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A Magnet System Implementation of the Hester Davis Fall Reduction Program

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This is to certify that the doctoral study by

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Abstract

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by

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

A Magnet-recognized academic hospital system experienced an increase in patient falls and patient falls with injury after transitioning to a new electronic health record. The purpose of the project was to evaluate the effectiveness of a system-wide quality improvement practice change. The practice-focused question addressed a Magnet model implementation of a standardized, system-wide, evidence-based Hester Davis Scale (HDS) fall risk assessment and intervention tool and the impact on the nursing-sensitive indicators of patient fall rates and fall rates with injury. Successful implementation and sustained, correct use of the HDS fall risk assessment and targeted fall-prevention-intervention tools added to the evidence of multifactorial fall-intervention-prevention strategies designed to reduce patient falls and patient injury associated with falls. Two models were used to inform the project: the American Nurses Credentialing Center next-generation Magnet model and the Institute for Healthcare Improvement framework for spread. The primary source of evidence was the National Database of Nursing Quality Indicators. A run chart approach to process improvement was determined to be the best method to assess the effectiveness of the HDS Falls Prevention Program for 28 months post implementation. The run chart for patient fall rates and fall with injury rates demonstrated a reduction in falls and sustained improvement over 28 months. The decreases in falls and fall with injury rates of this project have implications for positive social change. Magnet recognition supports the implementation of the evidence-based HDS Fall Reduction Program, thereby improving the quality of life for patients and families and reducing the burden and cost of health care associated with falls.

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Dedication

This project is dedicated to my mother, Betty L. Schwenk, RN, who inspired me to become a nurse. You have been a role model and cheerleader. Thank you for always being there and cheering me on.

Acknowledgments

Thank you to my husband, Scott, who supported me on this DNP journey. It wasn't always easy.

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Section 1: Nature of the Project

Nurses working at the bedside do not begin their shift with the intent of causing patient harm; however, they struggle to reduce patient falls and patient injury from falls. Two to 12% of all hospitalized patients fall at least one time during their hospitalization (Coussement et al., 2008). Reported fall rates in the literature vary from 1.3 to 17.1 falls per 1,000 patient days in acute and rehabilitation care settings (Coussement et al., 2008; Oliver, Healy, & Haines, 2010) to 17-67 falls per 1,000 patient days in psychogeriatric units (Oliver et al., 2010). Extrapolation of 2010 data indicated an annual occurrence of one million falls in the United States (Oliver et al., 2010).

Patient falls represent a significant quality issue in acute care hospitals. Thirty to 35% of all acute care patient falls result in an injury (Joint Commission, 2019). As part of the Deficit Reduction Act of 2005, the Centers for Medicare and Medicaid Services (CMS, 2018) ceased to provide payment for the cost of caring for the classification of hospital acquired conditions of patient falls with injury (falls that occur as a consequence of a hospital admission). Hospital-acquired conditions (HACs) related to patient falls were broadly defined as trauma and included "fractures, dislocations, intracranial injuries, crushing injuries and 'other'" (CMS, 2015. p. 1). Falls have been identified as an HAC because they can be prevented when evidence-based practice (EBP) guidelines are implemented (CMS, 2018). Payment penalties associated with this rule represent a significant reimbursement decrease to acute care hospitals (CMS, 2018). Hospital executive leadership teams are paying attention to their hospital's fall rate data and expect continuous improvement and resolution of the condition. The literature

demonstrated a lack of high-quality evidence to explain why fall rates are not improving. This project focused on a Magnet Recognized hospital system's implementation and evaluation of an evidence-based patient fall risk assessment tool and falls prevention intervention tool kit.

Problem Statement

A Magnet Recognized academic hospital system experienced an increase in patient falls and patient falls with injury after transitioning to a new electronic health record (EHR) in 2016. The EHR implementation included an embedded basic version of the Hester Davis Scale. The EHR that was replaced had included a modified version of the Morse Fall Scale.

When hospitalized patients fall, facility policies and procedures dictate steps that include subjecting patients to diagnostic imaging studies to determine the extent of any injuries that might have occurred as a result of the fall (National Database of Nursing Quality Indicators [NDNQI], 2010). Documented injuries in the hospital system's patient safety network (PSN) included head trauma, internal bleeding, and orthopedic fractures. The cost to diagnose and treat HACs is not reimbursed by third party payers (CMS, 2018). Hospitals must absorb the cost associated with patient falls.

Using values extrapolated from Quigley, Neily, Watson, Wright, and Strobel (2007) and Quigley and White (2013), a weighted, average cost to the system per patient, per fall was calculated to be $6,155.53. This cost was projected based on the system's 2016 patient fall data to have an annual cost impact of $10,132,000.00. Patient falls and patient injury from falls not only add unreimbursed cost related to the hospitalization,

patient falls also create a negative perception of the facility from patients and families (Institute of Medicine [IOM], 2001; Kohn, Corrigan, & Donaldson, 2000).

This project was significant to the field of nursing practice. Successful implementation and sustained, correct use of the HDS fall risk assessment, as well as targeted intervention tools may add to the evidence of multifactorial fall intervention prevention strategies aimed at reducing patient falls and patient injury associated with falls. Injury from falls are endorsed by the National Quality Forum (NQF) as a National Database of Nursing Quality Indicators (NDNQI) nursing-sensitive indicator (American Nurses Credentialing Center [ANCC], 2019a; Lake, Shang, Klaus, & Dunton, 2010; Montalvo, 2007; NQF, 2013, 2018) and is a quality outcome measure used in Magnet Recognition, Joint Commission (2019) accreditation, and Det Norske Veritas and Germanischer Lloyd (DNV-GL, 2014) accreditation.

Purpose

The purpose of my project was to evaluate the effectiveness of a system-wide quality improvement practice change. The aim of the practice change was to have successful system-wide implementation of an EHR-validated HDS fall risk assessment and intervention tool that would improve the nursing-sensitive outcomes of patient falls and patient falls with injury. This project contributed to the evidence supporting the effectiveness of Magnet model implementation of an evidence based HDS assessment and intervention tool in the acute care setting.

The short-term (1 year) system-level practice question was the following: In a large, urban, academic, acute care, Magnet Recognized hospital system in the

southwestern United States, will the Magnet model of implementation of an evidence based HDS yield interrater reliability results of .85 or better (Cohen's kappa)? The long-term, comprehensive, system-level practice question was the following: In a large, urban, academic, acute care, Magnet Recognized hospital system in the southwestern United States, will a Magnet model of implementation of a standardized, system-wide, evidence-based HDS fall risk assessment and intervention tool impact patient fall rates and fall rates with injury, as measured 12-18 months post-implementation, when compared to the pre HDS implementation? I evaluated the goals and outcomes associated with the short-term, comprehensive, system-level practice question and the long-term, comprehensive, system-level practice question. The long-term, comprehensive, system-level practice question will be an ongoing project that will focus on sustainability and improvement of the NDNQI nursing-sensitive patient outcomes of fall rates and fall rates with injury.

Nature of the Doctoral Project

A systems approach to standardize an EBP and improve fall rates and injury from falls must include consideration of how to rapidly spread the innovation throughout the system (Massoud et al., 2006; Viney, Batcheller, Houston, & Belcik, 2006). The Agency for Healthcare Research and Quality's (AHRQ, 2017) described the elements of a health system, which include "at least one hospital and at least one group of physicians that provides comprehensive care (including primary and specialty care) who are connected with each other and with the hospital through common ownership and /or joint management" (p. 1).

The goals of this project were to achieve HDS interrater reliability (IRR) of .85, as measured by Cohen's kappa, measured 1 year after HDS implementation, and to evaluate the effectiveness of the Magnet model approach to implementation of the evidence-based HDS fall risk assessment and multifactorial fall prevention intervention tools to improve the system's performance on the nursing-sensitive outcome measures of falls and falls with injury. Evaluation methods included the following:

- IRR data for HDS use,
- NDNQI system and benchmark data
- System PSN fall and fall with injury data,
- Literature reviews,
- National clinical practice guideline reviews,
- Review of systematic reviews that rate existing evidence,
- Analysis of the system-wide fall prevention policy, and
- Monthly meetings with stakeholders to gather input.

This project analysis of the findings contributed to an EBP that may support the bedside nurse's ability to provide safe, patient-centered care using the HDS assessment and multifactorial falls prevention intervention tool. Additionally, the findings may support the effectiveness of the Magnet model to achieve and sustain improved patient outcomes related to falls and falls with injury. The analysis addressed any gap in the system's practice before and after implementation of the HDS fall risk assessment and multifactorial fall prevention intervention tool kit.

Significance

The practice setting for the project was a large urban, academic, acute care, Magnet hospital system in the southwestern United States. The system comprises six hospitals (an academic medical center and five community hospitals), an ambulatory surgery center, and three off-campus emergency centers. Five of the six hospitals in the system have achieved Magnet Recognition. The sixth hospital is on the journey to achieve Magnet Recognition. The system encompasses 3,600 plus licensed beds with a network of over 20,000 health care professionals and employees. The system is a nonprofit, faith-based health care organization dedicated to excellence in research, education, and patient care. The hospital system strives to bring compassion and spirituality to all its endeavors to help meet the health needs of the community. The flagship hospital has been named by *U.S. News & World Report* as one of the country's top 20 hospitals, ranking as the number one hospital in Texas for eight consecutive years (Comarow, 2018; Comarow & Harder, 2016). The organization has consistently been recognized by several national organizations as one of the nation's best places to work.

Stakeholders include patients, families, bedside nurses, nursing leadership, physicians, hospital executives, and third-party payers. Magnet Recognition highlights the organization's commitment to an evidence-based model that includes (a) transformational leadership; (b) structural empowerment; (c) exemplary professional practice; (d) new knowledge, innovation, and improvements; and (e) empirical quality results (ANCC, 2019a). The Magnet model provides a framework for nursing practice and the integration of evidence-based research (ANCC, 2019a).

Addressing the nursing-sensitive indicator of patient falls and patient falls with injury may positively impact the facility's continued commitment to excellence in patient safety by improving patient falls and falls with injury outcomes, while the reducing the cost of care. The HDS fall risk assessment tool and multifactorial fall prevention intervention tool kit began to be implemented through a phased approach on February 1, 2018. My project included a review of the system's executive summary of de-identified data at baseline and monthly (up to 28 months) post implementation. A 28-month time period provided the opportunity to implement the framework for spread as described by Massoud et al., (2006) and provided enough data to identify any gaps in practice.

Summary

Section 1 of the project addressed the problem of patient falls and falls with injury. As a Magnet Recognition system, my practicum site is committed to improving patient fall rates and fall rates with injuries occurring in its facilities. The purpose of my project was to evaluate the effectiveness of a Magnet model, system-wide quality improvement practice change. The aim of the practice change was to have a successful system-wide implementation of an EHR-validated HDS fall risk assessment and fall prevention intervention tool kit that would improve the nurse-sensitive outcomes of patient falls and patient falls with injury. A literature review indicated evidence to be used within the ANCC (2019a) Magnet model framework. Additionally, the Institute for Healthcare Improvement (Massoud et al., 2006) framework for spread was used to disseminate the evidence-based practice changes.

In Section 2 I discuss the concepts, models, and theories that provided the foundation for this project. I also explain the relevance to nursing practice, background details of the problem, and my role and project team's role. I analyzed the effectiveness of an evidence-based framework for change to determine the impact on stakeholders during all phases of the implementation process.

