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Evaluating the Knowledge and Attitudes of Orthopedic Nurses Regarding the Use of SPHM Algorithms as a Standard of Care

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EVALUATING THE KNOWLEDGE AND ATTITUDES OF ORTHOPEDIC NURSES
REGARDING THE USE OF SPHM ALGORITHMS AS A STANDARD OF CARE

Presented in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Nursing Practice

Nova Southeastern University
Health Professions Division
Ron and Kathy Assaf College of Nursing

Terry L. Doire, MSN RN CRRN

2019

NOVA SOUTHEASTERN UNIVERSITY
HEALTH PROFESSIONS DIVISION
RON AND KATHY ASSAF COLLEGE OF NURSING

This project, written by Terry L. Doire under direction of Dr. Marcia Derby-Davis,
Project Chair, and approved by members of the project committee, has been presented
and accepted in partial fulfillment of requirements for the degree of

DOCTOR OF NURSING PRACTICE

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Certification

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Abstract

Background: Healthcare workers are ranked among one of the top occupations for musculoskeletal disorder (MSD) injuries that affect the muscles, the bones, the nervous system and due to repetitive motion tasks (Centers for Disease Control and Prevention, 2017). Numerous high-risk patient handling tasks such as lifting, transferring, ambulating and repositioning of patients cause injuries that can be prevented when evidence-based solutions are used for safe patient handling and mobility (SPHM) tasks.

Purpose: The purpose of this quality improvement project was to evaluate the knowledge and attitudes of orthopedic nurses regarding the use of SPHM algorithms as the standard of care when transferring patients.

Theoretical Framework. Lewin's Theory of Change

Methods. A quasi-experimental pretest-posttest design was utilized in this evidenced-based practice project.

Results. Descriptive statistics that evaluated pre and post questionnaires of the orthopedic nurses noted nurses displayed behavioral and attitudinal intent to use the SPHM algorithms as the standard of care to improve patient outcomes by decreasing falls. Although the behavioral beliefs and attitudes reflected acknowledgement of SPHM skills and knowledge, nursing did not improve in their documentation of SPH fall risk as two separate tools were required on each patient.

Conclusions: SPHM evidenced-based standards do guide staff to critically examine how to safely transfer and mobilize a patient. Patient fall rates did decrease during educational sessions, prompting the need for on-going education of all staff on the unit that transfers patients. The findings from this quality project may encourage future

practice approaches to use of the safe patient handling (SPH) fall risk assessment tool for all patients to prevent patient falls.

Keywords: safe patient handling, patient falls, fall risk assessment tools

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Chapter 1

Nature of Project and Problem Identification

Healthcare workers are ranked among one of the top occupations for musculoskeletal disorder (MSD) injuries that affect the muscles, the bones, the nervous system, and due to repetitive motion tasks (Centers for Disease Control and Prevention, 2017). According to the Bureau of Labor Statistics (2017), hospital staff face hazards related to lifting and moving patients leading to overexertion injuries. Most MSD injuries are attributed to improper patient handling activities such as manually lifting a patient, transferring a patient and the repositioning of patients. One of the highest risks for injury with patient handling tasks for nursing personnel is the manual lifting, moving and positioning of a patient (NIOSH, 2017). It is noted by Mayeda-Letourneau (2014) there exists numerous high-risk patient handling tasks such as lifting, transferring, ambulating, and repositioning of patients. Injuries can be prevented when evidence-based solutions are used for safe patient handling and mobility (SPHM) tasks.

SPHM programs enable health care personnel to transfer patients in a way so as not to cause injury. Knowledge of SPHM algorithms within these programs help to assess the patient's needs to determine what equipment is appropriate for a safe patient handling activity. These algorithms guide critical thinking and strategies for mobilizing patients and provide a standardized method to assess patients and how to transfer them safely without injury. Before any patient transfer, lifting or ambulation of a patient, an accurate assessment of the patient's capabilities should be performed using the Safe Patient Handling and Movement (SPHM) algorithm (Nelson et al., 2003 and OSHA, 2014).

Problem Statement

Current research suggests gaps in the orthopedic nurses' knowledge and attitudes regarding Safe Patient Handling and Mobility (SPHM) as the standard of care to prevent patient falls and assess patient for fall risk.

Purpose Statement

The purpose of the DNP quality improvement project was to decrease fall rates per 1000 patient days on the orthopedic unit of a local community hospital in Florida by developing and implementing an evidence-based educational protocol utilizing the Safe Patient Handling and Mobility (SPHM) algorithm educational program as the standard of care for patient transfer. Additionally, the project sought to evaluate behavioral attitudes and intent regarding the orthopedic nurses' readiness and perception to document fall risk assessment with the Safe Patient Handling (SPH) assessment on each patient in addition to the required Morse Fall risk tool.

Project Objectives

The following objectives were used to guide the project:

Objective One. To conduct a needs assessment to address gaps in the knowledge, skills or practices of the orthopedic nurses by performing a patient chart audit of falls risk assessment and safe patient handling documentation by the orthopedic nurses per policy of the facility on admission to the unit.

Objective Two. To develop an evidence-based training program on SPHM as the standard of care for mobility and safe patient transfers. Synthesize evidence from

literature review for the current evidence of safe practices and national standards of care for the orthopedic nurse for safe patient handling and mobility standard of care.

Objective Three. Assess orthopedic nurses' knowledge and attitudes regarding SPHM algorithms as the standard of care and fall risk documentation knowledge via a pre-questionnaire.

Objective Four. Review findings of pretest questionnaire to determine the gaps in knowledge on the use of the SPHM algorithms and fall assessment documentation. Present evidence-based educational training programs for the orthopedic nurses regarding the knowledge gaps from the pretest questionnaire.

Objective Five. Re-evaluate orthopedic nurses' knowledge and attitude in SPHM standard of care and evaluate the effectiveness of the educational program.

Objective Six. Implement SPHM algorithms as standard of care to reflect the current evidence-based practice.

Objective Seven. To conduct a retrospective chart review for fall risk assessment documentation and SPHM practices post education.

Objective Eight. Analyze fall rates 2 months prior to educational program and 2 months post educational sessions and fall risk documentation.

Objective Nine. Disseminate project findings to stakeholders. Present findings to stakeholders for adoption of SPHM algorithms into practice on the orthopedic unit.

Theoretical Foundation: Lewin's Theory of Change

Nurses understand the importance of integrating evidence-based knowledge into their practice; however, direct care providers often fail to implement the results of research into practice (McEwen & Wills, 2014). As theories provide a guide to evaluate

the effectiveness of nurse patient interventions, the theoretical basis for implementing this project will be to analyze change and to interpret behaviors of the nurses. The two theories that may benefit this project include Kurt Lewin's Theory of Change and also the Theory of Planned Behavior questionnaire. These theories provide perspectives among a set of concepts that may be related to this particular project to examine the behaviors of nursing to SPHM and evaluate the effectiveness of the SPHM program using both theories.

Kurt Lewin's Theory of Change

The Change Theory was developed by Kurt Lewin who is also referred to as the father of social psychology. Lewin's theory provides the fundamental principle for change (Wojciechowski, Pearsall, Murphy, & French (2016). Kurt Lewin believed there are two forces that happened when one attempts to implement change: driving forces and restraining forces. One is driving towards the desired goal and the other the restraining forces that hinder progress or change. With this quality improvement project, the goal was to have competent nurses who have retained education on the standards of SPHM and identify the barriers to accomplishing that goal.

Lewin's change theory has three distinct stages: unfreezing, movement, and the refreezing stage that requires prior learning to be rejected and replaced. Lewin theorized that individuals maintain a state of status quo by both driving forces as facilitators and restraining forces as barriers (Marquis & Huston, 2017). With Lewin's model, staff may feel safe and comfortable with their ways of performing daily duties. For change to occur, the balance of driving and restraining forces must be altered. The first step in the change process involves making others aware of the need for evidenced-based practices,

which was the unfreezing or directing staffs' behavior away from the status quo. The second step would be to decrease the restraining forces that may negatively affect the existing status quo.

Application of Lewin's Theory of Change

Unfreezing

This was critical in convincing all key stakeholders at the hospital about the value of maintaining a SPHM program. In the process of changing behavior to unfreeze the current behavior, the problem is recognized and identified and then a leader will mobilize others to see the need for change (Shirey, 2013). This project involved administering a pretest/posttest questionnaire to evaluate existing knowledge of SPHM current standards of care along with identifying nursing staff's attitudes towards practicing within the standards set forth. Lewin believed that if participants are involved actively in the process any change that occurs will enhance the acceptance for the change process (Hussain, et al., 2016).

Movement

During this second step of Lewin's change theory, an evidence-based educational program was provided to address any misconceptions of SPHM and address any gaps in knowledge of the guidelines and standards set forth on the orthopedic unit. Inner movement requires a detailed plan of action and engaging stakeholders in the process to utilize the standards of care set forth in the SPHM algorithms. This stage is difficult due to the uncertainty and fear associated with any change (Shirey, 2013). During the education program sessions, nurses had the opportunity to actively participate in the

discussion of the barriers identified. It was important to maintain open communication and support during this stage.

Refreezing

Refreezing integrates the change in behavior or attitudes into the nurses' current work environment as the new norm for behavior and as a higher level of performance expectation. This third stage locks in the standard of care change where nursing staff appropriately follows SPHM algorithms without injury to themselves or to the patient. A post evaluation provided information regarding any changes in the perception, knowledge and attitudes of the nursing staff after the educational sessions. To identify the factors influencing the barriers to practice within the standards set forth for SPHM, the Theory of Planned Behavior questionnaire was used to evaluate staff's attitudes, their expected outcomes and their control over their behavior.

Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) is a well-validated behavioral decision-making model to predict social and health behaviors as patient safety is a major concern throughout the world (Javadi, Kadkhodae, Yaghoubi, Maroufi & Shams, 2013). Icek Ajzen's Theory of Planned Behavior is a predictive model for human behavior that connects attitudes with actions. Psychological models can be useful in understanding and predicting behaviors and identifying factors with health care professionals. TPB is an effective framework to identify clinical nursing behaviors, intentions and attitudes with clinical nursing staff on the use of SPHM as the standard of care. This framework is based on three elements: attitudes, perceived norms, and perceived behavioral control to predict any behavioral intentions (Stenius, Haukkala, Hankonen & Ravaja, 2017).

Behavioral beliefs are the attitudes of the nursing staff regarding the use of the SPHM algorithms, whether positive or negative.

With TPB, nurses will participate in a behavior if they have an overall positive attitude towards it to believe that significant others desire such action and that nurses have the necessary resources for its implementation (Dunstan, Covic, & Tyson, 2013). A SPHM standard of care program should offer continued education, support, scenarios and monitoring to recognize when revisions are needed to the standard of care and to best meet the needs of the staff. Interventions to change practice should focus not only on improving the competence and capability of the nurses, but also to motivate them to make changes in their practices, (Byrne-Davis et al., 2017). Positive reinforcements influence positive behaviors, attitudes and intent. To assess the attitude, perceived norm, the perceived behavioral control and the intention of the nursing staff a TPB questionnaire pretest/posttest was utilized. Adaptation of the Ajzen TPB questionnaire content assessed for knowledge gaps between SPHM recommendations and standards of care practices. Further, identified beliefs and attitudes towards the development of an intervention design that can positively influence adherence to SPHM practice guidelines and reduce injuries.

Application of the TPB Theory

Theory of Planned Behavior Questionnaire

Although there is no official TPB questionnaire, Icek Ajzen (1991), constructed a questionnaire within his Theory of Planned Behavior Model. The behavior of interest will be the nursing staffs' attitudes towards using SHM algorithms in their daily practice. The questionnaire developed by Ajzen (1991) included five to six items formulated to

assess TPB such as attitude, perceived norm, perceived behavioral control and intention with a seven-point bipolar adjective scales. The items were self- directing and compatible with the behavioral criterion. The TPB questionnaire addressed specific questions to assess nursing beliefs in regard to utilizing the safe patient handling and mobility standard of care. Answers directed the intervention aspect of the project to be focused at the behavioral, normative or control of present belief system to obtain the desired outcomes. The Theory of Planned Behavior when applied to a safe patient handling program should demonstrate that by influencing a favorable attitude toward the use of the SPHM algorithms with scientific evidence, the staff would have a greater perceived control on their daily nursing practices.

Significance to Practice, Healthcare Outcomes & Policy

Work related injuries to hospital staff and patients are occurring. Safe patient handling programs support considerable benefits by reducing injuries, curtailing costs, enhancing patient care and improve outcomes for the patient. According to the ANA (2013), nurses are ranked sixth among all occupations for the highest incidence rates of MSD injuries. Lee and Lee (2017) cite that 112 health care facilities reported a patient handling injury with an incidence rate of 11.3 per 10,000 worker-months and that only one third of nurses reported using lifting equipment if warranted from their assessment.

Nursing Practice

Evidence from multiple research studies indicated nursing staff have increased injury rates, particularly musculoskeletal injuries related to safe patient handling and mobility (Thomas & Thomas, 2014). Patient falls are a high-risk challenge for health care facilities, especially as Medicare no longer will reimburse hospitals for costs related

to hospital-acquired falls. Fall prevention involves managing patient risk factors including problems with mobility and transfers. Evidence-based strategies such as adherence to the safe patient handling and mobility guidelines can improve nurses' perception of safety (Mahoney, 2016). The use of evidence-based practice should promote positive behaviors in the nursing staff while reducing injuries.

Health Care Outcomes

The purpose of this evidence-based project was to acknowledge that evidence-based practices that utilize the safe patient handling and mobility algorithms do provide a standardized method on assessing and ultimately transferring a patient safely without injury to staff or to the patient. As the standard of care to guide critical thinking strategies in mobilizing orthopedic patients, the findings of this project may decrease the patient fall rates.

