Adverse Event or Near Miss Analysis

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Quality Improvement for Interprofessional Care

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July, 2017

Comment [JS1]: This submission is very well crafted according to the rubric. The submission is written in a scholarly voice and free of APA and grammatical errors.

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Preventable adverse events are among the top causes of death in the United States. Estimates reveal that 210,000 to 400,000 fatal adverse events occur every year (Allen, 2013). Examples of preventable adverse events are hospital-acquired diseases, medication errors, and patient falls. The focus of this adverse event analysis is medication errors, also known as adverse drug events (ADEs), such as medication overdoses or administration of wrong medicines. The analysis will recommend strategies to mitigate ADEs based on a case of medication overdose observed in the emergency department (ED) at TrueWill General Hospital (TGH), a multispecialty hospital in the United States.

A 40-year-old woman was brought to the ED after suffering a seizure. Before she was discharged, she suffered another seizure and the ED doctor prescribed 800 mg of phenytoin, an anti-seizure medication, to be given intravenously (IV). The ED nurse misread the prescribed dosage in the electronic medical record (EMR) and administered 8000 mg, which was 10-fold greater than the prescribed dosage. The patient died soon after the lethal infusion (Manias, 2012).

The incident shows that the nurse made a series of cognitive errors in medication management and missed key steps (Manias, 2012), which will be explained in the analysis report. Additionally, the analysis will examine the implications of adverse events on multiple stakeholders. Relevant evidence and metrics will be incorporated when making suggestions for improvement of patient safety at TrueWill General Hospital.

Analysis of Missed Steps Related to the Adverse Event

Emergency departments are susceptible to adverse events because of the unscheduled nature of patient presentation, urgency, and severity of cases. In such high-pressure situations,

clinicians must be more careful when treating a patient (Manias, 2012). Retracing the steps taken by the nurse revealed several missed steps in the delivery of care.

To begin with, the drug dispensing machines in the ED were stocked with phenytoin in 250 mg vials; the correct dose required only 3.2 vials. As the nurse had misread the dose, she needed 32 vials of the drug. She took the vials from three different drug dispensers and administered the dose using two IV bags as well as a piggyback line (Manias, 2012). The nurse did not question the difficulty in procuring and administering the drugs; nor did she ask anyone to validate her calculations. Furthermore, she was not asked why she was removing so many vials from the drug dispensers in the ED unit.

The scenario also shows that the nurse was unaware of the toxic nature of phenytoin when administered in large quantities; she was unable to recognize the warning signs. Additionally, the fact that the nurse could remove 32 vials is evidence of the technical drawbacks of the automated drug dispensing machines. The machines were not programed to send out alerts when large quantities of medications, especially high-alert medication like phenytoin, were dispensed (Manias, 2012). They were also not synced to the patient's medical record. Therefore, the machines contained no information on drug preparation or correct dosages and did not display any warning signs.

Various systems factors such as communication, leadership, education, training, and innovation of health care technology influenced the ED nurse's clinical performance. The factors originate from the adaptation of systems theory into health care (Huber, 2017). There are, however, areas of uncertainty regarding the factors becoming problematic in TGH's scenario. For example, the nurse's hesitation to consult her team could have been caused by staff management problems such as conflict, overwork, or shortage of ED staff. Similarly, her lack of awareness of

dosages and safety measures shows gaps in education and training. Such problems are a result of a breakdown of systems factors. Further evaluation is essential to understand the root causes of adverse events and systems problems. Ignoring root causes can result in similar adverse events in the future and negatively impact the stakeholders.

Implications of the Adverse Event on Stakeholders

Since medicine is a profession that depends on interpersonal relationships, adverse events have unintended emotional, psychological, and professional consequences on all stakeholders. Patients and their families are the first victims of adverse events, while health care professionals and the organization become the second and third victims, respectively (Mira et al., 2015). A similar inference can be made about the adverse event at TGH; the inference is supported by certain assumptions about the health care environment. General assumptions about health care are as follows: (a) quality health care is a result of positive relationships between all stakeholders (Huber, 2017), (b) stakeholders are part of a high-risk environment where errors in clinical practice are common, (c) health care professionals are not always responsible for errors as errors are often caused by a breakdown in systems factors (Manias, 2012), and (d) errors diminish the morale and job satisfaction of health care professionals and lead to more adverse events (Huber, 2017).