Section 2: Background and Context

A Magnet Recognized academic hospital system experienced an increase in patient falls and patient falls with injury after transitioning to a new EHR in 2016. The EHR implementation included an embedded basic version of the Hester Davis Scale. The EHR that was replaced included a modified version of the Morse Fall Scale.

The short-term (1 year) system-level practice question was the following: In a large, urban, academic, acute care, Magnet Recognized hospital system in the southwestern United States, will the Magnet Model of implementation of an evidence based HDS yield interrater reliability results of .85 or better (Cohen's kappa)? The long-term, comprehensive, system-level practice question was the following: In a large, urban, academic, acute care, Magnet Recognized hospital system in the southwestern United States, will a Magnet model of implementation of a standardized, system-wide, evidence-based HDS fall risk assessment and intervention tool impact patient fall rates and fall rates with injury, as measured 12-18 months post-implementation, when compared to the pre HDS implementation?

The aim of the practice change was to have successful system-wide implementation of an EHR-validated HDS fall risk assessment and intervention tool kit that would improve the nursing-sensitive outcomes of patient falls and patient falls with injury. This project contributed to the evidence of the Magnet model framework's effectiveness in implementing a fall reduction quality improvement initiative.

In Section 2, I review the ANCC (2019a) next generation Magnet model and the (IHI) framework for spread (Massoud et al., 2006). The relevance of this project to

nursing practice is discussed, and existing evidence in the literature is synthesized. I also provide a summary of fall rates with injury and discuss the standard of care at the practicum site as a baseline for quality improvement. Lastly, I explain my role as it related to the topic and evidence.

Concepts, Models, and Theories

Two models were used to inform the project: the ANCC (2019a) Magnet model and the IHI framework for spread (Massoud et al., 2006). Magnet Recognition promotes improvements in patient outcomes and nursing-sensitive indicators by empowering the nurse and improving the practice environment (Grant, Colello, Riehle, & Dende, 2010). However, the evidence has been mixed, and the assumption that Magnet Recognition improves patient outcomes (specifically fall rates and fall with injury rates) cannot be supported (Ambutas, Lamb, & Quigley, 2017; Everhart et al., 2014; Lake et al., 2010). Five of the six hospitals at the project system site have Magnet Recognition. This project may add to the evidence of the effectiveness of the Magnet model in improving patient outcomes related to falls. The second model, the IHI framework for spread, was necessary because the Magnet model does not address the process to promote system-wide change. The models were complimentary.

Magnet Model

The Magnet Recognition program and model evolved from the American Academy of Nursing task force's 1983 study that addressed work environments with a history of attracting and retaining qualified nurses (ANCC, 2019a). These nurses exemplified quality patient care in a practice setting that promoted the practice of nursing

(ANCC, 2019a; Haller, Berend, & Skillin, 2018). The hospitals identified in the 1983 study had succeeded in retaining well-qualified nurses during a nationally recognized nursing shortage in the 1980s (McClure, Poulin, Sovie, & Wandelt, 1983).

The nursing shortage crisis occurred despite national data indicating an adequate number of experienced, licensed professional nurses available in the workforce; over 80% of hospitals in in the United States experienced a nursing shortage (McClure et al., 1983). An assumption was that the work environment of hospitals experiencing a nursing shortage did not promote the practice of professional nursing (ANCC, 2019a). The American Academy of Nursing task force identified 41 of 163 (25%) hospitals that demonstrated the ability to recruit and retain qualified professional nurses (ANCC, 2019a; McClure et al., 1983). The work environment of these hospitals was described as having characteristics of a magnet; that is, these hospitals had forces that attracted and retained quality, professional, registered nursing staff, from which the term *Magnet hospital* was coined (McClure et al., 1983). The original Magnet Model comprised 14 Forces of Magnetism (ANCC, 2019a).

The 14 Forces of Magnetism were organized into three broad categories: "administration, professional practice, and professional development" (McClure et al, 1983, p. 5). The category of administration focused on management style and the quality of leadership of nursing managers and directors (McClure et al., 1983). Magnet hospitals used a participatory style of leadership. Staff were involved in decision-making at all levels. Staff input was encouraged and valued (McClure et al., 1983). At the system level, nursing directors functioned at the executive level of the organizational chart, having a

voice over the professional practice of nursing (McClure et al., 1983). Staffing levels, work schedules, and opportunities for promotion within the organization were also viewed as important criteria for Magnet hospitals (McClure et al., 1983). In addition to the nursing leadership of a Magnet hospital, the professional practice of nursing in Magnet hospitals was deemed a force of magnetism.

A Magnet hospital's work environment and the nurse practice model were identified as key synergistic elements (McClure et al., 1983). Most of the hospitals in the Magnet study implemented a primary nursing model of care. The quality of nursing staff was defined by the number of baccalaureate-prepared nurses on staff (McClure et al., 1983). The final Force of Magnetism category revolved around professional development.

Professional development included the growth and development of nursing staff. Orientation, continuing education, and formal education were considered important aspects to the success of a Magnet hospital (McClure et al., 1983). Career development in the form of clinical ladders was promoted. Clinical ladders encouraged staff nurses to grow as clinicians. Nurses were motivated because they were compensated on competency (McClure et al., 1983). The Magnet model has continued to evolve.

In 2008, the Commission on Magnet released its new vision and conceptual model of Magnet (ANCC, 2019b; Grant et al., 2010).). The new Magnet model was organized into five components. The components included transformational leadership; structural empowerment; exemplary professional practice; new knowledge, innovations,

and improvement; and empirical outcomes (ANCC, 2019a; Grant et al., 2010). The next generation Magnet model was used as the framework for the current project.

The new Magnet Model was designed as a framework to enhance nursing practice and serve as a foundation for nursing research (ANCC, 2019a). Grant et al. (2010) suggested that the next generation Magnet model "provides an exceptional framework for building an agile and dynamic work force" (p. 326). Bedside nurses become aligned with the model when they (a) feel empowered to guide their practice based on evidence, (b) demonstrate exemplary professional practice, (c) explore innovations that contribute to improved patient outcomes, and (d) are supported by transformational leaders (Grant et al., 2010). When nurses are recognized for their contributions to the improvement in patient outcomes, quality of care, nursing satisfaction, and patient satisfaction will improve (Grant et al., 2010). Magnet Recognition implies superior performance in achieving positive patient and staff outcomes.

The Magnet model guides the practice of nursing and empowers nurses to use evidence-based practice guidelines; however, the model does not provide the framework necessary to standardize and spread best practices throughout the hospital or system. A model that supported an accelerated process to spread best practices within and between the system hospitals was needed. The IHI framework for spread (Massoud et al., 2006) was used to accelerate change and close the gap between EBPs to reduce falls and common (variable standards of care) practices.

Framework for Spread

To effectively close the gap between best practice and common practice, an organization must be able to rapidly spread innovations and the resulting EBP (Massoud et al., 2006; Nolan, Schall, Erb, & Nolan, 2005). The aim of the framework for spread was to develop a system that would target processes to accelerate improvement and spread change ideas and EBPs within and between organizations (Massoud et al., 2006; Nolan et al., 2005). A key success factor in spreading best practices is to identify an executive nursing leader to sponsor and set the strategic vision (aim) for the change process, along with an engaged department level leader (Massoud et al., 2006; Nolan et al., 2005). The aim for spread should include the identification of the target population, specific goals and outcome measures, and the time frame for the process to be implemented (Massoud et al., 2006; Nolan et al., 2005).

The next step in the framework for spread includes the development of a plan for spread that describes how the change process will be communicated throughout the system, along with deliverables and milestones to be achieved (Massoud et al., 2006; Nolan et al., 2005). At the end of the implementation period or project plan, consideration must be given to transitioning the spread effort to daily operations (Massoud et al., 2006; Nolan et al., 2005). This implies that the new process will be adopted, not adapted. If the process is not adopted as designed, the process will not be standardized. When a process is not standardized, process measures cannot be compared and benchmarked. The framework for spread has been demonstrated to effectively guide change processes across organizations with a standardized approach (Massoud et al., 2006; Nolan et al., 2005).

The Magnet model and the framework for spread were used to inform the current project. Both models were necessary because of the complex nature of the hospital system. The Magnet model promotes nursing practice and empowerment, and the framework for spread provides an evidence-based structure that empowered nurses can use to spread best practices across multiple hospital settings. The patient-centered outcome identified for improvement was the reduction of falls and falls with injury.

Relevance to Nursing Practice

Falls and falls with injury continue to occur in acute care settings despite an intense focus from regulatory agencies like the CMS, state licensing agencies, accrediting bodies like Magnet Recognition, The Joint Commission, DNV-GL, and patient safety groups like Leap Frog. The NQF has endorsed patient falls and falls with injury as a national nursing-sensitive indicator since 2004 (Garrard, Boyle, Simon, Dunton, & Gajewski, 2016). Efforts to implement and standardize EBPs have had mixed results because of variability in the ways falls are reported, variability in the way instruments are used to predict falls, variability in how falls are defined, and variability in types of interventions used to prevent falls (Avancecean et al., 2017; Aranda-Gallardo et al., 2013: Cameron et al., 2018; Haller et al., 2018; Holte, Underland, & Hafsad, 2015; Lizarondo, 2018). Outcome measures are an important step in Donabedian's quality improvement model (Quigley & White, 2013). The variability in how falls have been defined and measured has contributed to the dearth of high-quality, evidence-based studies that are necessary to drive change and sustain improvement in fall rates and fall rates with injury.

There have only been two studies by NDNQI researchers on the association of Magnet Recognition status and the impact on fall rates (Lake et al., 2010).

Falls Definitions

There are multiple definitions of falls and falls with injury. The World Health Organization (WHO, 2019) defined a fall as any incident in which a client inadvertently came to rest on a lower level, including the ground or floor. The Veterans Administration defined a fall as a client's loss of an upright position culminating in a position on the floor, ground, or furniture (Quigley et al, 2007). A fall was further defined as being sudden, uncontrolled, and unintentional in nature. The downward displacement of a client included striking another object like a chair or commode (Quigley et al, 2007). Falls have been further subclassified by injury type. The NDNQI defined a fall as

> an unplanned descent to the floor (or extension of the floor, e.g., trash can or other equipment) with or without injury to the patient and occurs on an eligible reporting nursing unit. All types of falls are to be included whether they result from physiological reasons (fainting) or environmental reasons (slippery floor). Include assisted falls – when a staff member attempts to minimize the impact of the fall. Exclude falls by visitors, students, and staff members; falls on other units not eligible for reporting; falls of patients from eligible reporting units, however patient was not on the unit at time of the fall (e.g., patient falls in radiology department). (p. 10)

Falls With Injury Definitions

Hospital acquired conditions (HACs) related to patient falls are broadly defined and include "fractures, dislocations, intracranial injuries, crushing injuries and 'other'" (CMS, 2015. p. 1). NDNQI provided categories of falls with injury that are used in all Magnet Recognized facilities:

> None – patient had no injuries (no signs or symptoms) resulting from the fall, if an x-ray, CT scan or other post fall evaluation results in a finding of no injury.
>
> Minor – resulted in application of a dressing, ice, cleaning of a wound, limb elevation, topical medication, pain, bruise or abrasion.
>
> Moderate – resulted in suturing, application of steri-strips/skin glue, splinting or muscle/joint strain.
>
> Major – resulted in surgery, casting, traction, required consultation for neurological (basilar skull fracture, small subdural hematoma) or internal injury (rib fracture, small liver laceration) or patients with coagulopathy who receive blood products as a result of a fall.
>
> Death – the patient died as a result of injuries sustained from the fall (not from the physiologic events causing the fall). (Garrard et al., 2016. p. 117)

Nursing-sensitive Indicators Definition

Nursing sensitive indicators are those processes and outcomes that are sensitive to nursing care (Dykes & Collins, 2013). NDNQI was established in 1998 to collect and standardize data to build nursing's body of knowledge related to structure, process, and outcomes that are directly or indirectly influenced by nursing personnel (Montalvo, 2007;

Petit dit Dariel & Regnaux, 2015). These processes and outcomes are called nursing-sensitive indicators and are specific to nursing (Montalvo, 2007). NDNQI utilized Donabedian's framework of structure measures, process measures, outcome measures, and balancing measures of quality improvement measurement to form the nursing-sensitive indictors of patient fall rate (NQF #0141) and falls with injury (NQF #0202) (Petit dit Dariel & Regnaux, 2015; Quigley et al., 2007; Quigley & White, 2013).