Health Care Delivery

Historically, nurses were trained in body mechanics and ergonomics and lifting techniques to prevent injury. However, an alternative evidenced-based approach to support safe patient handling practices is the SPHM programs. These programs involve staff education regarding the proper use of lifting equipment and devices and utilizing algorithms for safe patient transfers and repositioning of the patient. In 2013, The American Nursing Association (ANA) released national standards in regard to safe patient handling and mobility for health care professionals. Patients can be adversely affected by poorly trained staff on safe patient handling and the use of equipment to transfer the patient.

In 2008, the Centers for Medicare and Medicaid Services (CMS) enacted new payment provisions that would no longer reimburse hospitals for certain conditions, including falls with injury to patients. Hospital culture has strongly prioritized preventing falls with a potential unintended consequence for patient mobility by keeping patients from moving to stop falls (Growdon, Shorr, & Inouye, 2017). However, research has shown mobility improves outcomes and hospital staff should safely mobilize patients. Fall rates in hospitals are known to vary considerably by unit type (Bouldin, et al., 2013). Bouldin, et al., further remarks on other factors associated with patient falls that includes the improper use of ambulation aids for mobility. The findings of this project may demonstrate that SPHM algorithms provide a method to evaluate the safe transfer and mobility of a patient without injury to staff or to the patient utilizing mobility aids.

Healthcare Policy

Further legislation was introduced to Congress in 2015 to both the House and the Senate as the Nurse and Health Care Worker Protection Act (H.R. 4266/S.2408). To date, this is the sole national legislation that improves the quality of patient care and protects nurses by address the need for SPHM programs. Further action on this bill remains to be seen. The impact of safe patient handling legislation on organizational safety practices needs to be investigated in future research (Lee & Lee, 2017). This project may impact health care policy on an organizational level to address the need for ongoing nursing education regarding safe patient handling as part of their fall risk assessment process.

Summary

This evidence-based project addressed a gap in the standard of care for the orthopedic nurses. The quality of patient care improves when safe patient handling programs are implemented. Introduction of a safe patient handling and mobility program involves education on the use of transfer equipment and devices, and education on the standards of care specifically for the orthopedic nurse. Basic knowledge of hospital policies and standards of care regarding SPHM is not sufficient education to create a culture of safety. Despite current scientific evidence-based guidelines and standards for patient movement as the standard of care to guide critical thinking strategies in mobilizing the orthopedic patient, the risk for patient falls continues. Improving the work environment requires staff to be involved and evidence-based innovations be maintained as the standard of care. Planned, purposeful change in practice increases the likelihood of success.

Chapter 2

Integrated Literature Review

The purpose of this chapter was to present a comprehensive review of relevant literature. A comprehensive search of the literature on safe patient handling and mobility programs and standards included the following search engines and data bases:

MEDLINE, CINAHL, Science Direct, PubMed, ERIC, and OVID. To incorporate the historic background of evidence-based practice with SPHM, the time line for articles retrieved was from 2000-2018. Key words or terms used included: *safe patient handling and mobility, safe patient handling, patient handling, patient lifting, musculoskeletal disorders, work related musculoskeletal injuries, ergonomics, health care ergonomics, lift equipment, patient movement, patient handling, lift devices and evidence-based interventions* with SPHM. The results included 58 articles using key words or terms. Search criteria included full text articles published in the English language and the primary focus of the article was improved quality outcomes with a safe patient handling (SPH) criteria. Of those 5 articles were eliminated as they were not relevant to SPHM program or staff injuries as they relate to the movement and transferring of patients leaving 53 articles for this paper. This literature review will provide an overview of musculoskeletal injuries, the historical background of SPHM, the development of evidence-based algorithms and barriers to training, and gaps in the literature.

Musculoskeletal Injuries

Documented in research conducted in 2006, De Castro acknowledged that “work related musculoskeletal injuries are the leading occupational health problem for the nursing workforce” (p. 45). Patient handling and movement with transfers are physically demanding and unpredictable. The U.S. Department of Labor Bureau of Labor Statistics over the past eight years has reported musculoskeletal disorders (MSD’s) or injury rates for healthcare workers as one of the highest in the United States (Choi & Cramer, 2016; Daily, 2014; De Ruiter & Liaschenko, 2011; Elnitsky, Powell-Cope, Besterman-Dahan, Rugs, & Ullrich, 2015; Mayeda-Letourneau, 2014; Noble & Sweeney, 2017; Oermann, 2013; Przybysz & Levin, 2016; Weiner, Kalichman, Ribak & Alperovitch-Najenson, 2017). With the required lifting, positioning and transferring of patients accompanied by the older healthcare worker, obese patients and a more demanding approach for safe patient handling, nursing is steadily listed as one of the top ten occupations for work related MSD’s and suffer from MSD’s at a significantly higher rate than workers in other industries (Aslam, Davis, Feldman, & Martin, 2015; Krill, Staffileno & Raven, 2011; Elnitsky, Powell-Cope, Besterman-Dahan, Rugs & Ullrich, 2015; Weinmeyer, 2016). The Bureau of Labor Statistics in 2017 noted that overexertion was the leading cause of injuries to health care workers in the U.S. with nursing assistants having the greatest rate of MSD injury (Wiggermann, et al., 2016; Lahiri, Latif, & Punnett, 2010).

SPHM programs have been found to reduce patient handling injuries among nurses; however, nurses continue to sustain musculoskeletal injuries even with increased emphasis on safe patient handling and mobility (Garcia, 2014; Vendittelli, Penprase & Pittiglio, 2016). Although staff lifting injuries have decreased, nurses still suffer from

musculoskeletal disorders (Garcia, 2014). A national assessment of patient falls within the U.S. indicated that the medical nursing units have the highest rate of falls with injuries (Bouldin, et al., 2013; Hallmark, Mechan & Shores, 2015). Historically, nurses are trained in proper ergonomic body mechanics and lifting techniques. There continues to be injuries to staff and patients after training. Thomas & Thomas (2014) concluded that past research has shown interventions based solely on staff training do not reduce injuries as there is conflicting evidence regarding intervention training plus equipment training or multi-component intervention training as being more effective. An essential step to include a comprehensive safe patient handling and mobility (SPHM) program to reduce injury is to recognize the evidence-based research that has occurred historically.

Historical Background of SPHM

Mayeda-Letourneau (2014) emphasizes the work of Audrey Nelson, PhD., R.N., FAAN as a pioneer in SPHM through the Department of Veterans Affairs as identifying common tasks that contributed to musculoskeletal injuries during patient transfers. Historically, nurses received training in proper body mechanics and ergonomic techniques to prevent back injury. Research did support the belief that there should be no manually lifting of a patient. Nelson, et al., (2003) developed the elements of a comprehensive SPHM program that included an ergonomic assessment, a patient assessment criterion for the decision regarding equipment use, algorithms for patient handling and movement, and a no-lift policy. These algorithms guided further research of SPHM programs as a standard method to assess patients before movement or handling without injury (Lee & Lee, 2017; Perlow, Tunney, & Lucado, 2016).

As early as 1996, the American Nurses Association (ANA) recognized that worker's compensation injuries were due to patient handling tasks and education, technology, and policies to guide safe for safe effective patient transfers were necessary (Hodgson, Matz, & Nelson 2013; Perlow, Tunney, & Lucado, 2016, Sedlak, Doheny, Nelson & Waters, 2009). The first National Patient Handling conference was held in 2001, which produced the release of the Department of Defense (DOD) and the Veterans Administration (VA) patient handling guidebook of 2002 (Hodgson, Matz, & Nelson, 2013). Despite strategies placed and with alarming high MSD injuries and with nurses leaving direct patient care, the ANA launched a national campaign in 2003 to establish a national no-manual-handling policy, "*Handle with Care*" (Choi & Cramer, 2016; De Castro, 2004; De Ruiter & Liaschenko, 2011; Hodgson, Matz, & Nelson, 2013; Oermann, 2013).

The clinical case for a SPHM program research continued with the work of Dr. Nelson evaluating in 2001 the high number of injuries to nurses and patients at the VA center in Tampa, Florida (Nelson & Baptiste, 2004). Research conducted by Nelson and the VA team of researchers summarized evidence for interventions designed to reduce injuries with patient handling and mobility, which included safe patient handling algorithms (Nelson & Baptiste, 2004; Wiggermann, et al., 2016). Nelson, et al., (2003) research developed the elements of a comprehensive SPHM program that included an ergonomic assessment, a patient assessment criterion to decide about equipment to use, algorithms for the type of SPHM, and a no-lift policy that were implemented nationally from 2008-2011 (Elnitsky, Powell-Cope, Besterman-Dahan, Rugs, & Ullrich, 2015).

After publishing these findings and algorithms, the ANA and the VA system of hospitals nationwide embraced evidence-based approaches in 2004.

With the enactment in 2008 by the Centers for Medicare and Medicaid Services (CMS) of a new payment provision that would no longer reimburse healthcare facilities for hospital acquired conditions including falls with injury. Additionally, the Affordable Care Act in 2010 that levied financial penalties on hospital ranking in the lowest quartile for hospital acquired conditions updates to SPHM research was on-going (Growdon, Shorr & Inouye, 2017). The ANA in 2013 in collaboration with a national work group and other professional organizations released *Safe Patient Handling and Mobility* interprofessional national standards for safe patient handling and mobility to promote a stronger culture of safety to protect patients and health care workers following the release of the Joint Commission's 2012 national care standards (Elnitsky, Powell-Cope, Besterman-Dahan, Rugs, & Ullrich, 2015; Oermann, 2013; Wiggermann, et al., 2016). Following the launch of the ANA's 2003 national *Handle with Care Campaign* and the standards set forth by Dr. Nelson, advocacy for industry wide efforts began spurring federal and state legislations.

Legislation

Based on evidence from the literature, in 2005, Texas became the first state to pass a safe patient handling law in America with California and other states introducing the same type of legislature the same year (Hudson, 2005). Garcia (2014) cites Congress passing the ergonomic standard of Occupational Safety & Health Administration in 2000 but rescinded it in 2001 before regulations could take effect. Since 2003 to 2016, 11 states have enacted various safe patient handling laws or rules and regulations to address

and prevent workplace injuries to nursing staff (Choi & Cramer, 2016; Perlow, Tunney, & Lucado, 2016). The States include California, Illinois, Maryland, Minnesota, Missouri, New Jersey, New York, Ohio, Rhode Island, Texas, and Washington (Choi & Cramer, 2016; Fitzpatrick, 2014; Perlow, Tunney, & Lucado, 2016). Except for Ohio, all of these states' legislation requires healthcare facilities to establish comprehensive safe patient handling programs. Studies ensued regarding the effect of legislation on patient handling programs. Studies ensued regarding the effect of legislation on legislation for safe patient handling policies and program in California in 2011. Their findings revealed the majority of hospital nursing staff was unaware of the new California SPH law and that the law's effectiveness was relatively low with gaps in hospitals' policies and programs and gaps in training of the staff (Choi & Cramer, 2016; Lee, Lee, & Gershon, 2015; Przybysz & Levin, 2016). Further research is needed to determine if the law will have a major impact on injury prevention and safe work practices.

With a lack of federal level legislation to promote SPHM programs, the ANA in 2013 supported a federal bill to eliminate manual patient handling and published national interprofessional standards to guide nurses, physical therapist, nursing assistants and transportation personnel on creating a culture of safety (Choi & Cramer, 2016; Fitzpatrick, 2014). In 2015, both the Congressional House and Senate introduced a *Nurse and Health Care Worker Protection Act of 2015* that requires the Department of Labor to establish a standard on safe patient handling, mobility and injury prevention to avoid musculoskeletal disorders for health care workers (Weinmeyer, 2016). As of this date, future action on this bill remains to be seen. Rockefeller (2008) emphasized a decade ago that advances in technology, knowledge gained through research and legislative trends

will affect safe patient handling approaches. Evidence supports that patient handling was a major risk factor for musculoskeletal injuries among nurses and lifting equipment is a main component to prevent musculoskeletal injury (Lee, Faucett, Gillen, Krause, & Landry, 2010). Several studies cite various organizations as actively supporting and providing advocacy in the workplace in regard to SPHM.

Organizational Support of SPHM

Research shows that several organizations are advocating for work place safety along with the ANA. These include the Association of Operating Room Nurses (AORN), the VA, the Association of Safe Patient Handling Professionals, the Joint Commission on the Accreditation of Healthcare Organization (JCAHO), Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), American Physical Therapy Association (APTA), Association of Rehabilitation Nurses (ARN), and the National Association of Orthopaedic Nurses (NAON) to name a few (Aslam, Davis, Feldman, & Martin, 2015; Hallmark, Mehan & Shores, 2015; Olkowski & Stolfi, 2014; Perlow, Tunney, & Lucado, 2016; Waters & Rockefeller, 2010). All have established, recommended or adopted SPHM guidelines that established policies to train staff, obtain appropriate equipment, collect data and evaluate the effectiveness of the SPHM programs. One of the most important components of SPHM is ergonomics of the hazards of musculoskeletal disorders and patient falls (Hallmark, Mehan & Shores, 2015).

Ergonomics of SPHM

The ANA 2013 *Standard 3* involves incorporating ergonomic design principles to safe patient handling and mobility programs. As early as 2008, Rockefeller (2008)

reviewed evidence that ergonomic use of equipment to assist with patient handling is associated with decreases in injuries among health care workers. The use of patient handling equipment additionally improves patient outcomes. There is a need for alternative SPHM approaches based on ergonomic approaches to limit manual patient handling such as assessing height, weight, body shape and patient condition as part of SPHM programs (De Castro, 2004; Choi & Cramer, 2016). SPHM programs include no-lift policies, patient handling technology using lifting equipment and devices and staff training and education, however, injuries are still occurring.

SPHM Program

Evidence has shown prevention of patient handling injuries requires policies and programs to ensure safe patient handling along with individual staff safety, decreased costs, increased nurse retention and improved healthcare staff job satisfaction (Lee & Lee, 2017; Mayeda-Letourneau, 2014; Vendittelli, Penprase, & Pittiglio, 2016). Nelson and the VA team of researchers created algorithms as the standard of care to provide guidance on how to safely perform high-risk activities related to patient handling and movement (Boynton, Kelly, & Perez, 2014; Kumpar, 2014; Nelson, et al., 2003).

