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# Acute Agitation Intervention Tool for Reduction of Polypharmacy

Brooks J. Propst
*University of Missouri-St. Louis*, brooks.propst2015@gmail.com

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Brooks J. Propst BSN, RN

Candidate for Doctor of Nursing Practice with an emphasis in Pediatric Nurse Practitioner
B.S. Nursing, Arkansas State University, 2019

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Advisory Committee

Vanessa Loyd Ph.D., DNP, RN
Chairperson

Elise Schaller, DNP, MHA, APRN, CPNP-PC

Cheyanne Largent MSN, RN, NPD-BC, RNC-NIC



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## Abstract

**Introduction:** Patients with behavioral health diagnoses are among the highest risk for aggression. For pediatric patients with behavioral health needs, urgent treatment is needed for aggressive behavior, due to the potential unwanted outcomes. The purpose of this Quality Improvement (QI) pilot project was to implement an Acute Agitation Intervention Tool that uses the Broset Violence Checklist (BVC) to guide pharmacological intervention for mild and moderate to severe agitation in pediatric patients with behavioral health needs ages 8 to 18 to decrease the number of medications that patients are getting per agitation event over a 12-week period.

**Methods:** This QI included a retrospective analysis of PRN medications pre (Oct. 2022-Dec. 2022) and post (Jan 2023-Mar 2023) implementation of the Acute Agitation Intervention Tool using the BVC to inform pharmacological intervention. The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care served as the framework.

**Results:** A (N=337) agitation events occurred when combining the pre and post implementation period. Pre-Implementation (*n*=237) Post Implementation (*n*=100). A decrease in the number of medications utilized per agitation event by 6.6% was found. A Two-tailed independent sample t-test was performed.

**Implication for practice:** Continued utilization of the Acute Agitation Intervention Tool, modifying the tool to self-injurious behaviors, continual support, and audits of those performing the administration of the medication of order set will be completed. There will continue to be areas of opportunity for improvement in aggression assessment and PRN medication practices.

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**Acute Agitation Intervention Tool for Reduction of Polypharmacy**

The Joint Commission (TJC) (2021) revealed, as of 2018, healthcare workers were five times more likely than other workers to experience workplace violence. As a result, TJC (2021) issued a new workplace violence definition specific to health care which states, "An act or threat occurring at the workplace that can include any of the following: verbal, nonverbal, written, or physical aggression; threatening, intimidating, harassing, or humiliating words or actions; bullying; sabotage; sexual harassment; physical assaults; or other behaviors of concern involving staff, licensed practitioners, patients, or visitors" (para.1). Along with this definition, TJC tasked all its hospitals to follow newly issued standards to aid in the prevention of workplace violence incidence. These included hospital management of safety and security risks, careful observation and monitoring of conditions in the hospital environment, staff participation in ongoing training and education on workplace violence, and ensuring that leaders develop and sustain a culture of quality and safety throughout the hospital (TJC, 2021).

According to the Centers for Disease Control and Infection (CDC)(2021), aggression in young people is defined as the use of physical force or harm to others aged 10-24. The reasons for aggression in the inpatient setting are often thought to be due to impulsivity, aggressive beliefs, psychological illness, experiencing child abuse and neglect, exposure to violence in the home, lack of appropriate supervision, parental substance abuse, or inconsistent discipline (CDC, 2021).

While no specific diagnosis predicts future ensuing aggression, studies indicate that patients with behavioral health needs are among the highest risk for acting out with aggression (TJC, 2021). Research from the U.S. Bureau of Labor Statistics (BLS) (2021),

demonstrated from the years 2016 to 2020 there were 207 deaths due to violence in the workplace in healthcare in the private sector alone. Shaw (2015) showed that 26% of healthcare staff expressed concerns for their safety weekly, and another 27% had concerns for their safety monthly. Reasons for staff injury in the setting of pediatric patients with a psychiatric diagnosis include the frequency of verbal and physical aggression, physical restraining, sedation, and mechanical restraining (Hopper, 2012). Decreased safety and perceptions of safety in healthcare are partly due to the growing number of pediatric admissions with a primary psychiatric diagnosis (Hopper, 2012; Shaw, 2015).

For pediatric patients with behavioral health needs presenting to the hospital, urgent treatment is needed for those at risk for violent behavior. This is due to the potential unwanted outcomes associated with violent behavior. Approximately eight percent of youth presenting to the Emergency Department (ED) for psychiatric care require restraints (Gerson et al., 2019).

While non-pharmacological management is considered the first line for acute aggression, at times medication administration is warranted (Martin et al., 2017; Gerson et al., 2019). The use of psychotropic pro re nata (PRN) medication to assist in managing patient concerns and behavior is common practice in mental health inpatient units. However, there is no current standard of pediatric agitation assessment to guide pharmacological management. Because of this, at times, patients get more medication than needed, which can have unintended consequences (Asogwa et al., 2017, Cole et al., 2020).

In a midwestern pediatric hospital, there was an opportunity for improvement in aggression assessment and PRN medication practices. While nonpharmacological de-escalation strategies such as active listening, paraphrasing, diversional activity, and stimulation are known as the first line for agitation, medication is sometimes needed. The problem was, without a standardized tool for decision-making, there is often inappropriate responses from PRN medications and potential polypharmacy. The organization in which the quality improvement project was conducted was concerned with the combined utilization of psychiatric medications, including haloperidol, lorazepam, diphenhydramine, hydroxyzine, chlorpromazine, and olanzapine.