The current trend in nursing practice is for Magnet Recognized and non-Magnet hospitals to use the NDNQI database to benchmark nursing care performance at the unit level (Lake et al., 2010; Montalvo, 2007). Only 17% of hospitals in the NDNQI database are Magnet recognized (Lake et al., 2010). Magnet Recognition represents a credential of nursing excellence at the hospital level, and only 8% of all hospitals registered in the United States (U.S.) have achieved Magnet Recognition (ANCC, 2019b). Magnet Recognition has a requirement for hospitals to participate in a quality benchmarking program, and the NDNQI database represents that program for nursing (Lake, et al., 2010).

The Magnet model is closely aligned with Donabedian's Quality Improvement Model. The Magnet model requires organizations to identify and improve structure measures like staffing and the percentage of Bachelor of Science and higher degreed nurses (Quigley & White, 2013). Process measures include the use of evidence-based risk assessment tools like the HDS fall risk assessment and fall prevention intervention tool kit (Hester & Davis, 2013; Quigley et al., 2007; Quigley & White, 2013). Outcome

measures like the fall rate measure and the fall with injury measure in the NDNQI database are a keystone of the Magnet model.

Gaps in Practice

The quality movement in health care received a blow to its credibility in 2000 when the Institute of Medicine's Committee on Quality of Health Care in America published *To Err is Human: Building a Safer Health System* (Kohn et al., 2000). Extrapolation of data yielded projections that approximately 44,000 to 98,000 Americans died annually as a result of medical errors (Kohn, et al., 2000). The report highlighted the lack of standardized processes and systems in a fragmented health care delivery model of care as a contributing factor (Kohn, et al., 2000). This report represented the first time the public became acutely aware of serious quality issues in the U.S. health care system (Kohn et al., 2000).

Follow up reports from the Institute of Medicine (IOM) included *Crossing the Quality Chasm* (IOM, 2001). Information highlighted in this report included the lack of progress that had been made toward the recommendation that health care organizations establish evidence-based patient safety programs to improve patient outcomes (IOM, 2001; Kohn, et al., 2000). Health care systems had failed to rapidly change the processes and systems that contributed to patient harm (IOM, 2001). The report was stern in stating that health care delivery systems failed to "translate knowledge into practice and to apply new technology safely and appropriately" (IOM, 2001. p. 1).

On February 18, 2009, the Health Information Technology for Economic and Clinical Health (HITECH) Act, part of the American Re-investment and Recovery Act of

2009, was signed into law (HHS.gov, 2017). HITECH supported the use of electronic health records in a meaningful way to allow the electronic exchange of health information for the purpose of improving quality of care (CDC, 2017). Meaningful use of electronic health records to promote interoperability of electronic health data, was phased in three stages over six years from 2010 through 2017. Initially, hospitals received incentive payments as part of the Medicare EHR Incentive Program just for participating and meeting the required elements of Meaningful Use (MU) Stage 1 (CDC, 2017). MU Stages 2 and 3 increased the required elements that hospitals had to meet to continue receiving incentive payments. This culminated in MU Stage 3 with a downward payment adjustment from Medicare if the hospital failed to meet the required elements of the program (CDC, 2017).

The timeline for hospitals to purchase and implement EHRs to meet the three stages of MU requirements was six years. This resulted in rushed implementation plans that did not support nursing (end-user) participation. In the Magnet model, nurses should feel empowered to guide their practice based on evidence and be able to explore innovations that contribute to improved patient outcomes (Grant et al., 2010). The IOM (2001) was explicit in the expectation that rapid change implementation of new technology should be mindful of patient safety. The gap in practice embedded in this doctoral project originated from a rushed EHR implementation without adequate input from, or training of nursing end users. This contributed to an increase in patient fall rates and fall with injury rates for my practicum site.

The gap in practice that was addressed in this project was a description of how my practicum site implemented a quality improvement project to improve patient safety associated with fall rates and fall with injury rates. This project described how patient safety gaps that emerged with urgent implementation of the EHR HDS were addressed and corrected.

Local Background and Context

A Magnet Recognized, academic hospital system experienced an increase in patient falls and patient falls with injury when it transitioned to a new electronic health record (EHR) in 2016. The EHR implementation included an embedded, basic version of the Hester Davis Scale (HDS). The EHR that was replaced had used a modified version of the Morse Fall Scale. A gap in practice appeared when the HDS went live with little notice and training with the new EHR implementation in May 2016.

The HDS was built into the EHR by informatics personnel who did not have a clear picture of how the tool would be implemented at the bedside. The basic version of the HDS embedded in the new EHR did not provide guidelines for fall risk interventions. Decision making for purchase of the basic HDS versus the option to the purchase the HDS package that included an evidence-based, targeted, fall risk prevention tool kit, did not include nursing leadership and nursing end users To complicate the issue, informatics personnel migrated the intervention list from the previous EHR, which was the modified Morse Fall Scale (MFS) interventions. Another gap in practice occurred when the fall risk assessment tool did not map to the fall risk prevention interventions.

Additionally, the electronic measurement (e-measurement), defined by Dykes and Collins (2013) as a "secondary use of electronic data to populate standardized performance measures" (p. 2) of the HDS score did not populate into a nursing dashboard in meaningful way. The MFS interventions appeared in a drop-down menu in the EHR and nurses selected the entire list. Patients were assessed for risk of falling with the HDS. An independent list of interventions migrated from the previous EHR, which had been developed for use with the modified MFS score. Fall rates and fall rates with injury increased in May of 2016, coinciding with the implementation of the new EHR.

When hospitalized patients in the system fall, facility policies and procedures dictate steps that include subjecting patients to diagnostic imaging studies to determine the extent of any injuries that might have occurred as a result of the fall. Falls and falls with injury were documented in the hospital system's patient safety network (PSN) and included head trauma, internal bleeding and orthopedic fractures. PSN is an electronic, state, patient safety evaluation system (PSES) where patient safety and harm occurrences can be reported and evaluated. The Patient Safety and Quality Improvement Act provided a framework for hospitals to voluntarily report patient safety events to Patient Safety Organizations (PSOs) in a privileged and confidential manner (Federal Register, 2008). Each state has an established PSO for this purpose. This confidential patient safety work product framework provides the system with the ability to drill down to the root cause of the event that resulted in patient harm, without fear of discoverability, and promoting an honest analysis and plan for correction (Federal Register, 2008). The purpose of a PSO is to aggregate and analyze patient safety events (Federal Register, 2008).

The cost to diagnose and treat hospital acquired conditions is not reimbursed by third party payers (CMS, 2018). The hospital was absorbing the cost associated with patient falls. Using values extrapolated from Quigley et al., (2007) and Quigley and White (2013), a weighted, average cost to the system per patient, per fall was calculated to be at $61,55.53. This cost was projected, based on the system's 2016 patient fall data, to have an annual cost impact of $10,132,000.00. A modest 3% reduction in fall rates and fall with injury rates would decrease the annual cost of care for the system by $304,000.00.

The practice setting for the project is a large urban, academic, acute care, Magnet hospital system in the southwestern, United States. The system comprises six hospitals (an academic medical center and five community hospitals), an ambulatory surgery center, and three off-campus emergency centers. Five of the six hospitals in the system have achieved Magnet Recognition. The sixth hospital is on the journey to achieve Magnet Recognition. The system encompasses 3600 plus licensed beds with a network of over 20,000 health-care professionals and employees. The system is a nonprofit, faith-based health care organization, dedicated to excellence in research, education and patient care. The hospital system strives to bring compassion and spirituality to all its endeavors to help meet the health needs of the community. The flagship hospital has been named by U.S. News & World Report as one of the country's top 20 hospitals, ranking as the number one hospital in Texas for eight consecutive years (Comarow, 2018; Comarow & Harder, 2016). The organization has consistently been recognized by several national organizations as one of

the nation's best places to work. I had the privilege to do all my required practicum experience hours in the system's quality and patient safety department.

Role of the DNP Student

I am currently a full-time student in the DNP program at Walden University. I was a chief nursing officer (CNO) in for-profit and not-for-profit health care systems from 2002 to 2015. Prior to my CNO role, I had progressive leadership experience in critical care and emergency nursing. My CNO experience enabled me to see the big picture perspective on fall rates and fall with injury rates. As a CNO, I provided executive level leadership for fall prevention initiatives. Every health care system I was involved with experienced challenges in accurately identifying patients at risk for falling, and implementing evidence-based, patient-centered, targeted fall prevention interventions. I saw the variability in reporting fall rates and fall with injury rates.

I teach in an undergraduate nursing program. I am passionate about translating research into practice for nursing students. As a leader, it is my role to make sure EBPs are part of the curriculum. Patient safety is integrated throughout the curriculum and includes evaluating skills associated with accurately identifying patients at risk for falling. I also mentor them on the evidence-based, patient-centered, targeted approach to fall prevention interventions.

My preceptor was the system vice president of quality and patient safety. I came on board at the beginning of the HDS implementation project. I was able to observe the team and the project implementation from the outset. The framework for spread was the model used for the HDS fall risk assessment and fall prevention intervention project. The

framework for spread supports the six aims for improvement identified in the IOM (2001) report *Crossing the Quality Chasm: A New Health System for the 21st Century*.

In the IOM (2001) report, hospitals and health care professionals were encouraged to provide care that was safe, effective, patient-centered, timely, efficient, and equitable. The HDS fall reduction initiative was led by the system vice president of quality and patient safety. The CNOs at each community hospital were the executive sponsors at their individual hospitals. Day-to-day leaders and fall champions were identified at the system level and the hospital level. A project manager was assigned. This was an important role for the systems approach because it kept the team on task and on target. The multidisciplinary falls team developed an aim statement and worked with the project manager to develop the initial spread plan.

The spread plan addressed how to reach the stakeholders and engage them in the spread activities (IOM, 2001). The team agreed that a systems approach was necessary in order to standardize the implementation of the HDS fall risk assessment tool. The Magnet model was used as the change management framework for nursing. Even though the HDS was an evidence-based tool, the nurses' workflow had to be considered. This required the bedside nurse to be empowered and be part of the change process so that the new practice could be sustained (Grant et al., 2010). It must be noted that resistance of the nursing team members was encountered. There was a sense of urgency to implement the HDS tool because fall rates and fall with injury rates had increased. Empowered nurses and six disparate hospitals had not worked as a system prior to this project and didn't appreciate the inability to adapt the process. The system vice president of quality and patient safety

led the team through the growing pains associated with a systems approach to a standardized approach to process and outcome measurement.