Evidence-based standards show that a patient's functional assessment must be followed by an established algorithm to analyze and select the number of caregivers as well as the selection and use of appropriate lift equipment (Elnitsky, Lind, Rugs, & Powell-Cope, 2014; Hallmark, Mechan & Shores, 2015; Nelson & Baptiste, 2004; Nelson, et al., 2003). SPHM algorithms, as defined in the literature, follows a sequence of decision steps that describe ergonomic solutions, recommendations for specific technologies and the minimum number of caregivers need to perform a task safely based upon the patient's

ability to bear weight, provide assistance, height and weight and other medical recommendations (Nelson & Baptiste, 2004; Sedlak, Doheny, Nelson & Waters, 2009). Research has shown that the answers to these assessment questions determine which of the SPHM six algorithms to follow. *The Assessment Tool for Safe Patient Handling and Movement* algorithms developed by Nelson, et al., (2003) provide the basis for other organizations education and training programs. The assessment tool lists questions related to the level of assistance, present weight-bearing status, extremity strength, level of cooperation and comprehension, height/weight, and any conditions that may affect a patient handling and movement task.

SPHM Education and Training

The research supports the need for safe patient handling programs. Nursing staff requires effective education and training with support from managers. There should be a mandatory policy requiring the use of equipment and reduced-risk lifting techniques at each facility utilizing SPHM programs. Aslam, Davis, Feldman, & Martin (2015) concluded that based on their findings healthcare institutions can improve worker safety by implementing cost effective strategies that improve technological devices, staff education and policy development. Wanchisen, et al., (2014) discussed the drivers for implementing effective SPHM program that included a comprehensive approach of equipment, training and upper management commitment. In regard to SPHM education, literature cites that it is vital for educators or facilitators incorporate the most current safe patient handling (SPH) standards into their education competencies to create a safe patient handling culture of safety (Mayeda-Letourneau, 2014; Perlow, Tunney, & Lucado, 2016; Vollman & Bassett (2014).

Bhimani (2014) identified six themes regarding nursing input to understanding and reducing work related musculoskeletal injuries: (1) lack of time and staff; (2) patient acuity; (3) ergonomics; (4) body movement issues; (5) knowledge deficit; and (6) communication. Vendittelli, Penprase, & Pittiglio (2016) noted in their research that 46% of staff felt that were not informed or aware of national SPHM standards or guidelines during their education that was provided by their facilities. Research reviewed in the literature reflected that SPHM programs require evaluations of programs, evaluations of teaching methods, and evaluation of staff attitudes and concerns is lacking education on safe patient handling techniques (Daily, 2014). Regular assessments of patient mobility are needed to ensure appropriate transfer techniques and equipment used; however, there still exists a need in the research for evaluating the training program content and to investigate the effectiveness of the competency-based training provided (Hignett & Crumpton, 2005; Thomas & Thomas 2014).

Nurses' Knowledge and Attitudes

Barriers to SPHM Education

Identifiable barriers noted in the studies reviewed included staff requiring additional time to obtain and use appropriate equipment and the lack of knowledge of the patient's condition and how to properly handle the movement of that patient (De Ruiter & Liaschenko, 2011). Further barriers found in studies included the demand of nursing staff was intensified due to the aging of the nursing workforce, the shortage of nurses, by the increasing rates of patient obesity in the U.S. and by the increased seriousness of a patient's condition requiring early mobilization (Mayeda-Letourneau, 2014; Noble & Sweeney, 2017; Weinmeyer, 2016). Many studies support a multiple component

approach to comprehensive training along with the purchase and use of equipment alone without training, does not guarantee a successful SPHM program (Olinski & Norton, 2017; Przybysz & Levin, 2016). AbuRuz, Hayeah, Al-Dweik & Al-Akash (2017) research concluded that ongoing education for nurses and minimizing barriers are recommended to promote the use of evidence-based practice as a critical element to improve quality of health service and achieve excellence in patient care.

Knowledge, Perceptions and Attitudes Post SPHM Education.

Mayeda-Letourneau (2014) concluded that a SPHM program can lead to decreased worker injuries, improved job satisfaction and decreased overall work injuries while improving nurse retention, satisfaction and recruitment. Healthcare facilities do develop and disseminate patient handling guidelines with a comprehensive training program and purchase appropriate equipment to meet these quality outcomes. However, research within the past five years cite that the beliefs, attitudes and perception of nurse's post SPH training suggest further research. Nurses surveyed expressed feeling disillusionment, inability to communicate frustrations, feelings of punishment, too time consuming, equipment difficult to use, equipment unavailable, staff unavailable for appropriate patient transfer and the need for further on-going education (Daily, 2014; Fitzpatrick, 2014; Kay, Evans, & Glass, 2015; Krill, Staffileno, & Raven, 2011). Conclusions from this literature review remarked that a multi-component education is needed and that nurses needed guidance to change their mindset regarding the use of SPHM to understand the balance between policies and procedures as they relate to evidence-based practices (Elnitsky, Powell-Cope, Besterman-Dahan, Rugs, & Ullrich,

2015; Fitzpatrick, 2014; Risor, Casper, Andersen & Sorensen, 2017). Training programs need to be assessment for appropriateness of unit type.

SPHM Unit Specific Education.

Work-related musculoskeletal disorders (MSD's) have been shown in the literature to be a major safety concern due to manually lifting of patients in the healthcare environment. Research shows that hospitals do promote a culture of safety and promote teamwork to reduce the risk of harm to patients. However, one research article surveyed the interprofessional staffs' perception of safety and teamwork and found no statistically significant association between unit level safety and teamwork climates in the staff's viewpoint (Zadvinskis, Salsberry, Chipps, Patterson, & Crea 2018). Specific critical care areas, such as the emergency department and critical care, have also had similar research that showed SPHM training would decrease injuries; however, the education was incomplete for staff in those areas (Lee, Faucett, Gillen, Krause, & Landry, 2010; Resnick & Sanchez, 2009). A recent study noted that medical surgical units experienced more adverse events than any other unit and were rated the highest rate of patient falls with injuries than any other unit nationally (Bouldin, et al., 2013; Zadvinskis, Salsberry, Chipps, Patterson, & Crea, 2018). Further research has shown that occupational injuries are related to patient handling and common in nursing home employees, especially a higher rate for nursing assistants rather than nurses in long term care environments (Kurowski, Buchholz & Punnett, 2014; Lahiri, Latif, & Punnett, 2010). Research dispels common myths that SPHM does not cross over into the rehabilitation environment as noted by their findings, rehabilitation professionals favor traditional patient transfer and mobility methods and abandoned evidence-based patient handling practices (Nelson,

Harwood, Tracey & Dunn, 2008). Studies show that the ANA and the VA have partnered with the Association of Rehabilitation Nurses Association to advocate for safe environments (Nelson, 2008). Physical therapist in this type of environment required education regarding SPHM as therapists also had misperceptions regarding SPHM in the same manner as nursing staff (Olkowski & Stolfi, 2014). With international and national SPHM ANA standards, there are gaps in the research to specific areas related to staff education and evaluation of the SPHM programs.

Identification of Gaps in Literature

Current gaps in the literature are well documented and support the proposed DNP practice project to examine the knowledge, attitude and perception of nursing staff towards the standard of care for patient mobility. Although evidence supports SPHM programs, there exist gaps in the research regarding several issues. With the adoption of SPHM technology and equipment, there is evidence that WSD injuries are reduced; however, it is not stated how safe equipment is for the patients (Elnitsky, Lind, Rugs, & Powell-Cope, 2014). Throughout the research, healthcare facilities struggle to provide effective education to encourage staff participation with evidence-based practices at different patient care levels (Teeple, et al., 2017). Communication is cited as a barrier and noted by the Joint Commission as the most frequent root cause analysis of sentinel events in 2010 (Turkelson, Aebersold, Redman & Tschannen, 2017). Despite decades of evidence-based guidelines regarding safe patient handling, barriers are noted in the research to the effectiveness of staff translating the SPHM guidelines and algorithms into everyday practice. There still exists a need in the research for evaluating the training program content and to investigate the effectiveness of the competency-based training

provided (Hignett & Crumpton, 2005; Thomas & Thomas 2014). This project will focus on the gaps that exist in assessing the staffs' perception of the barriers they perceive and assess their attitudes towards the use of SPHM standards, specifically on the orthopedic unit.

After careful examination of unit specific nursing MSD injuries to orthopedic nurse, the National Association of Orthopaedic Nurses (NAON) formed a task force partnering with the VA, the NIOSH and the ANA to identify high risk tasks performed in the orthopedic setting to develop evidence-based solutions to minimize the risk of MSD's (Sedlak, Doheny, Nelson & Waters, 2009). Nelson (2009) remarked that NAON has emerged as one of the leaders in establishing methods to protect orthopedic nursing staff from the risks involved with patient handling. The NAON initially created four algorithms and one clinical tool as a foundation but in 2016 updated to a total of six orthopedic specific SPHM algorithms. The shift in research by the NAON from the areas of SPH towards implementing new research and technology to overcome the barriers to change behavior that includes knowledge and skill gaps associated with SPHM education (Nelson, 2009). This project will address the gaps in evaluating the teaching methods of staff to determine if communication and education was retained and effective. There also exists a gap regarding modification of existing SPHM programs after the evaluation of the teaching methods to determine areas lacking in staff education that need to be evaluated.

Summary

Review of the literature supports the need for ongoing safe patient handling and movement programs to create a culture of safety for the patient that is a prevalent goal

both nationally and internationally (Hallmark, Mechan & Shores, 2015). Numerous studies support the implementation of successful SPHM programs and legislation; however, patient handling injuries and staff injuries are still occurring. Basic knowledge of hospital policies and standards is not sufficient education to create a culture of safety. Organizations need to provide the initial and the ongoing training of the staff (Elnitsky, Powell-Cope, Besterman-Dahan, Rugs, & Ullrich, 2015). The major gaps in the research are the knowledge, skill and attitude of the staff post the initial training.

Chapter 3

Methods

Evidence-based practice (EBP) implementation improves the quality of the health care provided. The literature notes that when direct care providers are actively involved in the change process through communication, feedback, training, sustained effort and attention, and involved in a learning environment, evidence-based practice is successfully implemented (Huber, 2018). Integrating evidence-based knowledge into practice fails when direct care providers cannot implement the results of quality research into practice (McEwen & Wills, 2014). Addressing the gaps in staff knowledge regarding Safe Patient Handling and Mobility (SPHM) algorithms using scientific evidence as the standard of care on the orthopedic unit involved a quality educational program. The purpose of the DNP quality improvement project was to increase the orthopedic nurses' knowledge on fall risk assessments and the application of the SPHM algorithm, to improve the nurses' attitudes about the utilization of fall risk assessments and the SPHM algorithm, to increase the nurses' documentation of patient's fall risk assessments and decrease patient fall rates.

Project Design

There were three components involved with this project that addressed the planning, implementation and evaluation phases. Implementation of this DNP project involved a process of promoting the systematic application of evidence-based practice (EBP) knowledge into practice to improve the quality of care (Nilsen, 2015). Staff participating in the project each received the educational program along with the

pre/post- survey questionnaires to evaluate the effectiveness of the SPHM quality education program of the identified gaps in knowledge. A nurses' knowledge, attitude and beliefs about evidence-based practice (EBP) can play a crucial role to the extent to which EBP is implemented (AbuRuz, Hayeah, Al-Dweik, & Al-Akash, 2017). A quantitative design for this project allowed analysis to be conducted by entering data collected from the questionnaires into Microsoft Excel to eliminate inconsistencies. The data was transferred to a *Statistical Package for the Social Sciences* (SPSS®) vs. 26 software for data analysis.

Project Setting

The project setting was a 30-bed licensed acute care adult inpatient orthopedic unit within a 319-bed facility in West Florida. Implementation of the DNP scholarly project met all the ethical standards for quality improvement as dictated by the Institutional Review Board (IRB) approval at the university (Appendix A). Key stakeholders included the frontline orthopedic nursing staff, orthopedic manager, orthopedic educator, administration and quality directors. Success of a project was largely dependent on the key stakeholders and their acceptance and support of the project. See Appendix B for a copy of stakeholder's commitment letter.

Project Participants

Inclusion Criteria. For this project, the participants included fulltime registered nurses (RN) who worked on the acute care adult inpatient orthopedic unit in direct patient care. A total of fourteen registered nurses participated in the project.

Exclusion Criteria. Registered nurses who floated to the orthopedic unit, were per-diem not engaged in direct patient care or had been on leave during the past twelve months were excluded from this DNP project.

Ethical Considerations

The principles of healthcare ethics include nonmaleficence, beneficence, fidelity, integrity, justice, confidentiality, and autonomy (Ingham-Broomfield, 2017). Ethical considerations for a Doctor of Nursing practice (DNP) evidence-based project are vital to ensure the quality goals of the proposed DNP project. Considerations were given to the rights of participants, their respect and privacy, to the protection from harm and to voluntary consent. Confidentiality was maintained during the informed consent process as participants were informed of the precautions that will be taken to protect the confidentiality of any data and who will have access to that data. Informed consent communicated the project's commitment to transparency, which identified any potential risk and benefits (Appendix C).

The project utilized questionnaires in a pretest/posttest format while using codes on the data documents instead of the participants identifying information, which were locked in a separate location with restricted access. Any personal information was kept private and confidential. Maintaining anonymity and confidentiality, especially with sensitive information that may be obtained must be handled with respect and in a manner that enhances trust (Hiriscou, Stadler, & Reiter-Theil, 2014). The quality improvement project was exempt from IRB approval according to the guidelines by the University. There were no significant changes to the project after approvals were obtained.

