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The Effect of Root Cause Analysis on Safe Medication Administration

Kristi Sanborn Miller, MSN

College of Nursing, East Tennessee State University, Asheville, NC, USA

In 2000, the Institute of Medicine published a landmark report on the devastating effects of medical errors. The IOM report of 7,000 deaths per year from adverse drug events averages out to 583 deaths per month, 134 deaths per week, and 19 deaths per day (Kohn, 2000). Other reports have placed that number much higher, with the consensus that harm from medical error is underreported (Makary & Daniel, 2016). Researchers have proposed that death from medical error may rank as the third leading cause of death. Since the original report, strategies to reduce harm from medical error have been widespread and have included the institution of a Just Culture, adoption of the tenants of High Reliability Organizations, and the use of Root Cause Analysis to examine the root causes of sentinel events to design solutions that will prevent reoccurrence.

Harm from medication error, reported to be the most common error in health care (Aspden, Wolcott, Bootman, & Cronenwett, 2007; Kohn, 2001), is estimated to affect 1.5 million patients per year in the United States alone. Some estimate that more than one medication error a day occurs for each hospitalized patient (Aspden et al., 2007; Bates, 2007). Not all errors cause harm, however, the estimated 400,000 adverse events that do occur, result in more than \$3.5 billion in additional medical costs (Aspden et al., 2007). Extended hospital stays multiply the financial cost. Patients who suffer harm from medication error may remain hospitalized for 8 to 12 days longer than patients who do not experience harm. These added days mean their hospital stays cost \$16,000 to \$24,000 more (Agency for Healthcare Research and Quality [AHRQ], 2015).

Nurses are at the frontline of medication administration, and are in a prime position to prevent harm from medication error. More than 40% of a nursing shift is spent administering medications (Elganzouri, Standish, & Androwich, 2009). Nurses may be responsible for between 26% and 38% of medication errors (Bates, 2007; Leape et al., 2002). Self-reported medication errors made by nurses that resulted in patient death included wrong dose (40.9%), wrong drug (16%) and wrong administration route (9.5%) (Hughes, 2008). Nursing education has traditionally relied on the use of the 5 rights to prevent medication error (Potter et al., 2013), a strategy that is at the “sharp end of care” (Reason, 1990). Strategies at the sharp end of care rely on individual characteristics and responsibility. Nurses have identified that carelessly failing to follow the five rights and nursing incompetence are major causes for making an error (Jones & Treiber, 2010). When sharp end strategies fail, the individual is blamed, but little is done to prevent future incidents of harm. The modern patient safety movement is moving away from an environment of “blame and shame”. Healthcare institutions are encouraged to utilize strategies from systems theory (the blunt end of care) to prevent harm from error (Institute for Safe Medication Practice [ISMP], 2017).

Root Cause Analysis (RCA) is an error analysis tool used to train health care staff to identify systems factors that lead to error and suggest solutions to prevent similar errors from causing harm in the future (VA Center for National Patient Safety, 2017; The Joint Commission, 2017; Wachter, 2012). . Root Cause Analysis (RCA) is a tool successfully used by aviation, nuclear power and chemical engineering industries to reduce harm from error (Carroll et al., 2002; Shapell, 2001). The Patient Risk Detection Theory (PRDT; Despina, Scott-Cawiezell, & Rouder, 2010) states that nurse training is a factor that has the potential to reduce harm to patients. Educational strategies have a great deal of research support for reduction of harm to patients (Benner et al., 2002; Miller, Haddad & Phillips, 2016). The Joint Commission mandated use of Root Cause Analysis (RCA) for all sentinel events in 1997, and many states have mandated its use for major safety events as well (Association for Healthcare Research and Quality [AHRQ], 2017). Despite the widespread use of RCA, there is little evidence to support its efficacy (National Patient Safety Foundation [NPSF], 2016). RCA has been criticized due to lack of standardization, the lack of

implementation by trained professionals, and a lack of follow-up and aggregation of data (Hettinger et.al, 2013; Peerally, 2016). No one has studied the use of RCA training as an intervention to increase nurses' ability to administer medications safely.

This study is being done as dissertation research at East Tennessee State University. The study hypothesizes that participation in RCA, as compared to the usual safe medication administration education will increase knowledge of safe medication administration and improve scores on a measure of just culture. After consent and randomization, senior level nursing students take a pre-test, survey and demographics questionnaire. Students then participate in an online, interactive video of RCA or the usual education, followed by a post-test and a 30-day post-test and survey. Descriptive and analytic statistics will be used to analyze results (final goal for recruitment is n=90 for sufficient power for the study).

