (N=1). Post-intervention, a total of 1 "EZ Track" form was completed which indicated that there was 1 medication error pertaining to the wrong dose being administered (N=1). Two medication errors in total occurred on a Sunday, while the rest of the errors occurred on random days throughout the week. Pre-intervention data indicates that 50% of the medication errors

involved RNs with 0-3 years of work experience and 50% occurred with RNs who have 4-10 years of work experience on night shift. The post-intervention medication errors occurred with a RN who has 0-3 years of work experience. Seventy-five percent of the pre-intervention medication errors were near misses, while 25% caused patient harm, meaning the medication made it to the patient. 100% of the post-intervention medication errors were near misses. Lastly, 100% of both pre and post intervention medication errors resulted in staff education as corrective action.

Table 3.

"EZ Track" Data

"EZ Track" Data	**Pre-intervention (N=4)n(%)**	**Post-intervention (N=1)n(%)**
Date (day of the week)		
Sunday	1(25)	1(100)
Monday		
Tuesday	1(25)	
Wednesday		
Thursday	1(25)	
Friday		
Saturday	1(25)	
Time (shift)		
Day Shift	1(25)	0(0)
Night Shift	3 (75)	1(100)
Staff Involved (day shift/night shift)		
Day Shift	1(25)	
Night Shift	3(75)	1(100)
Years of Work Experience		
0-3 years	2(50)	1(100)
4-10 years	2(50)	0(0)
Nature of the Error		
Wrong Patient	2(50)	
Wrong Medication		
Wrong Time	1(25)	
Wrong Dose		1(100)

Other	1(25)	
Negative Impacts		
No Patient Harm (near miss)	3(75)	1(100)
Patient Harm	1(25)	
Corrective Action		
Education	4(100)	1(100)

Contextual Elements and Associations

Contextual elements within both the pre- and post-intervention process were acquiring proper consent documentation, staffing, stakeholder buy-in, patient acuity and patient participation. Communication played a large role in acquiring proper notes to document patients' consent to have their photographs taken. Traditionally, the organization required the patients to sign a consent form and it would be placed in their medical records. As technology has advanced, so has the organization's policy. The unit's CNL was able to work with the project lead to formulate the process of informing the patient about the intervention, answering questions as needed and documenting within the Electronic Medical Record (EMR) to take to ensure that consent was documented within the admission note. As previously discussed, patient refusal to participate was also documented within the admission note. Patient refusal played a role in the outcome of this intervention as the intervention was only performed with newly admitted patients.

Staffing and stakeholder buy-in both positively and negatively impacted the outcomes of this intervention. Stakeholders in this intervention were the unit's CNL, Nurse Manager, Resource Nurse, RNs (per diem, float pool, staff) and the patients. While the staff nurses, CNL, Nurse Manager and Resource Nurse were in full support of the intervention and had been informed and educated in person by this student which positively impacted the outcomes.

Unfortunately, because the float pool and per diem RNs do not consistently work the unit, they did not have the same education opportunities as staff RNs. Additional effort was made to briefly explain the intervention and its purpose on the tally sheet. This likely negatively impacted the data collected process due to possible inconsistency of utilizing the tally sheets when a workaround was performed. Lastly, as staffing is difficult within the microsystem, and patient acuity is high, the RNs did not always have time to add the step of taking the patient's photographs to the admission process. Therefore, it is possible that the outcome and data collection may have been skewed. Additionally, patient diagnosis and acuity may have hindered willingness to participate in having photographs taken and negatively impacted the data collection process, causing a decrease in opportunities for staff to utilize patient photographs during medication administration or if a workaround had to be completed with a patient who did not consent to participate.

Unintended Consequences

Per staff report, an unexpected benefit of this intervention was when staff explained the purpose of the photographs and patients consented to have their photograph taken, it formed a degree of trust between staff and patient which would have otherwise taken longer to form. Conversely, staff noted that those patients who refused to participate were less connected to staff at the beginning of their hospitalization.

An additional cost associated with this intervention was the increase in price of the camera. The cost of the camera and film was $179.67 in total versus the originally budgeted for

$74.98. The increase in price was unforeseen, though necessary to complete the intervention and data collection process.

Missing Data

Due to time constraints within the course curriculum, there was limited data collected both pre- and post-intervention. Patient acuity, low patient census and decreased admissions to the unit also created a potential for less data to be collected. Should there have been more time to collect data during both pre and post intervention periods, the results may have yielded more data. Adjusting the intervention to include patients who were already admitted to the unit could also increase opportunities for data collection by increasing the sample size.

Discussion

Summary

Key Findings

According to data collected, utilizing patient photographs to identify patients when administering medications on a mental health unit will reduce the number of wristband workarounds performed. Additionally, results indicate that there is a positive correlation between the utilization of patient photographs and a reduction in medication errors. Data shows that pre-intervention the Registered Nurses (RNs) performed a total of 19 wristband workarounds with a total of 4 medication errors over the course of 14 days. Post-intervention data reveals that staff performed a total of 14 wristband workarounds with only one post-intervention medication error over the 14-day time period. This shows a 75% significant decrease in medication errors overall.