The Health Insurance Portability and Accountability Act of 1996 (HIPAA) establishes the conditions under which protected health information may be used or disclosed. Protected health information (PHI) included an individual's demographic information, social security number, address and other information that could identify an individual (Craig, 2017). Encryption methods were used on any portable laptop devices with updated software to protect against malware. Access to any data was restricted through the use of password protection for electronic data and the use of a locked filing cabinet to restrict unauthorized access. The data was kept secure by use of codes in place of names and stored securely with only this student's access and kept secure as required by the University. Data was only released if necessary for the completion of the project. At which time, hard copy data stored in the locked cabinet was shredded. Electronic data will be destroyed by a computer retailer to have the data erased from the hard drive. All data will be kept for 36 months from the end of the project and destroyed after that time by shredder.

Instrument

The measurement instrument was based on the Theory of Planned Behavior (TPB) Pre- and posttest questionnaires followed a Likert-style format to gather valid and reliable information from the orthopedic nurses that addressed specific questions regarding the nursing attitudes and beliefs in regard to utilizing the safe patient handling and mobility standard of care. Answers to these questions directed the intervention aspect of the project that focused at the behavioral, normative or the control of present belief system to address gaps in knowledge to complete evidence-based educational programs.

Project Phases and Objectives

The project objectives focused on creating and implanting an evidence-based training program to increase the orthopedic nurse's knowledge and improve their attitude regarding the use of the SPHM algorithms. Specific phases of the objectives and how they were measured are outlined below:

Projective Objectives

Objective One. Conducted a needs assessment to address gaps in the knowledge, skills or practices of the orthopedic nurses by performing a patient chart audit of falls risk assessment and safe patient handling documentation by the orthopedic nurses per policy of the facility on admission to the unit.

Objective Two. Developed an evidence-based training program on SPHM as the standard of care for mobility and safe patient transfers. Synthesized evidence from literature review for the current evidence of safe practices and national standards of care for the orthopedic nurse for safe patient handling and mobility standard of care.

Objective Three. Assessed orthopedic nurses' knowledge and attitudes regarding SPHM algorithms as the standard of care and fall risk documentation knowledge via a pre-questionnaire.

Objective Four. Reviewed findings of pretest questionnaire to determine the gaps in knowledge on the use of the SPHM algorithms and fall assessment documentation. Presented evidence-based educational training sessions for the orthopedic nurses regarding the knowledge gaps from the pretest questionnaire.

Objective Five. Re-evaluated orthopedic nurses' knowledge and attitude in SPHM standard of care and evaluate the effectiveness of the educational program.

Objective Six. Implemented SPHM algorithms as standard of care to reflect the current evidence-based practice.

Objective Seven. Conducted a retrospective chart review for fall risk assessment documentation and SPHM practices post education.

Objective Eight. Analyzed fall rates 2 months prior to educational program and 2 months post training and fall risk documentation.

Objective Nine. Disseminated project findings with stakeholders. Presented findings to stakeholders for adoption of SPHM algorithms into practice on the orthopedic unit.

Outcome Measures

Objective One. Thirty charts were reviewed for completion of documentation for a fall risk assessment on admission and documentation of the safe patient handling risk assessment on admission, which showed Morse Falls risk assessment was not completed in four of the thirty charts on admission. Only four of the thirty charts had documentation of the safe patient handling risk scale that was ordered on admission. The Safe Patient Handling (SPH) fall risk assessment included defining terminology such as independent transfer, minimal assist, partial assist and if the patient is dependent for levels of assistance needed for the individual patient. Scoring categories included level of assistance, level of cooperation, patient's weight bearing ability, bilateral upper extremity strength, medications affecting movement, and conditions that would affect patient

transfer. Types of conditions included medical criteria, presence of wounds, splints and tubes for example. In contrast, the Morse Fall risk scored level of fall risk only.

Objective Two. A knowledge-based training program was developed utilizing the National Association of Orthopedic Nurses (NAON) algorithms and the hospitals policy regarding utilizing the Safe Patient Handling and Mobility algorithms as the standard of care for the transfer of patients to prevent falls.

Objective Three. Information was obtained from a pre-questionnaire survey that identified gaps in nursing knowledge regarding the Safe Patient Handling Algorithms, attitudes towards the use of the algorithms, and the documentation of fall risk and safe patient handling risk assessments.

Objective Four. After meeting with the orthopedic educator, only the NAON (2016) algorithms were specifically reviewed within the educational program to comply with the policy of the orthopedic unit (Appendix D). Fifteen-minute educational sessions were offered throughout various shifts to the participant nursing volunteers who completed the pre-questionnaire. All fourteen nurse volunteer participants attended the sessions with an additional educational session offered to any staff who wanted to attend per request of manager and educator of the unit.

Objective Five. The nursing participants were given the pre-questionnaire again as a post-questionnaire to evaluate the orthopedic nurses' knowledge and attitudes post educational offering. Post questionnaire findings were evaluated using descriptive statistics paired *t-test* with $p < 0.05$ to determine any statistically significant changes in the improvement of the knowledge of SPHM as the standard of care for patient transfers and mobility.

Objective Six. NAON algorithms were present within the orthopedic unit policy and competency validation checklist for orthopedic nursing, which reflected the current evidence-based practices.

Objective Seven. A retrospective chart review was conducted post education for fall risk assessment documentation and SPHM practice documentation. It was noted that 29 of 30 charts reviewed did document a Morse fall risk assessment per policy on a patient's admission to the orthopedic unit. Only 5 of the 30 charts completed the SPH fall risk documents as ordered on admission post education.

Objective Eight. The inpatient fall rates were analyzed with the assistance of the manager and quality manager two months prior to the educational offerings and two months post education training. A decrease in patient fall rates on the orthopedic unit along with an increase in fall risk assessment documentation improved the quality of care delivered to patients. There was no significant increase in the SPH fall risk documentation noted. However, there were no documented patient falls for twenty days immediately post education training.

Objective Nine. Preliminary project findings were reviewed with key stakeholders and final project findings presented post statistical analysis.

Timeline

The implementation of the project began as soon as approval was received in January 9th, 2019. The end of the implementation cycle was May 5th, 2019. Table 1 displays timeline of project.

Table 1

Timeline for the DNP Project

Task	January	February	March	April
Plan	Plan Approval			
Implementation	-Needs assessment -Develop training program -Chart Audit -Meet with key stakeholders	- Implementation Continued -Recruitment -Survey Nurses -Meet with key stakeholders on unit to initiate educational program	- Implementation Continued -Educational program presentations -Implement SPHM algorithms into policy standards of care.	-Post survey of nurses -Chart review post education -Analysis of patient Fall rates continue to May
Educational Program		Develop educational program	Educational Programs presented	
Evaluation	-Pre-questionnaire -Chart Audit fall risk assessment -Obtain quarterly patient fall rates on orthopedic unit compared to facility rates.			-Post questionnaire -Chart audit fall risk assessment post education -Present Project results -Falls data post educational programs

Resources/Budget

The expenses for the project included the nurses' time for the fifteen-minute educational program during normal work hours, and the cost for supplies by the student.

Table 2 displays the budget for this quality evidence-based project.

Table 2

Budget for DNP Project

Item	Description of Work	Cost
Printing	Education materials	\$30.00
Presentation supplies (paper, photocopying)	PowerPoint, flyers	\$50.00
SPSS® software	Data Analysis	\$99.00
File Cabinet w/ key	Storage of paper documents	\$33.00
Transportation (gas to site)	Traveling to site	\$50.00
Total		\$262.00

Summary

The evidence-based quality project provided an opportunity to understand the attitudes and skills of the orthopedic nurses who participated in this project regarding the use SPHM algorithms as the standard of care. Chart audits prior to the pre-questionnaire provided data in regard to documentation of the facility's policy admission fall risk scoring of every patient on admission. Noting the lack of the safe patient handling documentation fall risk score provided a further gap in knowledge that was included in the educational program sessions. The pre-posttest questionnaires provided data

regarding the knowledge base of each participant before and after the quality education program and the effect of such education on the patient fall rate.

Chapter 4

Results and Discussion

The risk for patient falls continued when educational programs were completed. Additionally, there was no increase in SPH fall risk documentation after the project despite current scientific evidence-based guidelines and standards of care for SPHM. The purpose of this quality improvement project was to evaluate behavioral attitudes and intent regarding the orthopedic nurses' readiness and perception to document fall risk assessment with the SPH assessment on each patient, in addition to the required Morse Fall risk tool. Attitudes of the orthopedic nurse in regard to how they valued the SPH and fall risk assessments was evaluated along with the subjective norm regarding the perceived pressure to engage or not to engage in documenting both the fall risk assessment and the SPH assessment and algorithms for transferring of patients. Further, the behavioral control belief of the perceived presence of factors that may have facilitated or impeded the orthopedic nurses using both assessments for each patient was evaluated with the outcome evaluation regarding their understanding of both the SPHM algorithm and the fall risk assessment policy. Objectives of this project were assessed with the use of descriptive statistics. This chapter also includes the reliability test for the survey questionnaire that was used. The frequency distribution tables were used to explain the appropriateness of each question and reliability testing for the survey questionnaire used within this quality project.

Participating Staff

The fourteen participants in this quality project were full time orthopedic nurses who had the orthopedic unit as their home unit and had completed prior SPHM education assigned by the hospital. Nurses from all shifts and weekend shifts were included in the questionnaire and educational portion of this project. No per-diem registered nurses, contract nurses, or nursing assistants were included in the quality project.

Expected Outcomes

The theoretical basis for this project encompassed three concepts within the Theory of Planned Behavior (TPB) model of behavioral, normative, and control beliefs. Expected outcomes were that there would be a reported increase in knowledge of the safe patient handling and mobility algorithms after educational programs. An expected outcome in behaviors of the orthopedic nurses towards the use of SPHM assessments and algorithms use in daily practice would improve and that the patient fall rates would decrease post educational programs. Further outcomes expected an improvement in the perceived pressure to engage in documenting both the fall risk and SPH assessments by the nurses, and that there would be an increase in documentation of the fall risk and the SPH assessment in charts per policy of the unit.

- Thirty charts were audited for documentation of admission fall risk assessment completion on the patient record and a Safe Patient Handling (SPH) assessment completed on admission by orthopedic nurses on the orthopedic unit.

- Gaps in knowledge of the orthopedic nurses regarding the policy of the unit for documentation was added to the evidence-based training program on using SPHM as the standard of care.
- Pre-questionnaire surveys were administered to volunteer orthopedic nurse participants who consented to participate in the quality project during a two-week time frame of 2/20/19 to 3/6/19.
- Fifteen-minute quality improvement educational presentations held daily during staff huddles, lunch breaks, and change of shift breaks over a time period from 3/16/19 to 3/23/19.
- Post-questionnaire surveys were administered to volunteer orthopedic nurse participants who consented to participate in the quality project educational program during a two-week time frame of 4/1/19 to 4/13/19.
- Thirty charts were audited for documentation of admission Morse fall risk assessment completion on the patient record and a SPH assessment completed on admission by orthopedic nurses post educational programs.
- Patient fall rates were evaluated for January and February 2019 on the orthopedic unit prior to the educational program and fall rates for April and May 2019 on the orthopedic unit and verified with the quality director after the educational programs (see table 3). Completion of project occurred May 5th, 2019. When meeting with stakeholder post project, it was noted there were no patient falls twenty days during the educational time frame from 3/24/19 to 4/12/19.

Table 3

Monthly Reported Fall Rates

2018	Jan	Feb	Mar	Quarter 1	Aril	May	June	Quarter 2
	4	4	1	9	3	2	7	12
2019	Jan	Feb	Mar	Quarter 1	April	May	June	Quarter 2
	4	5	2	11	2	5	No data	7

Note: From hospital quality data fall rates per unit

Evaluation of outcomes

Project outcomes were determined by descriptive statistics to assess the objectives of the project and frequency distribution tables were used to explain the appropriateness of each question in the Theory of Planned Behavior (TPB) pre and post questionnaires. A common tool for measuring the internal consistency of the questionnaire is the Cronbach's alpha, which measured how well items in the questionnaire relate to each other.

Data Analysis

The questionnaire used for pre and post administration consisted of five (5) questions in regard to behavioral intent, two (2) questions with seven (7) subitems summed together to represent attitude towards the behavior asked in the question, three (3) questions in regard to the subjective norm of intent, three (3) questions in regard to perceived factors that facilitate or impeded the adoption of the SPHM algorithm and performing a fall risk assessment, and two (2) questions to determine the understanding of normative beliefs in a five (5) point Likert Scale (see Appendix E). The TPB questionnaire was adapted with permission from Dr. Icek Ajzen (see Appendix F).

Cronbach's Alpha

Table 4 illustrates the results of Cronbach's alpha for the Therapy of Plan Behavior Survey used. The α coefficient for the 28 questions suggested that the questionnaire has a relatively high internal consistency and acceptable to measure the variable asked of the orthopedic nurses towards safe patient handling and the fall risk scale.

Table 4

<i>Reliability Statistics</i>		
	Cronbach's Alpha Based on	
Cronbach's Alpha	Standardized Items	N of Items
.886	.886	28

Descriptive Statistics

Table 5 shows simple sample t-tests with SPSS®-26 calculation to compare the mean scores of the pre-questionnaire and post-questionnaire that was performed.

Table 5

Group Statistics Comparing Means of Pre-Post Questionnaires

	CELL	N	Mean	Std. Deviation	Std. Error Mean
	Prequestionnaire	14	16.4286	3.69437	.98736
	Postquestionnaire	14	19.8571	3.71809	.99370
	Prequestionnaire	14	23.0714	4.32282	1.15532
	Postquestionnaire	14	30.8571	3.63439	.97133
	Prequestionnaire	14	10.0714	3.31580	.88618
	Postquestionnaire	14	12.5000	2.40992	.64408
	Prequestionnaire	14	8.5000	1.65250	.44165
	Postquestionnaire	14	9.4286	2.34404	.62647
	Prequestionnaire	14	7.3571	1.82323	.48728
	Postquestionnaire	14	8.5000	1.50640	.40260

Note. Overall Mean scores pre and posttest questionnaire per each construct

An independent paired sample 2-tailed t-test was performed in SPSS® to compare mean responses of the participants before the educational program and again after the educational program. Levine's Test for Equality of Variances level of significance of α -value of 0.05 was performed for each of the question categories as noted in Table 6 below.