The purpose of this QI project was to implement an Acute Agitation Intervention Tool that uses the BVC to guide pharmacological intervention for mild and moderate to severe agitation in pediatric patients with behavioral health needs ages 8 to 18. The aim was to decrease the number of PRN combination usages over three months by 10% in the utilization of the BVC to guide pharmacological intervention for mild agitation and moderate to severe agitation. The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care served as the framework for this QI project. The primary outcome measures were the number of documented PRN administrations per agitation event (six hours period from first PRN administration) of oral and intramuscular haloperidol, lorazepam, diphenhydramine, hydroxyzine, olanzapine, and chlorpromazine over 12 weeks before and during the BVC implementation phase. Other outcome measures included compliance with BVC obtained via retrospective chart review for each PRN medication given for those included in the criteria, the route of medications given, and BVC's association with the number of medications the patient received. The question

for the Quality Improvement (QI) was “In pediatric patients admitted with behavioral health, ages 8 to 18 on a medical-surgical unit and behavioral health unit, how does the implementation of the BVC reduce the usage of psychiatric medications including haloperidol, lorazepam, diphenhydramine, hydroxyzine, olanzapine and chlorpromazine over 12 weeks”?

## Review of Literature

To conduct the literature search, Medline, APA PsycINFO, and CINAHL were utilized. Key search terms and phrases included *aggression, aggressive behavior, aggressiveness, agitation, PRN medication, medication, haloperidol, olanzapine pediatric, child, children, and adolescent,* with the use of Boolean operators AND and OR. Initially, 310 articles were generated based on search terms and phrases. Inclusion criteria were studies from 2017 to 2022, published in the USA, in the English language, and with full-text availability. The publications selected were all from the past five years to ensure the most up-to-date and relevant information. Exclusion criteria were those publications with an older adult focus or not published in English. After inclusion and exclusion criteria were applied, 27 publications were generated, and 18 publications were selected for this literature review. No other search methods were utilized. Strategies to decrease publications from 27 to 18 included abstract review and assessing relevant and salient information that would help generate information and insight about the usage of PRN medication for agitation and the BVC.

Aggression screening and assessment tools used in an inpatient behavioral unit have positive effects. One of the greatest effects is fewer seclusion and restraint occurrences (Gaynes et al., 2017). In a review of the literature, Gaynes et al. (2017) found

that risk assessments are needed with aggressive patients in inpatient psych units regardless of diagnosis. A common tool utilized for psychiatric patients is the short-term risk assessment tool Broset Violence Checklist (BVC).

The BVC includes the assessment of and descriptions of known indicators of aggression. The six indicators are irritable, confused, boisterous, physical threats, verbal threats, and attacking objects (Woods & Almvic, 2002). The BVC can be used in a variety of settings and uses the presence or absence of six behaviors to forecast the potential for violence within a twenty-four-hour period. Assessment using the BVC is completed every nursing shift within two hours after the beginning of each nursing shift. Risk is classified as low (zero), moderate (one to two), or high (greater than two). After risk assessment occurs, institutions then implement safe and secure practices for the patient based on their hospital's system and standards.

Empirical research has shown that the BVC has moderate sensitivity and high specificity with adequate inter-rater reliability (Woods & Almvic, 2002). Lockerston et al. (2021) reported on the BVC and, using repeated measurement, found an association between the BVC and imminent violence. This retrospective cohort study aimed to determine the relationship between BVC scores and the occurrence of violent or aggressive behavior while also factoring in gender (Lockerston et al., 2021) Results showed an increased risk of aggression and violence with every point added to the BVC on admission, furthermore, throughout hospitalizations, the BVC was found to predict imminent threats and physical violence regardless of gender (Lockerston et al., 2021). All individual items were associated with aggression with violence and physical threats having the strongest association and confusion having the least possible association. Senz

et al. (2019) completed research using the BVC in the emergency department (ED) and found that if the BVC was completed on arrival and every subsequent half hour, the score could be used to implement intervention plans, de-escalation techniques, pharmacological intervention, or physical restraint. Although some studies show the positive effects of aggression tools such as the BVC, some studies show no significant effect. For this study, looking at both the benefits and potential deficits of the BVC will help shape practices and recommendations to better anticipate any pitfalls or troubleshoot any issues that occur.

Hvidhjelm et al. (2017) found no statistically significant in the BVC's reduction in the number of aggressive indicators. Along with this, Florisse et al. (2020), researched the impact of introducing a crisis monitoring system on aggression and containment interventions. In this study, the researchers utilized the "Crisis monitor" which combines five of the standard observation scales, including the BVC. It was found that the assessment, along with coercive interventions and seclusion practices utilized, lead to no difference in reducing aggression. A secondary finding was that nurses in charge of performing these assessments had increased feelings of anxiety, stress, and work pressure associated with the assessment tools (Florise et al., 2020). As the BVC is adequate to assess known indicators of aggression, it can be utilized to inform the pharmacological and non-pharmacological management of aggression in the inpatient pediatric unit.

Acute and urgent treatment is needed during acute agitation due to the risk of violent behavior. The standard for first-line agitation in children and adolescents is verbal de-escalation and coaching strategies. This treatment should be individualized and multidisciplinary and utilize family guidance (Gerson et al., 2019; Marin et al., 2017).

Paton et al. (2019) found de-escalation and PRN, or as needed, treatment may be most successful if the treatments are gender specific. Martin et al. (2017) found in a retrospective cohort study that non-pharmacological management of aggression is often not being utilized and is poorly documented by front-line staff.

PRN usage can limit the successor behavioral modification and verbal de-escalation strategies (Martin et al., 2017; Carlson et al., 2020). According to Carlson et al. (2020) when a behavioral modification plan is utilized, PRN and restraint usage go down from 483 per 1000 patient days to 160 per 1000 patient days. Medications should be used once the non-pharmacological intervention has failed (Gerson et al., 2019). These medications should be chosen for calming effects rather than sedating the youth (Gerson et al., 2019).

The standard medication utilized in the adult population for acute agitation is Haloperidol and Ativan (Asogwa et al., 2017). This medication combination is not found to be effective and has an increased chance of side effects, including extrapyramidal symptoms in children and adolescents (Asogwa et al., 2017)..According to Gerson et al. (2019), oral or intramuscular diphenhydramine a standard medication for mild agitation and aggression in children.