It is also important to note that according to the data collected, most medication errors and wristband workarounds occur during the 7pm-7am (night shift). There was no clear pattern or correlation between staff seniority and medication error frequency, therefore, no correlation could be drawn between the RNs' work experience and frequency of medication errors. Additionally, it was noted that 2 of the pre-intervention medication errors occurred on Saturday and Sunday, which may indicate that errors are more likely to occur during a weekend than a weekday. Conversely, there were more day shift tallies for both pre- and post-intervention than there were on night shift. Which would signify that while there are more barcode workarounds performed during the day, fewer of them lead to an EZ Track form being created and medication errors.

Lastly, two of the pre-intervention medication errors pertained to the RN administering the medication to the wrong person. Because the patient photographs assist the RN in the identification process and help to eliminate wrong patient errors, this may arguably be the most valuable piece of data collected. Post-intervention data did not have any medication errors pertaining to the wrong person. This data proves that the utilization of patient photographs in the medication room not only assists to properly identify the patient, but it significantly reduces the risk of a wrong patient medication error.

Chart 1.

Frequency of Medication Errors

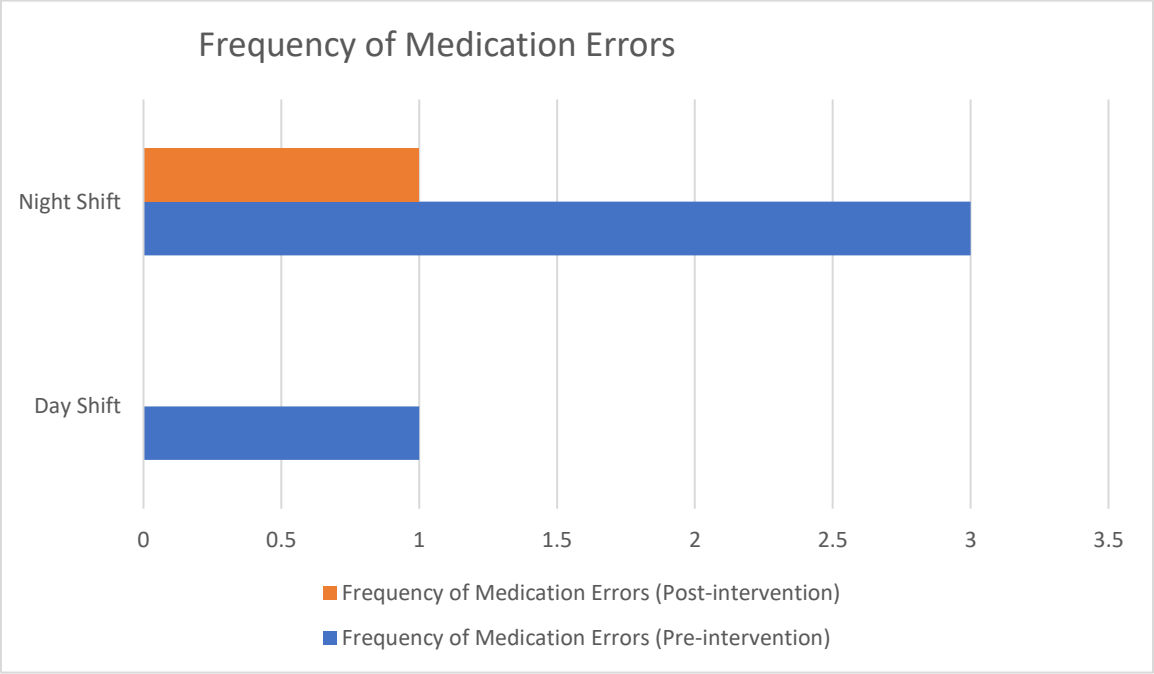
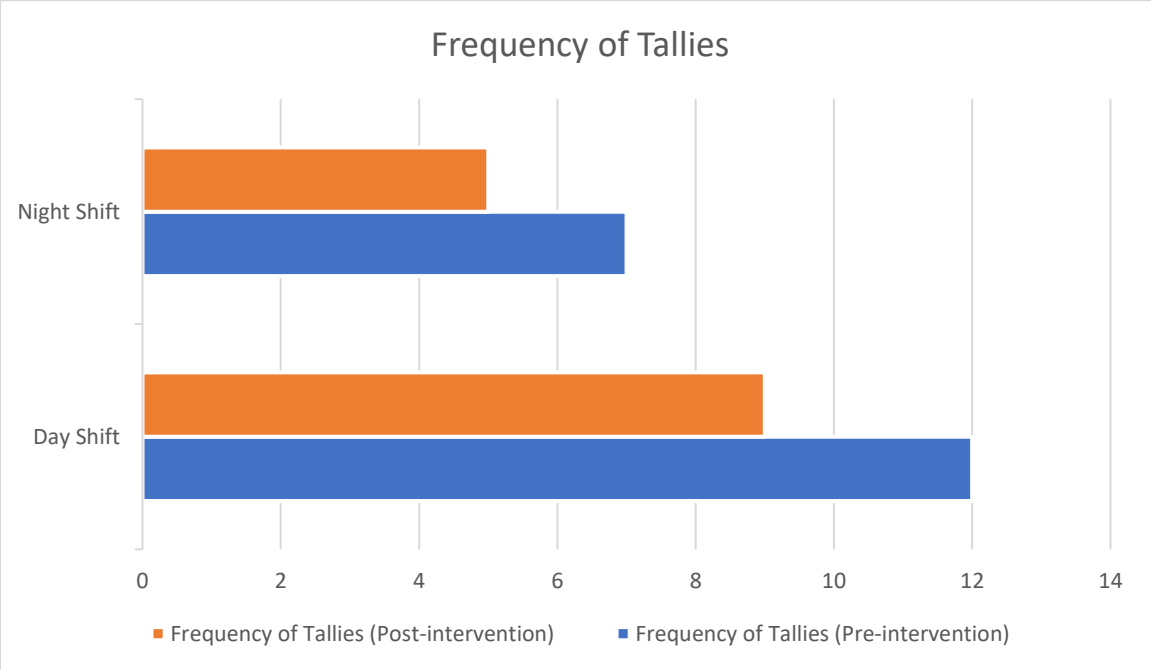