Table 6

Independent Samples Test for Equality of Variances and T-test Equality of Means.

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Attitude	Equal variances assumed	.314	-5.158	26	.000***	-7.78571	1.50939	-10.88831	-4.68312
	Equal variances not assumed		-5.158	25.255	.000	-7.78571	1.50939	-10.89277	-4.67866
Behavioral	Equal variances assumed	.247	-2.448	26	.021	-3.42857	1.40083	-6.30802	-5.4913
	Equal variances not assumed		-2.448	25.999	.021	-3.42857	1.40083	-6.30802	-5.4912
Subjective	Equal variances assumed	1.164	-2.217	26	.036	-2.42857	1.09552	-4.68044	-1.7670
	Equal variances not assumed		-2.217	23.738	.036	-2.42857	1.09552	-4.69093	-1.6621
Control Belief	Equal variances assumed	1.497	-1.211	26	.237	-.92857	.76650	-2.50413	.64699
	Equal variances not assumed		-1.211	23.362	.238	-.92857	.76650	-2.51283	.65569
Outcome Eval	Equal variances assumed	1.360	-1.808	26	.082	-1.14286	.63308	-2.44212	.15641
	Equal variances not assumed		-1.808	25.107	.083	-1.14286	.63308	-2.44438	.15866

Note. ***Construct of attitude indicates highly significant a $p < .001$.

Behavioral Intent

Five questions reflected on how the orthopedic nurse thinks and feel about using the SPHM algorithms as a standard of care to transfer patients and their intent to document per policy. The stronger the intention to engage in the behavior it is more likely nurses will perform the behavior. Figure 1 shows the results of the independent sample t-test pre-questionnaire ($M = 16.4286$, $SD 3.69437$, $n=14$) and post-questionnaire results ($M = 19.8571$, $SD 3.71809$, $n=14$) showed that a moderate behavioral intent to use and document using the SPHM documentation and the fall risk documentation after the educational program was not significant ($p=0.21$). Therefore, there was no statistically significant differences in behavior intention construct.

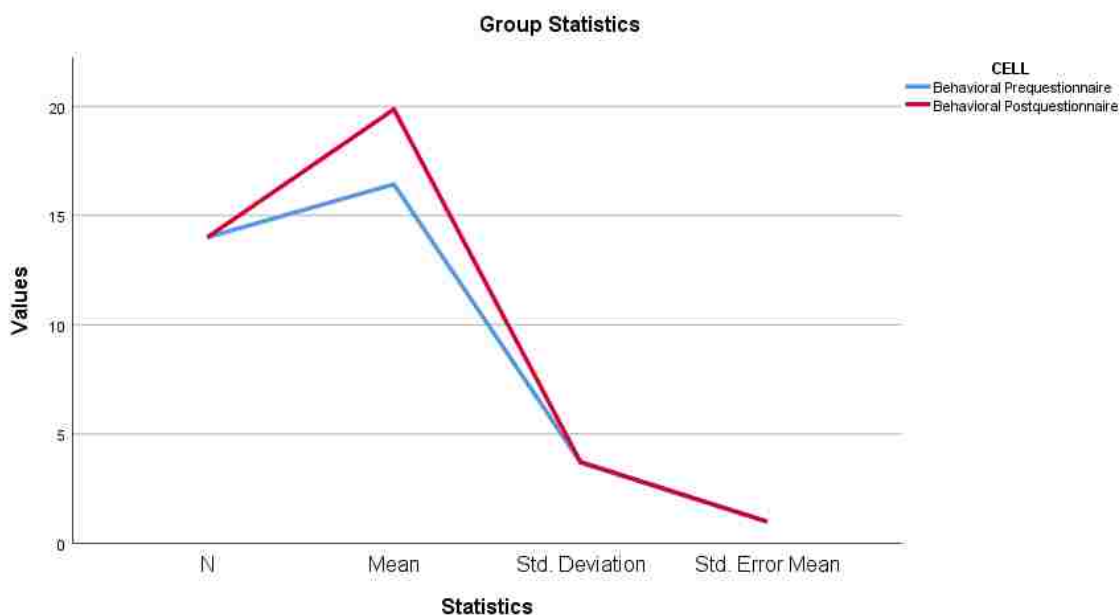


Figure 1. Mean amplitude for Behavioral Intent Pre and Post Questionnaire Results

Although there was no significant change in the behavioral intent of the orthopedic nurses, the mean behavioral intent amplitude indicated the orthopedic nurses'

readiness to use the SPHM algorithms for transferring of patients was greater following the educational offering as shown in Table 7.

Table 7

Group Statistics for Behavioral Intent

	CELL	N	Mean	Std. Deviation	Std. Error Mean
	Prequestionnaire	14	16.4286	3.69437	.98736
	Postquestionnaire	14	19.8571	3.71809	.99370

Attitudes

Two questions with seven sub- items summed together to represent attitude towards the behavior asked in the question. The extent to which the orthopedic nurse had a favorable or unfavorable appraisal toward their intention to use SPHM algorithms and documenting the fall risk assessment per policy of the unit and standard of care. This construct is the nurses' attitude towards the behavior as a favorable or unfavorable appraisal of the given behavior. Figure 2 shows results of the independent sample t-test pre-questionnaire ($M = 23.0714$, $SD 4.32282$, $n=14$) and post-questionnaire results ($M = 30.8571$, $SD 3.63439$, $n=14$). Results showed that the attitude to use and document using the SPHM documentation and the fall risk documentation was significant at the $\alpha < 0.05$ level of significance ($p < .001$) after the educational program.

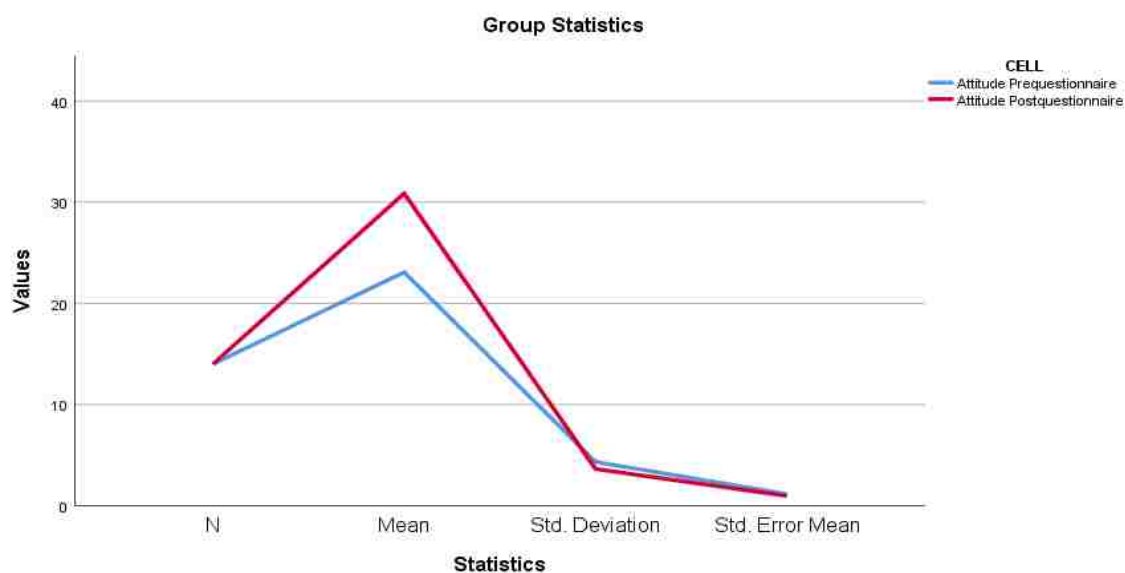


Figure 2. Mean amplitude for Behavioral Attitude Pre and Post Questionnaire Results

The attitude intent mean amplitude indicated the orthopedic nurses positively valued the use of the SPHM algorithms for transferring of patients with an increase in the mean after the educational program as it was evident in their mean score of 30.86 (SD=3.63) as seen in Table 8 below.

Table 8

Group Statistics for Attitude Intent

	CELL	N	Mean	Std. Deviation	Std. Error Mean
Prequestionnaire		14	23.0714	4.32282	1.15532
Postquestionnaire		14	30.8571	3.63439	.97133

Subjective Norm

Three (3) questions in regard to the subjective norm of intent to which the orthopedic nurses' intention is to use the SPHM algorithms and document fall risk per standard of care. Two types of predictor of intentions are the injunctive norms and the

descriptive norms. Injunctive norms are where others encourage the nurse to use SPHM and the descriptive norms where other coworkers may or may not use SPHM and approve or disapprove of the nurse performing the safe patient handling skills. This construct was the social pressure to perform or not to perform the given behavior. Figure 3 displays results of the independent sample t-test pre-questionnaire ($M = 10.0714$, $SD 3.31580$, $n=14$) and post-questionnaire results ($M = 12.5000$, $SD 2.40992$, $n=14$). The perceived pressure to engage or not to engage in documenting and utilizing the SPHM documentation and the fall risk documentation was not significant at the $p=.036$ level of significance following the educational program.

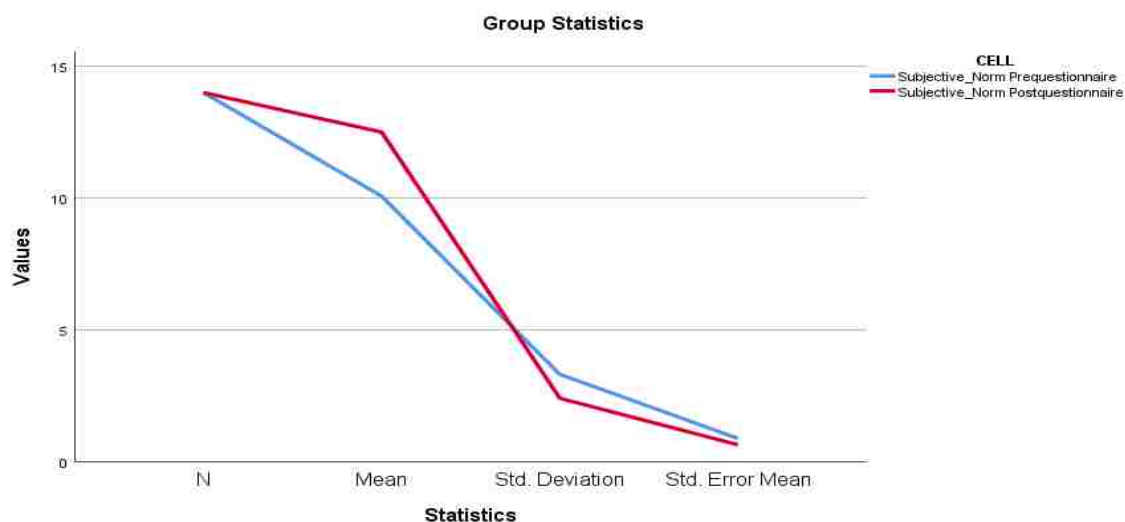


Figure 3. Mean amplitude for Subjective Norm Pre and Post Questionnaire Results

This mean amplitude subjective norm and normative beliefs scores were not a significant predictor of the nurses' intentions to use the SPHM standards of care and to document the fall risk assessment per policy and standard of care was of low influence after the educational program (Table 9).

Table 9

Group Statistics for Subjective Norm and Normative Beliefs

	CELL	N	Mean	Std. Deviation	Std. Error Mean
	Prequestionnaire	14	10.0714	3.31580	.88618
	Postquestionnaire	14	12.5000	2.40992	.64408

Control Belief

The next three (3) questions regarded the perceived behavioral control factors that facilitate or impeded the adoption of the SPHM algorithm and performing a fall risk assessment. Control beliefs are the perceived presence of factors that may impede or facilitate using SPHM. The construct of perceived behavioral control plays a key role in regard to the perception of the difficulty or ease of performing the behavior. Figure 4 displays results of the independent sample t-test pre-questionnaire ($M = 8.5000$, $SD = 1.65250$, $n=14$) and post-questionnaire results ($M = 9.4286$, $SD = 2.34404$, $n=14$). Results that the perceived presence of factors that may contribute to behavioral control in performing safe patient handling was not significantly different at the $\alpha < 0.05$ level of significance ($p = .237$) after the educational program.

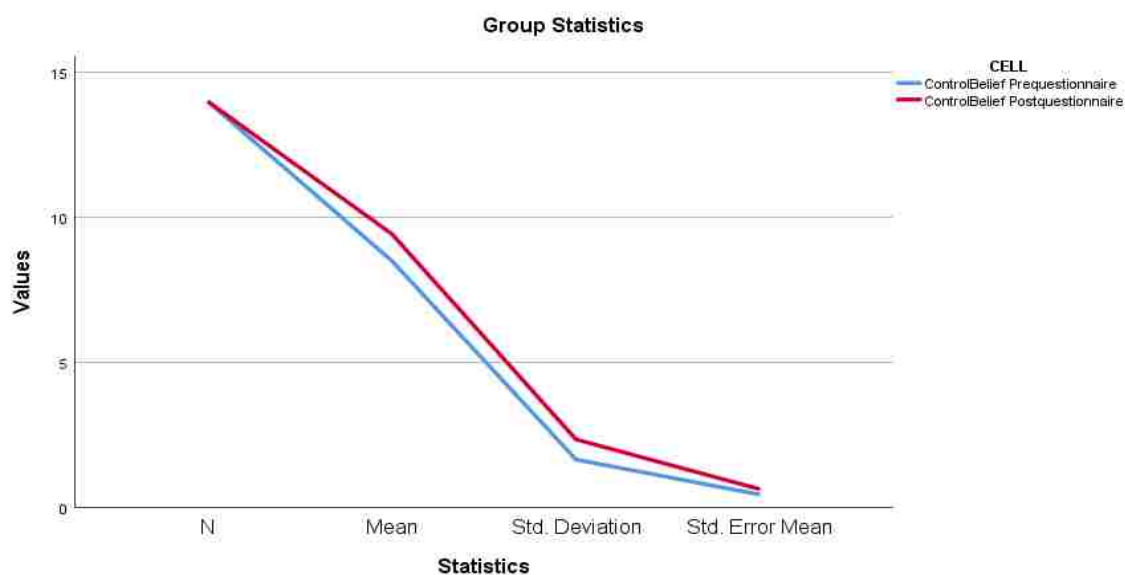


Figure 4. Mean amplitude for Control Belief Pre and Post Questionnaire Results

The orthopedic nurses' beliefs of factors that control or may influence their decision to use or not to use SPHM algorithms was not significant ($p=.237$) (see Table 10).