I had worked with the system vice president of quality and patient safety in another health care system. She was the division vice president of quality and I was a hospital Chief Nursing Officer (CNO) at a for-profit health care system. We were able to work well together. My CNO roles, multiple EHR implementation experiences, and responsibilities for MU compliance helped me to understand the sense of urgency from the system executive leadership team; however, I was amazed to witness the lack of urgency demonstrated by some individual hospital leaders and fall prevention teams. I found myself aligning more with the model for Spread as compared to the Magnet model. A gap in expectations began to emerge and slowed progress during the first year. Use of the EHR HDS tool was successfully spread to all hospitals in the system; however, another gap emerged as fall rates and fall with injury rates did not immediately improve. Random interrater reliability (IRR) audits of the HDS tool at all hospitals was well below the threshold established for compliance.

Role of the Project Team

This was an observational quality improvement project. The team was being developed and I was allowed the opportunity to observe the process. I provided some of the literature review for the team; however, this was not a doctoral project team.

Summary

In section 2 of the Project I described the Magnet model and the framework for spread that was embedded and used as the framework for this project. Literature was

reviewed and synthesized. The relevance of fall rates and fall with injury rates was connected to nursing practice. Local background and context were explored. Finally, the role of the DNP student was described and gaps in practice identified.

In section 3, I will describe the process for the collection and analysis of evidence that was used to address the practice focused question. Sources of evidence include a systematic review of published outcomes, research, and organizational operational data. I will explain the evidence specific to the project. I will describe the analysis and synthesis of the data, which is the last step in Section 3.

Section 3: Collection and Analysis of Evidence

A Magnet Recognized academic hospital system experienced an increase in patient falls and patient falls with injury when they transitioned to a new EHR in 2016. The EHR implementation included an embedded, basic version of the Hester Davis Scale. The EHR that was replaced included a modified version of the Morse Fall Scale.

The purpose of this project was to evaluate the effectiveness of a system-wide quality improvement practice change. The aim of the practice change was to have a successful system-wide implementation of the EHR-validated HDS fall risk assessment and intervention tool kit that improved the nursing-sensitive outcomes of patient falls and patient falls with injury. This project contributed to the evidence supporting the effectiveness of Magnet model implementation of an evidence-based HDS assessment and intervention tool kit in the acute care setting.

When a Magnet Recognized academic hospital, system transitioned to a new EHR, they experienced an unintended consequence: an increase in patient fall rates and fall rates with injury. An analysis of the problem indicated a series of unfortunate events. The new EHR, implemented in May of 2016, had been developed and implemented without the input of the nursing leaders and nursing end users. Patients were being assessed for risk of falling with the HDS, which appeared in the new EHR with minimal nursing orientation. An independent list of fall prevention interventions had been migrated from the previous EHR. These interventions had been previously developed for use with the modified MFS score.

Fall rates and fall with injury rates have been identified by NQF (2018), AHRQ (2014), ANCC (2019a), The Joint Commission (2019), and others as priority patient safety goals. A key component of Magnet recognition is participation in a quality benchmarking system (Lake et al., 2010). The NDNQI (2010) identified fall rates and fall with injury rates as a nursing-sensitive indicator. The NDNQI is a national benchmarking database used by over 2,000 U.S. hospitals (Press Ganey, 2019). There are 492 Magnet Recognized hospitals, and 95% of these hospitals participate in the NDNQI database (ANCC, 2019b; Press Ganey, 2019). Magnet Recognized hospitals represent 23% of hospitals reporting to the NDNQI database.

The cost to diagnose and treat HACs is not reimbursed by third party payers (CMS, 2018). The hospital absorbs the cost associated with patient falls. Using values extrapolated from Quigley et al., (2007) and Quigley and White (2013), a weighted, average cost to the system per patient, per fall was calculated to be $6,155.53. This cost was projected based on the system's 2016 patient fall data to have an annual cost impact of $10,132,000.00.

The sources of evidence that supported the practice-focused questions were reviewed and synthesized. The system's existing fall rates and fall with injury rates, pre and post new EHR implementation, were examined to provide context for the current project. Section 3 provides descriptions of how the evidence was collected and analyzed.

Practice-Focused Questions

A Magnet Recognized academic hospital system experienced an increase in patient falls and patient falls with injury after transitioning to a new EHR in 2016. The

EHR implementation included an embedded basic version of the Hester Davis Scale. The EHR that was replaced included a modified version of the Morse Fall Scale.

The gap in practice addressed in this project originated from a rushed EHR implementation without adequate input from or training of nursing end users. The EHR building and implementation timeline from the informatics department did not include mapping to the Magnet model culture of the nursing department. This contributed to an increase in patient fall rates and fall with injury rates for the practicum site.

The short-term (1 year) system level practice question was the following: In a large, urban, academic, acute care, Magnet Recognized hospital system in the southwestern United States, will the Magnet model of implementation of an evidence based HDS yield interrater reliability results of .85 or better (Cohen's kappa)? The long-term, comprehensive, system-level practice question was the following: In a large, urban, academic, acute care, Magnet Recognized hospital system in the southwestern, United States, will a Magnet model of implementation of a standardized, system-wide, evidence-based HDS fall risk assessment and intervention tool impact patient fall rates and fall rates with injury, as measured 12-18 months post-implementation, when compared to the pre HDS implementation? The gap in practice addressed in this project was a description of how the practicum site implemented a project to improve patient safety associated with fall rates and fall with injury rates. This project also addressed how patient safety gaps that emerged with an urgent implementation of the EHR HDS were addressed and corrected.

Alignment of the gap in practice with the short-term, practice-level question was designed to demonstrate competency of the nursing staff using the HDS. This was assessed using interrater reliability audits with the goal to achieve an HDS interrater reliability of .85 as measured by Cohen's kappa. Alignment of the gap in practice with the long-term, practice-level question was assessed by accurate use of the Hester Davis (HD) Falls Program by nursing. Outcome measures used to assess the effectiveness of the HD Falls Program were a monthly analysis of fall rates and fall with injury rates through 28 months post implementation.

Operational Definition: Hester Davis Falls Program

The HD Falls Program is marketed by HD Nursing (2018) as a total falls management solution. The HD Falls Program is a proprietary, evidence-based program that comprises three components used together to predict patients at risk of falls with the use of the HDS, to prevent falls with the use of a targeted care plan, and to sustain fall prevention efforts with the HD Falls Tool Kit (HD Nursing, 2018; Hester & Davis, 2013). The HD Falls Program is a comprehensive training tool for nursing that includes competencies, audits, and compliance tools (HD Nursing, 2018).

The HDS was validated as a cohort study for fall risk assessment in an acute care setting (Hester & Davis, 2013). A sensitivity of 90.9% and a specificity of 47.1% was demonstrated (Hester & Davis, 2013). The HDS instrument's goal was to accurately identify the correct patients at risk for falling and to tell why these patients were at risk (Hester & Davis, 2013). The HDS was developed and tested in the EHR environment (Hester & Davis, 2013). No one specific fall risk assessment tool has been supported as a

recommended practice (Aranda-Gallardo et al., 2013; Avancecean et al., 2017; Cameron et al., 2018; Joanna Briggs Institute, 2016; Lizarondo 2017, 2018; Matarese, Ivziku, Bartolozzi, Piredda, & Grazia De Marinis, 2014; Oliver et al., 2010; Spoelsta, 2011). The recommended practice is to use a validated tool designed to enhance the workflow of nurses and support patient safety practices and outcomes (Hester & Davis, 2013; Joanna Briggs Institute, 2016). The HDS has been validated in today's health care environment utilizing the EHR.

The HD Falls Program is a comprehensive approach that includes a tool to accurately identify patients at risk and to plan and implement multi-factorial targeted interventions to prevent patients from falling (HD Nursing, 2018). The HDS considered and weighted multiple indicators that placed the patient at risk of falling. The nine factors included two single categorical variables of patient age and date of last known fall (Hester & Davis, 2013). The seven multiple indicators included patient "mobility, medications, mental status, toileting needs, volume and/or electrolyte status, communication and/or sensory status, and behavior" (Hester & Davis, 2013. p. 301). The patient was assessed using the HDS upon admission, every shift, upon transfer to a different level of care, or upon any change in the patient condition (Hester & Davis, 2013). The importance of the HDS in today's health care environment is its demonstrated ability to accurately identify patients at risk for falling so that evidence-based practices can be focused on those patients who will benefit from targeted, multifactorial interventions. Nurses can streamline their resource utilization to the patients who are at risk and in need of those resources (Hester & Davis, 2013).

Operational Definition: Outcomes

An outcome is defined in the Magnet dictionary as quantitative or qualitative evidence, either structure or process related, that results in patient, nursing personnel, organizational, or consumer improvement (ANCC, 2019a; Grant et al., 2010). Magnet Recognition is a term used to measure a hospital's compliance to standards of nursing excellence designed to improve safety and quality of patient care and the nursing work environment (Lake et al., 2010). Patient-centered, or targeted, fall interventions are directed toward an individual patient's assessed risk for falls and include the following:

- Age,
- History of recent falls,
- Age greater than 65,
- Orthostatic hypotension,
- Communication tools to alert staff,
- Person-centered education,
- Physical therapy,
- Medication assessment and adjustment,
- Corrective lenses if vision impaired,
- Assessment for signs of infections,
- Assessment for ambulatory assistance needs,
- Assessment of toileting assistance related to urinary incontinence and frequency and frequency of bowel movements,
- Assessment of cognitive and behavioral issues; and

- Assessment of fluid and electrolyte imbalances. (Ambutas et al., 2017; Avancecean et al., 2017; Cameron et al., 2018; Hester & Davis, 2013; Kobayashi et al., 2017; Lizarondo, 2018; Quigley, Barnett, & Friedman, 2016; Titler, 2015; Williams, Szekendi, & Thomas, 2014).

Operational Definition: Quality of Care

Lohr and Schroeder (1990) described the IOM's definition of quality of care as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (p. 707). This definition was reiterated by the IOM (2009) and remains relevant for 21st century health care.

Operational Definition: Nursing-sensitive Indicator

Nursing-sensitive indicators reflect the structure, process, and outcomes of nursing care (ANA, 2010; Montalvo, 2007; NDNQI, 2010). Structure measures in the NDNQI model reflect the supply, skill level, and education of nursing staff (ANA, 2010; Montalvo, 2007; NDNQI 2010). Process measures reflect the methods for risk assessment and interventions (ANA, 2010; Montalvo, 2007; NDNQI 2010). An outcomes assumption is that quality of care (patient outcomes) improve if there are evidence-based nurse-staff ratios that would result in greater quality of nursing care (ANA, 2010; Montalvo, 2007; NDNQI 2010). Outcome measures are data presented to demonstrate improvement and are defined by the organization (Joint Commission, 2019; Quigley et al., 2007; Quigley & White, 2013). Both patient falls and patient falls with injury reflect process and outcome measures.

Operational Definition: Benchmarks of Care

Benchmarks of care reflect a standard by which others can be measured. Benchmarks of care must be achievable, and data driven and must reflect process of care indicators (Kiefe et al., 1988). Kiefe et al. (1998) described how benchmarks should represent levels of excellence that recognize high performing organizations. The Magnet model serves as the framework for high performing organizations.