Chart 2.

Frequency of Tallies



Relevance to the Quality Improvement Model

The Plan-Do-Study-Act (PDSA) framework model was utilized for this quality improvement project because it aligned with the steps of collecting information and data. This model also emphasizes analyzing what is learned about the intervention and creating a plan for further action (or making recommendations for further action). The "Plan" portion of the project included collecting data about the microsystem such as the "5 P" assessment which included information about the staff, processes, patient population, patterns and identifying the need for the intervention. The "Plan" phase also included conducting a literature review on the identified problem. Once the problem was identified, the "Do" portion of the project was implemented by using tally sheets and observational data collection to collect pre-intervention (baseline) data.

The "Study" portion of the project was centered around analyzing the data, looking for patterns and determining what the next steps or further interventions should be. The "Act" phase included creating the binder with the patient photographs and barcodes to prevent workarounds, collecting on the effectiveness of the intervention, and determining the next steps for improvement. Because the PDSA model is essentially a cycle, it allows ample opportunity for continuous quality improvement efforts and interventions as well as continuous data collection on the effectiveness of the intervention. This will allow for opportunity to improve the medication administration workflow, improve patient outcomes and reduce the risk for medication errors in the microsystem.

Specific Aims

The aim of 80% utilization of the tally sheets by staff was not able to be assessed because the tally sheet was not being observed by the project lead twenty-four hours a day. However, the aim to reduce the number of medication errors associated with overriding scanning a patient identification wristband at the time of medication administration by 2% within two weeks, was exceeded. Data indicates that medication errors in the post-intervention phase decreased by 75% by June 25, 2023.

The last specific aim for this intervention, which was to increase the number of medications administered with BCMA technology, was unable to be assessed because the organization is not equipped with technology to track this data. The recommendation for further assessing this aim would revolve around the ability of the facility to complete audits within the Electronic Medical Record (EMR).

Strengths of the Project

The biggest strength of this project is the key stakeholder buy-in. All stakeholders avidly supported this intervention and voiced hope that it would be effective on multiple occasions. Because stakeholder buy-in was so strong, acquiring needed input and guidance was not a challenge.

Another strength of this project was the simplicity of the intervention and the data being collected. Because there were not multiple data collection methods and data sources the results were easily interpreted. This intervention and project offered many areas where another quality improvement project could be created based off data collected. There is ample opportunity for

making this intervention a long-term solution to the microsystem's problem of medication errors associated with barcode workarounds.

Interpretation

Association Between Intervention and Outcome

Based on the results of the data collection, the conclusion could be drawn that implementing the utilization of patient photographs for identification on a behavioral or mental health unit in an inpatient setting, will reduce the number of barcode and wristband workarounds during medication administration. This intervention can be linked to reducing the number of medication errors overall.

Because the data indicates that pre-intervention there were a total of four medication errors, and only one medication error post-intervention, one could safely assume that the intervention was a success. Additionally, the number of workarounds reduced significantly across the board from 19 pre-intervention to 14 post-intervention, which would also indicate that the utilization of patient photographs greatly reduced the need for workarounds.