Table 10

Group Statistics Behavioral Belief

CELL	N	Mean	Std. Deviation	Std. Error Mean
Prequestionnaire	14	8.5000	1.65250	.44165
Postquestionnaire	14	9.4286	2.34404	.62647

Outcome Evaluation

The final two (2) questions to determine the understanding if the expected outcome of using the SPHM algorithms and the fall risk documentation is good or bad beliefs for the orthopedic nurse. Figure 5 displays results of the independent sample t-

test pre-questionnaire ($M = 7.371$, $SD 1.82323$, $n=14$) and post-questionnaire results ($M = 8.5000$, $SD 1.50640$, $n=14$). Results showed that the knowledge to use and document using the SPHM documentation and the fall risk documentation was not significantly different at the $\alpha = 0.05$ level of significance ($p = .082$).

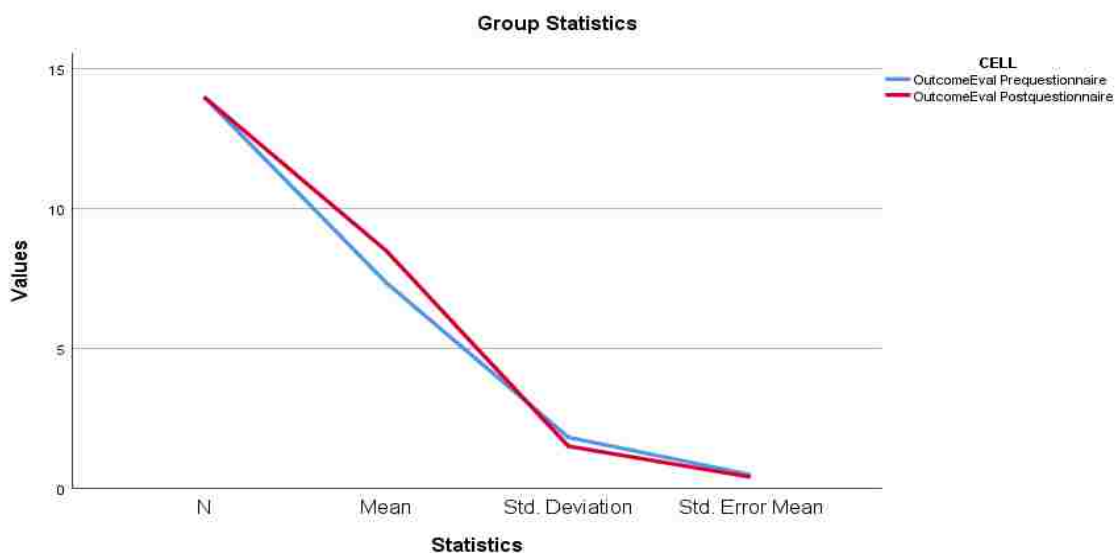


Figure 5. Mean amplitude for Outcome Eval Pre and Post Questionnaire Results

Although there was no significant change in the subjective norm of the orthopedic nurses, the mean amplitude for the outcome evaluation were not significant to determine the expected outcome of using SPHM algorithms and the SPH fall risk documentation as a good or bad belief as a standard of care (see Table 11).

Table 11

<i>Group Statistics Outcome Eval</i>					
	CELL	N	Mean	Std. Deviation	Std. Error Mean
	Prequestionnaire	14	7.3571	1.82323	.48728
	Postquestionnaire	14	8.5000	1.50640	.40260

Discussion

Safe Patient Handling and Mobility (SPHM) algorithms reflect the standards of care of national organizations such as the National Organization of Orthopedic Nurses (NAON) and the Occupational Safety and Health Administration (OSHA) to prevent patient falls. The NAON algorithms are reflected within the policies of the project hospital orthopedic unit for any patient transfer activity. The theoretical basis for implementing a continued SPHM policy reflects an evidence-based practice that decreases patient falls. Discussion of the findings above from the Theory of Planned Behavior questionnaire reflected the attitudes, behaviors and intent of the orthopedic nursing staff to use SPHM as the standard of care.

The findings from the pre- and post- questionnaires, the primary strength of the project that produced statistically significant improvement was attitudinal intent toward the orthopedic nurse to use the SPHM algorithms for transferring of patients and to correctly document the Morse fall assessment and the SPH assessment as the standard of care. This attitude intent indicated the orthopedic nurses positively valued the use of the SPHM algorithms for transferring of patients after the educational program.

The constructs of behavioral intent, subjective norm, control belief and outcome evaluation were not statistically significant. The orthopedic nurses did not perceive external factors or leadership significantly influencing their ability to perform SPHM and to complete the fall risk assessment documentation of both the SPH and the Morse fall risk assessment. With a small sample size, there may be an issue of not enough statistical power to detect relationship between control belief and outcome evaluation results.

Control beliefs include the presence of factors that may facilitate or hinder staff from completing documentation and further research is needed.

Both the normative belief and the behavioral categories to comply with the standard of care did not indicate the intention of the orthopedic nurse to document SPH assessment. Further evidence was noted by the retrospective chart review that indicated there was no significant increase in either the documentation of fall risk through the Morse fall scale or the SPH assessment as required on admission. Results reflected the orthopedic nurses felt they had the ability to meet the demands of using the algorithms in daily practice and had strong attitudinal intention to engage in the behaviors of using the algorithms as the standard of care at the bedside. There were no patient falls twenty days during the educational sessions. The orthopedic nurse's perception of the standard of care for safe patient handling did produce good quality patient outcome benefits during the quality project. However, further research is needed to determine the effectiveness of having two fall assessment documentation requirements and factors that impede staff from completing both risk assessments on each patient.

Lewin's model "change process"

Lewin's change theory's first step of "unfreezing" was successfully demonstrated by the staff's awareness of the need to change behaviors as the patient fall rate decreased immediately following and during the educational sessions. The pre and post chart audits revealed that the nursing staff were not routinely documenting both fall risk scales with each patient. Nursing staff understood the Morse Fall risk assessment policy, but, not the SPH policy for documentation. During the unfreezing stage, the nursing staff maintained

old behaviors regarding the standing order to document the Morse Fall Scale with each admission.

During the moving phase of Lewin's theory, the organization began to update the fall prevention policy, which included on-going education regarding SPHM algorithms as the standard of care on the orthopedic unit. This stage was not achieved as nursing documentation and the integration of the SPHM standard of care did not show an actual change in practice. The overall effectiveness within practice change during the refreezing stage evaluated the nurse's ability to be involved in the process of re-assessing criteria standards for safe patient handling. Ongoing support of the orthopedic nurses is vital to ensure that the staff members are comfortable with the SPHM algorithms and with the incorporation of adequate documentation.

Strengths and Limitations of the Project

Strengths

A noted strength of this project was a heightened awareness of the orthopedic nursing staff knowledge on safe patient handling to prevent falls. Patient falls were reduced during the educational sessions. The orthopedic nurses had a positive attitude to promote optimal patient outcomes by reducing patient falls. Education of the staff provided evidence for effective use of the SPHM algorithms for safe patient transferring at the bedside with no patient falls. The orthopedic nurses' who took part in this quality improvement project had never been involved in an evidence-based practice (EBP) project. This project provided an insight into how increasing EBP knowledge affected the standards of care of the patient.

Limitations

Limitations of this project included a short timeframe for the project and a small sample size. Generalizations to larger groups of nursing could not be made as the educational sessions were only made available to full time registered nursing staff on the orthopedic unit. The exclusion of part time nurses, contract nurses, and the nursing assistants in the educational programs created a dearth within this group of employees on the orthopedic unit regarding SPHM. Including all staff within this quality project might have provided a collaborative team effort for success of safe patient handling as the standard of care.

Implications for Nursing Practice

This project provided insight into the attitudes and behaviors of the orthopedic bedside nursing staff to use an evidence-based algorithm for fall prevention. On-going education regarding SPHM algorithms as the standard of care needed to be required. The involvement and support of the organization and management staff impacts the success of the fall prevention protocols and standards of care. Nursing staff requires management's clarification regarding the documentation of a patient's fall risk using two mandatory assessment tools within the electronic record. Both the Morse Fall risk assessment and the SPH assessment were a standing order for nursing to complete on each patient on admission and each shift. An area of quality improvement would be to discuss the effectiveness of each tool to benefit the patient in preventing falls and eliminate redundant charting and use the tool that had better outcomes.

Scientific Underpinnings for Practice

Nursing science frames the development of evidence-based practices based on nursing theories for evolving scientific practices (AACN, 2006). During the implementation process, it was crucial to consider obstacles, such as nursing staff's lack of research involvement, and adjust the process and evaluate outcomes to improve the delivery of safe patient transfers to prevent patient falls.

Organizational and Systems Leadership

Organizational and systems leadership emphasizes ongoing improvement of health outcomes and ensuring patient safety (AACN, 2006). Essential to this project was the impact safe patient handling practices have on policies of the orthopedic unit to improve the quality of care through the application of evidence-based practice algorithms. With the reduction of patient falls within the hospital, on an organizational level, the cost of extended length of stay would also be reduced if continued education is offered to nurses.

Clinical Scholarship and Analytic Methods

An extensive literature review process was performed to search databases for scholarly research-based evidence for SPHM algorithms as the standard of care. During this quality project, focus was on the examination of the orthopedic nursing staff's knowledge, perception and attitudes towards safe patient handling standards of care. The synthesis of evidence-based research provided an understanding of the gaps in knowledge of the staff. Dissemination of findings to key stakeholders include the orthopedic educator, orthopedic manager, and administration of the facility that will result in collaborative knowledge sharing.

Information Systems/Patient Care Technology

To apply new knowledge requires assessment of information through the use of information systems and technology. The setting for this project was an acute care hospital orthopedic unit with access to the electronic charting system for record documentation of the fall risk assessments. Both the Morse Fall Scale and the SPH fall risk assessment tools were in place and both had a standing order for admission assessment.

Healthcare Policy for Advocacy in Healthcare

Health care policy and the commitment to policy development that influences the quality of care are essential for the reduction of patient falls. Safe patient handling laws, rules, and regulations are enacted in eleven states from 2003 to 2016 (Choi & Cramer, 2016). Further research is needed to determine if state versus federal safe patient handling laws will have a major impact on injury prevention and safe work practices. The American Nurses Association (ANA) has also released national standards in regard to safe patient handling and mobility for health care professionals and supports a federal bill to eliminate manual patient handling (Choi & Cramer, 2016).

Interprofessional Collaboration

Interprofessional collaboration during this project occurred between the educator, manager, administration, and the staff of the orthopedic unit at an acute care hospital. This project involved working with professionals with a similar background of inpatient rehabilitation patient transfers as this student. Effective collaborative skills guided practice skills and standards of care.

Clinical Prevention and Population Health

The focus of this project was to evaluate a quality health promotion component of safe patient handling for the prevention of patient falls. Patient falls are a high-risk challenge and fall prevention national strategies involve managing patient risk factors that include safely transferring a patient. Adherence to safe patient handling and mobility guidelines improve quality of care and promote positive behaviors in nursing staff to prevent injuries to patients and to staff when transferring a patient. Evidence-based practice SPHM standards are translated into the unit's policy on patient transfer.

Advanced Nursing Practice

The aspects of this project demonstrated advancement of nursing practice to evaluate evidence-based care to improve patient outcomes and guide other nurses to achieve excellence in nursing practice using safe patient handling algorithm in patient care. It was evident with the evaluation of this quality improvement project that the educational program provided nursing the behavioral intent to practice SPH at the bedside to prevent falls. Future quality improvement programs for SPH would need to be on-going with policy adjustments as needed to ensure continued quality outcomes.

Summary

The purpose of this DNP project was to evaluate the knowledge and behavioral attitudes of orthopedic nurses to use SPHM algorithms as the standard of care. Further, the purpose of the DNP project was to also evaluate if SPHM educational programs influenced the patient fall rates. The findings revealed that the orthopedic nurses have the intent and knowledge to perform care based on the evidence that supports safe patient handling and mobility transfers. Orthopedic nurses gained an understanding of the

concepts involved in their standard of care to perform safe patient handling; however, no change in their documentation habits reflected the need for change in practice. Patient fall rates decreased with educational influence and continued SPHM education needs to be included in daily huddles, staff meetings, and competency skills of the orthopedic nurse. More research would be needed to focus on the effectiveness of using the SPH fall risk tool and algorithms based on evidence-based practice to prevent falls instead of the Morse Fall Risk Scale. Safe patient handling and mobility is a national issue with pending national legislation to prevent work injuries and patient falls. Every acute care hospital unit can benefit from utilizing the assessment guidelines for fall prevention and educating all nursing on those benefits.