Atypical Antipsychotics are standard first-line PRN medications for moderate to severe aggression in children due to the less frequent side effects occurrences (Zaeifopoulos & Panayiotakopoulos, 2019). Of these, the most notable for moderate to severe aggression is Olanzapine. Olanzapine works in neurotransmitter receptors D2-D3, 5HT2A, 5HR2C al, H1, M1-M5(Gerson et al., 2019; Zaeifopoulos & Panayiotakopoulos,

2019). This atypical antipsychotic has a 20-hour half-life, and has the availability to be given orally (PO) or intramuscularly (Gerson et al., 2019).

Gerson et al. (2019) found in a systematic review of PRN medications among psychiatrically hospitalized youth found that Olanzapine was more likely than lorazepam or chlorpromazine to produce a "settling effect" within 30 minutes or less. while Cole et al. (2020) found that there was a more significant change in agitation scores compared with other antipsychotics utilized. However, Synder et al. (2021) found that coadministration with diphenhydramine occurred at a greater frequency in olanzapine than in medications such as chlorpromazine. When olanzapine was given as the first line sedative another sedative was given within one hour 17 percent of the time (Cole et al., 2020).

There are negatives to the usage of olanzapine in pediatrics for acute aggression. The usage of PRN medications is a factor that is associated with an increased length of stay. Due to the nature of psychotropic medication and its usage, antipsychotics are largely based upon unscientific observation which has the chance of leading to side effects and unintentional exposure to side effects. Paton et al. (2019) found that atypical antipsychotics may fail to achieve a calming effect in up to one in four episodes. Limitations throughout this review of the literature regarding polypharmacy and medication use were that many of the studies did not make comments about polypharmacy and the multiplied effects of this practice making it difficult to make conclusions about the effectiveness of this practice.

The IOWA model revised: Evidence-based practice to promote excellence in healthcare was utilized as the model to drive this QI project. The QI project started with

identifying the triggering issue/opportunity which led to understanding if this topic was a priority to the organization. Following the priority question, a team was formed which will assemble, appraise, and synthesize the body of evidence. After the evidence was reviewed the team decided that there was sufficient evidence to continue, which lead to the design and pilot of the practice change. Following the design and pilot, the team decided that the change was appropriate for adoption into practice, leading to the integration into practice change. Finally, the team disseminated the results (Iowa Model Collaborative, 2017)

As seen through this review of literature, aggression risk assessments such as the Broset Violence Checklist (BVC) have helped determine the risk of aggression, both in the in-patient psychiatric units and emergency departments. This tool is best performed when intervention follows. While the best intervention is de-escalation and behavioral modification techniques, evidence-based PRN medication administration is vital in the control of aggression in a pediatric patient with behavioral health needs in the inpatient medical unit.

## Table 1

Review Of Literature

| Topic | Source | Findings | Level of Evidence |
|---|---|---|---|
| | Cole et al. (2020) | 17% who received Olanzapine in the ED required another Sedative within 1 hour | |
| Broset Violence Checklist (BVC) | Florisse & Delespaul (2020) | No difference in the amount of aggression | II, III, IV |
| | Hvidhjelm et al. (2017) | No significant decrease in the risk of aggression | |
| | Lockerston et al. (2021) | Age/Gender showed an association with violence | |
| | | Increased risk of violence with every point | |
| | Senz et al. (2019) | Best utilized when there is a pharmacological intervention | |
| Non-pharmacological Management | Carlson et al. (2020) | Behavioral modification plan lowers rates of PRN/seclusion/restraints | III, IV |
| | Martin et al. (2017) | The first response for agitation should be de-escalation | |
| | | Nonpharmacological strategies can be limited by PRNs | |
| Pharmacological Medication Management | Asogwa et al. (2017) | Medications used for agitation are Haloperidol, Olanzapine, Diazepam, and Risperidone | I, III |
| | | Reasons include aggression toward staff disrupted behavior, and aggression toward self | |
| | Cole et al. (2020) | Agitation is the primary indication | |
| | Gerson et al. (2019) | Treatment should be individualized, multidisciplinary, and collaborative | |
| | | Diphenhydramine utilized in mild agitation, Olanzapine in moderate to severe agitation | |
| | | Administration should be PO whenever possible | |
| | Synder et al (2021) | Coadministration of IM diphenhydramine occurred more inolanzapine group than the chlorpromazine group | |
| Side effects of Medication (PRN) | Asogwa et al. (2017) | Acute dystonia, agitation, lethargy, and bizarre behavior | I, II, IV |
| | Cole et al. (2020) | Hypoxia, supplemental O2 placement, intubation, and dystonia | |
| | Paton et al. (2019) | Parenteral medication may fail in 1/4 of patients | |
| | | Haldol/Promethazine: 25% were extremely or continuously active | |
| | Zareifopoulos & Panayiotakopoulos (2019) | Haloperidol: Extrapyramidal symptoms | |
| | | Olanzapine: respiratory depression and sedation | |

## Methods

The purpose of this quality improvement was to implement an Acute Agitation Intervention Tool that uses the BVC to guide pharmacological intervention for mild and moderate to severe agitation in pediatric patients with behavioral health needs. This QI project was behavioral health staff led including registered nurses, pediatric psychiatrists, a pediatric pharmacist, and pediatric behavioral health nursing leadership. This QI began in 2023, and the Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care was utilized to guide clinical practice management.

### Design

The design of this study was the systematic process of quality improvement with a retrospective data analysis review of medication administration. The pre-implementation phase was from October 2022 to January 2023. The post-implementation phase for data analysis was from January 2023 to April 2023.

