

Spring 5-10-2019

Implementation of a Medication Near-Miss Reporting System

Jamie Deubel

Follow this and additional works at: <https://spark.siu.edu/dnpprojects>

Part of the [Nursing Commons](#)

Recommended Citation

Deubel, Jamie, "Implementation of a Medication Near-Miss Reporting System" (2019). *Doctor of Nursing Practice Projects*. 38.
<https://spark.siu.edu/dnpprojects/38>

This DNP Project is brought to you for free and open access by the School of Nursing at SPARK. It has been accepted for inclusion in Doctor of Nursing Practice Projects by an authorized administrator of SPARK. For more information, please contact magraser@siue.edu.

Introduction to the Problem

Medication errors are a problem in healthcare. From 2000-2002, 595,000 deaths in the U.S. were caused by medication errors (Makary & Daniel, 2016), which are often due to external and internal factors including: stress, urgency, and fatigue (Abeysekera, Bergman, Kluger, & Short, 2005). The only methods of reporting medication near-miss errors available to students at an Illinois state university's nurse anesthesia program was via email or phone conversation. Faculty of the university wanted information on near-miss events in an electronic reporting system. This information would be used to improve curriculum designed to prevent medication errors among students and future nurse anesthetists. This project involved the development, implementation, and evaluation of a near-miss reporting system using the Qualtrics system.

Literature Review

The literature review involved evidence from many health care specialties, however, evidence on anesthesia medication errors was given highest priority. Medication errors during anesthetics was reported as happening as often as 1 in every 133 cases (Webster, Merry, Larsson, McGrath, & Keller, 2001). The rate of errors amongst inexperienced versus experienced providers was two times higher (Cooper, Digiovanni, Schults, Taylor, & Nossaman, 2012). When nurse anesthesia providers were asked about their medication errors, 89-98% of providers have reported making at least one error in their career (McLennan et al., 2015; Merry & Peck, 1995). Errors among anesthesia providers are assumed to be higher than any other medical specialty because they are the only providers who order, dispense, and administer medications independently or with little supervision (Cooper & Nossaman, 2013). Most types of errors were omission of a drug, repeated administration, substitution, incorrect dose, unattended drug, and other (Cooper, DiGiovanni, Schultz, Taylor, Nossaman, 2012; Webster et al., 2001). The "other"

category included drugs being given that were contraindicated and IV drips being run too fast (Webster et al., 2001).

Evidence indicates that the top factors leading to medication errors have been the same for the past 22 years (Chopra et al., 1990; Cooper et al., 2012; Webster et al., 2001). The reported factors that led to the errors were: not following the checks of medication administration, distraction/lack of vigilance, misread vials, misread or wrongly labeled syringes, inattention/carelessness, production pressure, and communication problems (Webster et al., 2001; Cooper et al., 2012; Cooper & Nossaman, 2013). Provider fatigue, inexperience, and inadequate knowledge were additional causative factors for medication errors (Cooper et al., 2012; Webster et al., 2001; Keers, Williams, Cooke, & Ashcroft, 2013). Most anesthesia related medication errors caused no harm to the patient (Abeysekera et al., 2005); as many as 73.5% of patients did not have an adverse effect from a medication error.

According to three surveys of 500 to 2500 participants, 50-96% of medication errors are not reported (Cullen et al., 1995; Kohn et al., 2000; Leape, 1994). According to a survey of 733 nurses, reasons for not choosing to report an error include: fear that the individual and not the system would be blamed, concerns about consequences (punishment), perception by others of incompetence, reporting takes too much time, unimportance of error, and the belief that it is not necessary to report if a patient was not harmed (Bayazidi et al., 2012). To remove fear as a barrier to reporting, evidence suggests that reporting systems must ensure anonymity or confidentiality of the reporter (Beasley, Escoto, & Karsh, 2004; Holden & Karsh, 2007; Leape, 2002; Wakefield, Uden-Holman, & Wakefield, 2005). An anonymous/confidential reporting system removes the blame from the individual and focuses on the actual error. This view was

well received by inexperienced anesthesia providers who felt that more blame is put on them in comparison to experienced providers (Heard et al., 2012).

The Institute of Medicine (IOM) reports three options for reporting medication errors: errors that result in harm to the patient, errors that do not result in harm, and near-misses (Barach & Small, 2000; Holden & Karsh, 2007; Layde et al., 2002). Several reports indicate near-miss events occur 3-300% more often than adverse events (Battles, Kaplan, Van der Schaaf, & Shea, 1998; March, Sproull, & Tamuz, 1991; Petersen, Orav, Teich, O'Neil, & Brennan, 1998).