Comparison of the Results with Other Publications

The use of barcode workarounds resulting in medication errors in a fast-paced setting such as a behavioral health unit are well represented in the literature. Common themes identified in the literature reviewed were medication errors and adverse drug events stemming from high patient census. Additional themes identified were staffing shortages, time constraints for staff, high-level patient acuity, lack of education usage of technology. Lastly, a theme identified was lack of education for Registered Nurses (RNs) on best practice as well as frequent utilization of

workarounds on scanning patient wristband and barcodes. The research conducted by Salmasian et al. (2020), Keers et al. (2018), Gumapac, (2021), Mulac et al. (2021), Van der Veen et al. (2018) and Xie et al. (2019), highlighted the fact that patient diagnosis plays major role in the healthcare provider and RNs' ability to safely administer medication through utilization of the Electronic Health Record (EMR) or with usage of technology like patient wristbands.

All researchers also concluded that nearly all medication errors were preventable and provided suggestions for improvement. Suggestions included more staff and prescriber education, proper training on technology and EMR use, providing patient education on the importance of patient barcodes or identification wristbands and effectively preventing workarounds by implementing methods for nonpunitive accountability (education) should a workaround or medication error occur.

Additional suggestions within the literature were made for effectively reducing the number of medication errors. Some of the suggestions were patient biometric scanning such as palmar vein scans. The key intervention discussed within the literature was adding patient photographs to the EMR upon admission to prevent having to utilize workarounds to dispense patient medications. The addition of patient photographs to the EMR to prevent medication errors is scarcely represented in the literature, however the lack of supporting research only signifies the need for further data to be conducted via quality improvement projects such as this one.

Fortunately, the results of this project mimic those of the studies conducted in the reviewed literature. The utilization of technology along with patient identification photographs,

staff education and nonpunitive action if an error does occur will reduce the number of medication errors and workarounds overall. The utilization of nonpunitive corrective action is key in preventing errors, and the microsystem does it well. There is a portion of the EZ Track form which requires the management team to indicate what type of action occurred as a result. The only options are education or additional leadership supervision hours with the RN involved (essentially more education).

The Impact

The impact of this quality improvement project on the people and systems within the clinical microsystem was profound. Outside of the obvious positive impact of the reduction of wristband workarounds and medication errors overall, it also gave staff confidence during the medication administration process. Staff have reported to the project lead that they feel that the patient photographs give them confidence in dispensing medications in situations where there are multiple patients with the same first names or when there are high-acuity patients who may be inclined to provide inaccurate patient identification information at the medication window. They feel that the use of patient photographs made the medication administration process run more smoothly, efficiently, and significantly reduced the duration of the routine shift medication administration process. While the data collection process is concluded, the unit has chosen to continue to utilize the intervention as this student implemented it and efforts are being made by the leadership team to make it an official process across the board of the behavioral health units within the Macrosystem.

Differences in Outcomes

Because the identified problem of medication errors and barcode/wristband workarounds were so heavily represented within the literature and the problem was voiced from leadership and staff within the microsystem the need for intervention was apparent and the anticipated results were clear. The results of the actual intervention mimicked the anticipated results with one exception. The one difference from anticipated versus actual outcome was that the actual number of pre- and post-intervention workarounds and medication errors were lower than predicted. This is not necessarily a difference in actual data collected, rather simply a limitation which will be discussed in the next section of this paper.

Costs

Because the data collection process had a few minor changes from the initial proposal such as not utilizing the BlueSight Software, there were a few tradeoffs within the project. Data collection was somewhat simplified from the original proposal. Though this did not outwardly affect the outcome of the intervention or the data collection process, it did prompt review of whether the finalized data collection process would suffice.

An opportunity cost within this project was the length of time of the pre- and post-intervention data collection, meaning how long would this intervention last. The original project timeline planned for pre- and post-intervention data collection for four weeks, however due to constraints within the patient population and microsystem, it was decided that it would be reduced to two weeks for each. The data collected was sufficient and results indicated that the intervention was successful regardless of the length of time.

Limitations

Limitations to Generalizability

The findings from this intervention mimicked those of the literature reviewed, even those which occurred in different clinical microsystem settings such as emergency departments and medical-surgical inpatient units. This intervention could be replicated within another unit or clinical microsystem with different patients and professionals with success. While the patient diagnosis and acuity may not be the exact same within other clinical settings, many patients within mental health diagnosis also have medical comorbidities, making them just as likely to prompt workarounds for medication administration. The process of administering medications on an inpatient behavioral or mental health unit differs from other inpatient or Emergency Department units because medications are not administered at the bedside. However, data from other studies indicates that this intervention was not only effective, but also reduced medication errors. Therefore, it would be reasonable to believe that bedside medication administration is not a *major variable in the outcome.*

Factors that May Have Impacted Variability

The most significant factors that may have impacted variability in this quality improvement project were the patient population and patient acuity. Because this intervention was only applicable to patients who were newly admitted to the unit, not the patients who were already admitted inpatient at the time of implementation, the sample size was considerably reduced. Additionally, the number of patients being admitted to the unit during the post-intervention period was low, meaning the number of patients to collect data on was also low.