### Setting

The setting was a midwestern United States pediatric hospital comprising 184 medical-surgical patient beds. These beds do not include those in the Emergency Department. There are 14 Beds within the behavioral health unit in the hospital. The focus of this QI was that the eight behavioral health beds in medical-surgical units and the 14 beds in the pediatric behavioral health unit (PBHU). The patients with behavioral health needs were assigned Crisis Prevention Intervention trained nurse as well as a patient safety assistant or patient care technician based upon the patient's acuity level.

**Sample**

This QI included a convenience sample of pediatric patients admitted with behavioral health needs, ages 8 to 18 admitted to a medical-surgical unit. Inclusion criteria are ages 8-18, admitted to a medical unit, admitted with behavioral health needs, and having a PRN medication plan based upon the recommended standard as described in the intervention section. Exclusion criteria included those without behavioral health needs, outside of the inpatient medical-surgical units, and/or with atypical PRN care as determined by the psychiatry team. Each patient with behavioral health needs was assigned patient safety assistant (PSA) depending on their acuity level, whose role was to inform the RN of changes in behavior to inform the nurse of their presence to complete BVC.

**Procedures**

The QI project included a retrospective analysis of PRN medications pre and post-implementation of the BVC to inform pharmacological intervention. Before implementation, the team prepared clinicians and materials by education registered nurses and providers acute agitation intervention tool via in-person, electronic, and signage. The Information technology department also uploaded the BVC and PRN plan into the Electronic Medical Record(EMR). Finally, the BVC was placed outside of rooms that enclose patients with behavioral health needs, and acute agitation materials was distributed. Before pharmacological intervention provided to a patient, the RN and the PSA utilized the ABCs of de-escalation including, allowing time to verbally de-escalate, attempting behavioral interventions, and changing the environment. The appropriate duration for the intervention of non-pharmacological de-escalation is patient-specific and

depends on patient and staff safety. If this fails, a pharmacological intervention occurred. The pharmacological intervention was based on the indicators of aggression including irritability, confusion, boisterous activity, physical threats, verbal threats, and attacking objects. The number of indicators of aggression determined what medication the patient received. Each indicator was one point on the BVC scale. There were two different pathways for pharmacological aggression management based on the patient's BVC score of mild or moderate to severe. Medications that the patients received per provider preference for mild agitation, a BVC score of one or two including hydroxyzine, diphenhydramine, and lorazepam (see Figure 2). For moderate agitation, BVC scores of three or four, and for severe agitation, BVC score of five or six, a second pharmacological pathway was utilized of medications including haloperidol, chlorpromazine, and olanzapine (see Figure 2).

**Approval Process**

The implementation of the Acute Agitation Intervention tool using the BVC posed minimal to no risk to the patients involved, and no ethical consideration was addressed. Approval was obtained from the Healthcare Organization IRB, Institutional IRB committee, and doctoral committee.

**Data Collection**

Data was collected via retrospective medical record review in EPIC regarding the administration of PRN oral and intramuscular haloperidol, lorazepam, diphenhydramine, hydroxyzine, olanzapine, and chlorpromazine over 12 weeks before and during the BVC implementation phase. All data were stored and protected in Intellectus Statistics with password protection(see Figure 3. No identifiable information was collected to maintain

confidentiality. Data gathered exclude atypical PRN care, those not consisting of PRN plan as described in intervention care, and exclude scheduled doses of psychiatric medications for agitation and aggression management. Other data collection included compliance with BVC obtained via retrospective chart review for each PRN medication given for those included in the criteria and the number of patients with this PRN plan.

## Results

The retrospective data of the administration of PRN haloperidol, lorazepam, diphenhydramine, hydroxyzine, olanzapine, and chlorpromazine via oral and intramuscular routes was analyzed by comparison of pre-implementation (Oct 2022 to Jan 2023) for three months and post-implementation for three months (Jan 2023 to April 2023). The sample included pediatric patients admitted with behavioral health needs, ages 8 to 18, admitted to a medical-surgical or behavioral health unit, having at least one PRN medication given during the pre or post-implementation phase. In the pre-intervention phase, 26 patients met the criteria while in the post-implementation phase, 17 met the criteria. The 26 patients in the pre-implementation phase required ($n$=237) occurrences of PRN medication for acute agitation. In the 17 patients in the post-implementation phase, there were ($n$=100) occurrences of a PRN medication for acute agitation administration. Mild agitation medications were given first in the pre-intervention group 43.51% of the time while in the post-intervention group, mild-agitation medications were given first 60% of the time (see Figure 4 and 5).

For the primary outcome measure in this QI project, an independent sample t-test was conducted to examine the mean of the number of medications in six hours was significantly different between the pre-implementation group and the post-

implementation group. The results of this two-tailed independent samples t-test were not significant based on an alpha value of .05, with the *p*=.199 (see Figure 6). Despite not meeting statistical significance, it did display clinical significance. This displayed that there was a decrease of 6.6% of the number of medications given per agitation event.

A second outcome that was measured was showed differences in the route of medication pre and post-implementation of the BVC. A Chi-square Test of Independence was conducted to examine whether the route and pre and post-implementation of the Acute Agitation Intervention tool were related. There were 2 levels in route PO and IM. Results suggest that the Route and implementation of the Acute Agitation Intervention tool using the BVC are related to one another at a *p*-value of .13 (see Figure 7).

The final data outcome measure was conducted via the Pearson Correlation Analysis which was utilized to observe the relationship between the BVC score of the patient and the number of PRN medications for agitation given in six hours. The results of this correlation were based on an alpha value of 0.05. The results observed were a significant positive correlation between the BVC score of the patient and the number of PRN medications for agitation given in a six-hour period. As the BVC score increases so does the number of medications in a six-hour period (see Figure 9).