According to the literature, feedback is crucial in ensuring an effective reporting system. When reporters take the time to report near-misses and actual errors, they report wanting to hear about the errors and what is being done in the future to prevent them (Holden & Karsh, 2007; Johnson, 2003; Reed et al. 2013; Wakefield, Wakefield, Uden-Holman, Blegen, 1996). Studies have shown that electronic, website-based error reporting systems are easier to use, less costly, and help increase the number of medication errors reported (Askarian, Ghoreishi, Haghiginejad, Palenik, & Ghodsi, 2017). Electronic reporting systems have been shown to reduce the number of adverse events and cost less than paper reporting (France et al., 2003; Kivlahan, Sangster, Nelson, Buddenbaum, & Kenneth, 2002).

Project Methods

The reporting system was developed with the characteristics that the literature review revealed to be the most effective for maximizing response rates: it is electronic, anonymous, requires little time, and is easy to use (Askarian, Ghoreishi, Haghiginejad, Palenik, & Ghodsi, 2017; Beasley, Escoto, & Karsh, 2004; Holden & Karsh, 2007; Leape, 2002; Stump, 2000; Wakefield, Uden-Holman, & Wakefield, 2005). Faculty stakeholders provided input on question

content, design, and gave approval for the final survey. The system was created utilizing the Qualtrics system, which all students and faculty members can access. The students could gain access to the reporting system by a number of methods including: a QR code that was printed and passed out to students during presentation, a link on Blackboard, or via the power point presentation.

The questions were centered around the most common types of near-miss and actual errors that occur. Some questions were devoted to specific issues regarding how clinical preceptors addressed the near-miss. Multiple-choice or short answer questions included, but were not limited to: the type of clinical rotation they were in, the department in the hospital where the near-miss occurred, and the type of near-miss event. In addition to the multiple choice and short answer questions, additional questions allowed students to describe in more detail what happened during the near-miss event. Finally, there was a question about the number of hours the student had been working when the near-miss occurred.

The Qualtrics link and power point presentation were uploaded to the clinical class forum for all second and third-year students. Not every student participated since not all students had near-miss events or chose to document events they may have. No identifying subject data was collected; however, students had the opportunity to reveal their identity if they wanted support from faculty following the event.

Evaluation

Two sets of data were produced during this project. The first is the data obtained from the system itself. This data set involves student report of near-miss events. The other set of data is from the evaluations of the system obtained from system reporting participants and faculty.

Reporting System Results

Most near-miss events (76.92%) occurred from 0700-1500. Nurse anesthesia students spend long days in clinicals, even 24-hour shifts. Since, most of the near-miss events occurred during the first 8 hours of the day, however, long shifts did not contribute to near-miss events in this population.

Overall, 15 students reported near-miss events. Several types of medication near-miss events were reported. Most common were wrong drug and wrong dose (42.86% each). Wrong route and wrong concentration errors were measured at 7.14% each. There were no recorded wrong patient events.

Drugs reported as being a part of a wrong drug near-miss event included: Versed instead of Fentanyl, Neostigmine instead of Anectine, Dilaudid instead of Fentanyl, Flumazenil instead of Heparin, Glycopyrrolate instead of Phenylephrine, and Rocuronium instead of Lidocaine. The most common drug that experienced wrong dose administration was phenylephrine. There were two accounts where 10 mg was given instead of 100 mcg and a drip that was run at 4 mcg/kg/min instead of 0.4 mcg/kg/min. These were caught after administration, but no harm came to the patient. Wrong dosages of Ketamine, Decadron, Versed, and Fentanyl were also delivered. There was one recorded drug that was given by the wrong route. This drug was Methergine and was almost given IV instead of IM but was caught before doing so. In one instance, Phenylephrine was prepared to the wrong concentration of 1 mg/ml instead of 100mcg/ml but no dose was administered.

Debriefing after the event proved beneficial for 100% of students who experienced a debriefing and responded to the survey. Unfortunately, only 58.33% of respondents experienced a debriefing. Respondents reported that the near-miss event and their debriefing conversation

with preceptors helped the students identify strategies to improve their practice and decrease the possibility of future errors.