Staff and patient buy-in could have also affected variability. Patients not consenting to their photograph being taken, staff decision not to obtain patient photograph upon admission resulted in less data being collected. Staff exercised discretion if a patient was combative or physically violent upon admission and a patient would not be photographed due to risk for increased violence. Patient acuity or staffing shortages could lead to staff inadvertently forgetting to mark a tally on the tally sheet indicating a workaround was performed could also have impacted variability in a negative way. Lastly, the amount of time for both pre- and post-intervention data collection could have impacted variability due to the unanticipated reduced rate of admissions during the project timeframe. While the results yielded supported the thesis, it is believed that a longer duration of time would have offered more data and thus, more concrete support that this intervention is effective in preventing medication errors.

Steps Taken to Minimize Limitations

Steps taken to minimize limitations were frequent check-ins with the clinical microsystem and providing education to staff when needed to ensure that sufficient buy-in was maintained. While this could have created bias, the project lead attempted to maintain check-ins with the microsystem to strictly an educational level and limited the duration which was spent discussing the intervention, unless staff presented questions. Patient acuity and lack of admission to the unit is not a factor that can be controlled. In the future, it would be interesting to collect data for long periods of time both pre- and post-intervention to ensure adequate data and patient population/sample size.

Conclusion

The usefulness of this work is immense as outlined by the literature, the data collected, and the report of staff involved in utilizing this intervention. This intervention could easily spread to other inpatient microsystems, specifically Geriatric Psychiatric inpatient units, or emergency departments, as they see patients with similar diagnosis and acuity. Because the camera utilized for patient photographs was inexpensive in cost and staff education can be conducted in a short time, the implementation of this intervention can occur in a timely manner no matter the clinical setting. Few resources are required to effectively implement this intervention; therefore, it can be assumed that sustainability is high. After the camera and additional film has been purchased, the only resources needed are the patients and the staff implementing the intervention.

Implications for future practice include continued staff education regarding the importance of the five rights of medication administration, patient safety and medication errors and patient education regarding the unit's medication administration process. The data collected from this intervention indicates that a need for change in the medication administration process exists and that medication errors can be reduced with a change in process. A change in the medication administration process will not only reduce the length of time that medication administration requires for each shift but will also reduce the number of barcode workarounds and the number of medication errors overall. Suggested next steps include continuing to utilize the patient photograph and barcode binder for medication administration and continuing to educate staff and patients on safe and effective patient identification and medication administration.

Other Information

Funding

All monetary funding for this quality improvement project was covered by the project lead for the sole purpose of acquiring data on the chose intervention.