## Discussion

The question for the QI was "In pediatric patients admitted with behavioral health needs, ages 8 to 18 on a medical-surgical unit or behavioral health unit, how does the implementation of the BVC reduce the combination usage of psychiatric medications including haloperidol, lorazepam, diphenhydramine, hydroxyzine, olanzapine and chlorpromazine over 12 weeks?" The results of the data set results revealed that the mean

number of medications per agitation event was not significantly different between the pre and post implementation period. In the pre-implementation phase, 26 patients met the criteria while in the post-implementation 17 met the criteria. The 26 patients in the pre-BVC implementation phase required ($n$=237) occurrences of PRN medication for acute agitation. In the 17 patients in the post-implementation phase, there were ($n$=100) occurrences of a PRN medication for acute agitation administration.

The type of medication intervention, whether a "mild agitation medication" or "moderate to severe agitation medication" was not significant as it relates to the amount of medication the patient received. However, the decrease of 6.6% in the number of medications given per agitation event is of value. The QI results displayed other significant data which may indicate behaviors were identified efficiently resulting in proper usage of PRN management.

While no specific study in the review of literature utilized the Acute Agitation tool (with the BVC) to drive which PRN medication was utilized for acute agitation management, the BVC has been utilized to drive intervention and assess aggression for which the data from this QI showed to be in cohesion. According to the results, the BVC was directly correlated with the number of medications the patient received in a six-hour period with a ($p$<.001) indicating that there was a need for more medications for a higher BVC score, independent of which medications were received. This leads to preparedness and offers teaching points to families regarding medication management of acute agitation. This is consistent with results from Lockerston et al. (2021) whose study showed an increased risk of aggression and violence with every point added to the BVC

on admission, furthermore, throughout hospitalizations, the BVC was found to predict imminent threats, and physical violence regardless of gender.

Asogwa et al. (2017) stated that reasons for IM PRN usage included: aggression toward staff and disturbed behavior. Oftentimes, IM usage is also associated with staff injuries and increased restraint usage. In this QI the pre-implementation utilized PO medications were utilized first 63.2% of the time while in the post-implementation PO medications were utilized first 77% of the time (see Figure 2 and 7). By utilizing the Acute Agitation Intervention Tool, those doing the assessments and caring for individuals with behavioral health needs may have felt more secure in giving needed PRN medications for acute agitation. The observed frequencies of the route and pre-post intervention displayed a ($p$=0.13). This observed change may have been due to the potential of recognizing behaviors more quickly, and encouraging PO medications has the potential to lead to a known reason to decrease IM injections in preventing needlestick injuries and being less invasive for the patient (Asogwa et al., 2017).

## Limitations

While this QI displayed many strengths it was not without its limitations. First, the number of patients and number of PRNs in the pre-Implementation was significantly greater than in the post-Acute Agitation intervention group. The second limitation occured due to the individual patient's length of stay in the inpatient setting. Patients in this facility typically stay inpatient until they are either discharged home with family or sent to another inpatient behavioral health facility. Because of this, there is a high turnover of patients. This led to different samples of patients in the pre post-intervention. These different patients have varying levels of aggressive behaviors, psychiatric illnesses,

and histories. Thirdly, in the intervention phase of the QI, it was determined that the Acute Agitation Intervention tool using the BVC did not account for self-injurious behavior (SIB). This was brought to the primary researcher's attention by multiple nurses performing the assessments of patients with behavioral health needs. Therefore, these patients were unable to properly be scored with the BVC leading to insecurities from the nursing staff regarding which medications the patient needed for a specific SIB. These SIB can range from minimal harm to severe self-harm. The fourth limitation was the percentage of correctly documented BVC scores at the time of PRN administration as 20 minutes post PRN administration at 81% and 66% respectively. This may skew the data as those administering the PRN medication may not have utilized the Acute agitation intervention tool using the BVC to give the correct behavior medication. Finally, throughout the intervention phase, the primary research did weekly audits on providers using the correct order set. There were six-times when the primary researcher sought out the primary provider for a specific patient to clarify the need to change to the new order set to be placed in the patient's EMR.

## Implications and Future Study

The results of this QI displayed that there is more than the acknowledgment of aggression indicators and the amount of aggression that drives the number of PRNs a patient may need for acute agitation in the inpatient setting in a six-hour time. While improving practice with standards set forth by TJC, settings where patients with behavioral health needs are should seek to continue to monitor individuals for polypharmacy in the in-patient setting, along with utilizing proper medications for specific behaviors. Strategies to maintain change could should include assessing

medication usage in the behavioral health setting, listening to stakeholders' comments regarding acute agitation management, and including education on the Acute Agitation Intervention Tool during new graduate orientation, along with onboarding orientation for both RNs and physicians.

Data gathered could include injury reporting from pre and post-implementation. Nurses perceptions of how the Acute Agitation Intervention Tool is affecting decision-making for PRN management, and their comfortability levels in the management of patients with acute aggression in the inpatient setting could be studied. Further QI could benefit from increased length of time in monitoring PRN usage on a patient-specific basis. The behavioral health team should continue regular monitoring and audits of PRN administrations for acute agitation.

## Conclusion

The intended purpose of the QI pilot project was to determine if the usage of the Acute Agitation Intervention Tool led to a decrease in polypharmacy in the pediatric population with acute agitation admitted to a pediatric medical-surgical unit or behavioral health unit. While the results did not show a statistical significance, clinically significant data was found which may indicate behaviors were identified efficiently resulting in proper usage of PRN management. These data included increased amount of PO rather than IM administration of medication, decreased medications given, and acknowledgment of the association of the number of medications the patient received and BVC score.

There will continue opportunities for improvement in aggression assessment and PRN medication practices. However, by using the Iowa Model Revised: Evidence-Based

Practice to Promote Excellence in Health Care, the organization will continue to analyze and utilize the Acute Agitation Intervention Tool in the in-patient setting with the potential of increasing the span of the tool to hospital-wide coverage.