Operational Definition: Fall Rate Calculations

Falls are calculated at the unit level, taking into consideration the patient days for each unit. Patient days (or patient bed days) are defined as a health care accounting unit of measure and reflect the number of days a patient is hospitalized on a given unit (Ganz et al., 2013; Lake et al., 2010). The data definition further described by Lake et al. (2010) indicated that a patient day reflects a 24-hour period starting with the day of admission. The day of discharge is excluded.

Fall rate calculations and fall rate with injury calculations are standardized throughout the literature. Fall rates are calculated as follows: number of patient falls (including repeat fallers) divided by the number of patient days multiplied times 1,000. Fall rates are reported as falls per 1000 patient days (Ganz et al., 2013; Quigley et al., 2007; Quigley & White, 2013). Fall rates with injury are calculated by including falls that have been classified as producing a major or minor injury divided by number of patient falls multiplied by 100. Fall rates with injury are reported as injuries per 100 patient falls (Ganz et al., 2013; Quigley et al., 2007; Quigley & White, 2013). The falls with injury

calculation of minor and major classifications also include the NDNQI categories of minor, moderate, major, and death (NDNQI, 2010).

Operational Definition: Fall Injury Categories

NDNQI (2010) provided categories of falls with injury definitions that are used in all Magnet Recognized facilities:

> None – patient had no injuries (no signs or symptoms) resulting from the fall, if an x-ray, CT scan or other post fall evaluation results in a finding of no injury.
>
> Minor – resulted in application of a dressing, ice, cleaning of a wound, limb elevation, topical medication, pain, bruise or abrasion.
>
> Moderate – resulted in suturing, application of steri-strips/skin glue, splinting or muscle/joint strain.
>
> Major – resulted in surgery, casting, traction, required consultation for neurological (basilar skull fracture, small subdural hematoma) or internal injury (rib fracture, small liver laceration) or patients with coagulopathy who receive blood products as a result of a fall.
>
> Death – the patient died as a result of injuries sustained from the fall (not from the physiologic events causing the fall). (Garrard et al., 2016. p. 117)

Operational Definition: Universal Fall Precautions

In the acute care setting, universal fall precautions are always applicable to all patients, are typically environmental in nature, and are independent of the patient's risk for falls (Ganz, et al., 2013). AHRQ commissioned the development of a fall prevention

tool kit. In it, universal fall precautions are described as the foundation of patient safety and include, but are not limited to, the following:

- Familiarize the patient with the environment.
- Have the patient demonstrate call light use.
- Maintain call light within reach.
- Keep the patient's personal possessions within patient safe reach.
- Have sturdy handrails in patient bathrooms, room, and hallway.
- Place the hospital bed in low position when a patient is resting in bed, raise bed to a comfortable height when the patient is transferring out of bed.
- Keep hospital bed brakes locked.
- Keep wheelchair wheel locks in 'locked' position when stationary.
- Keep nonslip, comfortable, well-fitting footwear on the patient.
- Use night lights or supplemental lighting.
- Keep floor surfaces clean and dry. Clean up all spills properly.
- Keep patient care areas uncluttered.
- Follow safe patient handling practices. (Ganz et al., 2013. p. 30-31).

Operational Definition: Standard Fall Precautions

Standard fall precautions are the outcome of the patient's standardized falls risk assessment (Ganz et al., 2013). In the acute care setting, all patients have universal fall precautions applied, but a risk specific tool is necessary to identify patients at a higher risk of falling (Ganz et al., 2013). Risk factor assessment is a continuous process, the

results of which drive the development of the nursing care plan (Ganz et al., 2013). Key risk factors which should be included in all risk assessment tools include:

- A patient history of falling
- The presence of mobility problems and the use of assistive devices
- Use of medications that produce sedation or contribute to confusion and orthostatic blood pressure changes
- The presence of cognition issues, including dementia, confusion, delirium and psychosis
- The presence of urinary or stool incontinence issues
- An others category that includes the presence of being tethered to equipment, and vision impairment (Ganz et al., 2013).

Operational Definition: Targeted Fall Precaution Interventions

Merriam-Webster's (2019) medical definition of a target is an action or development that produces a specific (targeted) outcome; as a transitive verb, target is an action used to achieve a goal. Targeted fall prevention interventions are therefore defined as those interventions designed to prevent patient falls in patients truly at risk of falling, based on the outcome of a valid and reliable fall risk assessment tool; multifactorial fall prevention interventions should then be targeted to the specific areas that identified the patient at risk of falling, i.e. mobility, toileting, or cognitive issues (Ambutas et al., 2017; Carroll, Dykes, & Hurley, 2012; Hester & Davis, 2013; Hester, Tsai, Rettiganti, & Mitchell, 2016; Joanna Briggs Institute, 2016; Lizarondo, 2018; Oliver & Haines, 2010; Quigley & White, 2013; and Titler, et al., 2015).

Targeted fall precaution interventions are only as effective as the tool being used to measure a patient's fall risk. My literature review included individual studies, systematic reviews, The Joanna Briggs Institute (JBI) of EBP and Practice Recommendations, and the Cochrane Database of Systematic Reviews; these reviews demonstrated a variety of tools being used to assess patients' risk of falling. Tools included were the Morse Fall Scale (MFS), Schmid Fall Scale, Conley Fall Scale, Hendrich II Fall Risk Model Scale (HII-FRM), Saint Thomas Risk Assessment Tool in Falling Elderly Inpatients (STRATIFY), and hospital developed fall risk assessment scales. The HII-FRM, Conley Scale, and STRATIFY were the only published tools that had been psychometrically tested in the elder population, and no one tool demonstrated acceptable sensitivity or specificity values (Lizarondo, 2017).

Fall risk assessment scales in the literature did not account for patient specific risk factors (Avanecean et al., 2017). EBP recommendations did not include a specific tool for use as a fall risk assessment because of variable predictive values and low-quality evidence to support their use (Aranda-Gallardo, 2013; Hempel, 2013; Hester et al., 2016; Joanna Briggs Institute, 2016; Lizarondo, 2017; Matarese et al., 2014; Oliver et al., 2010; & Williams, Szekendi, & Thomas, 2014). More than 50 percent of the studies used fall risk assessment tools with unknown psychometric values (Hempel et al., 2013). Fall prediction tools should fit the purpose for which they are intended (Hester & Davis, 2013; Oliver et al., 2010). For example, in a specific population, does the fall prediction tool discriminate between those patients who are potential fallers and those who are not?

If patient specific risk factors are not identified, patient-centered, multifactorial, fall prevention interventions cannot be developed and implemented.

Sources of Evidence

Fall rates and injury from fall rates are defined as a nursing-sensitive indicator by the National Database of Nursing Quality Indicators (NDNQI) and are endorsed by the National Quality Forum (NQF) (NQF, 2018; NQF,2013; Lake, et al., 2010; ANCC, 2019a; Montalvo, 2007). Fall rates and injury from fall rates are quality outcome measures used for Magnet Recognition (ANCC, 2019a; Everhart et al., 2014; Grant et al., 2010; Lake et al., 2010; Petit dit Dariel & Regnaux, 2015).

While there are multiple sources of evidence to support my practice focused questions, the primary source of evidence I used was the NDNQI database. This is a benchmarking database and is supported by the NQF, the Agency for Healthcare Research and Quality (AHRQ), and the Magnet Recognition program (Garrard et al., 2016; Montalvo, 2007; & ANCC, 2019a). The aim of the practice change being evaluated was to have a successful system-wide implementation of an EHR validated, HDS fall risk assessment and intervention tool, that would improve the nurse sensitive outcomes of patient falls and patient falls with injury.

The NDNQI provided data definitions and both internal and external comparisons for benchmarking outcomes (Quigley & White, 2013). The system's internal fall rates and injury from fall rates were intended to be benchmarked against similar-sized units and facilities in the databases that included the number of beds in an organization, academic status, and Magnet status. (Quigley & White, 2013); however, it was

demonstrated that national benchmarks at the systems level were not available (AHRQ, 2013). The lack of national, system level benchmarks was due to the variability of the data across hospitals, making comparisons inaccurate (AHRQ, 2013). The NDNQI database provided unit level benchmarks. The intended relationship of NDNQI and AHRQ to the purpose of my proposed project was to provide the evidence and benchmark data used to evaluate the effectiveness of a Magnet model implementation of an evidence-based, HDS assessment and intervention tool, in the acute care setting, on the reduction of fall rates and fall with injury rates.

Baseline total falls and total fall with injuries were obtained from the system's Patient Safety Network (PSN) for the calendar year 2016; however, this was raw data that represented the number of falls and falls with injuries per month. Patient days associated with the monthly number of falls for the system was unavailable, and therefore, could not be converted to fall rates and fall with injury rates. These factors resulted in the inability to compare pre and post fall rates and fall with injury rates. Aggregate, hospital, and unit level data were available. For the purpose of my project, aggregate, or systems level, data were used. The time frame represented the new EHR migration and the implementation and post-implementation phases of the HD Falls Prevention Program. The new EHR migration and HD Falls Prevention Program was phased in over the calendar year 2017. Fall rates and fall with injury rates for calendar year 2018 and the first four months of 2019 were used to measure the effectiveness of the HD Falls Prevention Program on fall rates and fall with injury rates.

A u-chart control chart was intended to be used to analyze the total number of falls, which would represent non-unique events, such as multiple falls for one patient; this would then be plotted as a ratio on the u-chart (Joshi Ransom, Nash, & Ransom, 2014). A control chart analysis required data to be plotted as a numerator and a denominator. The numerator, represented by the total number of falls and falls with injury per month, was available. The denominator, represented by the number of patient days per month was not available; therefore, a control chart analysis was not possible.

A comparison chart analysis was also intended to be utilized to evaluate the system's fall rate performance against other organizations' data (Joshi et al., 2014). Fall rate benchmark data was only available at the unit level from the NDNQI database; therefore, the use of a comparison chart was not possible. The NDNQI did provide data definitions and both internal and external comparisons for benchmarking outcomes at the unit level (Quigley et al., 2007; and Quigley & White, 2013). The system's internal fall rates and injury from fall rates at the unit level could have been benchmarked against similar-sized units and facilities in the databases that include the number of beds in an organization, academic status, and Magnet status. (Quigley & White, 2013).

The use of the control chart and the comparison chart to analyze the system's data would have provided powerful approaches to data synthesis to determine if the processes were better or worse than national benchmarks, stable and in statistical control (Joshi et al., 2014). Because these methods did not yield a process for data interpretation for my project, the literature was reviewed for additional methods for data interpretation. A run

chart approach to process improvement was determined to be the best method to assess the effectiveness of the HD Falls Prevention Program over time.

The run chart is an important tool for assessing the effectiveness of a quality improvement change (IHI, 2019a). Improvement takes time, and a run chart graphs the improvement process providing a method to analyze whether the improvement has been hard-wired into the organization (IHI, 2019a). The benefits of using a run chart included:

- depicting how well (or poorly) a process is performing,
- determining when changes are truly improvements by displaying a pattern of data that you can observe as you make changes, and
- Giving direction as you work on improvement and information about the value of particular changes (IHI, 2019a, p. 1).

A run chart provided a method to determine the effectiveness of the quality improvement process over time. When testing a change on a run chart, the baseline is plotted, the median is extended to begin the test of change, and data is continuously plotted (IHI, 2019b). Once data has been plotted over time, run chart rules are applied. Run chart rules included operational data definitions.