Data collection for this project has involved the use of Research Electronic Data Capture (REDCap, 2017). REDCap is a secure web application for building and managing online surveys and databases. While REDCap can be used to collect virtually any type of data, and is specifically geared to support online or offline data capture for research studies and operations. The REDCap Consortium, a support network of collaborators, is composed of thousands of active institutional partners in over one hundred countries who utilize and support REDCap in various ways. This study will present the design and implementation of an online, randomized controlled trial of a nursing educational intervention using the REDCap data collection tool.

Title:

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Nursing education, Patient safety and Root Cause Analysis

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Abstract Summary:

Though Root Cause Analysis has been required for sentinel events for many years, there is little evidence for efficacy. This study explores the impact of RCA on nursing knowledge and attitudes about safe medication administration.

Content Outline:

I. Introduction

A. Medical error may cause the deaths of over 400,000 patients each year with physical, financial and emotional consequences (Makary & Daniel, 2016). Medication error is the most common medical error.

B. Despite multiple interventions, including mandated use of Root Cause Analysis for sentinel events by The Joint Commission, this number has not changed since first reported in 2000 by the IOM (Landrigan, 2010).

II. Body

A. Despite competent commitment to safe nursing practice, nurses make errors.

1. Some estimates state nurses spend up to 40% of their time administering medications (Elganzouri, 2009).

a) Unlike physicians and pharmacists, there is no one to check nursing administration practice before the medication reaches the patient.

b) In a 2010 survey, 78% of nurses stated they had made a medication error (Jones & Treiber, 2010)

2. The primary strategy used by nurses to prevent medication error is the 5 rights.

a) Nurses identify incompetence and not following the 5 rights as reasons for making error (Jones & Treiber, 2010)

b) The nursing profession has a tradition of blaming the individual for mistakes, and not looking at systems issues.

B. Root Cause analysis is an important systems tool for identification and prevention of error.

1. RCA has been used successfully in industries other than healthcare.

a) Aviation, nuclear power, and chemical engineering have all used RCA to successfully reduce risk of harm to consumers (Carroll, 2002; Shapell, 2001).

b) In High Reliability Organizations, RCA is an element of preoccupation with failure (Weick & Sutcliffe, 2006).

2. Little evidence exists in health care regarding the efficacy of RCA (Peerally, 2016).

a) There is no standard method for RCA.

b) RCA is not always led by trained professionals.

c) Follow up with results and aggregation of data are lacking.

C. Previous research suggests that nurse training and experience has the potential to reduce risk of harm to patients (Benner, et al., 2002)

1. The Patient Risk Detection Theory supports the use of training to reduce risk of harm from error (Despins, Scott-Cawiezell, & Rouder, 2010)

a) Reporting and analyzing error gives nurses the opportunity to learn from mistakes.

b) The PRDT combines concepts of High Reliability Theory and Signal Detection Theory to support the design of interventions that facilitate nurses' ability to prevent harm from error.

2. RCA is an intervention that identifies the basic and causal factors underlying variation in performance.

a) Participation in RCA will increase nurse knowledge of strategies to prevent medication error.

b) Participation in RCA will improve attitudes towards use of systems strategies to prevent medication error.

III. This study provides evidence for the use of RCA as a strategy to reduce harm from error

A. Nursing knowledge of safe medication administration practices is being measured with the Safe Administration of Medications-Revised Scale (Bravo, 2014)

B. Nursing attitudes of safe medication administration practices are being measure with the Safety Attitudes Questionnaire (Sexton, 2006)

First Primary Presenting Author

Primary Presenting Author

Kristi Sanborn Miller, MSN
East Tennessee State University
College of Nursing
Graduate student
Asheville NC
USA

Professional Experience: I have been a registered nurse for over 10 years. My MSN thesis was on patient safety (falls prevention), this poster topic is my dissertation research. I am board certified as a patient safety professional (CPPS) by the National Patient Safety Foundation, and just attended national congress. In addition, I worked for 2 years as a patient safety officer for Mission Health Systems

Author Summary: This poster topic is my dissertation research. I am board certified as a patient safety professional (CPPS). In addition, I have worked as a patient safety officer and run many RCAs. I am also a nurse entrepreneur and owner of Safety First Nursing, dedicated to supporting the physical, psychological and emotional safety of patients and nurses through education, research and resources.