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# Appendix

## Figure 1

*Broset Violence Checklist*

| The Brøset Violence Checklist | |
|---|---|
| Confused | Appears obviously confused and disorientated. May be unaware of time, place or person. |
| Irritable | Easily annoyed or angered. Unable to tolerate the presence of others. |
| Boisterous | Behavior is overtly "loud" or noisy. For example slams doors, shouts out when talking etc. |
| Physically threatening | Where there is a definite intent to physically threaten another person. For example the taking of an aggressive stance; the grabbing of another person's clothing; the raising of an arm, leg, making of a fist or modelling of a head-butt directed at another. |
| Verbally threatening | A verbal outburst which is more than just a raised voice; and where there is a definite intent to intimidate or threaten another person. For example verbal attacks, abuse, name-calling, verbally neutral comments uttered in a snarling aggressive manner. |
| Attacking objects | An attack directed at an object and not an individual. For example the indiscriminate throwing of an object; banging or smashing windows; kicking, banging or head-butting an object; or the smashing of furniture. |

***Note.*** *The Broset Violence Checklist was utilized by the RN to determine the need for PRN medication for Acute Agitation*

**Figure 2**

*Acute Agitation Intervention Tool*

**Recommended intervention based on Broset scores**

**Mild agitation** (Broset score 1-2)

No imminent danger but unable to cooperate with medical care

**ABCs of de-escalation**

| | | |
|---|---|---|
| A | Allow time to verbal de-escalation | active listening, reflection, paraphrasing, nonthreatening body posture, respect personal space, offer choices |
| B | Attempt behavioral intervention | diversional activity |
| C | Change environment | decreased stimulation, sensory modulation |

**Pharmacological interventions for mild agitation**

| Med | Dose | Route/Frequency | Onset of action/ Peak effect | Max daily dose |
|---|---|---|---|---|
| Hydroxyzine (liquid, tab) | 0.5 mg/kg/dose Max single dose <6 years: 12.5 mg ≥6 years: 25 mg | PO Q 6 hours prn | PO: 15-30 mins/ 2 hours | <6 years: 50 mg >6 years: 100 mg |
| Diphenhydramine (liquid, tab) | 0.5 - 1mg/kg/dose Max single dose: 50 mg | PO Q 6 hours prn | PO: 15-30 mins/ 2 hours | Child: 100mg Adol: 200mg |
| Clonidine (liquid, tab) | <45 kg: 0.05 mg ≥45 kg: 0.1 mg | PO Q 8 hours prn | PO: 30-60mins/ 1-3 hour | < 27 kg: 0.2 mg 27-40.5 kg: 0.3 mg > 40.5 kg: 0.4 mg |
| Lorazepam (liquid, tab) | 0.1 mg/kg/dose Max single dose: 2 mg | PO Q 6 hours prn | PO: 20-30 mins/ 1-2 hours | Child : 4 mg Adol: 8 mg |

**Moderate agitation** (Broset score 3-4) **Severe agitation** (Broset score 5-6)

Potential to escalate to violence. Preventive measures should be taken.

**ABCs of de-escalation** (please see above)

*It is recommended to attempt to deescalate pt by using non-pharmacological interventions fist. There is no cutoff time on how long non-pharmacological intervention should be tried prior to pharmacological interventions. Appropriate duration for trial of non-pharmacological interventions is pt-specific and depends on pt's and staff's safety.

**Pharmacological interventions for moderate - severe agitation**

*Please attempt to offer PO before IM if appropriate. Appropriate duration of time for offering PO before moving to IM is pt-specific and depends on pt's and staff's safety.

| | | | | | |
|---|---|---|---|---|---|
| 1 | Olanzapine (ODT, tab, IM) | 0.1 mg/kg Max single dose: 10 mg | PO/ IM Q 6 hours prn. Can repeat another dose if no response in 30 mins. | PO: 1 hours/ 5 hours IM: 15mins/ 45-60 mins | Child: 20 mg Adol: 30 mg |
| 2 | Diphenhydramine (liquid, tab, IM) | 0.5 - 1mg/kg Max single dose: 50mg | PO/ IM Q 6 hours prn | PO: 15-30 mins/ 2 hours IM: 5 mins/ 2 hours | Child: 100mg Adol: 200mg |
| 3 | Haloperidol (liquid, tab, IM) | 0.05-0.1 mg/ kg Max single dose: 5 mg | PO/IM Q 6 hours prn | PO: 1 hours/2 hours IM: 15 mins/20-30 minutes | Child (<40kg): 6mg Adol: 15mg |

**Figure 3**

*Data Collection Tool*

| | BVC completed | BVC score | PRN medication given | Route | 20 mint post PRN BVC score | Secondary PRN medication given if need | 20 mint post secondary PRN BVC score |
|---|---|---|---|---|---|---|---|
| | Y or N | 0 - 6 | | IM or PO | 0 - 6 | | 0-6 |
| Patient 1 | | | | | | | |
| Patient 2 | | | | | | | |
| Patient 3 | | | | | | | |
| Patinet 4 | | | | | | | |
| Patient 5 | | | | | | | |
| Patient 6 | | | | | | | |
| Patient 7 | | | | | | | |
| Patient 8 | | | | | | | |
| Patient 9 | | | | | | | |
| Patinet 10 | | | | | | | |
| Patinet 11 | | | | | | | |
| Patient 12 | | | | | | | |
| Patient 13 | | | | | | | |
| Patient 14 | | | | | | | |
| Patient 15 | | | | | | | |
| Patient 16 | | | | | | | |
| Patient 17 | | | | | | | |
| Patient 18 | | | | | | | |
| Patient 19 | | | | | | | |
| Patient 20 | | | | | | | |

**Figure 4**

*Barplot of Pre-Intervention Tool Medication Utilization for Initial Agitation Event*