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Appendices

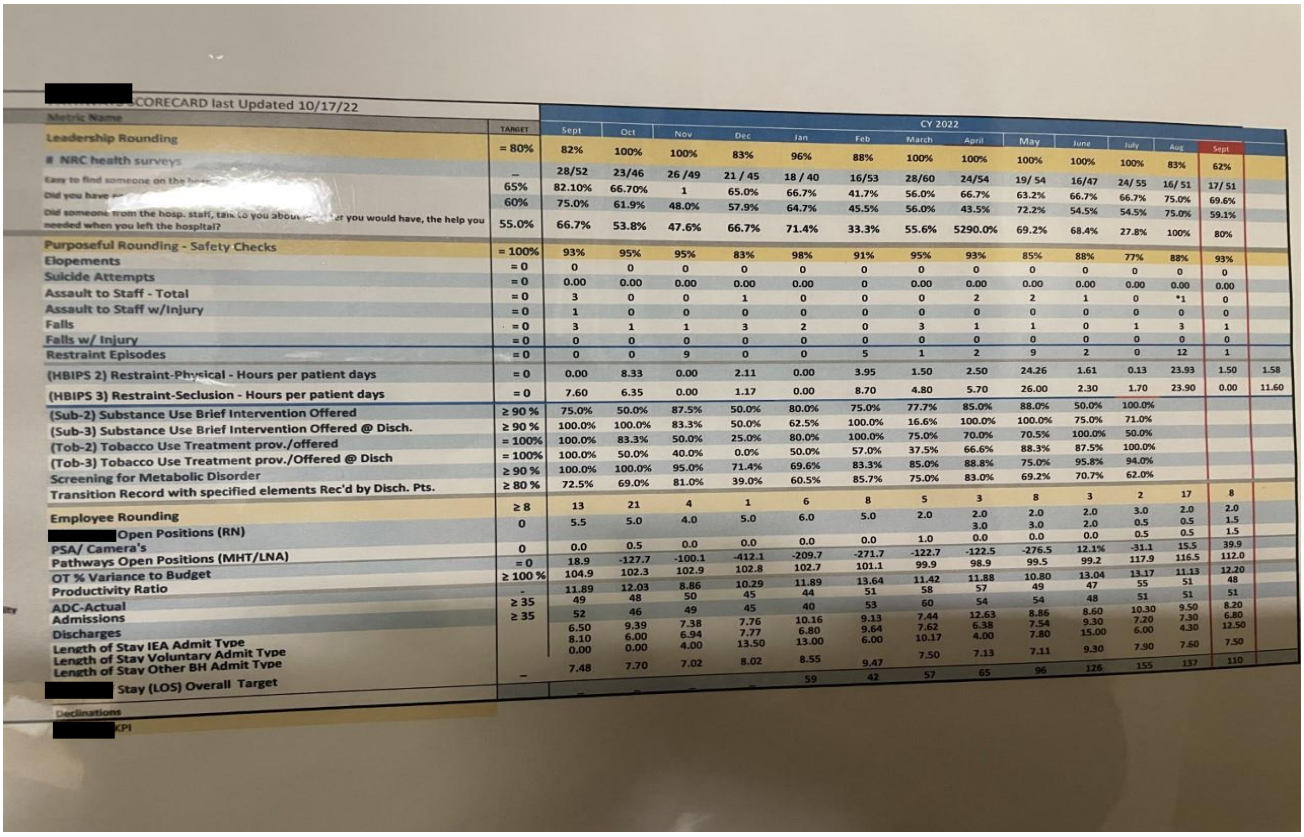
Appendix A

Staff Demographics

Title	**FTE (Y/N)**	**Number**	**Shift**	**Education/Certification**
Certified Clinical Nurse Leader (CNL)	Y	1	Day/Weekdays	CNL Certification
Social Worker	Y	2	All	MSW
APRN	Y	2	Day	APRN
Occupational Therapy	Y	2	Day	Master's Level
Registered Nurse (RN)	Y	7	Day	2 MSN/5 BSN
Registered Nurse (RN)	Y	6	Night	6 BSN
Per Diem Registered Nurse (RN)	N	3	All	BSN
Mental Health Tech(MHT)/Licensed Nurses Assistant (LNA)	Y	2	Day	2 MHT certification
Mental Health Tech(MHT)/Licensed Nurses Assistant (LNA)	Y	3	Night	3 MHT certification
Camera Monitor	Y	2	Day	2 LNA certification
Camera Monitor	Y	1	Night	1 LNA certification
Unit Secretary	Y	1	Day	1 LNA certification
Traveler Registered Nurse (RN)	N	1	All	1 BSN