The analysis of implications on stakeholders begins with identifying how each category of victims is impacted. The first victims expect hospital stays and procedures to be safe and beneficial. When a patient suffers an injury, or dies because of medical negligence, the family may feel aggrieved and may require counseling and support. They may feel unnerved and scared by health care professionals (Bernhard, 2013) and hesitate to seek medical treatment in the future. The study reported that health care professionals were traumatized after committing a

preventable error or witnessing an adverse event. They may lose confidence, abandon their careers (Bernhard, 2013), and experience anxiety or depression (Mira et al., 2015). Adverse events are damaging to careers, and nursing professionals may face difficulty in finding another job (Bernhard, 2013).

Adverse events also affect the organization—the third victim—by damaging its reputation. Adverse events can discourage people from seeking treatment at a particular hospital (Mira et. al, 2015). Moreover, as most preventable errors are not covered by Medicaid and Medicare services, the hospital can stand to lose a significant amount of reimbursement money.

It is important that health care organizations such as TGH find ways to minimize the impact of adverse events on different stakeholders. The current trend in quality improvement (QI) is focused on reducing human errors through automation of health care technologies. In the case of TGH, the existing level of automation of patient records and drug dispensers is not sufficient and needs to be replaced. The next section recommends and discusses the benefits of a popular QI technology—patient care dashboards.

Evaluation of Quality Improvement Technologies

Performance measurement and reporting by health care professionals are the crux of QI because transmitting, organizing, analyzing, and displaying performance data help in identifying areas that need improvement (Ghazisaeidi, 2015). A recent development in QI technologies is the introduction of visual dashboards. Dashboards are interactive performance management tools that use graphic and easy-to-use formats to present specific metrics or key performance indicators (KPIs) on a single computer screen (Ghazisaeidi, 2015). Implementing a dashboard can help TGH improve quality of care and patient safety.

Studies show that the use of data-driven dashboards improves patient safety and accelerates cost reduction efforts. A dashboard reduces human errors in processes and minimizes the cognitive effort needed to make decisions, thereby saving time and increasing efficiency and accuracy. The KPIs aggregate data collected from various sources. For example, clinical data incorporated into a dashboard include patient information gathered from physician or nurse charts. A dashboard can also consolidate metrics about market dynamics, innovation for long-term sustainability, and availability of financial and human resources for managers to analyze (Weiner, Balijepally, & Tanniru, 2015).

To help TGH efficiently customize the dashboard to its specific clinical context, the tool should be tested and evaluated using certain criteria. The categories for each criterion are as follows: (a) easy customization, (b) knowledge discovery, (c) security, (d) information delivery, (e) visual design, (f) alerts, and (g) system connectivity and integration (Karami, 2014). These criteria can be used for all types of dashboards and health care settings.

While the design features are important, the dashboard is only useful if the KPIs provide valuable data. Hence, the selection and development of KPIs are critical steps in QI at TGH without which the organization runs the risk of ignoring areas that require corrective action (Ghazisaeidi, 2015).

Relevant Metrics of Quality Improvement for TrueWill General Hospital

The KPIs are the most valuable content in a dashboard. They measure performance across the organization using a combination of administrative and clinical data sets. To prevent overloading the electronic dashboard, only a limited number of KPIs concerning high-priority areas are selected. These KPIs are based on evidence-based academic literature. Data for each KPI is sourced from different source systems in the organization such as accounting system,

human resources system, and clinical system (Ghazisaeidi, 2015). For example, clinical data are sourced from reports on whether clinicians treated the correct patient, addressed the equipment or supplies needs, prescribed the correct medication or anesthesia at the appropriate time, and detected patient allergies (Hagland, 2012). For the adverse event analysis report, the relevant KPIs will focus on clinical and patient-centric metrics.

Health care agencies such as the Agency for Healthcare Research and Quality (AHRQ) have developed their own sets of metrics that address various aspects of quality—patient safety, prevention quality, inpatient quality, and pediatric quality. TGH can customize its clinical and patient-centric KPIs for the dashboard from these aspects. Examples of relevant AHRQ metrics that are applicable to the ED adverse event include (a) death rate in low-mortality diagnosis related groups, (b) accidental puncture or laceration rate, (c) heart failure mortality rate, and (d) dehydration admission rate (AHRQ, 2015a, 2015b, 2015c).