- Run - “a sequence of consecutive points which all lie on the same side of the line (median)” (IHI, 2019b, p. 2). Points that fall on the line are ignored.
- Shifts – represent a signal of non-random patterns that is defined as “6 or more consecutive points either all above or all below the median” (IHI, 2019b, p. 2).

- Trends – represent a signal of non-random patterns defined as "5 or more consecutive points all going up or all going down" (IHI, 2019b, p. 2).

Runs can be further defined as having too many or too few runs (IHI 2019b). Perla, Provost, & Murray, (2011) described how non-randomized patterns of runs can be analyzed when they cross the median line too few times or too many times. If chance is influencing a process improvement's performance over time, then there should be regular intervals where the data points cross the median (Perla et al., 2011). Data points that fall on the median confound the process to determine which run the data point belongs (Perla et al., 2011). Perla et al., (2011) published a table of critical values that can be used to determine if the number of runs is too few or too many. The table "is based on a 5% risk of failing the run test for random patterns of data" (Perla et al., 2011, p. 49). Ten data points are required before shift and run rules can be applied (Perla et al., 2011). The recommended method to count the number of runs is "to count the number of times the line connecting the data points crosses the median and add one" (Perla et al., 2011, p. 48).

Archival and Operational Data

Falls and falls with injury rates were documented in the hospital system's Patient Safety Network (PSN). Falls with injury included head trauma, internal bleeding and orthopedic fractures. PSN is a state system electronic patient safety evaluation system (PSES) where patient safety and harm occurrences can be reported and evaluated. The Patient Safety and Quality Improvement Act provided a framework for hospitals to voluntarily report patient safety events to Patient Safety Organizations (PSOs) in a privileged and confidential manner (Federal Register, 2008). Each state has an

established PSO for this purpose. This confidential patient safety work product framework provides the system with the ability to drill down to the root cause of the event that resulted in patient harm, without fear of discoverability, and promoting an honest analysis and plan for correction. The purpose of a PSO is to aggregate and analyze patient safety events (Federal Register, 2008).

Each hospital within the system documented falls and falls with injury at the unit level. This data is rolled up to the system level. Falls and falls with injury were documented as a patient occurrence/incidence report. Events are documented and analyzed within the PSN. Fall rate data and fall with injury rate data were rolled up and analyzed at the hospital and system levels. These data were aggregated and reported monthly at the System Falls Prevention Committee. The purpose of this meeting was to provide a forum for the fall prevention champions from each hospital to share best practices, lessons learned, and coordinate strategy development. The System Falls Prevention Committee had representatives from each hospital within the system. Fall champions were responsible for taking the fall rate and fall with injury rate data back to the individual hospitals and departments participating in the NDNQI database. Each hospital had an NDNQI lead who was responsible for validating and uploading the data into the NDNQI database. The fall rate and fall rate with injury data that was uploaded into the NDNQI database was the data used to measure improvement for my Project.

The system quality and patient safety department was led by the vice president of quality and patient safety. Within that department are multiple support personnel

including project managers. The system director of patient safety was the designated team leader.

Limitations inherent in the data included the process of reporting falls and falls with injury within the system. Falls should be reported at the unit level and documented in the PSN. Not all falls were reported in the system. Education should occur with the bedside caregivers on the data definitions for falls and should also promote a non-punitive culture of patient safety. A just culture promotes a balance between not blaming an individual nurse or other caregiver, and not tolerating behaviors that do not promote patient safety; this just culture focuses on wrong processes and not on people who may have caused the problem (Joanna Briggs Institute, 2016; Miake-Lye, Hemple, Ganz, & Shekelle, 2013; & Quigley & White, 2013). The NDNQI data definitions evolved because of the variability in fall definitions as perceived by bedside nurses (Garrard, 2016 & Montalvo, 2007).

Access to de-identified data was provided by the System Director of Patient Safety. The data was accessible through reports from the system's NDNQI database. The analyzed data was reported monthly and quarterly to various committees and system leadership, including the governing body. Permission to use this data was provided by the system director of patient safety.

Analysis and Synthesis

The short-term (one year) system level practice question follows: In a large, urban, academic, acute care, Magnet Recognized hospital system in the southwestern United States, will the Magnet model of implementation of an evidence based HDS yield

interrater reliability results of .85 or better (Cohen's kappa)? The HD Falls Program provided standardized processes to analyze falls and falls with injury. A nursing post-fall algorithm tool standardized the clinical assessment of patients post fall; the purpose of the tool was to prevent treatment delays for fall related injuries (HD Nursing, 2018). After the patient was assessed for injury, all patient fall events were to be reported in the PSN. A post-fall huddle form was provided to standardize the evaluation process for all fall events. This tool was useful to communicate process failures to the staff nurse and promote a just culture (HD Nursing, 2018). An audit tool was provided to identify areas where compliance could be improved. The HD Falls Program is evidence driven, and program compliance directly impacts patient outcomes (HD Nursing, 2018). In order to be able to prospectively compare, or perform meta-analyses of any tool, the tool must be adopted, not adapted (Hester et al., 2016).

After nursing education was provided prior to going live with the HD Falls Program, it was important to measure the accuracy of the nurses' fall risk assessments using the HDS. An audit tool was provided by HD Nursing. Interrater reliability (IRR) was measured using Cohen's kappa. Auditing continued until Cohen's kappa of .85 was achieved. This was affected by fall champions providing immediate feedback and/or education to the nurse being audited, in a non-punitive manner. In the post-implementation phase of the HD Falls Program, IRR was performed on reported patient falls with injury. On patients who fell and sustained an injury, Cohen's kappa was 0.35. The tool needed to be used as intended in order to effectively improve patient outcomes based on the use of the tool.

The long-term, comprehensive, system level practice question follows: In a large, urban, academic, acute care, Magnet Recognized hospital system in the southwestern, United States, will a Magnet model of implementation of a standardized, system-wide, evidence-based HDS fall risk assessment and intervention tool impact patient fall rates and fall rates with injury, measured 12-18 months post-implementation when compared to the pre HDS implementation?

The PSN network is the system that was used for recording, tracking, and organizing the evidence (Federal Register, 2008). It was intended for the data to be analyzed using control charts and run charts. Run charts display plotted data visually, over defined periods of time (Joshi et al., 2014; Quigley et al., 2007; and Quigley &White, 2013). A method to analyze the data is the control chart. Control charts are used to assess the amount of variation within a specific range of measures (Joshi et al., 2014; Quigley et al., 2007; and Quigley &White, 2013). The standard deviation is reflected in upper control limits (UCLs) and lower control limits (LCLs); UCLs and LCLs represent a threshold that brackets approximately 99% of the normal variation reflected in the data (Joshi et al., 2014; Quigley et al, 2007; and Quigley &White, 2013). A center line represents the mean of the data; plotting the data presents a visual cue relating how the data is mapped to processes and outcomes related to fall rate measurements (Joshi et al., 2014; Quigley et al., 2007; and Quigley &White, 2013). Data points outside the UCLs and LCLs represent significant variations in outcomes (Joshi et al., 2014; Quigley et al., 2007; and Quigley &White, 2013). The use of the control chart required the denominator data of patient days. These data were not available to me; therefore, a control chart was

not used. The run chart was used to graph the impact of the process improvement over time. No other statistical analysis used for the purpose of my project. The goal of the project was to determine if fall rates improved over time after implementation of the HD Falls program.

Summary

In section 3, I reviewed and synthesized the sources of evidence that supported the practice focused question. I proposed that the system's fall rate and fall with injury rates, pre and post EHR implementation, be examined for the sole purpose of providing context for the project. In section 3, I also provided descriptions of how the evidence was collected and analyzed.

In section 4, I will report the analysis and synthesis of the findings. Nursing implications for future practice and research will be discussed. Recommendations for positive social change and narrowing gaps in practice will be provided.

Section 4: Findings and Recommendations

A Magnet Recognized academic hospital system experienced an increase in patient falls and patient falls with injury when they transitioned to a new EHR in 2016. The EHR implementation included an embedded, basic version of the Hester Davis Scale (HDS). The EHR that was replaced included a modified version of the Morse Fall Scale. A gap in practice appeared when the HDS went live with little notice and training with the new EHR implementation in May of 2016.

The HDS was built into the EHR by informatics personnel who did not have a clear picture of how the tool would be implemented at the bedside. The basic version of the HDS embedded in the new EHR did not provide guidelines for fall risk interventions. Decision-making for purchase of the basic HDS scale versus the option to the purchase the HDS package that included an evidence-based, targeted, fall risk prevention tool kit did not include nursing leadership and nursing end users. To complicate the issue, informatics personnel migrated the intervention list from the previous EHR, which was the modified Morse Fall Scale (MFS) interventions. Another gap in practice occurred when the fall risk assessment tool did not map to the fall risk prevention interventions.

Additionally, the electronic measurement (e-measurement) defined by Dykes and Collins (2013) as a "secondary use of electronic data to populate standardized performance measures" (p. 2) of the HDS score did not populate into a nursing dashboard in meaningful way. The MFS interventions appeared in a drop-down menu in the EHR, and nurses selected the entire list. Patients were assessed for risk of falling with the HDS and interventions deployed from an independent list of interventions that had been

migrated from the previous EHR. Fall rates and fall rates with injury increased in May of 2016, coinciding with the implementation of the new EHR.

Sources of Evidence

Fall rates and injury from fall rates were defined as a nursing-sensitive indicator by the NDNQI and are endorsed by the National Quality Forum (ANCC, 2019a; Lake et al., 2010; Montalvo, 2007; NQF, 2013, 2018). Fall rates and injury from fall rates are quality outcome measures used for Magnet Recognition (ANCC, 2019a; Everhart et al., 2014; Grant et al., 2010; Lake et al., 2010; Petit dit Dariel & Regnaux, 2015).

Although there are multiple sources of evidence to support my practice-focused questions, the primary source of evidence I used was the NDNQI database. This is a benchmarking database and is supported by the NQF, the AHRQ, and the Magnet Recognition program (ANCC, 2019a; Garrard et al., 2016; Montalvo, 2007). The aim of the practice change being evaluated was to have a successful system-wide implementation of an EHR-validated HDS fall risk assessment and intervention tool that would improve the nursing-sensitive outcomes of patient falls and patient falls with injury.

The NDNQI provided data definitions and both internal and external comparisons for benchmarking outcomes (Quigley & White, 2013). The system's internal fall rates and injury from fall rates were intended to be benchmarked against similar-size units and facilities in the databases that included the number of beds in an organization, academic status, and Magnet status (Quigley & White, 2013); however, national benchmarks at the systems level were not available (AHRQ, 2013). The lack of national, system-level

benchmarks was due to the variability of the data across hospitals, making comparisons inaccurate (AHRQ, 2013). The NDNQI database provided unit-level benchmarks. The relationship of NDNQI and AHRQ to the purpose of my project was to provide the evidence and benchmark data used to evaluate the effectiveness of a Magnet model implementation of an evidence-based, HDS assessment and intervention tool in the acute care setting on the reduction of fall rates and fall with injury rates.