Appendix B

Fast Track Data



[redacted] SCORECARD last Updated 10/17/22

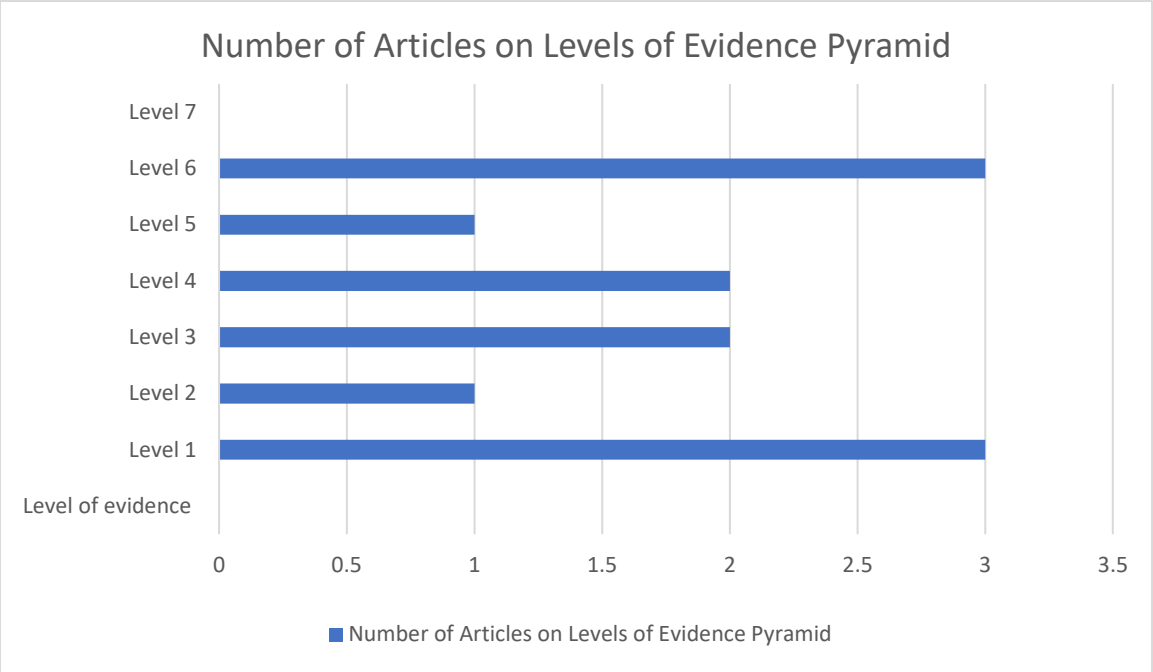
Metric Name	TARGET	CY 2022 Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	
Leadership Rounding	= 80%	82%	100%	100%	83%	96%	88%	100%	100%	100%	100%	100%	83%	62%	
# NRC health surveys	–	28/52	23/46	26 /49	21 / 45	18 / 40	16/53	28/60	24/54	19/ 54	16/47	24/ 55	16/ 51	17/ 51	
Easy to find someone on the [redacted]	65%	82.10%	66.70%	1	65.0%	66.7%	41.7%	56.0%	66.7%	63.2%	66.7%	66.7%	75.0%	69.6%	
Did you have [redacted]	60%	75.0%	61.9%	48.0%	57.9%	64.7%	45.5%	56.0%	43.5%	72.2%	54.5%	54.5%	75.0%	59.1%	
Did someone from the hosp. staff, talk to you about [redacted] you would have, the help you needed when you left the hospital?	55.0%	66.7%	53.8%	47.6%	66.7%	71.4%	33.3%	55.6%	5290.0%	69.2%	68.4%	27.8%	100%	80%	
Purposeful Rounding - Safety Checks	= 100%	93%	95%	95%	83%	98%	91%	95%	93%	85%	88%	77%	88%	93%	
Elopements	= 0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Suicide Attempts	= 0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Assault to Staff - Total	= 0	3	0	0	1	0	0	0	2	2	1	0	*1	0	
Assault to Staff w/Injury	= 0	1	0	0	0	0	0	0	0	0	0	0	0	0	
Falls	= 0	3	1	1	3	2	0	3	1	1	0	1	3	1	
Falls w/ Injury	= 0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Restraint Episodes	= 0	0	0	9	0	0	5	1	2	9	2	0	12	1	
(HBIPS 2) Restraint-Physical - Hours per patient days	= 0	0.00	8.33	0.00	2.11	0.00	3.95	1.50	2.50	24.26	1.61	0.13	23.93	1.50	1.58
(HBIPS 3) Restraint-Seclusion - Hours per patient days	= 0	7.60	6.35	0.00	1.17	0.00	8.70	4.80	5.70	26.00	2.30	1.70	23.90	0.00	11.60
(Sub-2) Substance Use Brief Intervention Offered	≥ 90 %	75.0%	50.0%	87.5%	50.0%	80.0%	75.0%	77.7%	85.0%	88.0%	50.0%	100.0%			
(Sub-3) Substance Use Brief Intervention Offered @ Disch.	≥ 90 %	100.0%	100.0%	83.3%	50.0%	62.5%	100.0%	16.6%	100.0%	100.0%	75.0%	71.0%			
(Tob-2) Tobacco Use Treatment prov./offered	= 100%	100.0%	83.3%	50.0%	25.0%	80.0%	100.0%	75.0%	70.0%	70.5%	100.0%	50.0%			
(Tob-3) Tobacco Use Treatment prov./Offered @ Disch	= 100%	100.0%	50.0%	40.0%	0.0%	50.0%	57.0%	37.5%	66.6%	88.3%	87.5%	100.0%			
Screening for Metabolic Disorder	≥ 90 %	100.0%	100.0%	95.0%	71.4%	69.6%	83.3%	85.0%	88.8%	75.0%	95.8%	94.0%			
Transition Record with specified elements Rec'd by Disch. Pts.	≥ 80 %	72.5%	69.0%	81.0%	39.0%	60.5%	85.7%	75.0%	83.0%	69.2%	70.7%	62.0%			
Employee Rounding	≥ 8	13	21	4	1	6	8	5	3	8	3	2	17	8	
[redacted] Open Positions (RN)	0	5.5	5.0	4.0	5.0	6.0	5.0	2.0	2.0 3.0	2.0 3.0	2.0 2.0	3.0 0.5	2.0 0.5	2.0 1.5	
PSA/ Camera's	0	0.0	0.5	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.5	0.5	1.5	
Pathways Open Positions (MHT/LNA)	= 0	18.9	-127.7	-100.1	-412.1	-209.7	-271.7	-122.7	-122.5	-276.5	12.1%	-31.1	15.5	39.9	
OT % Variance to Budget	≥ 100 %	104.9	102.3	102.9	102.8	102.7	101.1	99.9	98.9	99.5	99.2	117.9	116.5	112.0	
Productivity Ratio	–	11.89	12.03	8.86	10.29	11.89	13.64	11.42	11.88	10.80	13.04	13.17	11.13	12.20	
ADC-Actual	≥ 35	49	48	50	45	44	51	58	57	49	47	55	51	48	
Admissions	≥ 35	52	46	49	45	40	53	60	54	54	48	51	51	51	
Discharges		6.50	9.39	7.38	7.76	10.16	9.13	7.44	12.63	8.86	8.60	10.30	9.50	8.20	
Length of Stay IEA Admit Type		8.10	6.00	6.94	7.77	6.80	9.64	7.62	6.38	7.54	9.30	7.20	7.30	6.80	
Length of Stay Voluntary Admit Type		0.00	0.00	4.00	13.50	13.00	6.00	10.17	4.00	7.80	15.00	6.00	4.30	12.50	
Length of Stay Other BH Admit Type															
[redacted] Stay (LOS) Overall Target	–	7.48	7.70	7.02	8.02	8.55	9.47	7.50	7.13	7.11	9.30	7.90	7.60	7.50	
		–	–	–	–	59	42	57	65	96	126	155	137	110	