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Appendix A

MEMORANDUM

To: Terry Doire

From: Vanessa A Johnson, Ph.D.,
Center Representative, Institutional Review Board

Date: December 3, 2018

Re: IRB #: 2018-633; Title, "Evaluating the Knowledge and Attitudes of Orthopedic Nurses Regarding the Use of SPHM Algorithms as a Standard of Care"

I have reviewed the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review under 45 CFR 46.101(b) L Exempt 2: Interviews, surveys, focus groups, observations of public behavior, and other similar methodologies. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

- 1) **CONSENT:** If recruitment procedures include consent forms, they must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.
- 2) **ADVERSE EVENTS/UNANTICIPATED PROBLEMS:** The principal investigator is required to notify the IRB chair and me (954-262-5369 and Vanessa A Johnson, Ph.D., respectively) of any adverse reactions or unanticipated events that may develop as a result of this study. Reactions or events may include, but are not limited to, injury, depression as a result of participation in the study, life-threatening situation, death, or loss of confidentiality/anonymity of subject. Approval may be withdrawn if the problem is serious.
- 3) **AMENDMENTS:** Any changes in the study (e.g., procedures, number or types of subjects, consent forms, investigators, etc.) must be approved by the IRB prior to implementation. Please be advised that changes in a study may require further review depending on the nature of the change. Please contact me with any questions regarding amendments or changes to your study.

The NSU IRB is in compliance with the requirements for the protection of human subjects prescribed in Part 46 of Title 45 of the Code of Federal Regulations (45 CFR 46) revised June 18, 1991.

Cc: Marcia Derby-Davis
Vanessa A Johnson, Ph.D.

Appendix B

Stakeholder Commitment Letter



To: [Redacted]
 DNP Program Director
 College of Nursing
 Nova Southeastern University

I have read and approve the DNP project entitled, *Evaluating the Knowledge and Attitudes of Orthopedic Nurses Regarding the Use of SPHM Algorithms as a Standard of Care*, by Terry Doire and give consent for the study to be conducted at or through [Redacted] Hospital.

[Redacted Signature Line]

Signature _____ Date _____
 Title of person signing (representing the authority to give institutional permission)

[Redacted Title]

The institution may add any other appropriate requirements, so long as information regarding the study is shared with staff of the agency after the completion of the study, etc.

Appendix C

General Informed Consent Form



General Informed Consent Form
NSU Consent to be in a Research Project Entitled
Evaluating Knowledge & Attitudes of Orthopedic Nurses
Regarding the Use of SPHM Algorithms as a Standard of Care

Who is doing this evidenced-based project?

College: Nova Southeastern University, the Ron and Kathy Assaf College of Nursing

Principal Investigator: Terry Dolne, RN, MSN, CRRN

Faculty Advisor/ Dissertation Chair: Marcia Derby-Davis, Ph.D., RN

Co-Investigator(s): None

Site Information: [REDACTED]

Funding: Unfunded

What is this project about?

This is an evidence-based project regarding nursing knowledge and attitudes towards safe patient handling and mobility (SPHM) algorithms as a standard of care on the orthopedic unit to decrease the number of falls per 1000 patient days. Health care workers are ranked among one of the top occupations with musculoskeletal disorder injuries. Nurses significantly influence the quality of care provided, especially when working on an orthopedic unit that requires safe patient handling and mobility with transferring a patient.

This form is part of a process called "informed consent" to allow you to understand this project before deciding whether to take part. Before you decide to participate, it is important for you to understand what participation consists of and the purpose of this project. The data collected will provide useful information regarding knowledge of safe patient handling and mobility.

Why are you asking me to be in this project?

As an orthopedic nurse, you are being asked to participate in this project because of your experience working with the safe patient handling and mobility algorithms for patient transfers. It is expected that twenty nurses from your orthopedic unit will be enrolled to participate in this project.

What will I be doing if I agree to be in this project?

While you are taking part in this project, you will be asked to fill out an on-line pre-test questionnaire regarding your knowledge of the 5PHM algorithms for safe patient handling. On-line questionnaires will only take 10-15 minutes to complete. From that first questionnaire, you will be asked to attend an educational session regarding any educational gaps noted from the first questionnaire. A post-test questionnaire will be administered after the educational session. There is minimal risk of being identified by demographic information provided in the questionnaire. Your participation in this project is completely voluntary and you may choose not to participate without any penalty. If you choose to participate, you may withdraw your participation at any time during the survey. Completion of the questionnaire will serve as your consent to participate. Participants that will be eligible include registered nurses and licensed practical nurses who work fulltime, part-time and per-diem with the orthopedic unit as their home base.

Are there possible risks and discomforts to me?

Being in this type of project involves minor discomforts that can be encountered in daily life such as fatigue, stress, or becoming upset. Being in this project will not pose risk to your safety or wellbeing.

What happens if I do not want to be in this project?

This evidence-based project is voluntary. You are free to accept or turn down the invitation. If you decide to leave or do not want to participate in the project anymore, you will not be penalized or lose any services you have a right to. If you choose to stop being in the project before the project is completed, any information concerning your individual information collected before the date you leave will be kept in the research record for 36 months from the end of the project and may be used as part of the research.

What if there is new information learned during the project that may affect my decision to remain in the project?

If significant new information relating to the evidence-base practice project becomes available, which may relate to whether you want to remain in the project, this information will be given to you by the investigator. You may be asked to sign a new informed consent form if the information is given to you after you have joined the project.

Are there any benefits for taking part in this project?

There will be no direct benefits to you for participating in this project, however, we hope that the evidence-based knowledge information learned from this project will increase your knowledge and quality of care as an orthopedic nurse.

Will I be paid or given compensation for being in this project?

You will not be given any payments or compensation for participating in this quality improvement project.

Will it cost me anything?

There will be NO cost to you for participating in this project.

How will you keep my information private?

Results coming out of this project will be handled in a confidential manner, within the limits of the law and will be limited to people who have a need to review this information. Your responses will be anonymous. Information obtained about you in this project will be handled in a confidential manner. The Institutional Review Board (IRB) is a group of people who review the project to protect your rights. The results of the project will be available to the investigator, the Institutional Review Board and other representatives of the institution, and any regulatory and granting agencies. If we publish the results of the project in a scientific journal or book, we will not identify you. All confidential data will be kept securely lock away in the DNP investigator's possession only accessible to the DNP student. All data will be kept for 36 months from the end of the project and destroyed after that time by a shredder.

Whom can I contact if I have questions, concerns, comments, or complaints?

If you have a question about your rights as a participant, or you would like to discuss problems or concerns, have questions, or want to offer input, or you want to obtain additional information, you should contact the Chairperson of the IRB at the facility. If you have questions now, feel free to ask us. If you have more questions about the project, your rights during the project, or have a project related injury, please contact:

Primary Contact:

Should you have any questions about the project or anything else related to the project, please contact me, Terry Doine can be reached at [REDACTED] during and after normal work hours.

If primary contact is not available, contact:

Dr. Marcia Derby-Davis at [REDACTED] during and after normal work hours.

Research Participants Rights

For questions/concerns regarding your research rights, please contact:

Institutional Review Board

Nova Southeastern University

[REDACTED]

IRB@nova.edu

You may also visit the NSU IRB website at www.nova.edu/irb/information-for-research-participants for further information regarding your rights as a research participant.

All space below was intentionally left blank

Research Consent & Authorization Signature Section

Voluntary Participation - You are not required to participate in this project. In the event you do participate, you may leave this quality project at any time. If you leave this quality project before it is completed, there will be no penalty to you, and you will not lose any benefits to which you are entitled.

If you agree to participate in this quality project, sign this section. You will be given a signed copy of this form to keep. You do not waive any of your legal rights by signing this form.

SIGN THIS FORM ONLY IF THE STATEMENTS LISTED BELOW ARE TRUE:

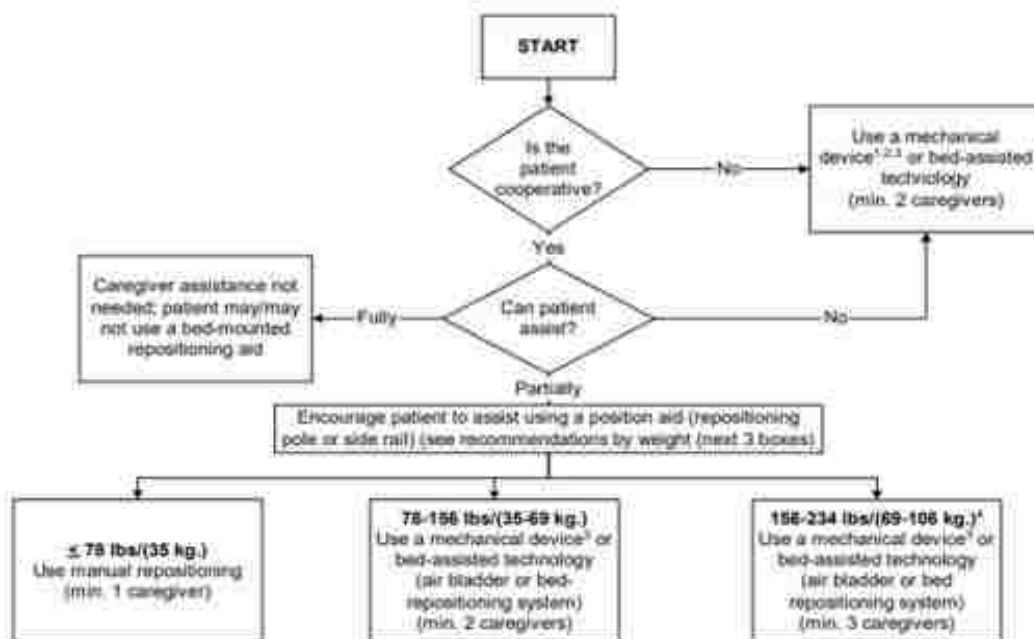
- You have read the above information.
- Your questions have been answered to your satisfaction about the research.

<u>Adult Signature Section</u>		
I have voluntarily decided to take part in this quality project.		
_____	_____	_____
Printed Name of Participant	Signature of Participant	Date

All space below was intentionally left blank

Appendix D

Orthopaedic Algorithm #1: Turning Patient in Bed (Side-to-Side) Patient with Orthopaedic Impairments

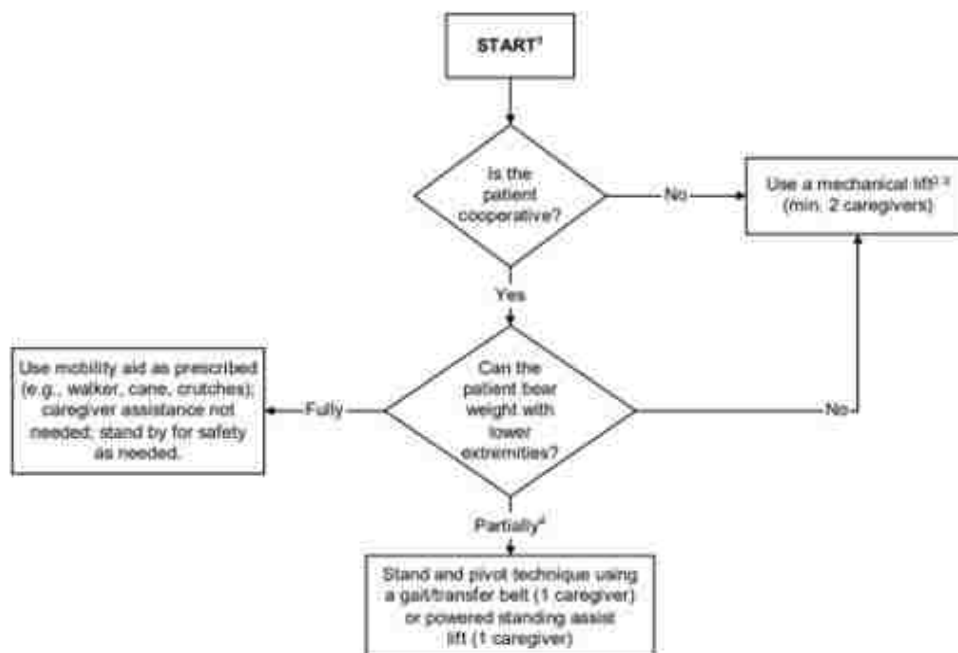
**FOOTNOTES:**

1. Maintain orthopaedic precautions as prescribed while performing this activity such as total hip, knee, shoulder, or spine precautions.
2. Select sling to meet and maintain the patient's pre-op or post-op positioning guidelines/precautions for the affected limb/body part(s). For more information on sling section, see Appendix A.
3. Examples of repositioning mechanical devices are: **Turning clips:** these simple clips attach to a bed sheet and can be used with a floor-based lift or ceiling-based lift to facilitate turning a patient. **Turning straps/slings:** one end of these straps or slings is connected to the bed and the other end is attached to either a ceiling or floor based lift to facilitate turning the patient. **Powered mechanical devices:** a ceiling lift is a powered overhead lift that can be used with a repositioning sling to turn a patient in bed. **Friction reducing devices:** either tubular in design, or two separate pieces of material are placed under the patient to assist in turning the patient in bed or moving the patient to the head of the bed. **Pulley systems:** these devices work by use of a pulley system and an overhead frame. The user turns a crank, which engages the pulley system to retract straps that are connected to a rod and bed sheet, thus turning the patient on the side.
4. If the patient weighs more than 234 lbs., mechanical assistive devices should be used to assist. Use your best clinical judgment for the number of caregivers required to assist.

GENERAL NOTES:

- For any patient who has, or is at risk for a pressure ulcer, care should be taken to avoid shearing force (such as using a friction reducing device for repositioning in bed). Shearing force is when there are two forces moving in opposite directions adjacent to each other (like scissors).
- The height of the bed should be appropriate for staff safety (at elbow height).
- During any patient handling task, if the caregiver is required to lift more than 35 lbs. (16 kg.) of a patient's weight, then the patient should be considered fully dependent and an assistive device should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? *American Journal of Nursing*, 107(6), 53-59).