Baseline total falls and total fall with injuries were obtained from the system's Patient Safety Network (PSN) for the calendar year 2016; however, these were raw data that represented the number of falls and falls with injuries per month. Patient days associated with the monthly number of falls for the system were unavailable and therefore could not be converted to fall rates and fall with injury rates. These factors resulted in the inability to compare pre and post fall rates and fall with injury rates. Aggregate, hospital, and unit-level data were available. For the purpose of my project, aggregate, or systems-level, data were used. The time frame represented the new EHR migration and the implementation and postimplementation phases of the HD Falls Prevention Program. The new EHR migration and HD Falls Prevention Program was phased in over the calendar year 2017. Fall rates and fall with injury rates for calendar year 2018 and the first 4 months of 2019 were used to measure the effectiveness of the HD Falls Prevention Program on fall rates and fall with injury rates. A run chart approach to process improvement was determined to be the best method to assess the effectiveness of the HD Falls Prevention Program over time.

The run chart is an important tool for assessing the effectiveness of a quality improvement change (IHI, 2019a). Improvement takes time, and a run chart is used to graph the improvement process, providing a method to analyze whether the improvement has been hard-wired into the organization (IHI, 2019a). The benefits of using a run chart included the following:

- depicting how well (or poorly) a process is performing,
- determining when changes are truly improvements by displaying a pattern of data that you can observe as you make changes, and
- giving direction as you work on improvement and information about the value of particular changes (IHI, 2019a, p. 1).

A run chart provided a method to distinguish between common cause variation, "the natural or expected variation inherent in a process" (IHI, 2017, p. 1), and special cause variation or "specific circumstances that are not inherent in the process (IHI, 2017, p. 1).

When change is tested on a run chart, the baseline is plotted, the median is extended to begin the test of change, and data are continuously plotted (IHI, 2019b). Once data have been plotted over time, run chart rules are applied. A run is defined as "a sequence of consecutive points which all lie on the same side of the line (median)" (IHI, 2019b, p. 2). Points that fall on the line are ignored. Signals of nonrandom patterns include shifts and trends.

Runs can be further defined as having too many or too few runs (IHI, 2019b). Perla et al. (2011) described how nonrandomized patterns of runs can be analyzed when they cross the median line too few or too many times. If chance is influencing a process

improvement's performance over time, then there should be regular intervals where the data points cross the median (Perla et al., 2011). Data points that fall on the median confound the process to determine which run the data point belongs to (Perla et al., 2011). Perla et al. published a table of critical values that can be used to determine whether the number of runs is too few or too many. The table "is based on a 5% risk of failing the run test for random patterns of data" (Perla et al., 2011, p. 49). Ten data points are required before shift and run rules can be applied (Perla et al., 2011). The recommended method to count the number of runs is "to count the number of times the line connecting the data points crosses the median and add one" (Perla et al., 2011, p. 48).

Findings and Implications

System level fall rates and fall with injury rates data were obtained from the system's NDNQI rollup of unit-level data. The fall rate data were reported as the fall rate per 1,000 patient days. The fall with injury rate data were reported as the fall with injury rate per 100 patient days. Fall rate data and fall with injury rate data were plotted on separate run charts, and similar data were compared. Interrater reliability measurement for the agreement of the HDS was obtained from a small sample of fall with injury data. Cohen's kappa was calculated from the available sample.

Analysis and Synthesis of System Fall Rates

System fall rates per 1,000 patient days data were available from January 2017 through April 2019. This timeline represented the postimplementation phase of the HDS Fall Prevention Program. Twenty-eight data points were plotted on the run chart. An early trend was identified with five consecutive data points all going down from March

2017 to August 2017. The trend was not sustained and did not develop into a shift or a signal in the quality improvement process. A second trend was demonstrated beginning in August 2018. This trend was sustained and developed into a shift of the data. A shift in the process improvement was demonstrated beginning in August 2018. This shift and trend in the data was sustained through reported data from April 2019.

August 2018 also represented a signal on the run chart that demonstrated the beginning of a nonrandom pattern of process improvement that was sustained through April 2019. According to the third rule of runs, a nonrandom pattern in the quality improvement process was signaled (see Perla et al., 2011). Applying the tabled critical values supplied by Perla et al. (2011) for the 26 total data points that did not fall on the median, I observed that the 7 demonstrated too few runs and represented a nonrandom process. This was interpreted based on the run analysis, which meant that the quality improvement process of the HD Fall Prevention Program intervention had been effective in keeping the data from climbing back above the median (see Figure 1).

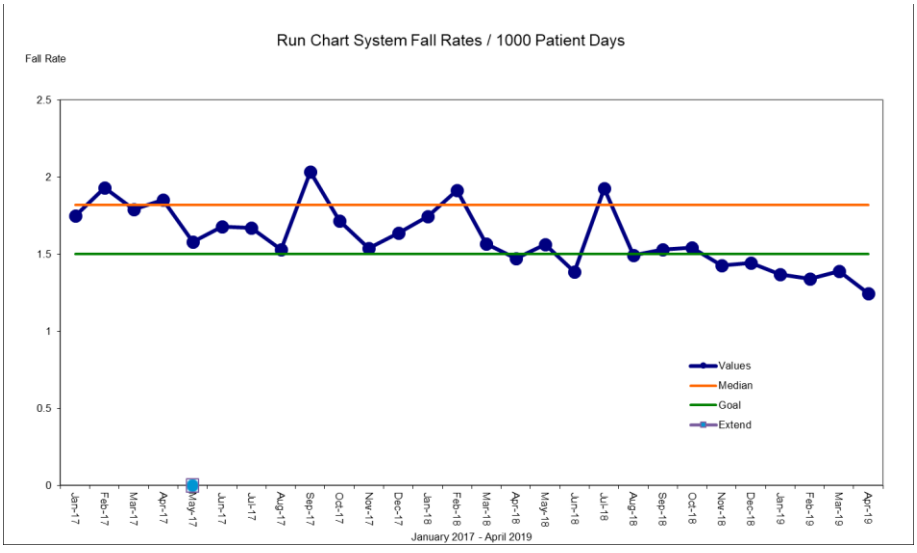

Figure 1. Run chart with 28 data points representing monthly fall rates per 1000 patient days from January 2017 to April 2019. Run chart produced from the IHI run chart tool Excel template (IHI, 2019b).

Analysis and Synthesis of System Fall With Injury Rates.

System fall with injury rates per 100 patient days data were available from January 2017 through April 2019. This timeline represented the postimplementation phase of the HDS Fall Prevention Program. Twenty-eight data points were plotted on the run chart. An early trend of 5 consecutive points all going down was identified in the fall with injury rates run chart. This trend paralleled the trend identified in Figure 1. This trend materialized in February 2017 and was sustained through June 2017. A second trend was demonstrated in March of 2018, also paralleling the trend identified in Figure 1. Although this trend started with 5 consecutive data points, it was not sustained. The downward shift demonstrated in March 2018 did demonstrate a signal and a shift of 13 data points. Applying the tabled critical values supplied by Perla et al. (2011) for the 26 total data points that did not fall on the median, I observed that the 7 demonstrated too few runs and represented a nonrandom process. This was interpreted based on the run analysis, which meant that the quality improvement process of the HD Fall Prevention Program intervention had been effective in keeping the data from climbing back above the median (see Figure 2).

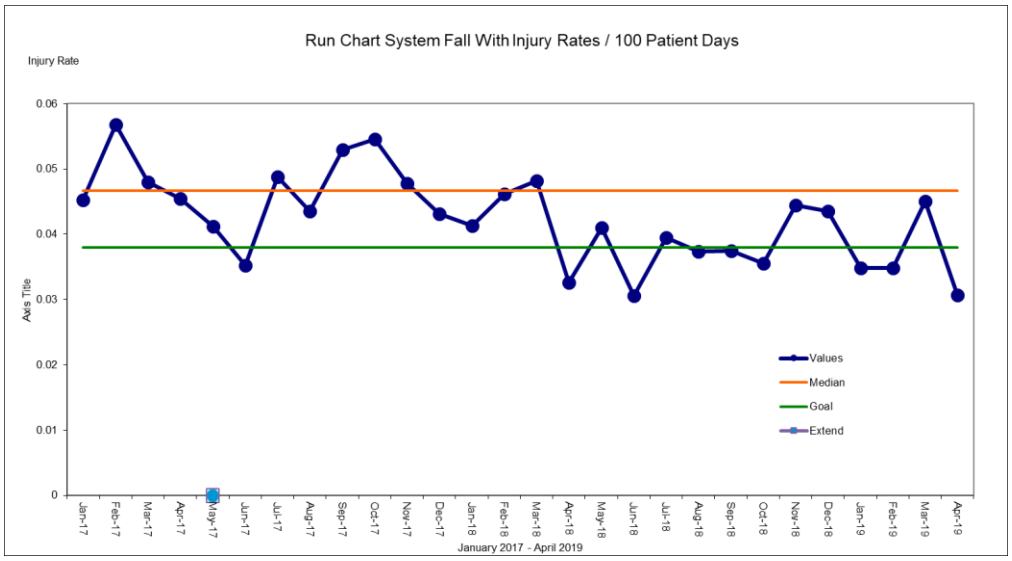

Figure 2. Run chart with 28 data points representing monthly fall with injury rates per 100 patient days from January 2017 to April 2019. Run chart produced from the IHI run chart tool Excel template (IHI, 2019b).

Analysis and Synthesis of Interrater Reliability of the HDS.

Limited data were available for this analysis. Interrater reliability (IRR) was performed as part of the root cause analyses for two patients who fell and sustained serious injuries in 2019. IRR was not being reported consistently during the postimplementation phase of the HD Falls Prevention Program. Cohen's kappa for these two IRR analyses was calculated at 0.31, which is considered only fair agreement (see Salkind, 2016). The IRR coefficient of .67 did not represent a strong level of agreement.

I concluded that the HDS scale was not properly assessed by the nurses caring for these two patients and that the patients were not identified as a high risk of falling. The root cause analyses indicated that in both instances, the nurses caring for the two patients underscored the HDS fall risk assessment. As a result, the patients were not placed on the appropriate fall risk prevention. As assumption can be made that patients who do not fall

have an appropriate HDS fall risk assessment, are placed in the appropriate fall risk category, and have appropriate fall risk preventions in place. More IRR data are needed.

Limitations

Run charts for data analysis are useful to identify early signals of process improvement or decline over time (Perla et al., 2011). The run chart analysis does not provide information on the stability of the process. This would require the use of a control chart. The data needed for control chart analysis were incomplete, and I decided to forego the control chart analysis for this project. An unanticipated finding was the inability to obtain the patient days data for each month that falls data were available. This prohibited the control chart analyses and ability to compare data pre and post HD Fall Prevention Program implementation. The use of both run charts and control charts would have provided a more powerful approach to data analysis.

A second limitation related to the use of run charts was that it required an understanding and the use of judgement within the context of the setting and quality improvement process being measured (see Perla et al., 2011). Rules for identifying and predicting patterns of process improvement must be consistently applied (see Perla et al., 2011). When presenting these data to committees and governing boards, the presenter must be able to iterate the findings within the run chart context. It is important to not imply or predict quality improvement processes that exceed the scope of the run chart rules (Perla et al., 2011).

A limitation related to the determination of IRR and Cohen's kappa was that there were only two samples available. This was an unanticipated finding. The policy for all patient falls with injury should include the use of root cause analyses and IRR evaluation.

Implications

When a Magnet Recognized, academic hospital system experienced an increase in patient falls and patient falls with injury after a transition to a new electronic health record (EHR) and fall risk assessment tool in 2016, they responded to the gap in practice by using the Magnet model and framework for spread as the foundation to guide the quality improvement process. Implications as a result of this study supported the use of the Magnet model and framework for spread to guide quality improvement and improve the patient outcomes of fall rates and fall with injury rates.