Some of the errors that occurred were not made by students, they were made by their supervising CRNA or anesthesiologist. There were three incidences (20%) where a wrong drug was given but it was not the student that pushed the drug.

Student Evaluation of Survey

Both students (n=15) and faculty members (n=2), completed an evaluation survey of their satisfaction with the near-miss reporting system. Respondents and faculty received different surveys, but both rated characteristics of the reporting system. Student respondents' survey utilized a Likert scale where a score of 1 indicated the reporter was "extremely dissatisfied" with the given system characteristic and a score of 7 meant indicated the student was "extremely satisfied" with the given system characteristic. Reporting time received a mean score of 6.75. Flow of the survey received a score of 6.83. Every reporter gave ease of use a score of 7. Accessibility of the system, education on the system, and anonymity of the system all received a mean score of 6.92. Based on these scores, the overall rating of the system was very good. Although there was a question soliciting recommendations for changes to the survey, none were reported.

Faculty Stakeholder Evaluation of Survey

Responses of a qualitative, open-ended questionnaire survey of faculty stakeholders revealed both their concerns about and praise of the system. The questions were designed to obtain faculty perceptions of questions on the near-miss system and, also, the effectiveness of the system in its entirety. Because the survey was designed to help faculty educate students to reduce

medication errors, it was essential that faculty received information that would be helpful in this curricular process. Stakeholders were concerned with the low levels of debriefing experienced by students despite the reported positive effects of debriefing.

Stakeholders believed that some questions should be removed and others should be changed. One stakeholder wanted the “what day of the week did the near-miss occur?” question changed to, “including today, how many consecutive shifts have you worked?” Other suggested changes were to add more standardized responses and less free text, consolidating questions, and altering the survey to cover all errors, not just near-miss events.

Limitations

At the beginning of the project, a near-miss was defined as a situation in which an accident almost happened (Near-miss, n.d.). Upon further investigation and consultation with faculty advisors, the definition was expanded to the World Health Organization’s definition: a near-miss is a serious error or mishap that has the potential to cause an adverse event but fails to do so because of chance or because it is intercepted (World Alliance for Safety, 2005). This change allowed students to report all errors that did not result in harm to the patient. Changing the definition likely led to more reports.

A limitation of this survey was obtaining participants. Students did not want to report their near-miss events because they questioned the anonymity of the survey despite attempts to convince them otherwise. In response, a power point was created and presented to second and third-year nurse anesthesia students who were in the clinical practicum during the first summer semester. A letter was also sent to all clinical students urging them to use the system during the

fall semester. After this reassurance, a total of 15 students completed the survey. Prior to that, there were only 3 student documented near-miss events.

Another limitation was the low number of medication near-miss events occurring during the time period that the system was active. The system was available to students from June of 2018 to December 2018. In order to overcome this limitation, I extended the time period the system was active. Respondents could report near-miss events from the entirety of their clinical experiences in the SRNA program even those that had occurred a year prior to the initiation of the reporting system. This added more than a full year of potential near-miss events for third year anesthesia students since they had begun their clinical practicum in May of 2017.

Impact on Practice

Faculty stakeholders reported plans to continue the use of the near-miss reporting system and presenting the information to students on an annual basis. Given the reported lack of debriefing, stakeholders reported plans to implement near miss debriefing sessions throughout the year. Stakeholders also indicated making revision to the survey so that all errors be reported including not only near-miss events, but also sentinel events. This could not be accomplished as part of this project, due to the inability to collect patient data. Finally, faculty stakeholders plan to send reminders to students multiple times throughout the year to encourage participation.

I believe that the reporting system should be continued, and that information collected should be expanded to all errors. While errors that result in patient harm are already assumed to be reported to faculty, reporting these errors through the system would be beneficial for tracking. If a student prefers, the new system would ideally allow faculty to debrief with the student without faculty being able to identify the student.

Conclusion

The reporting system was a new way for the university to receive data on near-miss events and the electronic nature of the survey provided an organized format to record and track data. Data that was obtained was useful in identifying what errors were occurring and faculty plan to use this information to improve curriculum. I believe this project will and should be an ongoing part of the nurse anesthesia program. The reporting system could be expanded to include actual medication errors, mechanical errors, and adverse events. For this system to include all of these reports, the anonymity of the system would need to be negated in some instances. Given the importance of anonymity to response rate, however, students should be clearly informed of which errors would not be anonymous.

Author Contact Information

Jamie Deubel

(314) 486-8030

jawiegm@siue.edu