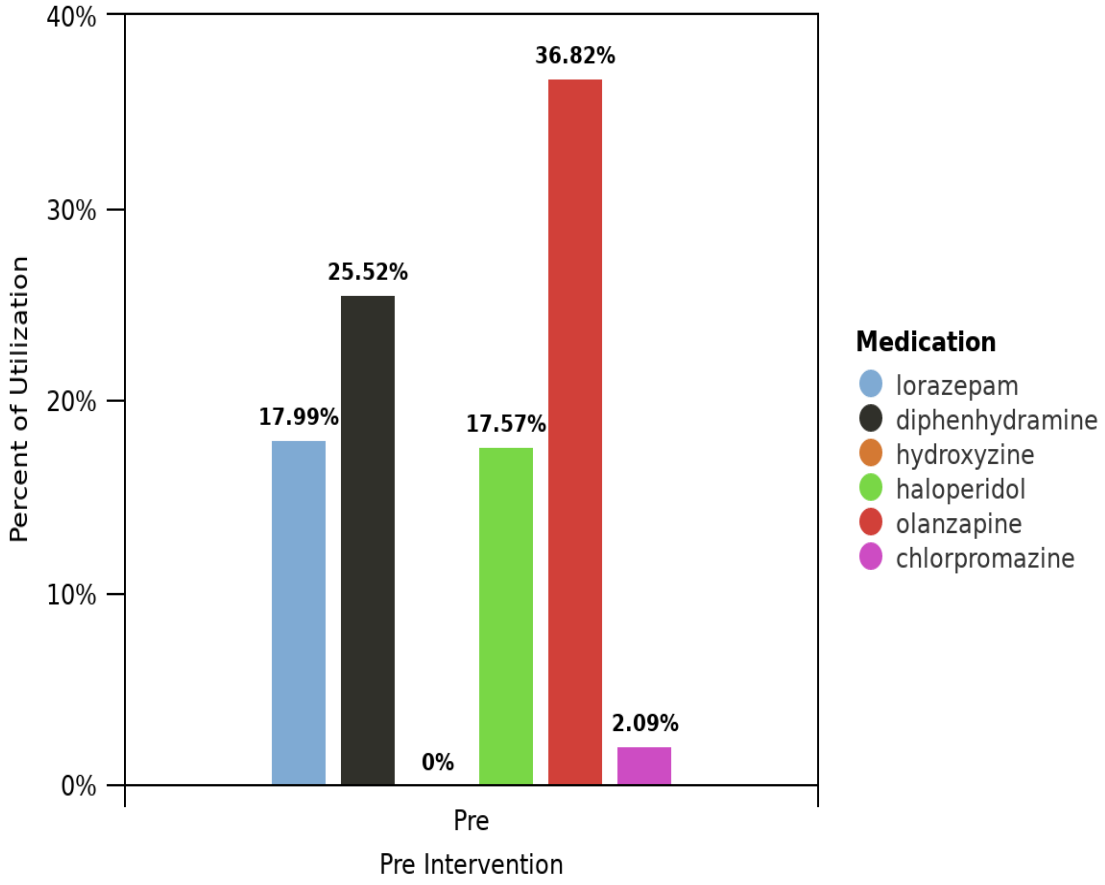

**Figure 5**

*Barplot of Post-Intervention Tool Medication Utilization for Initial Agitation Event*