**Orthopaedic Algorithm #2: Vertical Transfer of a
Post-Operative Total Hip Replacement Patient
(Bed to Chair, Chair to Toilet, Chair to Chair, or Car to Chair)**

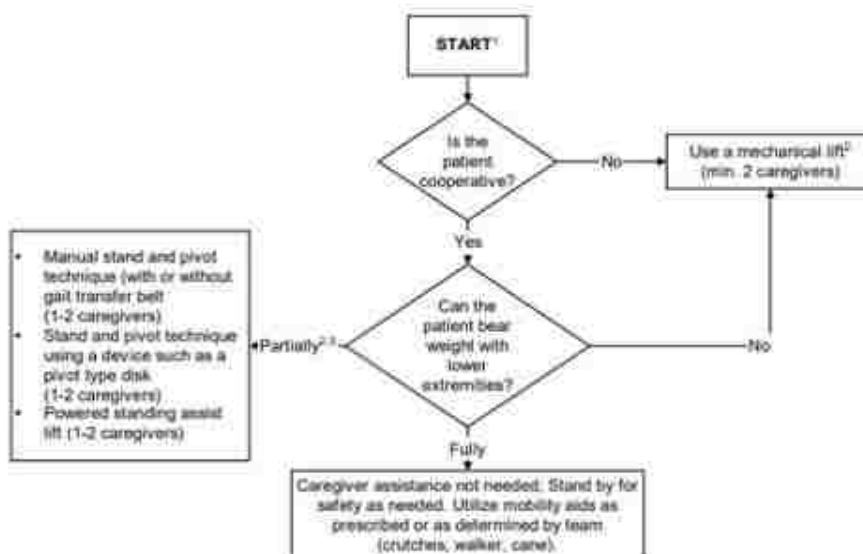
**FOOTNOTES:**

1. See 1A, 1B, 1C, 1D below for techniques to position patient at side of bed.
 - 1A. Moving from supine head of bed elevated to sitting at edge of bed requires. Patient's ability to shift their seated weight in a sitting position. Typically accomplished by counterbalancing one buttock and moving it toward the edge of the bed; repeating this in alternating fashion until patient is sitting at edge of bed.
 - 1B. With an injured upper or lower extremity, caregiver might need to support the limb while patient attempts #1A.
 - 1C. If patient is unable to accomplish #1A with #1B and the amount of assistance from caregiver will exceed 35 lbs., then a mechanical lift device should be used to achieve sitting position at the edge of the bed.
 - 1D. Anti-slip sheets and seated discs might be useful when the amount of caregiver assistance is close to recommended limits; be aware of skin shearing risks. Shearing forces are caused when there are two forces moving in opposite directions adjacent to each other (like scissors).
2. Maintain orthopaedic precautions as prescribed while performing this activity such as total hip, knee, shoulder, or spine precautions.
3. Select sling to meet and maintain the patient's pre- or post-op positioning guidelines/precautions for the affected in-situ body part(s). For more information on sling section, see Appendix A.
4. This will include situations where the patient may be allowed: a) Limited weight bearing on one lower extremity and full weight bearing on the other extremity; b) Partial weight bearing through both lower extremities.

GENERAL NOTES:

- If patient has partial weight bearing capacity, transfer toward stronger side.
- For car transfers: a) If patient cannot tolerate a seated position when doing a car transfer use a stretcher transfer or alternative transportation may be required; b) All car transports should comply with state laws for both children and adults; c) Don't forget to use all of the features of the car (ie., adjustability of the seat) during the transfer.
- The height of the bed should be appropriate for staff safety (at elbow height).
- During any patient handling task, if the caregiver is required to lift more than 35 lbs. (16 kg.) of a patient's weight, then the patient should be considered fully dependent and an assistive device should be used. (Waters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107(8), 53-61).

Orthopaedic Algorithm #3: Vertical Transfer of a Patient with an Extremity Cast/Splint



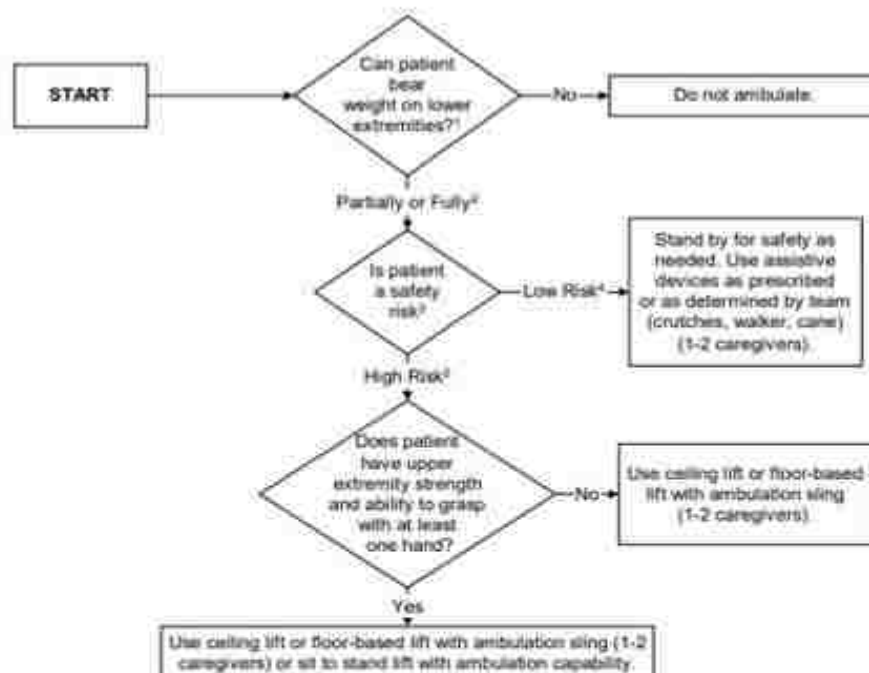
FOOTNOTES:

1. Moving from supine head of bed elevated to sitting at edge of bed requires a patient's ability to shift their seated weight in a sitting position.
 - a. When assistance is not required, this is typically accomplished by unweighting one buttock and moving it toward the edge of the bed, repeating this in alternating fashion, until patient is sitting at the edge of the bed.
 - b. With an impaired upper or lower extremity.
 - if the amount of assistance from caregiver does not exceed 35 lbs., caregiver may provide limb support while patient moves unassisted to side of bed (see a. above)
 - if the amount of assistance from caregiver may exceed 35 lbs., then a limb support strap/sling with a mechanical lift will provide limb support while patient moves unassisted to side of bed (see 1a. above)
 - c. if patient is unable to accomplish a. and/or b. then utilize one of the following options:
 - mechanical lift device with a seated sling to lift patient to side of bed.
 - friction-reducing device to assist staff in pulling patient to side of bed.
 - d. Friction-reducing devices and seated discs may be useful when the amount of caregiver assistance is close to recommended limits, but be aware of skin shearing risks. Shearing is caused when there are two forces moving in opposite directions adjacent to each other (like scissors).
2. Select sling to meet and maintain the patient's pre-op or post-op positioning guideline/precautions for the affected limb/body part(s). For more information on sling selection, see Appendix A.
3. Patient can bear weight on one leg only (e.g., weight bearing on unaffected limb or limited weight bearing on affected limb).

GENERAL NOTES:

- Need to test the fit of the sling with an immobilized extremity.
- Maintain affected extremity immobilization/alignment.
- Use lift device with limb sling if applicable.
- During any patient handling task, if the caregiver is required to lift more than 35 lbs. (16 Kg.) of a patient's weight, then the patient should be considered fully dependent and an assistive device should be used. (Waters, T. (2007). When is it safe to manually lift a patient? *American Journal of Nursing*, 107(6), 53-59).

Orthopaedic Algorithm #4: Ambulation



FOOTNOTES:

1. Non-weight bearing: Patient is unable to bear weight through both lower extremities or weight bearing through both lower extremities is contraindicated.
2. Partial weight bearing: This will include situations where the patient may be allowed: a) Limited weight bearing on one lower extremity and full weight bearing on the other extremity; b) Partial weight bearing through both lower extremities.
3. Safety risks may include: decreased cognition, decreased ability to cooperate/ compliance, medical instability.
4. Factors that contribute to low safety risk: a) Lack of comorbidities; b) Ability to follow commands; c) Medical stability; d) Experience with the assistive device.
5. Factors that contribute to high safety risk: a) Comorbidities; b) Lack of ability to follow commands; c) Medical instability; d) Lack of experience with the assistive device; e) neurological deficits.

GENERAL COMMENTS/DISCUSSION:

- In healthcare, weight bearing is often used to describe the amount of weight bearing that the patient can or has done. In orthopedics, weight bearing status is prescribed by the physician based on the patient's ability to safely bear weight through the musculoskeletal system. Exceeding the prescribed weight bearing status may be detrimental to the patient.
- Patients should be assessed for safety risks as described above. If patients are determined to be at significant risk for falls, then caregivers assisting with ambulation are also at risk for assisting patients to prevent fall. In high risk situations precautions should be taken, and devices such as walking slings should be used. At some point in care, the team will need to weigh the risks of falls with the benefits of ambulation and use a "therapeutic" risk in order to functionally advance the patient.
- Need to test the fit of the sling with an immobilized leg. For more information on sling selection, see Appendix A.
- Nonpain affected extremity immobilization/alignment.
- During any patient handling task, if the caregiver is required to lift more than 30 lbs (10 kg) of a patient's weight, then the patient should be considered fully dependent and an assistive device should be used. (Walters, T. [2007]. When is it safe to manually lift a patient? American Journal of Nursing, 107(8), 53-59).

Appendix E

Theory of Planned Behavior Questionnaire

Questionnaire

Instructions: Please complete this evaluation. Many questions in this evaluation make use of rating scales with 5 places; you are to circle the number that best describes your opinion.

1. I intend to perform patient transfer utilizing the SPHM algorithm in the next 14 days.

Extremely unlikely: 1 : 2 : 3 : 4 : 5 : Extremely likely

2. I will try to document fall assessment every shift for the next 14 days.

Definitely True: 1 : 2 : 3 : 4 : 5 : Definitely False

3. I plan to perform assessment of the orthopedic surgical patient using the SPHM in the next 14 days.

Strongly Agree: 1 : 2 : 3 : 4 : 5 : strongly Disagree

4. If I wanted to, I could safely transfer each patient using the algorithm in the next 14 days.

Definitely True: 1 : 2 : 3 : 4 : 5 : Definitely False

5. For me to utilize the SPHM algorithm within the next 30 days would be...

Impossible: 1 : 2 : 3 : 4 : 5 : Possible

6. For me to utilize SPHM with every patient transfer over the next 14 days would be...

Important: 1 : 2 : 3 : 4 : 5 : Unimportant

Good : 1 : 2 : 3 : 4 : 5 : Bad

Enjoyable: 1 : 2 : 3 : 4 : 5 : Unenjoyable

Pleasant: 1 : 2 : 3 : 4 : 5 : unpleasant

Useful: 1 : 2 : 3 : 4 : 5 : Useless

Worthless 1 : 2 : 3 : 4 : 5 : valuable

Harmful 1 : 2 : 3 : 4 : 5 : Beneficial

7. For me to document a fall risk assessment on every patient every shift over the next 14 days would be....

Important: 1 2 3 4 5 Unimportant
 Good: 1 2 3 4 5 Bad
 Enjoyable: 1 2 3 4 5 Unenjoyable
 Pleasant: 1 2 3 4 5 unpleasant
 Useful: 1 2 3 4 5 Useless
 Worthless: 1 2 3 4 5 valuable
 Harmful: 1 2 3 4 5 Beneficial

8. Most people who I work with think that I should perform a falls risk assessment each shift during the next 14 days.

Strongly Agree: 1 2 3 4 5 Strongly Disagree

9. My educator believes that I should know what SPHM algorithm are and how to use them.

Strongly Agree: 1 2 3 4 5 Strongly Disagree

10. When it comes to safe patient handling and mobility, how much do you want to perform the algorithm with each patient transfer?

Not at all 1 2 3 4 5 very much

11. I expect my patient assignment will place high demands on my time in the next 14 days.

Strongly Disagree: 1 2 3 4 5 Strongly Agree

12. The orthopedic unit places high demands on my time in the next 14 days that would make it much more difficult 1 2 3 4 5 much easier to perform Safe Patient Handling with each patient.

13. The orthopedic unit places high demands on my time in the next 14 days that would make it much more difficult 1 2 3 4 5 much easier to perform a falls risk assessment each shift for each patient.

14. My understanding of what the Safe Patient Handling and Mobility algorithm is...

Good: 1 2 3 4 5 Poor

15. My understanding of the policy of the orthopedic unit to document a fall risk assessment on each patient each shift is...

Good: 1 2 3 4 5 Poor

Appendix F

Permission to Use Questionnaire

Aizen [REDACTED]
4/24/18, 2:15am

Dear Ms. Doire,

The theory of planned behavior is in the public domain. No permission is needed to use the theory in research, to construct a TPB questionnaire, or to include an ORIGINAL drawing of the model in a thesis, dissertation, presentation, poster, article, or book. If you would like to reproduce a published drawing of the model, you need to get permission from the publisher who holds the copyright. You may use the drawings on my website

[REDACTED] for non-commercial purposes, including publication in a journal article, so long as you retain the copyright notice.

Regarding your specific request, note that there is no standard TPB questionnaire. In most published research papers, you can find detailed information about the questionnaire used by the investigator. A sample questionnaire is available online

[REDACTED]. However, the items employed in previous research and the items shown in the sample questionnaire may not be appropriate for your behavior, population, or time period. Formative research is therefore required to construct a new questionnaire suitable for the behavior and population of interest. If beliefs are to be assessed, they must be elicited anew from a representative sample of the research population. Similarly, items designed to directly assess the theory's constructs must be validated prior to construction of the final questionnaire. (See h [REDACTED]df).

Best regards,

Icek Ajzen
Professor Emeritus

[REDACTED]
[REDACTED]