The ED department at THG can include other relevant KPIs in the dashboard such as (a) monthly averages for patient length of stay (inpatient and outpatient); (b) patients in the ED who left without being seen (monthly); (c) radiology test (CT scan and x-ray), start to final dictation turnaround time (Weiner, Balijepally, & Tanniru, 2015); (d) speed of onset of pain relief; (e) cost reduction percentage per patient; and (f) risk of drug interactions (Dolan, Veazie, & Russ, 2013).

The evidence-base for the selected KPIs consists of peer-reviewed studies. Hagland (2012) proved the success of the dashboard for patient safety optimization at the Saint Luke's Mid America Heart Institute, Missouri. The dashboard increased communication within medical teams, reduced safety errors, and improved coordination between the teams. Dolan, Veazie, and Russ (2013) studied the effectiveness of the electronic dashboard as a decision-making tool. The results showed that the dashboard had potential to foster informed decision-making and patient-

centered care. Weiner, Balijepally, and Tanniru (2015) studied the integration of data-driven dashboards at the St. Joseph Mercy Oakland Hospital in Michigan. The study reported tangible benefits such as KPIs reporting reduced adverse event rates and intangible benefits such as increased accountability across the organization, self-improvement among nurses, and improved unit performance.

The dashboard is just the technological component of quality improvement. TGH requires a broader QI framework that incorporates organizational strategies to overcome problems in the ED that resulted in the death of the patient. A suitable framework will be selected after evaluating different perspectives and data about quality improvement.

Outline for a Quality Improvement Initiative for TrueWill General Hospital

The health care industry has adopted and adapted many QI and measurement models over the years. Two popular models in quality improvement are the six sigma and lean models. Both models have similar goals—eliminate operational waste and defects to improve quality and efficiency of a system. The main difference between the six sigma and lean is in the approaches to identifying the cause of defects and errors. According to six sigma, variations in processes cause errors, while lean thinking highlights unnecessary steps as the cause of operational waste and errors (AHRQ, 2017).

As both process variations and unnecessary steps can cause errors, the combination of the lean and six sigma models can be implemented at TGH as its quality improvement outline. The hospital can follow the lean six sigma model's DMAIC approach. DMAIC is a five-step approach to process improvement: (a) define—identify key business issues; (b) measure—understand current levels of performance; (c) analyze—identify root causes of process errors; (d) improve—introduce strategies and tools to improve quality of process; and (e) control—maintain

new levels of performance across the organization (Huber, 2017). Implementing the lean six sigma into all units and departments, not just the ED, at TGH will help streamline processes in a proactive manner. By improving the whole system, the hospital can prevent communication gaps or errors, disorganization, and breakdown of faulty systems. DMAIC steps will allow TGH to enhance QI process using tools and strategies such as the dashboard.

The Institute of Health Improvement's plan-do-study-act (PDSA) model and the Baldrige criteria were other quality improvement perspectives that were considered (Huber, 2017). However, the PDSA insufficiently addressed specific types of errors caused by variations or unnecessary steps, unlike the lean six sigma model. The Baldrige criteria too were insufficient because their usage was more suitable for enabling educational excellence. Additionally, there is extensive evidence supporting the lean and six sigma models in quality improvement.

While the lean six sigma model and dashboards have a high success-rate, implementing the QI initiative depends on coordinated and collaborative efforts by multiple stakeholders. Teamwork enables TGH's health care professionals to optimize systems factors and the quality of processes and prevent future adverse events.

Conclusion

The process of QI and ensuring patient safety is challenging because health care organizations must simultaneously provide the highest quality of services and introduce cost reduction strategies. Quality improvement initiatives, such as implementing dashboards, must focus on finding and fixing the root causes of errors or process inefficiencies. To identify the root causes of errors, the organization should train health care professionals, update health care technologies, and open lines of communication to meet the expectations of patients for safe, timely, affordable, and quality care.

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Comment [JS2]: I would suggest locating a more current reference. This reference is on the cusp of being outdated according to health care research standards of being less than five years. With this topic, I am sure there are more updated references that could be used instead.

Comment [JS3]: This is another reference that should be updated for the above reasons.

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