Declinations

[redacted]KPI

Appendix C

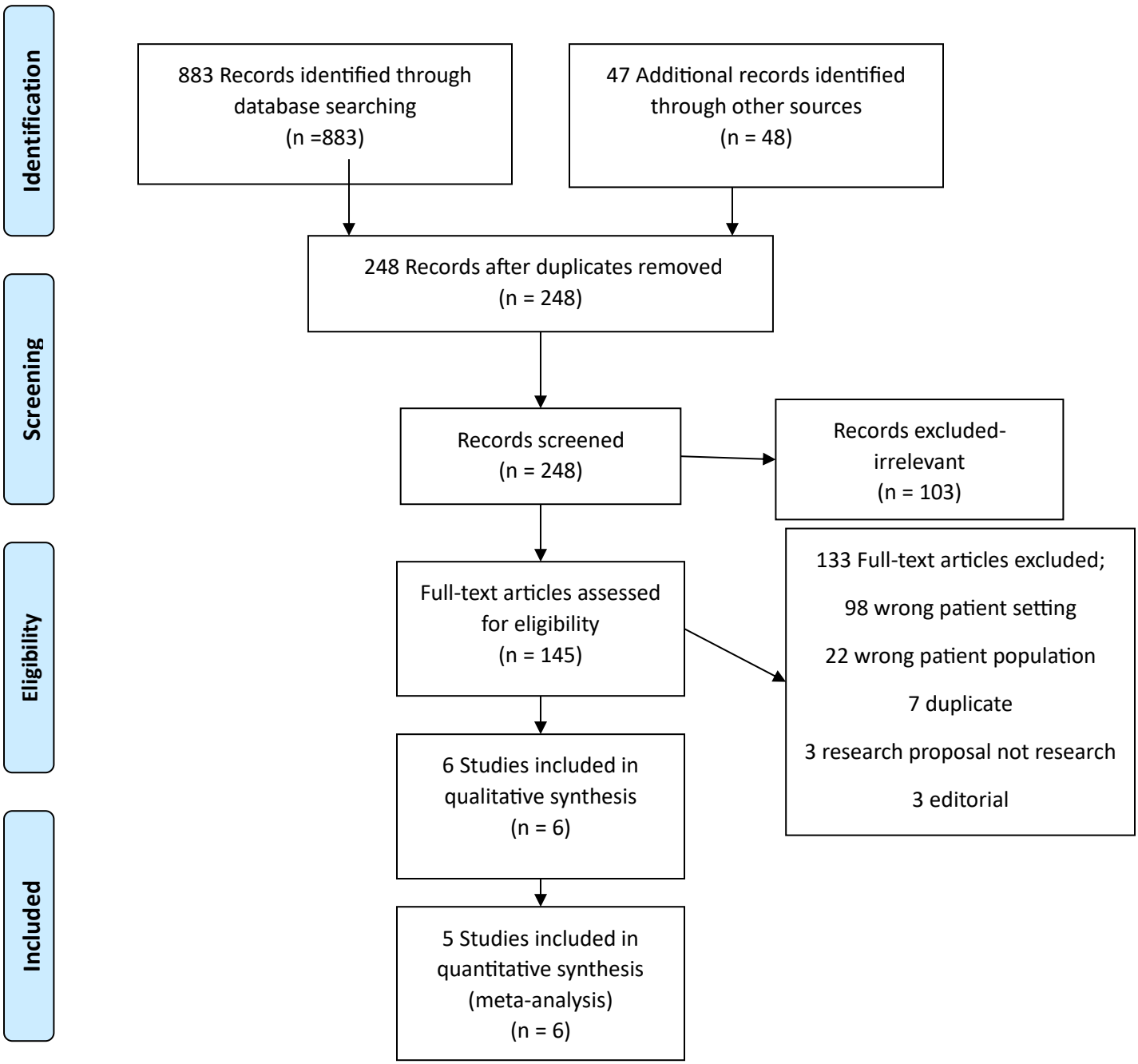
Melnyk's Levels of Evidence



Appendix D

PRIMSA Flowsheet

RISMA 2009 Flow Diagram



Appendix E

Example Tally Sheet

Week of *5/29/23*	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	**Total**
1st Shift								
2nd Shift								

Appendix F

Unit Visual Prompt

Please remember!

To receive your scheduled or 'as needed' medication you will need your **patient wristband!**