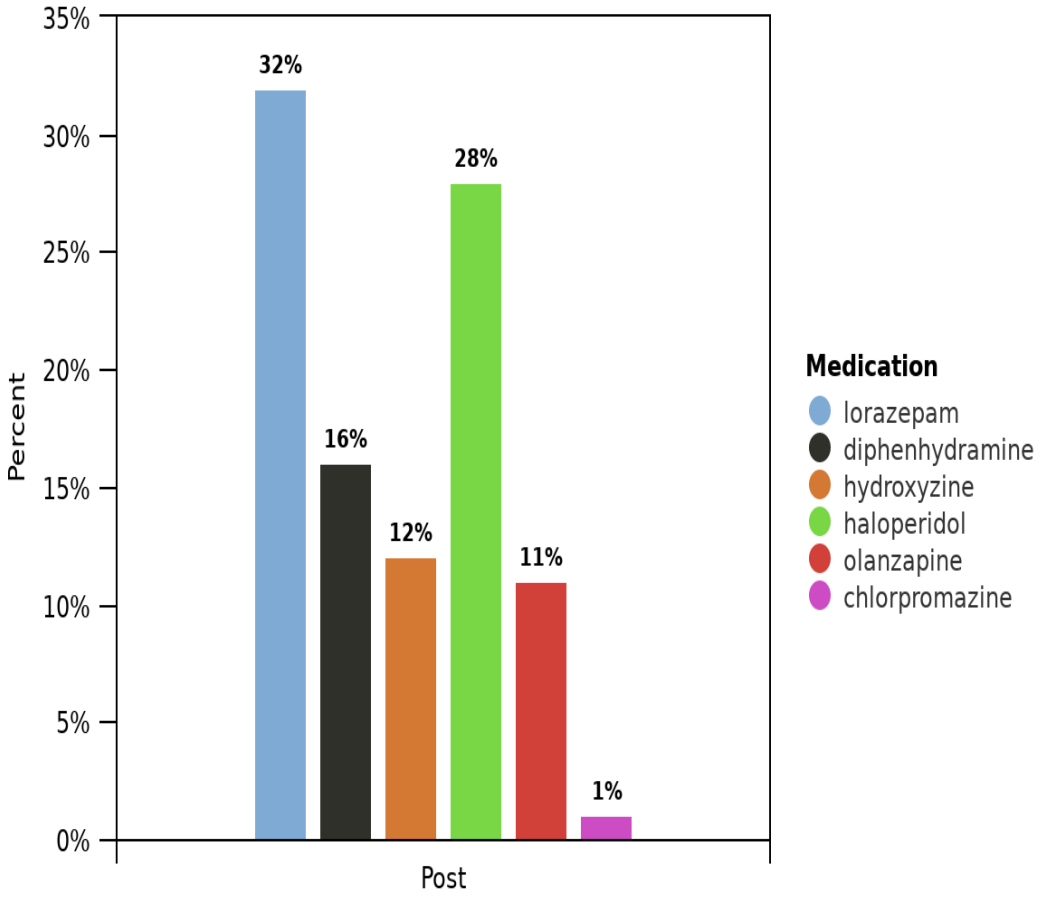

**Figure 6**

*Mean Number of Medications by Pre-post*

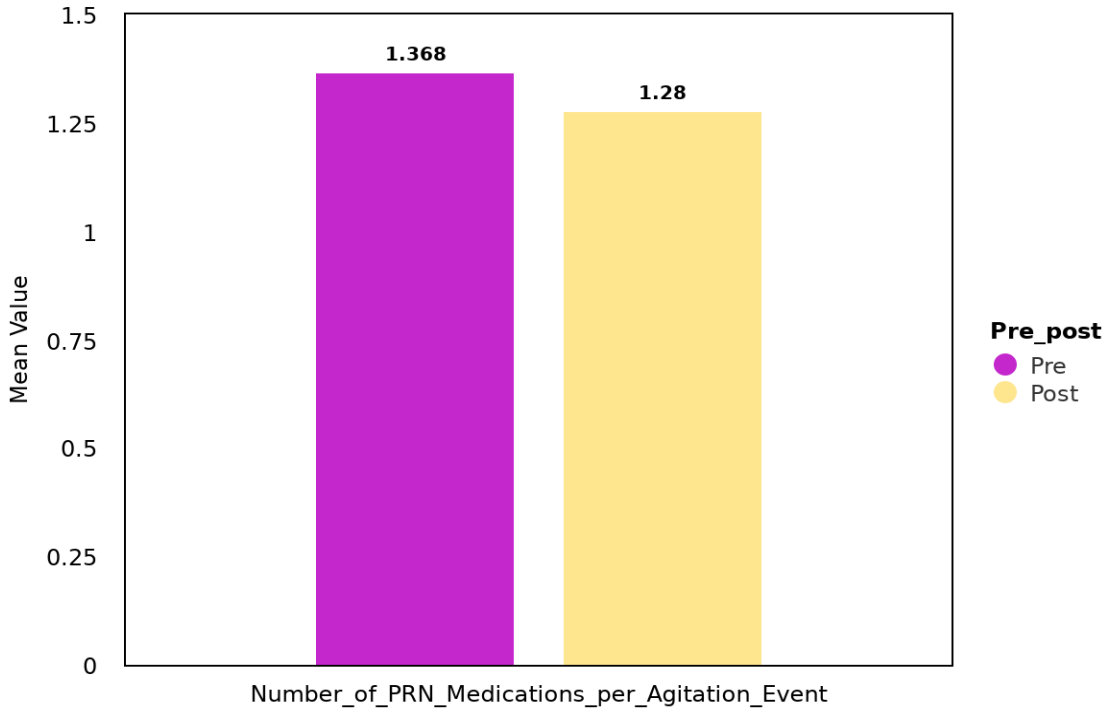

**Figure 7**

*Barplot of Pre/Post Intervention Tool and Route of Medication*

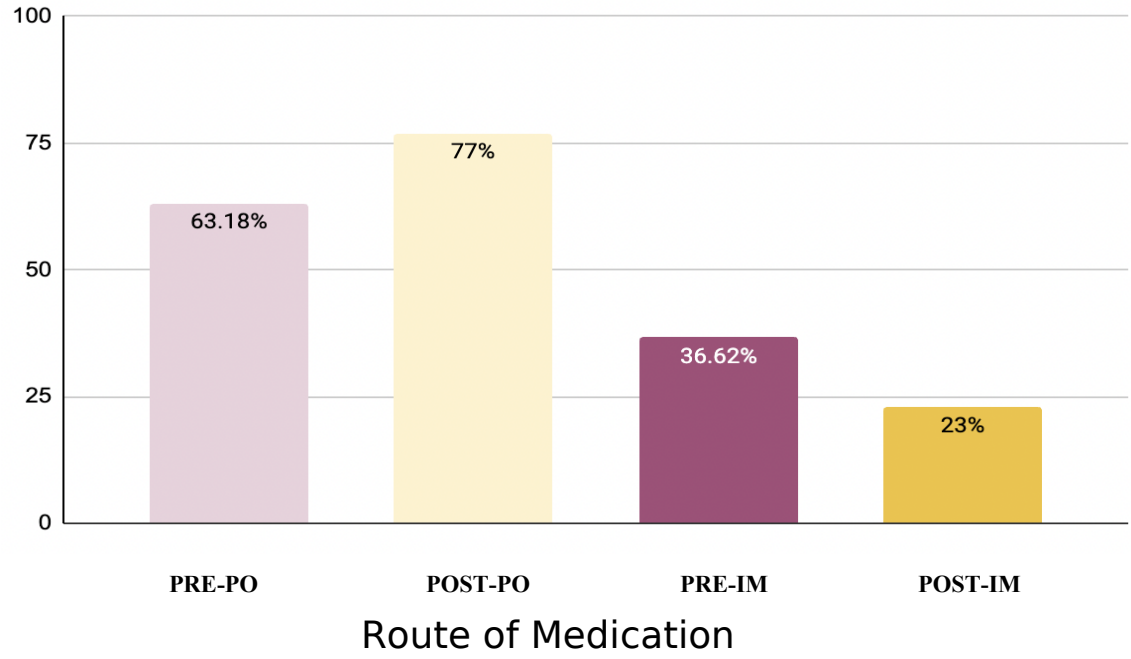

**Figure 8**

Scatterplot of BVC score and Number of PRN Medications per Agitation Event with Regression Line