The system was comprised of six hospitals. Five of the six hospitals were Magnet Recognized, and one hospital was on the Magnet journey. The hospitals had varying levels of performance, and one hospital demonstrated exceptional performance in the reduction of patient falls and patient falls with injury. This hospital's best practices were identified and used as an internal benchmark for achievement.

The improvement in patient fall rates and fall with injury rates also supported the effectiveness of the HD Fall Reduction Program. There are limited studies supporting this fall risk assessment tool and associated fall risk prevention strategies. The HD Fall Reduction Program is an evidenced-based tool kit and was successfully translated into practice in this Magnet Recognized hospital system.

Finally, the cost reduction related to the reduction in fall rates and fall with injury rates could be calculated and quantified. That was beyond the scope of this project, but the data could be used to extrapolate cost savings. The cost savings, the negative emotional and social impact to patients, families, and nurses would all be improved.

Positive Social Change

Patient falls and patient injury from falls not only add unreimbursed cost related to the hospitalization, they also create a negative perception of the facility and nurses from patients and families (IOM 2001; Kohn, Corrigan, & Donaldson, 2000). The improvement in patient outcomes associated with falls and falls with injury may improve the quality of life for patients and families. The improvement and/or avoidance of falls would lessen the burden and cost of health care.

This project holds significance to the field of nursing practice. Successful implementation and sustained, correct usage of the HDS fall risk assessment and targeted, intervention tools have added to the evidence of multifactorial fall intervention prevention strategies aimed at reducing patient falls and patient injury associated with falls. Injury from falls is endorsed by the National Quality Forum (NQF) as a National Database of Nursing Quality Indicators (NDNQI) nursing-sensitive indicator (outcome) (NQF, 2018; NQF,2013; Lake, Shang, Klaus, & Dunton, 2010; ANCC, 2019a; Montalvo, 2007), and is a quality outcome measure used in Magnet Recognition, Joint Commission (2019) accreditation, and Det Norske Veritas and Germanischer Lloyd (DNV-GL) (2014) accreditation. By implementing the evidence-based HD Fall Reduction Program, the nurse sensitive indicator of patient falls, and patient falls with injury, were decreased.

Recommendations

This project began when an increase in the system's fall rates and fall with injury rates were identified after the implementation of a new electronic health record system in 2016. Addressing the nursing-sensitive indicator of patient falls and patient falls with injury positively impacted the facility's continued commitment to excellence in patient safety, by improving patient falls and falls with injury outcomes, while the reducing cost of care. The HDS fall risk assessment tool and multifactorial fall prevention intervention tool kit began to be implemented through a phased approach on February 1, 2018. Run chart data and analysis demonstrated an improvement trend and shift in practice after implementation of the HD Fall Reduction Program.

Opportunity existed to continue to monitor the run rates for fall and fall with injury rates. Additionally, data should be prospectively monitored in control charts to determine the stability of the process aimed at reducing fall rates and fall with injury rates. IRR monitoring was identified as an opportunity for improvement. This should be done as a mini root cause analysis on all patient falls resulting in injury. Incorrectly assessing patients fall risk with HDS puts patients at risk for falling. Further study is needed to assess Cohen's kappa on these analyses. The HD Fall Reduction Program provided tools for auditing and communicating results of quality improvement.

The Institute of Medicine's (IOM) *Crossing the Quality Chasm* (IOM, 2001) highlighted the lack of progress that had been made toward the recommendation that health care organizations establish evidence-based patient safety programs to improve patient outcomes (IOM, 2001; Kohn, et al., 2000). Health care systems had failed to

rapidly change the processes and systems that contributed to patient harm (IOM, 2001). The report was stern in stating that health care delivery systems failed to "translate knowledge into practice and to apply new technology safely and appropriately" (IOM, 2001. p. 1).

The framework for spread was effectively used to close the gap between best practice and common practice. The system was able to rapidly spread innovations and the resulting EBP, thereby decreasing patient harm (Massoud et al., 2006; Nolan, et al., 2005). This was evidenced by a downward trend in fall rates and a shift in fall rates with injury on the run charts. It is recommended that the framework for spread concepts be adopted for future quality improvement efforts.

The new Magnet model was designed as a framework to enhance nursing practice and serve as a foundation for nursing research (ANCC, 2019b). Grant et al., (2010) suggested the next generation Magnet model "provides an exceptional framework for building an agile and dynamic work force" (p. 326). Bedside nurses become aligned with the model when they (a) feel empowered to guide their practice based on evidence, (b) demonstrate exemplary professional practice, (c) explore innovations that contribute to improved patient outcomes, and (d) are supported by transformational leaders (Grant et al., 2010). It is hypothesized that when nurses are recognized for their contributions to the improvement in patient outcomes, quality of care, nursing satisfaction, and patient satisfaction will improve (Grant et al., 2010). Magnet Recognition implies superior performance in achieving positive patient and staff outcomes. An assumption can be made that the Magnet model contributed to the successful implementation of the HD

Falls Reduction Program and improvement of fall rates and fall with injury rates over time.

The HDS was prospectively validated as a cohort study for fall risk assessment in an acute care setting (Hester & Davis, 2013). A sensitivity of 90.9% and a specificity of 47.1% was demonstrated (Hester & Davis, 2013). The HDS instrument's goal was to accurately identify the correct patients at risk for falling and to tell why these patients were at risk (Hester & Davis, 2013). The HDS was developed and tested in the electronic health record environment (Hester & Davis, 2013). No one specific fall risk assessment tool has been supported as a recommended practice (Aranda-Gallardo, et al., 2013; Avanecean, Callise, Contreras, Lim, & Fitzpatrick, et al., 2017; Cameron, Dyer, Panagoda, Murray, Hill, Cumming & Kerse, 2018; Joanna Brigs Institute, 2016; Lizarondo 2017, 2018; Matarese, Ivziku, Bartolozzi, Piredda, & Grazia De Marinis, 2014; Oliver, Healey, & Haines, 2010; & Spoelsta, 2011). The recommended practice is to use a validated tool designed to enhance the workflow of nurses, and support patient safety practices and outcomes (Hester & Davis, 2013; Joanna Briggs Institute, 2016). The HDS has been validated in today's health care environment utilizing the electronic health record. The HDS and Fall Reduction Tool Kit are proprietary intellectual property. Fall risk assessment scales that are in the public domain have been adapted for use in multiple settings and patient populations, impacting their reliability and validity (Joanna Briggs Institute, 2016). Because the HDS is proprietary intellectual property, the author can maintain standards for adoption of the tool in its validated form. This standard promotes rigor and will ultimately promote comparative studies and meta analyses.

Contribution of the Project Team

A project team was not used in the development of this project.

Strengths and Limitations of the Project

Strengths of this Project included the length of time available to retrospectively measure improvement and compare the improvement to milestones in the project. At least 10 data points must be available before the shift and run rules of a run chart can be applied (Perla et al., 2011). This project had 28 data points. Another strength of the project was the use of the validated HDS and Falls Reduction tool kit. This provided consistency in education and monitoring of the results. There was also ongoing support from the HD Nursing team. The executive leadership at the systems quality and patient safety level was key in driving the change process throughout the system. The vice president and patient safety director leaders guided the hospitals to use a standardized, evidence-based HD Falls Program to improve patient outcomes. Finally, the Magnet Recognition status was a strength for this quality improvement process. The Magnet framework assisted the bedside nurses to become aligned with HD Fall Reduction Program implementation because they felt empowered to guide their practice based on evidence, were able to demonstrate exemplary professional practice, were exposed to innovations that contributed to improved patient outcomes, and were supported by transformational leaders (Grant et al., 2010).

Limitations of the project included the inability to obtain data for use in control charts. The run chart analysis did not provide information on the stability of the process. This would require the use of a control chart. The data needed for control chart analysis

was incomplete and it was decided to forego the control chart analysis for this project. This prohibited a control chart analyses and ability to compare data pre and post HD Fall Prevention Program implementation. The use of both run charts and control charts would have provided a more powerful approach to data analysis. This project was a retrospective analysis of a quality improvement process and would be more powerful if done in a prospective manner. The proprietary nature of the HD Fall Reduction Program can be considered strength for reasons previously discussed; however, a cost is involved to purchase the program, and this could be prohibitive for some organizations.

Future Recommendations

Future recommendations would include a comparative, prospective study design to add to the evidence supporting the use of the HD Fall Reduction Program. At the system level, ongoing collection and monitoring the data should also include the raw data needed to populate the numerators and denominators for the control chart calculations. Continued focus on the correct use of the HDS should be measured until Cohen's kappa of .85 is achieved. An additional impact to positive social change would be the extension of fall reduction strategies throughout the continuum of care, to include home care. This could contribute to improved quality of life and decrease the burden of health care costs.

Section 5: Dissemination Plan

The purpose this project was to evaluate the effectiveness of a Magnet model, system-wide quality improvement practice change. The aim of the practice change was to have successful system-wide implementation of an EHR-validated HDS fall risk assessment and intervention tool kit that would improve the nursing-sensitive outcomes of patient falls and patient falls with injury. The data supported the improvement of fall rates and fall with injury rates over a 28-month period from January 2017 through April 2019.

The results of this project will be disseminated at the system level through the office of the vice president of quality and patient safety. I will review the data with the vice president and with the system director of patient safety. I will recommend presentation of the data to the systems falls prevention committee. A poster presentation will be prepared for use and discussion at individual hospitals' RN competency fairs. This information can also be used for Magnet recertification processes.

Grant et al. (2010) suggested the next generation Magnet model "provides an exceptional framework for building an agile and dynamic work force" (p. 326). The results of this project may contribute to the evidence supporting the relationship of improved patient outcomes related to fall reduction and fall with injury reduction and Magnet Recognition. I plan to publish this information in peer-reviewed journals that support quality improvement. I also plan to present poster presentations at various Magnet and patient safety nursing conferences.

Analysis of Self

I have grown in my role as a scholar. I have gained confidence in reviewing the literature to support evidence-based practice change recommendations. I can speak confidently to groups regarding the literature review results that support practice changes. As a practitioner, I have become an advocate for improving patient safety and reducing patient harm. This project has improved my focus and ability to convey patient safety to undergraduate nursing students. My current position is nursing faculty at an undergraduate nursing program. I plan to continue to help undergraduate nursing students connect evidence and practice.

My long-term professional goals include teaching at the graduate level, most likely in the online format. I am currently proficient in developing hybrid and online courses at the undergraduate level. Achieving my DNP degree from Walden University will provide the educational background required for my future professional goals.

As a result of this project, I have discovered a love of research. The biggest challenge I experienced was keeping focused on my practice questions. There is so much evidence, so much potential data, and so little time to change everything. My project chair, Dr. Carolyn Sipes, helped me to refocus when I felt I was spinning my wheels.

Summary

Nurses working at the bedside do not begin their shift with the intent of causing patient harm; however, they continue to struggle to reduce patient falls and patient injury from falls. The HD Falls Program provided evidence-based tools for the bedside nurse to use to improve the nursing-sensitive indicators of patient fall rates and patient fall with

injury rates. Using the Magnet model to empower the bedside nurse, I demonstrated the effectiveness of a Magnet Recognition system in improving the outcomes of patient fall rates and patient fall with injury rates.

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